Technical Report Overview

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Report: Interpretive Report: 2015 Chronic Toxicity Program

Overview: This report presents the results of chronic toxicity studies undertaken in 2015 for Teck's steelmaking coal mining operations in the Elk Valley. The report interprets results by evaluating correspondence between water chemistry and toxicological responses and identifies recommendations for revision or augmentation of planned future programs.

This report was prepared for Teck by Golder Associates Ltd.

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Future studies will be made available at **teck.com/elkvalley**

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INTERPRETIVE REPORT

2015 Chronic Toxicity Testing Program

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Teck Coal Limited

REPORT

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Golder Associates

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ABBREVIATIONS

%	Percent
<	Less than
>	Greater than
±	Plus or minus
≥	Greater than or equal than
°C	Degrees Celsius
µg/L	Micrograms per litre
AB	Alberta
ALS	ALS Environmental
ANCOVA	Analysis of covariance
ASTM	American Society for Testing and Materials
BC	British Columbia
BC MOE	British Columbia Ministry of Environment
BC WQG	British Columbia Water Quality Guideline
$CaCO_3$	Calcium carbonate
CETIS™	Comprehensive Environmental Toxicity Information System
dw	Dry weight
e.g.	For example
Golder	Golder Associates Ltd.
i.e.	That is
IC	Inhibiting Concentration
mg	Milligrams
mg/kg	Milligrams per kilograms
mg/L	Milligrams per litre
mg/L as N	Milligrams per litre as nitrogen
mL	Millilitres
mm	Millimetres
NTU	Nephelometric Turbidity Units
Q1	Quarter 1
Q2	Quarter 2
Q3	Quarter 3
Q4	Quarter 4
QA/QC	Quality assurance/quality control

RAEMP	Regional Aquatic Effects Monitoring Program
SD	Standard deviation
SPO	Site performance objective
TDS	Total dissolved solids
Teck	Teck Coal Limited
US EPA	United States Environmental Protection Agency
USA	United States of America
vol/vol	Volume per volume
WA	Washington
WCT	Westslope cutthroat trout
WQ	Water Quality

1.0 INTRODUCTION

Golder Associates Ltd. (Golder) is pleased to provide Teck Coal Limited (Teck) with the following interpretive report on chronic toxicity studies undertaken in 2015 for Teck's coal mining operations in the Elk Valley.

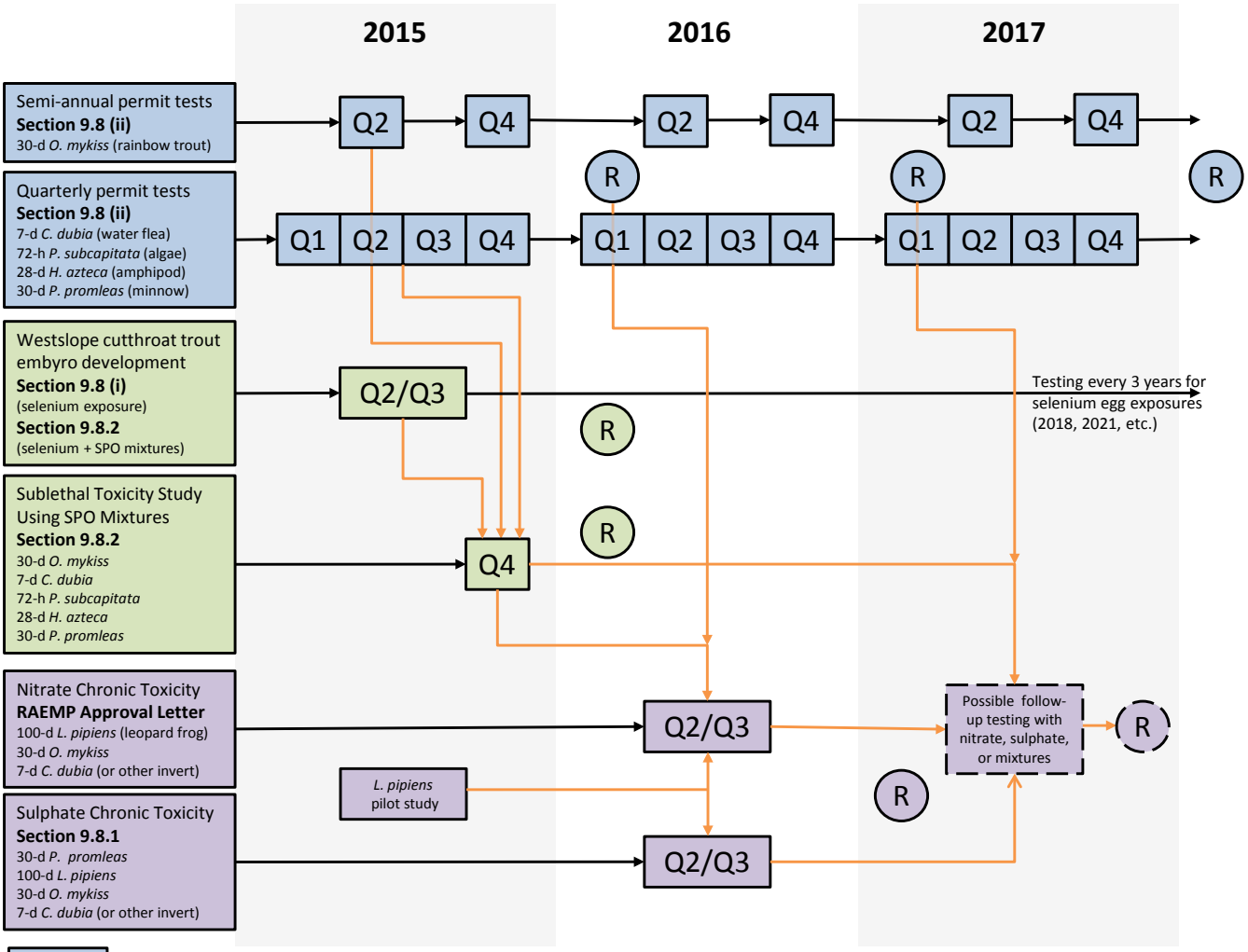
1.1 Context and Background

Requirements for chronic toxicity testing associated with Teck's coal mining operations in the Elk Valley are specified in Section 9.8 of Permit #107517 issued under the *Environmental Management Act* (the Permit) and a November 14, 2014 letter from the British Columbia Ministry of Environment (BC MOE) approving the study design for the Regional Aquatic Effects Monitoring Program (the RAEMP approval letter). Chronic toxicity requirements specified in these documents are summarized in Appendix A.

The chronic toxicity testing program has been organized into three subprograms, reflecting the underlying objectives of Permit and RAEMP approval letter requirements:

- **Quarterly and Semi-Annual Testing**. This subprogram, depicted in blue in Figure 1-1, includes ongoing Permit requirements for periodic testing of water samples at compliance points in the Elk Valley. Relative to other subprograms, these tests are the most prescriptive in terms of protocols, frequency, and sampling locations. This subprogram addresses Permit requirements in Section 9.8(ii).
- **Westslope Cutthroat Trout Gamete Study and Sublethal Toxicity Study Using Site Performance Objectives Mixtures**. This subprogram, depicted in green in Figure 1-1, includes chronic toxicity tests required to satisfy Permit requirements specified in sections 9.8(i) and 9.8.2. Most of these tests entail testing of site waters amended to concentrations of nitrate, sulphate, selenium, and cadmium equal to long-term site performance objectives (SPOs) specified in the Permit. Section 9.8(i) testing of westslope cutthroat trout (WCT) gametes has been included in this subprogram because the WCT gamete test is being conducted both in laboratory water (i.e., testing effects of maternally derived selenium) and with SPO mixture exposures (i.e., testing interactions between maternally derived selenium and waterborne constituents at SPO concentrations).
- **Nitrate and Sulphate Toxicity Studies**. This subprogram, depicted in purple in Figure 1-1, addresses requirements for additional chronic testing of nitrate and sulphate. Requirements for additional nitrate testing are specified in the RAEMP approval letter and requirements for additional sulphate testing are specified in Permit Section 9.8.1. Both requirements are intended to address residual uncertainty for these substances at high hardness levels. As shown on Figure 1-1, the 2015 testing for this subprogram was an amphibian pilot study. The 2015 pilot study was initiated to inform proper design and implementation of a 2016 amphibian test design by developing methods for culturing leopard frogs in the laboratory and conducting preliminary range-finding tests.

Figure 1-1: Overview of Elk Valley Chronic Toxicity Testing Program



Semi-annual and quarterly chronic testing program (Permit 107517)

WCT egg selenium exposures and SPO mixtures chronic testing program (Permit 107517)

Nitrate and Sulphate chronic testing program (RAEMP approval letter, Permit 107517)

R — Reporting period for chronic testing component(s). For example, the three reports scheduled for Q1 of 2016 would summarize the collective information from Q1-Q4 of 2015.

Program continuation per Permit 107517 requirements

Information flow among chronic testing components. Information obtained from earlier studies will be used to inform design details for other components (e.g., choice of sensitive species, replication, stations).

1.2 Objectives

The purpose of this interpretive report is to assemble results from 2015 chronic testing, interpret test results by evaluating correspondence between water chemistry and toxicological responses, and identify recommendations for revision or augmentation of planned future programs.

1.3 Report Organization

The remaining sections of this report present the methods, results, and interpretation of each testing program as follows:

- Section 2 – Quarterly and Semi-Annual Testing.
- Section 3 – SPO Mixture Testing.
- Section 4 – WCT Gamete Study.
- Section 5 – Amphibian Pilot Study.

2.0 QUARTERLY AND SEMI-ANNUAL TESTING

2.1 Overview

The quarterly and annual toxicity testing program addresses Permit requirements in Section 9.8(ii). This section provides an overview of the 2015 program, including methods (Section 2.2), results (Section 2.3), summary of findings (Section 2.4), uncertainty (Section 2.5), and recommendations (Section 2.6).

2.2 Methods

2.2.1 Field

Teck personnel collected water samples from reference locations upstream of mining and test sites downstream of mining, as shown in Table 1. Water samples were submitted to Nautilus Environmental (Nautilus; Burnaby, BC and Calgary, AB) for toxicity testing (Section 2.2.2) and to ALS Environmental (ALS; Burnaby, BC) for chemical analysis. Weekly refresh samples were collected for toxicity tests longer than 7 days. Water collection dates and maps of reference and test sites are provided in Appendix B.

Table 1: Reference Locations and Tests Sites used in the Quarterly and Semi-Annual Toxicity Testing

Watercourse	Reference or Test Site	Teck WQ Station ID[(a)]	EMS Location ID
Fording River	Reference	FR_UFR1	E216777
	Test Site	FR_FRCP1	E300071
		GH_FR1	200378
Elk River	Reference	GH_ER2	200389
	Test Site	GH_ERC	E300090
Michel Creek	Test Site	CM_MC2	E258937
		EV_MC2	E300091
Harmer Creek		EV_HC1	E102682
Line Creek		LC_LCDSSLCC	E297110

[(a)] Stations are listed from upstream to downstream for each watercourse.

2.2.2 Laboratory

Test organisms and procedures used in the quarterly and semi-annual testing program followed requirements outlined in Permit Section 9.8(ii). An overview of this program is provided in Table 2. Laboratory reports for each round of quarterly and semi-annual testing are provided in Appendix B, including detailed methodology, raw data, laboratory notes, quality assurance overview, and statistical significance tests, per protocol requirements.

Quarterly (*Ceriodaphnia dubia* and *Pseudokirchneriella subcaptiata*) and semi-annual *(Oncorhynchus mykiss)* chronic toxicity tests were conducted using water collected from all locations listed in Table 1, except for the Elk River reference site (GH_ER2) which was only tested in Q2 and Q4, per Permit requirements. Quarterly toxicity tests with *Hyalella azteca* and *Pimephales promelas* were conducted using water collected from the Fording River reference (FR_UFR1) and three test sites (CM_MC2, FR_FRCP1, GH_FR1). Laboratory control water tests were also conducted for each species and test date, as specified in Appendix B.

Table 2: Summary of Quarterly and Semi-Annual Toxicity Testing

Test Species	Test Duration [days]	Endpoint(s)	Test Protocol	Frequency of Testing
Ceriodaphnia dubia	7	Survival and reproduction	Environment Canada (2007a)	Quarterly
Pseudokirchneriella subcapitata	3	Cell yield (growth inhibition)	Environment Canada (2007b)	Quarterly
Oncorhynchus mykiss	30	Survival, viability (which assesses incidence of deformities), length, weight, behaviour[(a)]	Environment Canada (1998)	Semi-annual
Hyalella azteca	28	Survival and growth	Modified from US EPA (2000), as described in Norberg-King et al. (2014)	Quarterly
Pimephales promelas	28	Survival, hatch, length, biomass, normal development	US EPA (1996) and ASTM (2013)	Quarterly

(a) Permit 107517 also includes hatching as an endpoint. A hatch rate was not calculated in these tests; however, the survival endpoint provides an appropriate measure of successful hatch, since the test is terminated shortly following hatch (Appendix B).

2.2.3 Data Analysis

Quality Assurance

Laboratory reports for each round of quarterly and semi-annual testing include a quality assurance section (Appendix B). Quality assurance information was reviewed and summarized to establish that organism performance in the laboratory control water met the acceptability criteria for the protocol, as it pertains to the health histories and sensitivity of the organisms.

Evaluation of Control and Reference Performance

Test organism responses in laboratory control water, Elk River reference water, and Fording River reference water were plotted. Responses in Fording and Elk River reference waters were pooled to calculate the mean and variability in responses (± 2 standard deviations) in 2015 reference water tests. This information was used as context for interpreting results at test sites. Plots were used to evaluate seasonal trends in test organism performance in control and reference waters, and to compare performance in laboratory control and reference waters.

Evaluation of Test Results

The results of each test were evaluated relative to the Fording River reference (Q1 to Q4) and Elk River reference (Q2 and Q4) to assess whether significant adverse responses could be detected. Each quarterly laboratory report includes statistical analyses using CETIS™ (Comprehensive Environmental Toxicity Information System; Tidepool Scientific Software 2013) to identify test sites with mean results significantly ($p < 0.05$) lower than the mean response in associated Fording or Elk River reference waters.[1]

[1] Q2 and Q4 *C. dubia* and *P. subcapitata* tests in LC_LCDSSLCC water were reported under a separate program, and CETIS significance tests were not conducted. For these tests, responses were compared to reference waters using *t*-tests (if assumptions of normality and equality of variances were met) or Mann-Whitney U tests with Conover Inman post-hoc multiple comparisons (if assumptions were not met).

If a statistical difference was identified between a test site and either reference for a given endpoint, then all replicate results for that endpoint in all tests were plotted. Endpoints that showed no statistically significant difference from either reference in any test were not plotted. The pooled mean and variability in reference responses (± 2 standard deviations) was shown on these plots to illustrate the normal range of test organism responses observed in Fording River and Elk River reference waters tested in 2015.

Test results were interpreted as follows:

- Tests with mean results not significantly lower than reference were not considered to reflect an adverse response.
- Tests with mean results significantly lower than reference but individual replicate results within the normal variability of test performance in reference waters (i.e., within 2 standard deviations of the pooled reference mean) were considered to represent a possible adverse response, with elevated uncertainty. There is uncertainty as to whether the result represents an adverse response to the test water or simply normal variability in test organism performance. For example, statistically significant effects in some cases appeared to be the result of unusually low variability (assessed qualitatively, relative to variability observed in other quarterly tests) in the paired reference water test, leading to a small difference in test organism performance being identified as statistically significant.
- Tests with mean results significantly lower than reference and individual replicate results outside the normal variability of test performance in reference waters (i.e., more than 2 standard deviations lower than the pooled reference mean) were considered to represent a likely adverse response to the test water.

Concentration-Response Analysis

A concentration-response analysis was conducted to examine potential causes of adverse responses observed in quarterly and semi-annual tests. This analysis was conducted for all endpoints identified in the laboratory reports as being significantly reduced relative to the Fording or Elk River reference waters (i.e., including both possible and likely adverse responses, as described above). Although correlation does not necessarily indicate causation, the analysis of correspondence between test results and water quality may provide insight into potential causes. This analysis included all quarterly and semi-annual test results for reference locations and test sites.

Effects data were paired with matching water chemistry data for this analysis. *Ceriodaphnia dubia* and *P. subcapitata* tests, conducted using water collected on a single day, were paired with water chemistry collected on that day. For other test species, effects data were paired with the mean concentration of the weekly samples collected over the duration of the test that were submitted for chemical analysis. If a concentration was below the reported detection limit, the full detection limit was used.

The examination of potential causes of responses in the quarterly and semi-annual tests followed three steps:

- Spearman rank order correlation;
- screening against water quality guidelines and site-specific or published toxicity data; and
- graphical concentration-response analysis.

Spearman rank order correlations were conducted using paired response and water chemistry data from all reference and test sites. Total concentrations were used for metals with a chronic British Columbia Water Quality Guideline (BC WQG) for the total fraction (e.g., copper) or with no chronic BC WQG (e.g., lithium). Dissolved concentrations were used for metals with a chronic BC WQG for the dissolved fraction (e.g., cadmium). Parameters with significant correlations ($\alpha = 0.05$) were carried forward to the second step.

For parameters with significant correlations, concentrations in tests with a statistically significant response (relative to either reference water) were screened against chronic BC WQGs. Parameters with concentrations lower than the chronic BC WQG were not carried forward. If the concentration was greater than a chronic BC WQG or if the parameter did not have a chronic BC WQG, then the parameter was carried forward to the third step.

Graphical analysis was conducted for cadmium, selenium, nitrate, sulphate, and all parameters that had statistically significant correlations and that either were greater than a chronic BC WQG or did not have a chronic BC WQG (i.e., met the first two conditions). For parameters without a chronic BC WQG, but that are commonly assessed as a component of total dissolved solids (TDS) (e.g., calcium), responses were plotted against the concentration of TDS. Concentration-response plots were visually examined to assess the consistency of correspondence between parameter concentrations and test responses. Tests with statistically significant responses were plotted using distinct symbols. Water chemistry associated with each statistically significant response was also inspected to identify parameters that may have contributed to the observed response in that test. If the concentration of a parameter in a test with a statistically significant response was lower than concentrations measured in tests that did not have statistically significant results, then that parameter was considered unlikely to be causing toxicity.

2.3 Results

2.3.1 Quality Assurance/Quality Control

Detailed laboratory quality assurance/quality control (QA/QC) information is provided in the Nautilus reports (Appendix B). The following bullets summarize QA/QC information for all quarterly and semi-annual tests:

- Health histories of the test organisms used in the exposures were acceptable and met requirements of the Environment Canada protocols.
- Tests met all control acceptability criteria[2].
- Water quality parameters remained within ranges specified in the protocol throughout the tests.
- There were no deviations from the test methodologies.
- Results of the reference toxicant tests fell within the acceptable range for organism performance of mean and two standard deviations, based on historical results obtained by the laboratory (i.e., sensitivity of organisms used in the tests was acceptable).

[2] In Q2, tests using *H. azteca* that were initiated with samples collected on July 21 and 22, 2015, were terminated prior to completion because the control exposures associated with these tests failed to meet performance criteria. Subsequently, these tests were restarted using the samples collected on August 5, 2015, and the results of the second test were reported. Control acceptability criteria were met in the second test.

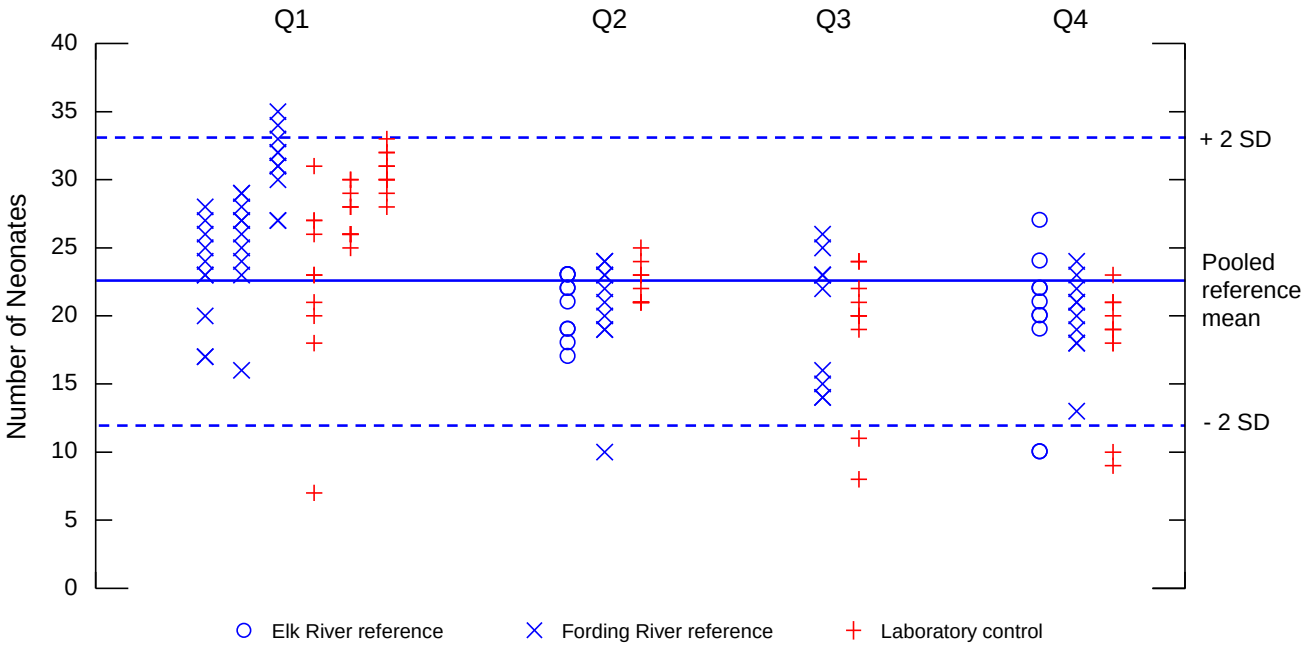
2.3.2 Evaluation of Organism Performance

This section provides an overview of organism performance in reference and laboratory control water. The mean response in reference waters tested in 2015 (± 2 standard deviations) was used as context for interpreting test results in site waters (Section 2.3.3).

Ceriodaphnia dubia

Survival was 100% in all tests conducted with reference and laboratory control water, except one laboratory control replicate in Q1 (0%) and one laboratory control replicate in Q4 (0%). Figure 2-1 shows *C. dubia* reproduction in reference and control waters for quarterly tests in 2015. Reproduction was higher in Q1 compared to other quarters, but reproduction was similar in reference and control waters in all quarters. The mean number of neonates per individual in pooled Fording and Elk River reference tests (± 2 standard deviations) was 23 ± 11.

Figure 2-1: Individual replicate results for C. dubia reproduction in Elk River reference (n =20), Fording River reference (n = 60), and laboratory control (n = 60) water.



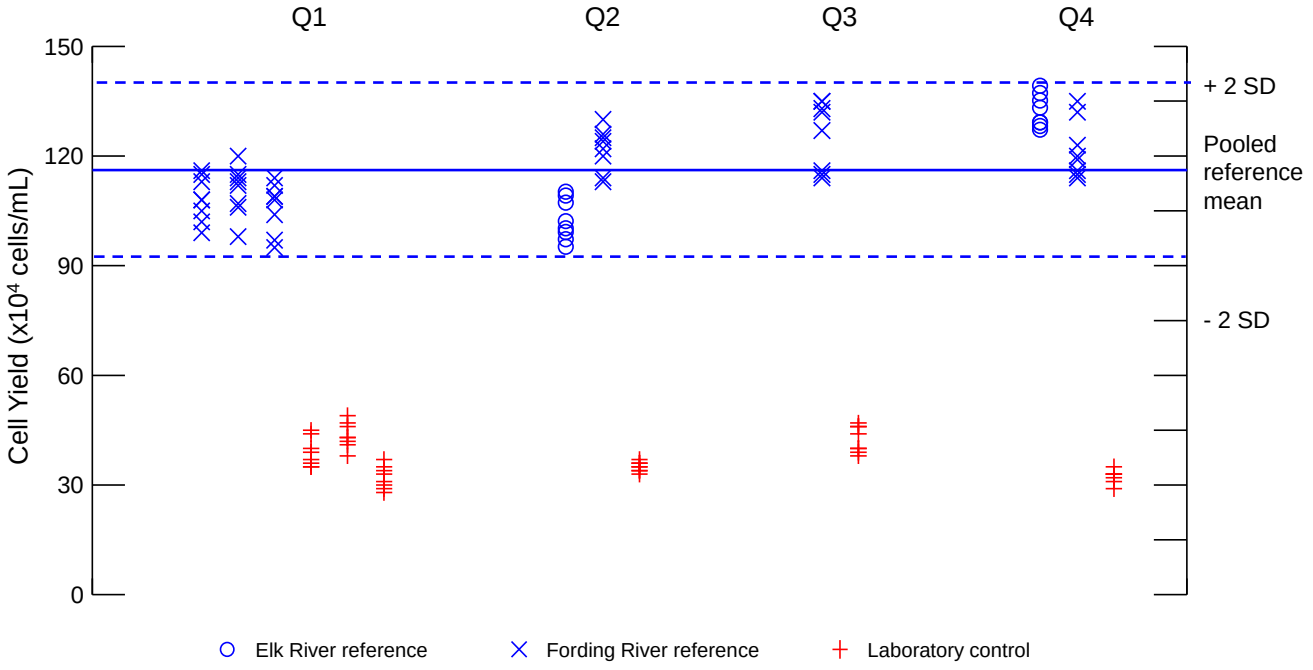
Note: Lines are mean of Elk and Fording River references (solid blue line) plus or minus two standard deviations (± 2 SD) (dashed blue lines).

Pseudokirchneriella subcapitata

Cell yield in reference and control waters tested in 2015 (Q1 to Q4) is presented on Figure 2-2. Algal cell yield was significantly higher in Elk and Fording River reference waters relative to laboratory control water. This is a common response, consistent with higher nutrient concentrations and higher ionic strength in natural waters such as the Fording and Elk rivers compared to standard laboratory control water. It should be noted that these tests are designed and employed to evaluate toxicity, not enrichment effects.

Cell yield in Fording River reference tests was significantly lower in Q1 compared to other quarters. In the Elk River reference tests, cell yield was significantly lower in Q2 compared to Q4. When Elk River and Fording River references were tested in the same quarter, cell yield significantly differed between reference waters. Comparing Fording River and Elk River reference waters, in Q2, cell yield was significantly higher in Fording River reference, and in Q4 cell yield was significantly higher in Elk River reference (Appendix B). Mean cell yield in pooled reference tests (± 2 standard deviations) was 116 ± 24 times 10^4 cells per millilitre (x10^4 cells/mL).

Figure 2-2: Individual replicate results for P. subcapitata cell yield in Elk River reference (n =16), Fording River reference (n 48), and laboratory control (n = 48) water.

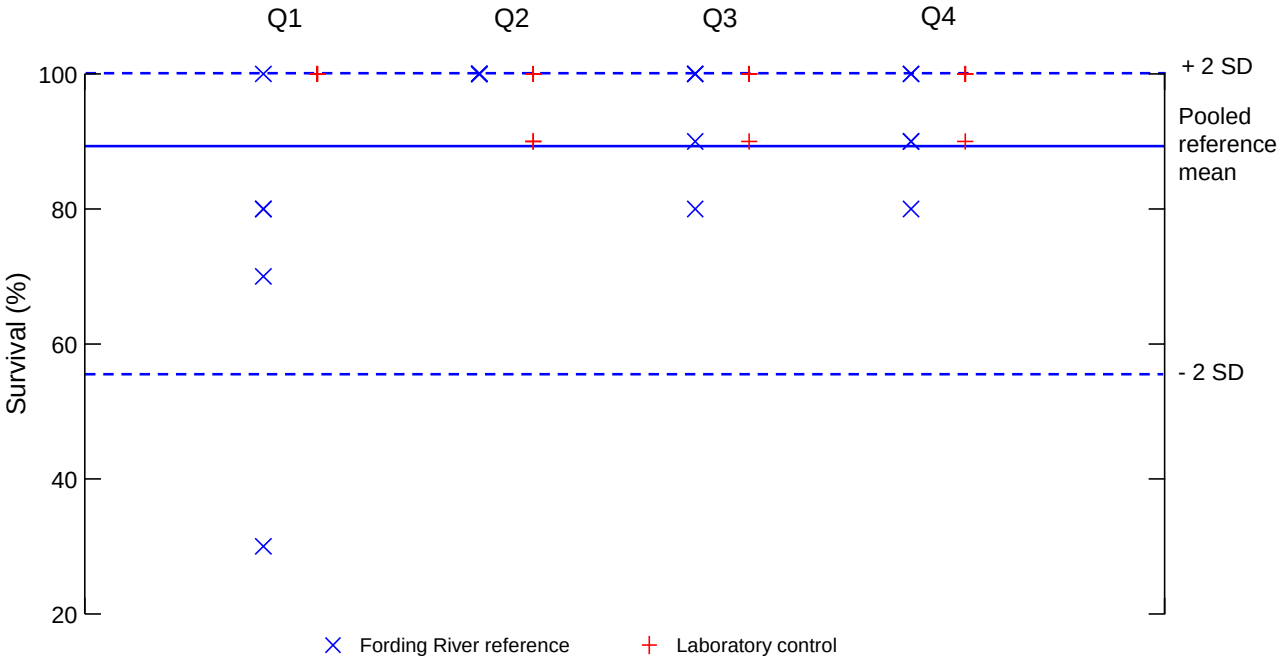


Note: Lines are mean of Elk and Fording River references (solid blue line) plus or minus two standard deviations (± 2 SD) (dashed blue lines).

Hyalella azteca

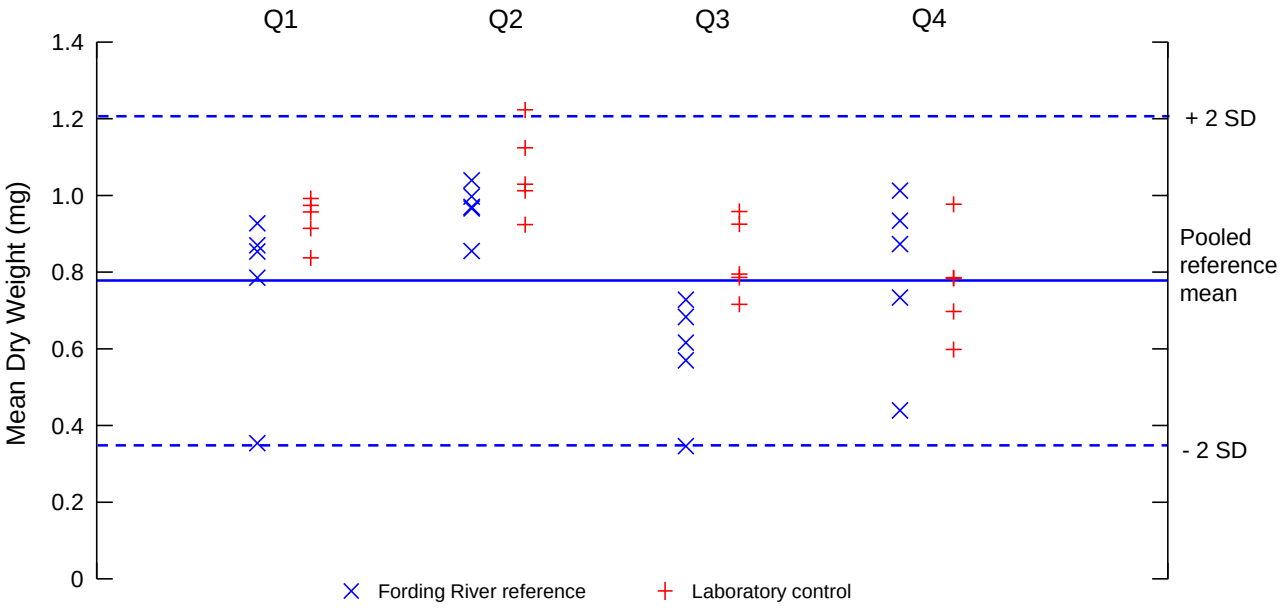
Survival was ≥ 80% in all tests conducted with Fording River reference water and laboratory control water, except for two Fording River reference replicates in Q1 that had survival of 30% and 70% (Figure 2-3). Mean survival in the Fording River reference water (± 2 standard deviations) was 89 ± 34%. Dry weight was variable across quarters in 2015, but was generally similar in Fording River reference and laboratory control waters (Figure 2-4). Mean dry weight in Fording River reference water (± 2 standard deviations) was 0.78 ± 0.4 milligrams (mg).

Figure 2-3: Individual replicate results for H. azteca survival in Fording River reference (n = 20) and laboratory control (n 20) waters tested in 2015.



Note: Lines are mean of Fording River reference (solid blue line) plus or minus two standard deviations (± 2 SD) (dashed blue lines; note maximum 100% survival).

Figure 2-4: Individual replicate results for H. azteca dry weight in Fording River reference (n = 20) and laboratory control (n = 20) waters tested in 2015.

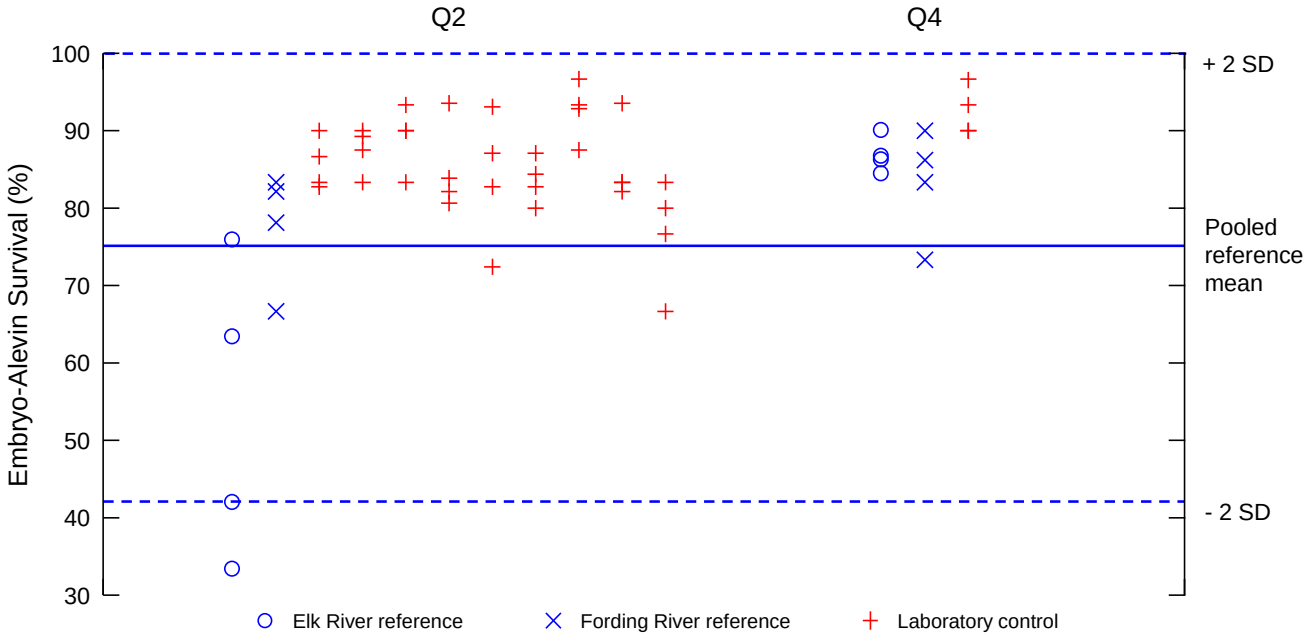


Note: Lines are mean of Fording River reference (solid blue line) plus or minus two standard deviations (± 2 SD) (dashed blue lines).

Oncorhynchus mykiss

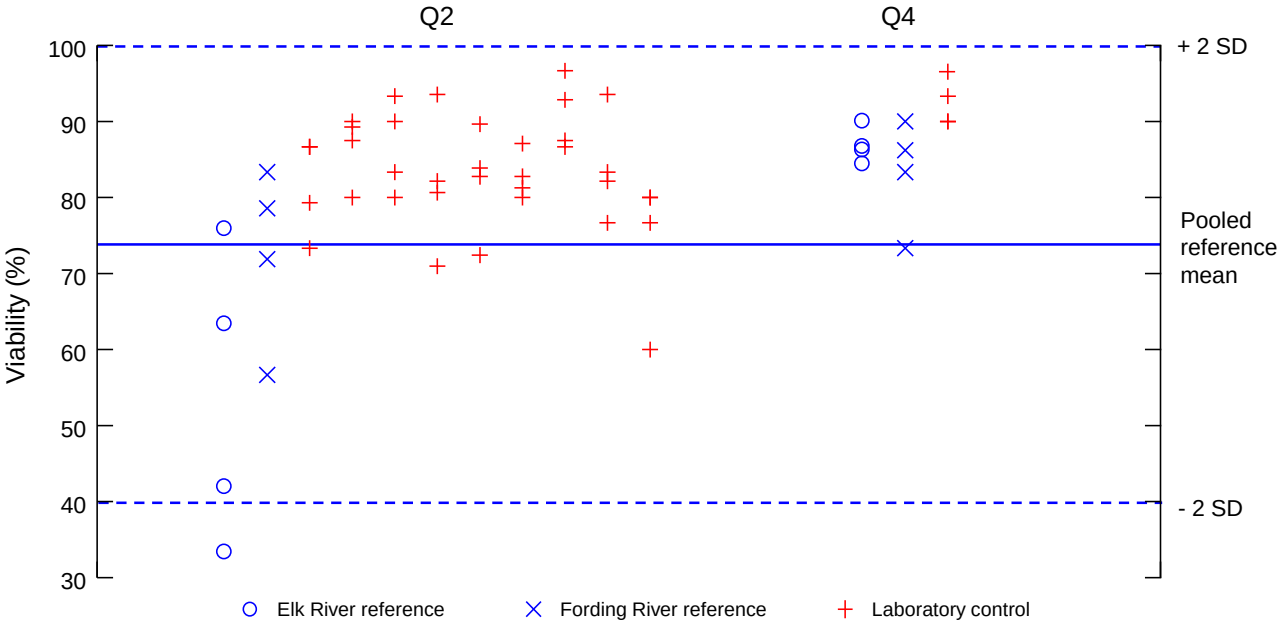
Survival, (Figure 2-5), viability (Figure 2-6), length (Figure 2-7), and wet weight (Figure 2-8) were similar in reference and control waters in Q2 and Q4, except for Q2 survival and viability in the Elk River reference, which was lower and more variable than the other tests. As shown in these figures, responses were more variable in Q2 relative to Q4. Wet weight was lower in Q4 relative to Q2 in reference and control waters; however, length was consistent in both quarters. The mean response in Elk River and Fording River references (± 2 standard deviations) was 75 ± 33% for survival, 74 ± 34% for viability, 18.5 ± 1.7 mm for length, and 87.3 ± 17 mg for wet weight.

Figure 2-5: Individual replicate results for O. mykiss survival in Fording River reference (n = 8), Elk River reference (n = 8), and laboratory control (n = 40) waters tested in 2015.



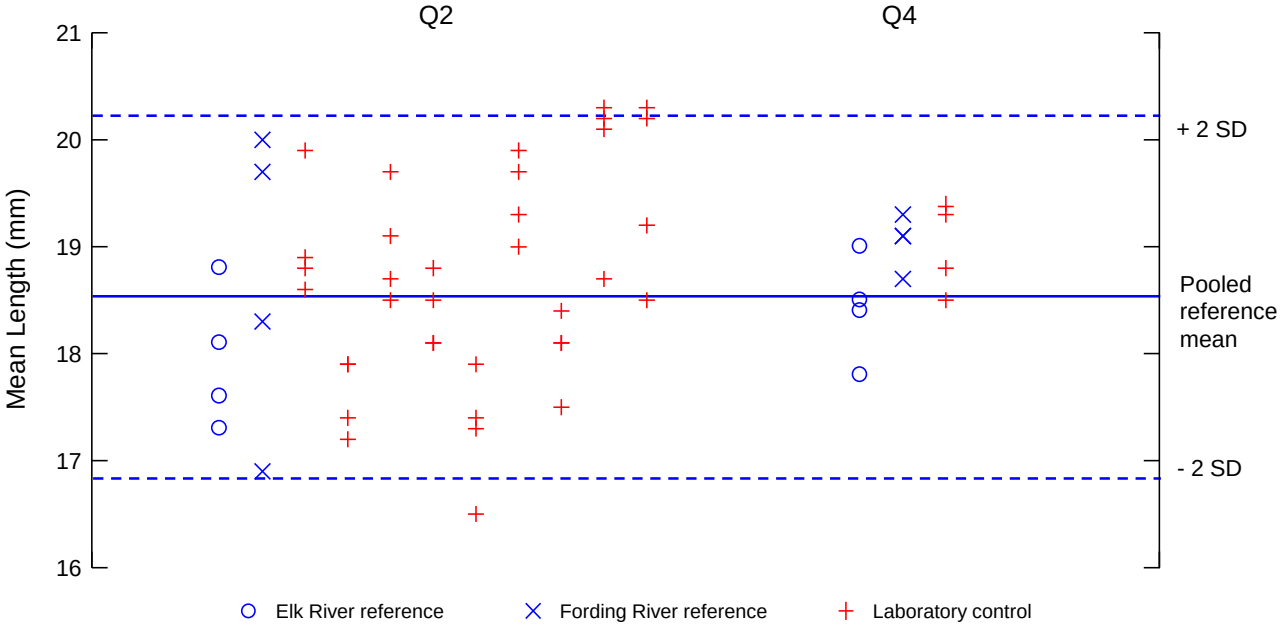
Note: Lines are mean of Elk and Fording River references (solid blue line) plus or minus two standard deviations (± 2 SD) (dashed blue lines; note maximum 100% survival).

Figure 2-6: Individual replicate results for O. mykiss viability in Fording River reference (n = 8), Elk River reference (n = 8), and laboratory control (n = 40) waters tested in 2015.



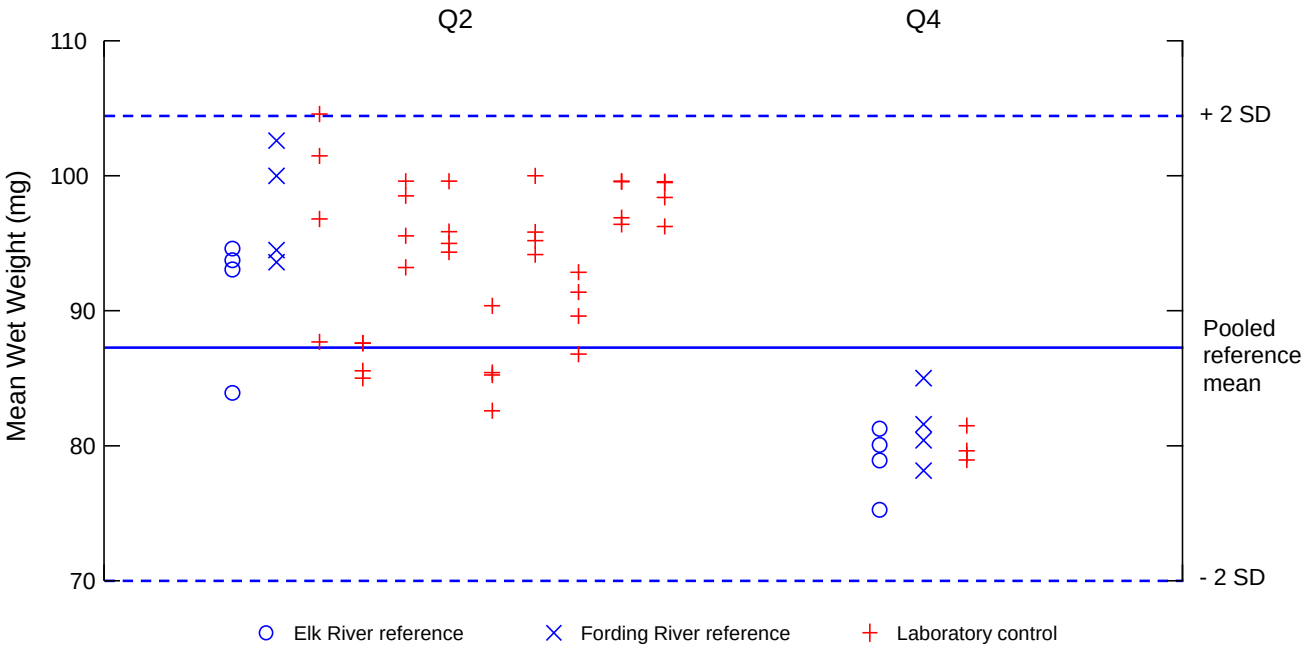
Note: Lines are mean of Elk and Fording River references (solid blue line) plus or minus two standard deviations (± 2 SD) (dashed blue lines; note maximum 100% viability).

Figure 2-7: Individual replicate results for O. mykiss length in Fording River reference (n = 8), Elk River reference (n = 8), and laboratory control (n = 40) waters tested in 2015.



Note: Lines are mean of Elk and Fording River references (solid blue line) plus or minus two standard deviations (± 2 SD) (dashed blue lines).

Figure 2-8: Individual replicate results for O. mykiss weight in Fording River reference (n = 8), Elk River reference (n = 8), and laboratory control (n = 40) waters tested in 2015.

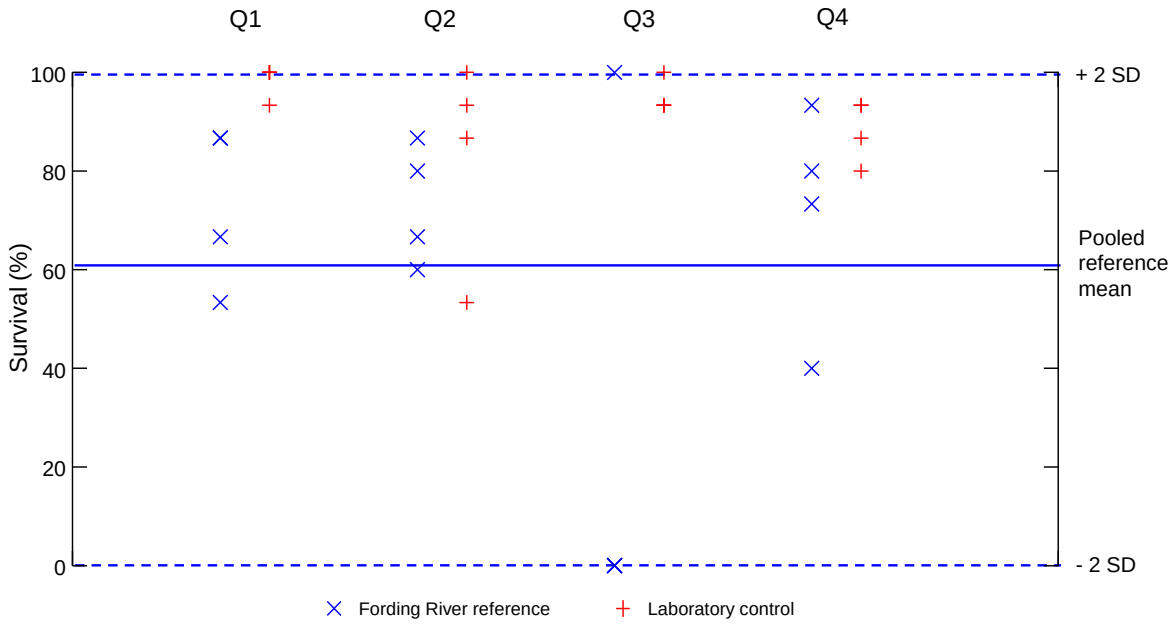


Note: Lines are mean of Elk and Fording River references (solid blue line) plus or minus two standard deviations (± 2 SD) (dashed blue lines).

Pimephales promelas

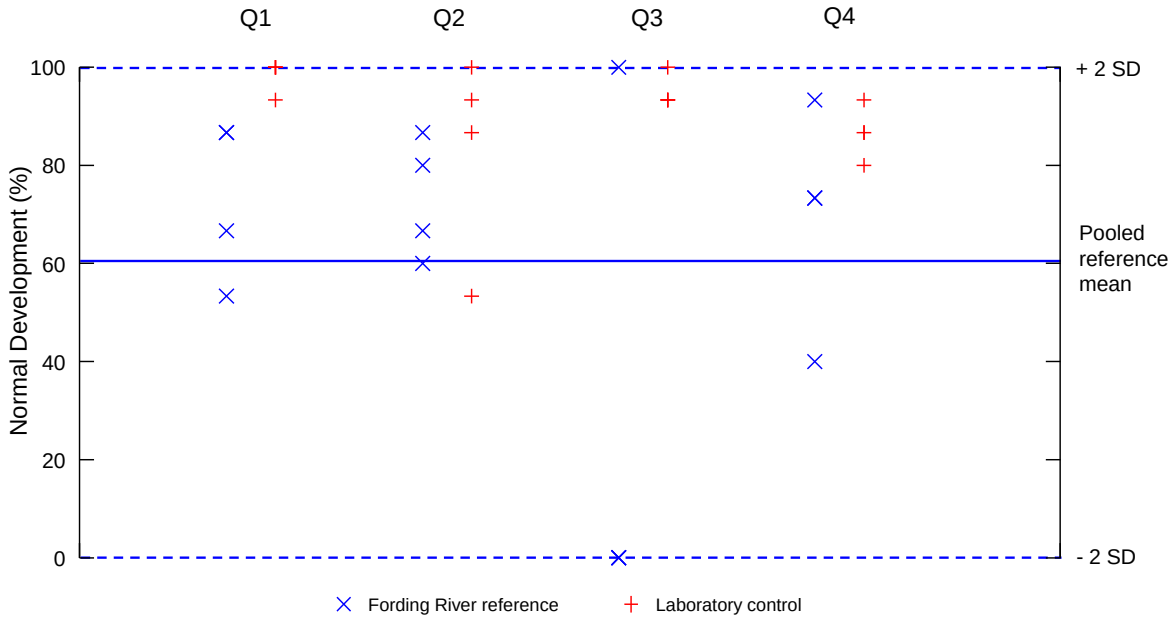
Hatch success was ≥ 87% in all tests conducted with the Fording River reference and laboratory control water, except one Fording River reference replicate in Q3 (53% success). Survival (Figure 2-9) and normal development (Figure 2-10) were similar across quarters, whereas biomass (Figure 2-11) and length (Figure 2-12) decreased from Q1 to Q4. In each quarter, responses were similar in the Fording River reference and laboratory control waters for all endpoints except survival, which tended to be higher in the laboratory control than the Fording River reference.

Figure 2-9: Individual replicate results for P. promelas survival in Fording River reference (n = 16) and laboratory control (n = 16) water.



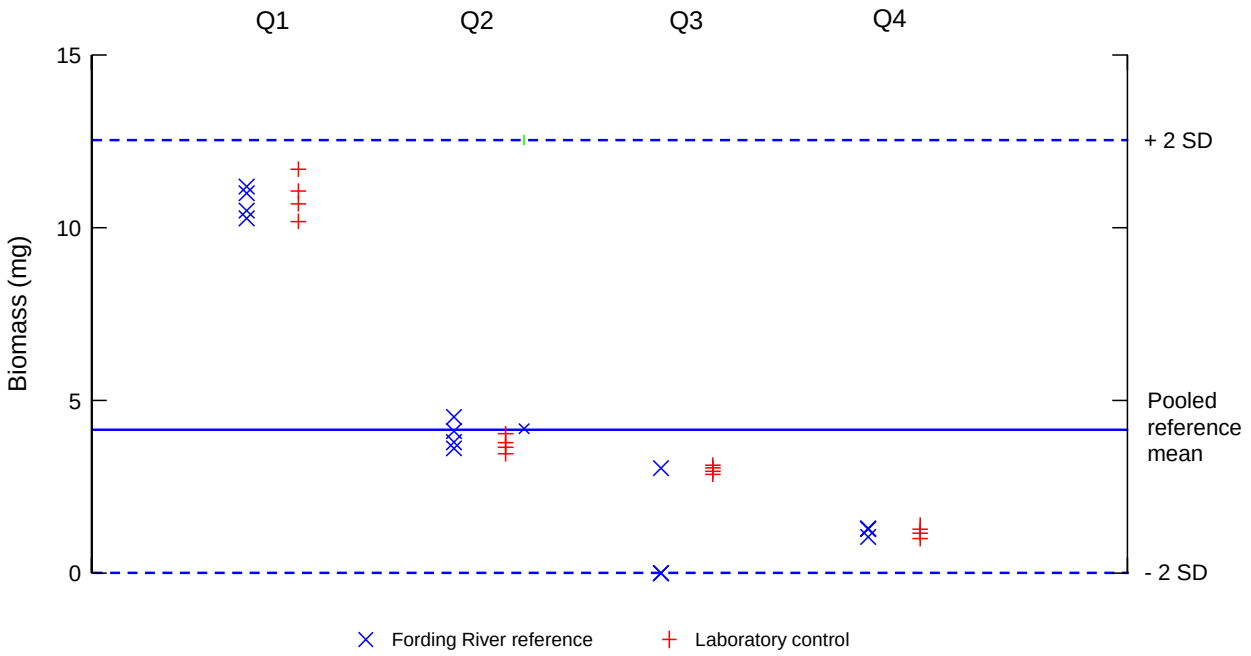
Note: Lines are mean of Fording River reference (solid blue line) plus or minus two standard deviations (± 2 SD) (dashed blue lines; note minimum 0% and maximum 100% survival).

Figure 2-10: Individual replicate results for P. promelas development in Fording River reference (n = 16) and laboratory control (n = 16) water.



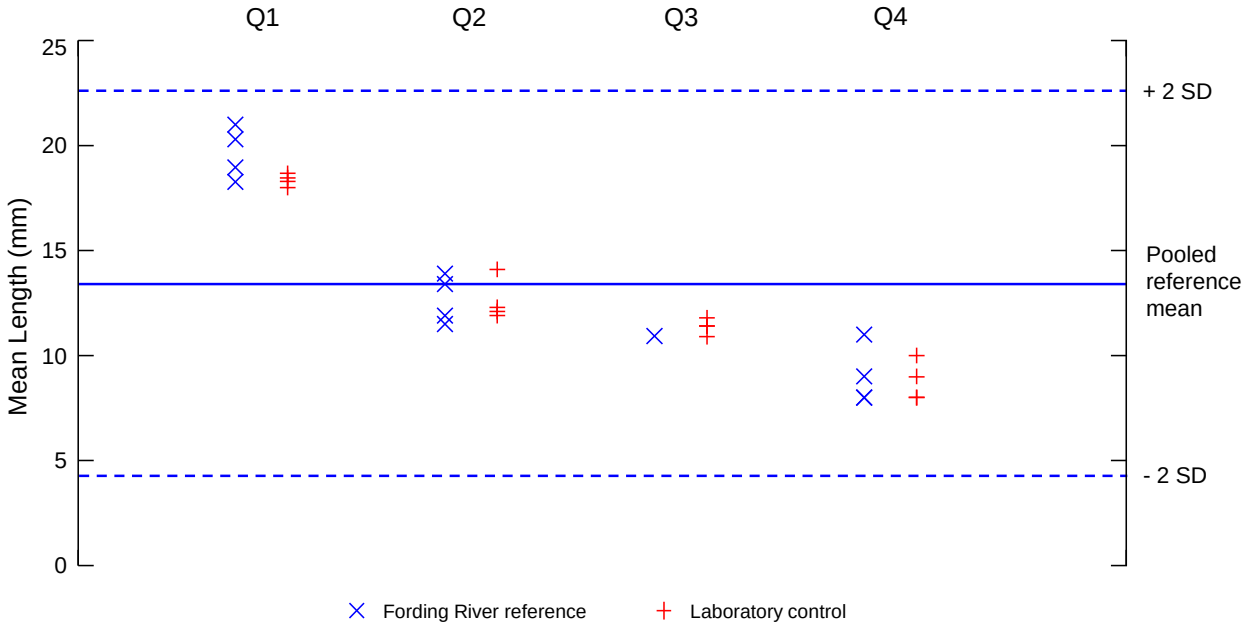
Note: Lines are mean of Fording River reference (solid blue line) plus or minus two standard deviations (± 2 SD) (dashed blue lines; note minimum 0% and maximum 100% normal development).

Figure 2-11: Individual replicate results for P. promelas biomass in Fording River reference (n = 16) and laboratory control (n = 16) water.



Note: Lines are mean of Fording River reference (solid blue line) plus or minus two standard deviations (± 2 SD) (dashed blue lines; note minimum 0 mg biomass).

Figure 2-12: Individual replicate results for P. promelas length in Fording River reference (n = 13) and laboratory control (n 16) water.



Note: Lines are mean of Fording River reference (solid blue line) plus or minus two standard deviations (± 2 SD) (dashed blue lines).

The observation of reduced survival in some Fording River reference water replicates is consistent with results summarized in the memo *Update of Toxicity Identification Evaluation Efforts for Fathead Minnow Tests* (Appendix C). In that memo, Nautilus summarized results showing that toxicity tests in water collected from the Elk Valley (including Fording River reference water) showed effects to survival that were consistently different than survival of test organisms in the laboratory control water, and that samples collected from sites downstream of mine operations did not consistently show effects greater than upstream reference sites. Nautilus conducted a toxicity identification evaluation (TIE) that determined that these results could be attributed to fungi or other microbes in the test. Such effects have been termed sporadic mortality phenomenon[3]. The TIE test design was consistent with the 28-day test method with this species, with the exception that the duration was limited to 14 days because no adverse effects on survival had been observed after day 14 of the test.

In the TIE, site water was treated using filtration, chlorine, ultraviolet sterilization, or copper. Each of these treatments would be expected to curtail growth of microbes in the sample. Because toxicity was reduced using all four treatment methods, Nautilus concluded that is highly likely that adverse effects observed in the *P. promelas* quarterly tests have been caused by microbiological components of the samples, rather than by chemical toxicants. This conclusion was supported by the fact that adverse effects were observed in samples collected upstream and downstream of mine operations, and that responses in the *P. promelas* test due to sensitivity to microbes have been documented elsewhere.

Based on the conclusions of the TIE, quarterly toxicity test results showing a significant reduction in survival or biomass (note that biomass endpoint incorporates both survival and growth) were considered to be a result of sporadic mortality phenomenon (i.e., adverse effects caused by microbes). Although the *P. promelas* test results are reported in Section 2.3.3, survival and biomass endpoints were not considered in the concentration-response analysis.

2.3.3 Test Results

Results of the quarterly and semi-annual toxicity tests are presented in Table 3. A summary of results is provided below for each test species.

Ceriodaphnia dubia

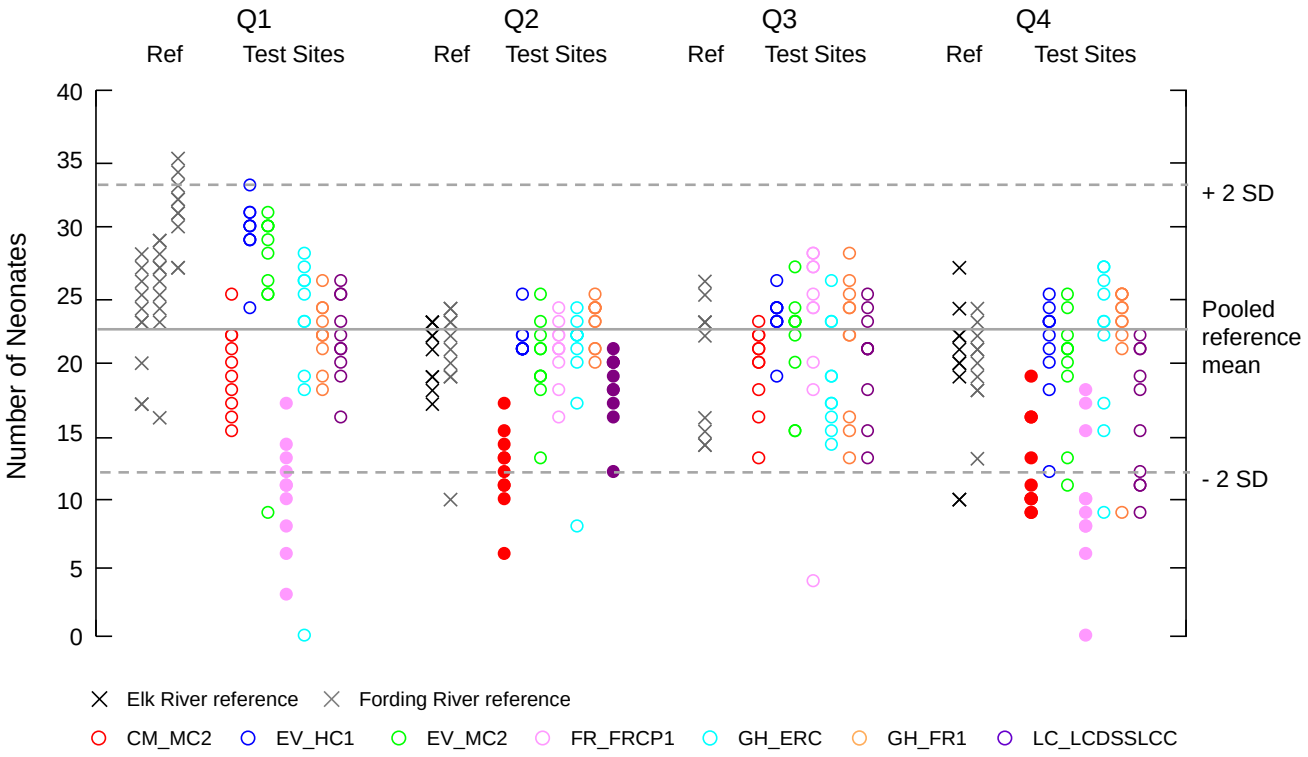
There was no evidence of adverse effects on *C. dubia* survival in any test (Table 3).

Reproduction was significantly reduced relative to the Fording River or Elk River references in two FR_FRCP1 tests (Q1 and Q4), two CM_MC2 tests (Q2 and Q4), and one LC_LCDSSLCC test (Q2) (Figure 2-13). In the LC_LCDSSLCC test, reproduction was significantly lower than both paired reference tests, but was within two standard deviations of the pooled reference mean. It is uncertain whether this result indicates an adverse response or normal variability in test organism performance. In the FR_FRCP1 and CM_MC2 tests, responses in one or more (but not all) replicates in these tests were lower than the normal variability observed in the Fording River and Elk River reference tests in 2015 (Figure 2-13), and therefore may have indicated adverse responses to the test water.

The concentration-response analysis for *C. dubia* reproduction is presented in Section 2.3.4.

[3] Effects are associated with mortalities that generally occur beginning on day 4 of the 7-day test with this species; this age is equivalent to day 6 of the 28-day test, which starts with an earlier life-stage (Appendix C). Effects associated with this phenomenon are generally associated with a high degree of between-replicate variability, as has been observed in tests with samples from the Elk Valley.

Figure 2-13: Individual replicate results for C. dubia reproduction in reference (Ref) and test site waters.



Note: Lines are mean of Elk and Fording River references (solid grey line) plus or minus two standard deviations (± 2 SD) (dashed grey lines). Filled symbols represent tests with mean response significantly lower than one or both references tested that quarter (Table 3).

Table 3: Results of Quarterly and Semi-Annual Toxicity Tests[(a)]

Quarter	Location	*C. dubia*		*P. subcapitata*	*H. azteca*		*P. promelas*					*O. mykiss*			
		% Survival	Reproduction	Cell Yield [x 10^4 cells/mL]	% Survival	Dry weight [mg]	% Hatch	% Survival	Biomass [mg]	Length [mm]	% Normal Development	% Survival	% Viability	Length [mm]	Wet Weight [mg]
Q1	Fording River control	100	23 + 3.9	108.3 + 6.1	72 + 25.9	0.76 + 0.23	96.7 + 3.8	73.3 + 16.3	10.7 + 0.4	19.6 + 1.2	100 + 0	-			
	FR_FRCP1	90	**10.5 + 4**	**64 + 8.9**	94 + 5.5	0.76 + 0.05	96.7 + 3.8	70 + 20.7	10.7 + 1.2	19.2 + 1.3	98.1 + 3.8				
	CM_MC2	100	19.5 + 3.1	101 + 11.9	94 + 5.5	0.68 + 0.21	100 + 0	80 + 14.4	10.7 + 0.7	19.2 + 1.1	100 + 0				
	LC_LCDSSLCC	100	21.8 + 3.1	117 + 2.2	-		-								
	GH_ERC	90	21.5 + 8.2	107.5 + 12.1	-		-								
	GH_FR1	100	22.1 + 2.4	96.5 + 5.9	98 + 4.5	0.84 + 0.1	98.3 + 3.3	58.3 + 19.9	10.2 + 1.2	20.4 + 1	100 + 0				
	Fording River control	100	25.4 + 3.9	110.6 + 6.8	-		-								
	EV_MC2	100	26.3 + 6.5	140.8 + 19.5	-		-								
	Fording River control	100	31.2 + 2.7	106 + 6.8	-		-								
	EV_HC1	100	29.6 + 2.3	**27.2 + 3.9**	-		-								
Q2	Fording River control	100	20.5 + 4.1	121.8 + 5.9	100 + 0	0.97 + 0.07	93.3 + 5.4	73.3 + 12.2	4 + 0.4	12.7 + 1.2	100 + 0	77.6 + 7.6	72.6 + 11.6	18.7 + 1.4	97.7 + 4.3
	Elk River control	100	20.7 + 2.3	**102.4 + 5.7**	-		-					**53.6 + 19.5**	53.6 + 19.5	18 + 0.7	91.3 + 5
	FR_FRCP1	100	20.8 + 2.3	140.3 + 8.4	96 + 5.5	**0.76 + 0.11**	98.3 + 3.3	**31.7 + 8.4**	**2.4 + 0.3**	14.2 + 1.1	100 + 0	73.9 + 14.9	72.3 + 16.2	20 + 0.1	106.2 + 3.8
	GH_FR1	100	22.9 + 1.7	125 + 7.4	96 + 5.5	0.83 + 0.26	96.7 + 3.8	**25 + 22**	**1.9 + 1.3**	15 + 1.8	100 + 0	75.5 + 10.5	75.5 + 10.5	18.8 + 0.7	94.7 + 3.4
	GH_ERC	100	20.1 + 4.7	131 + 6.7	-		-					58 + 11.7	56.3 + 13	17.5 + 0.4	91 + 4
	EV_MC2	100	20 + 3.3	**102 + 5.2**	-		-					86.5 + 6.1	84.8 + 8	20.3 + 0.4	100.6 + 4.4
	EV_HC1	100	21.6 + 1.3	139.8 + 13.6	-		-					69.4 + 17.5	68.6 + 16	18 + 0.5	**88.2 + 0.7**
	CM_MC2	100	**12.2 + 3**	**107.5 + 8.8**	96 + 5.5	0.92 + 0.09	100 + 0	65 + 8.4	4.7 + 0.2	13.4 + 0.7	100 + 0	68.8 + 6.4	68.8 + 6.4	20.4 + 1.1	99 + 7.9
	LC_LCDSSLCC	100	**18.1 ± 2.6**	**69.2 ± 5.7**	-		-					78.3 + 2	75 + 4.1	19.8 + 0.8	99.7 + 5.4
Q3	Fording River control	100	20.1 + 4.8	125.9 + 9.4	94 + 8.9	0.59 + 0.15	85 + 22	25 + 50	0.8 + 1.5	10.9 + 0	100 + 0	-			
	FR_FRCP1	100	22.5 + 7.3	126.8 + 7	86 + 20.7	0.65 + 0.08	96.7 + 3.8	13.3 + 26.7	0.6 + 1.3	12.6 + 0	100 + 0				
	GH_FR1	100	21.5 + 5.1	**107 + 5.8**	68 + 43.2	0.51 + 0.22	98.3 + 3.3	53.3 + 14.4	3 + 0.1	12.7 + 0.6	100 + 0				
	GH_ERC	100	18.9 + 3.9	129.3 + 7.2	-		-								
	EV_MC2	100	21.5 + 3.8	**110.3 + 5.2**	-		-								
	EV_HC1	100	23.3 + 1.8	133.8 + 5.5	-		-								
	CM_MC2	100	19.6 + 3.1	**109.3 + 4.8**	**66 + 21.9**	**0.29 + 0.21**	95 + 3.3	23.3 + 20.7	2.3 + 1.5	15.1 + 2.2	100 + 0				
	LC_LCDSSLCC	100	20.2 + 3.8	**101.3 + 4.3**	-		-								
Q4	Fording River control	100	19.9 + 3.1	121.8 + 7.9	92 + 8.4	0.8 + 0.23	95 + 6.4	71.7 + 22.7	1.2 + 0.1	9 + 1.4	97.9 + 4	83.2 + 7.1	83.2 + 7.1	19 + 0.3	81.3 + 2.9
	Elk River control	100	19.5 + 5.5	132.1 + 4.5	-		-					86.8 + 2.3	86.8 + 2.3	**18.4 + 0.5**	78.8 + 2.6
	FR_FRCP1	100	**10.1 + 5.4**	**96.2 + 2.2**	100 + 0	0.71 + 0.03	98.3 + 3.3	85 + 14.8	1.6 + 0.1	9.2 + 0.5	98.3 + 3.5	**67.5 + 1.7**	**66.7 + 2.7**	**18.3 + 0.2**	79.8 + 1
	GH_FR1	100	22.1 + 4.8	153 + 5	94 + 5.5	0.74 + 0.05	88.3 + 19.2	38.3 + 26.9	1 + 0.7	10 + 1	100 + 0	74.2 + 5	**73.3 + 3.8**	**17.9 + 0.3**	78.2 + 1.5
	GH_ERC	100	21.4 + 5.9	146.5 + 3.1	-		-					**71.3 + 20.4**	**68.8 + 20.1**	**18.4 + 0.4**	**76.1 + 0.4**
	EV_MC2	100	19.7 + 4.4	136 + 4.1	-		-					80.8 + 14.6	79.2 + 14	18.7 + 0.4	78 + 2
	EV_HC1	100	21.1 + 3.8	129 + 3.9	-		-					76.2 + 3.5	74.5 + 2.6	18.7 + 0.3	80.1 + 0.4
	CM_MC2	100	**12.3 + 3.5**	115.3 + 3.5	100 + 0	0.61 + 0.06	91.7 + 10	**28.3 + 22.7**	1.1 + 0.3	12.5 + 2.6	100 + 0	75.9 + 3.7	75.1 + 5.2	19 + 0.6	82.1 + 1.7
	LC_LCDSSLCC	100	15.9 ± 4.9	112.0 ± 8.4	-		-					81.6 + 8.3	80.8 + 8.2	18.6 + 0.7	82.2 + 3.4

[(a)] Results presented as survival or mean ± standard deviation.

Notes: **Bold values** = result significantly lower than Fording River reference.
Underlined values = result significantly lower than Elk River reference.
- = not tested; mg = milligrams; mL = millilitre; mm = millimetres; % = percent; ± = plus or minus.

Pseudokirchneriella subcapitata

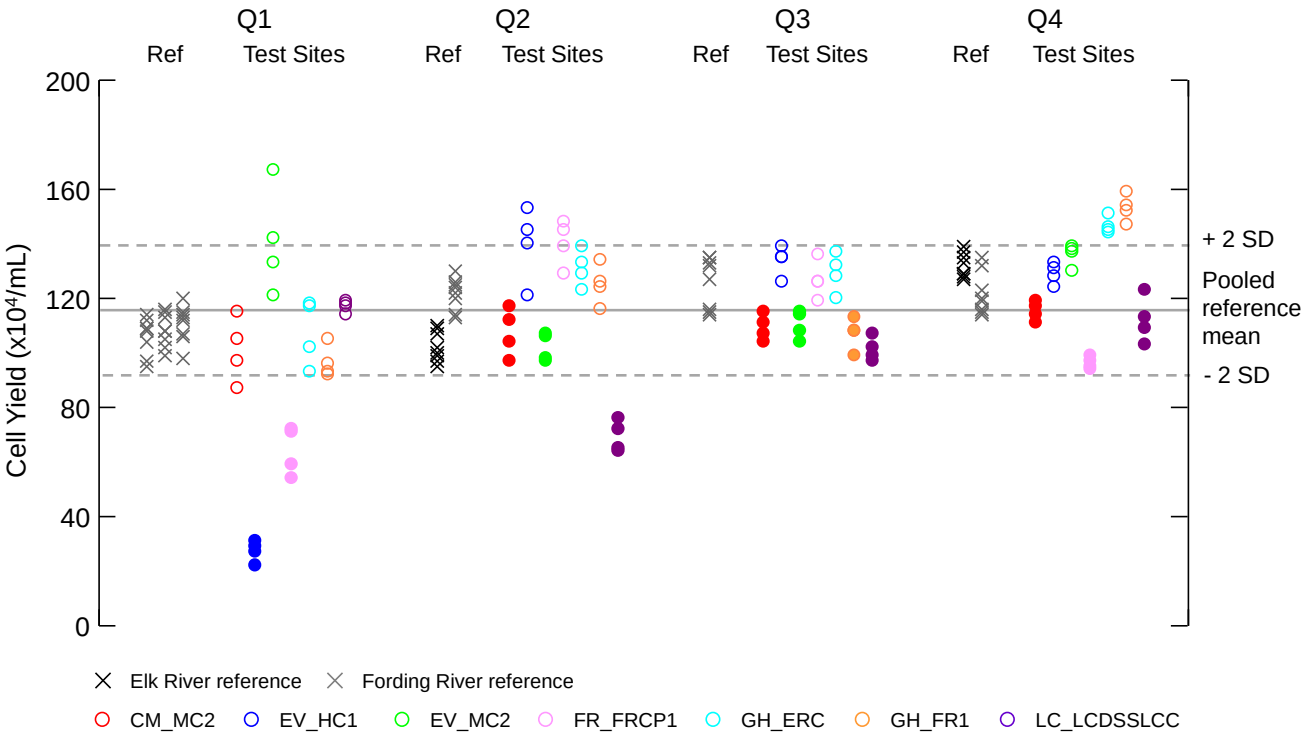
Cell yield was significantly reduced in 12 tests relative to either the Fording River or Elk River reference, including two tests in Q1 (EV_HC1, FR_FRCP1), three tests in Q2 (CM_MC2, EV_MC2, LC_LCDSSLCC), four tests in Q3 (CM_MC2, EV_MC2, GH_FR1, LC_LCDSSLCC), and three tests in Q4 (CM_MC2, FR_FRCP1, LC_LCDSSLCC) (Figure 2-14). For nine of those 12 tests with statistically significant responses, evidence for adverse effects was equivocal:

- In two Q2 tests (CM_MC2 and EV_MC2) and two Q4 tests (CM_MC2 and LC_LCDSSLCC), cell yield was significantly reduced relative to one but not both reference waters, and was within the normal range of responses for pooled reference tests. For these three tests, performance of organisms in the test water was similar to that in one of the paired reference waters and consistent with typical reference test performance in 2015. These results likely do not indicate an adverse response to the test water.
- In four Q3 tests (CM_MC2, EV_MC2, GH_FR1, and LC_LCDSSLC), cell yield was significantly lower than the paired Fording River reference test, but was within two standard deviations of the pooled reference mean and was comparable to Fording River reference results in Q1. These results likely do not indicate an adverse response to the test water.
- In one Q4 test (FR_FRCP1), cell yield was significantly lower than both paired reference tests, but was within two standard deviations of the pooled reference mean (i.e., consistent with reference test responses in other quarters). It is uncertain whether this result indicates an adverse response or normal variability in test organism performance.

In two Q1 tests (EV_HC1 and FR_FRCP1) and one Q2 test (LC_LCDSSLCC), cell yield was significantly lower than reference and all replicates were lower than the normal variability observed in reference waters (Figure 2-14). These three results likely indicate an adverse response to the test water.

Concentration-response analysis for *P. subcapitata* cell yield is presented in Section 2.3.4.

Figure 2-14: Individual replicate results for P. subcapitata cell yield in reference (Ref) and test site waters.



Note: Lines are mean of Elk and Fording River references (solid grey line) plus or minus two standard deviations (± 2 SD) (dashed grey lines). Filled symbols represent tests with mean response significantly lower than one or both references tested that quarter (Table 3).

Hyalella azteca

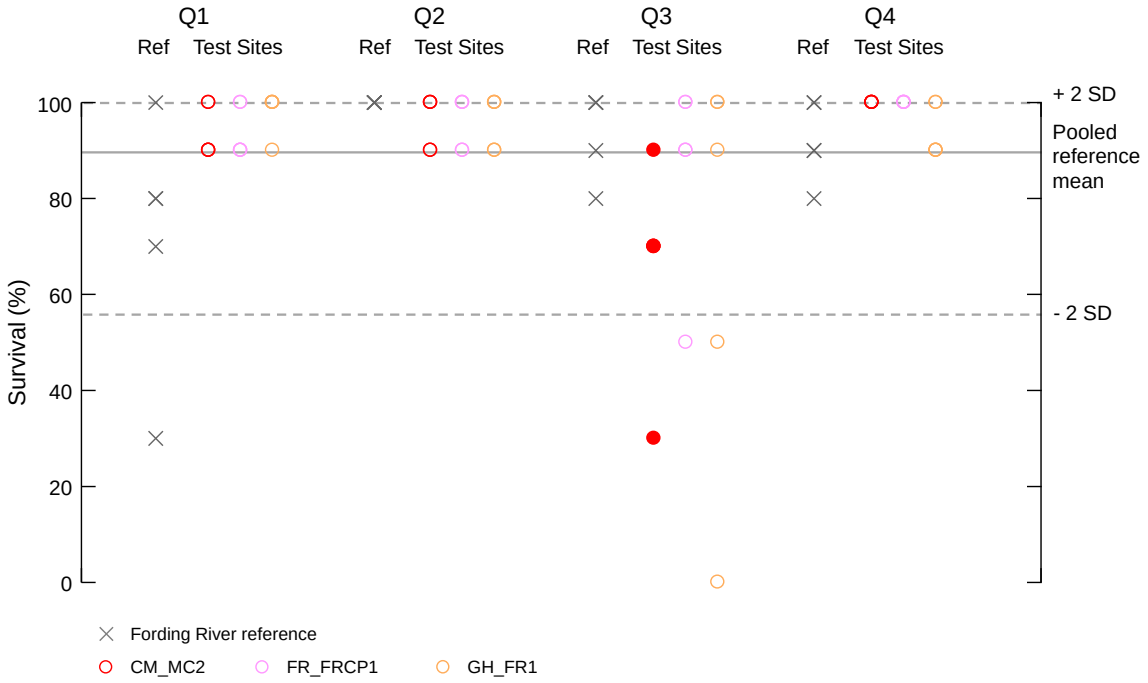
There was no evidence of adverse effects on *H.azteca* survival in any test, with the exception of one Q3 test (CM_MC2) in which mean survival was reduced due to 30% survival in a single replicate, compared to 70% to 90% survival in the other four replicates (Figure 2-15). This inconsistency in response among replicates exposed to the same test water suggests that the statistically significant result may have reflected unusual conditions in a single test vessel, rather than an adverse response to the test water.

Dry weight was significantly reduced compared to the Fording River reference in two tests: FR_FRCP1 (Q2) and CM_MC2 (Q3). As shown on Figure 2-16, dry weight in the FR_FRCP1 test was similar to the mean reference response in 2015 and within the normal range of responses for pooled reference tests, and the statistically significant result appears to reflect higher-than-average performance of the paired reference test.

It is uncertain whether this result represents an adverse response or normal variability in test organism performance. Dry weight in one or more replicates in the CM_MC2 (Q3) test was lower than the normal variability observed in the Fording River reference tests in 2015, and therefore may have indicated adverse responses to the test water.

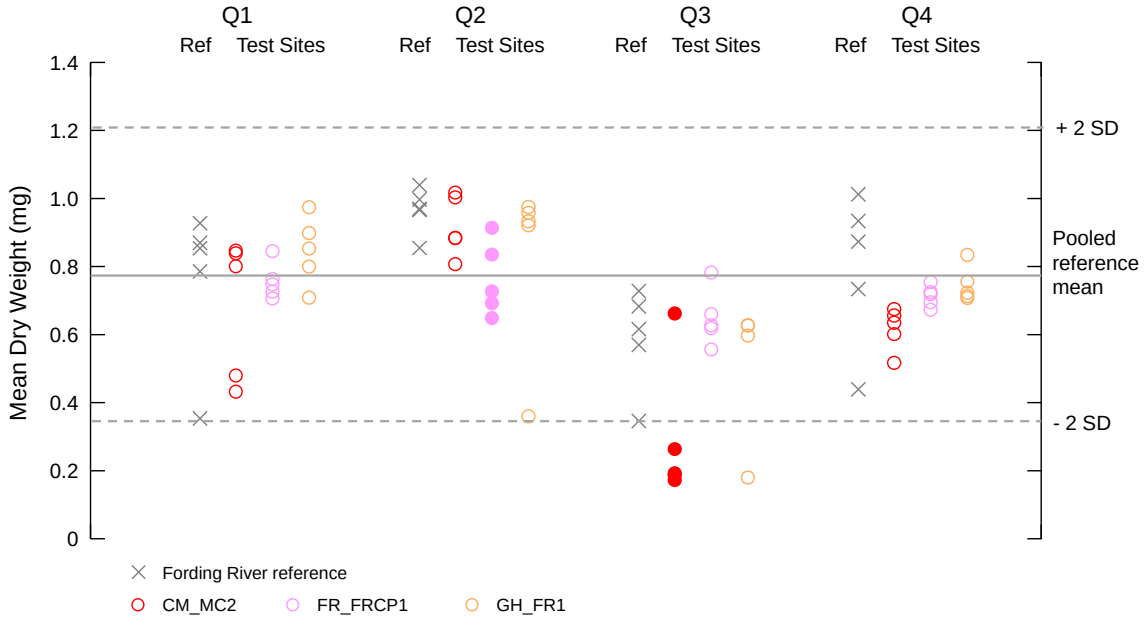
Concentration-response analysis for *H. azteca* dry weight is presented in Section 2.3.4.

Figure 2-15: Individual replicate results for H. azteca survival in reference (Ref) and test site waters.



Note: Lines are mean of Elk and Fording River references (solid grey line) plus or minus two standard deviations (± 2 SD) (dashed grey lines). Filled symbols represent tests with mean response significantly lower than one or both references tested that quarter (Table 3).

Figure 2-16: Individual replicate results for H. azteca growth in reference (Ref) and test site waters.



Note: Lines are mean of Elk and Fording River references (solid grey line) plus or minus two standard deviations (± 2 SD) (dashed grey lines). Filled symbols represent tests with mean response significantly lower than one or both references tested that quarter (Table 3).

Oncorhynchus mykiss

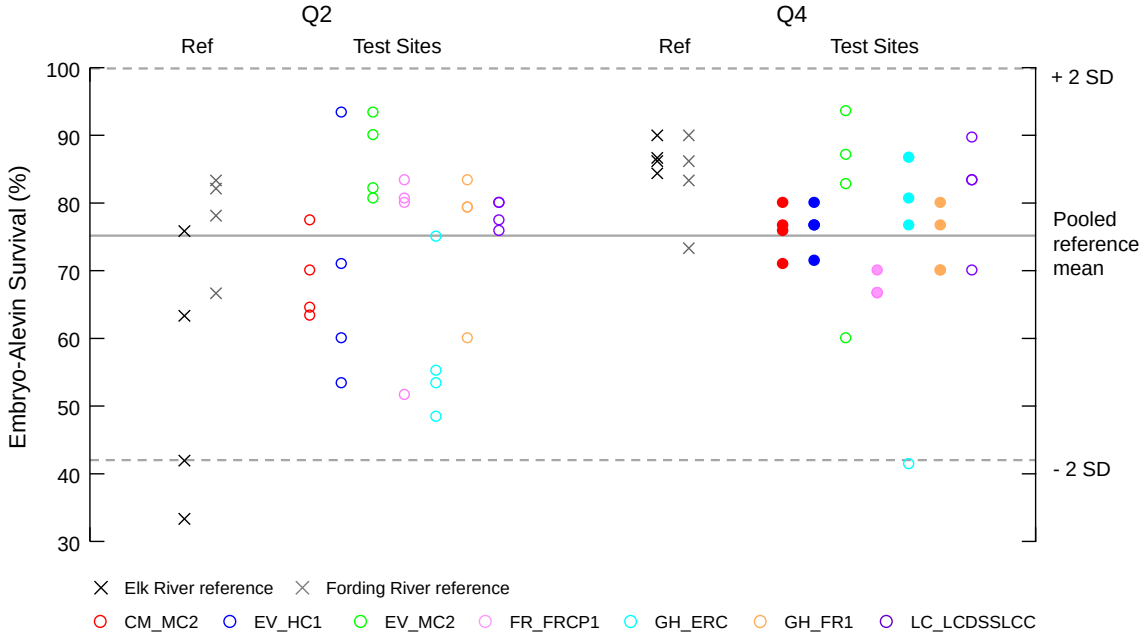
There were no observations of unusual behaviour of *O. mykiss* in any test, and the survival and viability endpoints were similar, indicating a low rate of deformities in all samples (Appendix B).

Survival (Figure 2-17) and viability (Figure 2-18) were significantly reduced in five tests in Q4 (FR_FRCP1, GH_FR1, GH_ERC, EV_HC1, and CM_MC2). However, evidence for adverse effects on survival and viability was equivocal in all cases. Mean responses in these test waters were similar to the mean reference response in 2015 and all replicates were within the normal range of responses for pooled reference tests. These statistically significant results appear to reflect higher-than-average performance of the paired reference tests, combined with relatively low variability among replicates in the test waters. It is unlikely that these responses indicate an adverse response to the test waters.

Length (Figure 2-19) was significantly reduced in three tests in Q4 (FR_FRCP1, GH_FR1, GH_ERC) and weight (Figure 2-20) was significantly reduced in one test in Q2 (EV_HC1) and one Q4 test (GH_ERC) relative to the Fording River reference or both references. However, all test results for length and weight were within the normal range of responses for pooled reference tests. It is uncertain whether these results indicate adverse responses or normal variability in test organism performance.

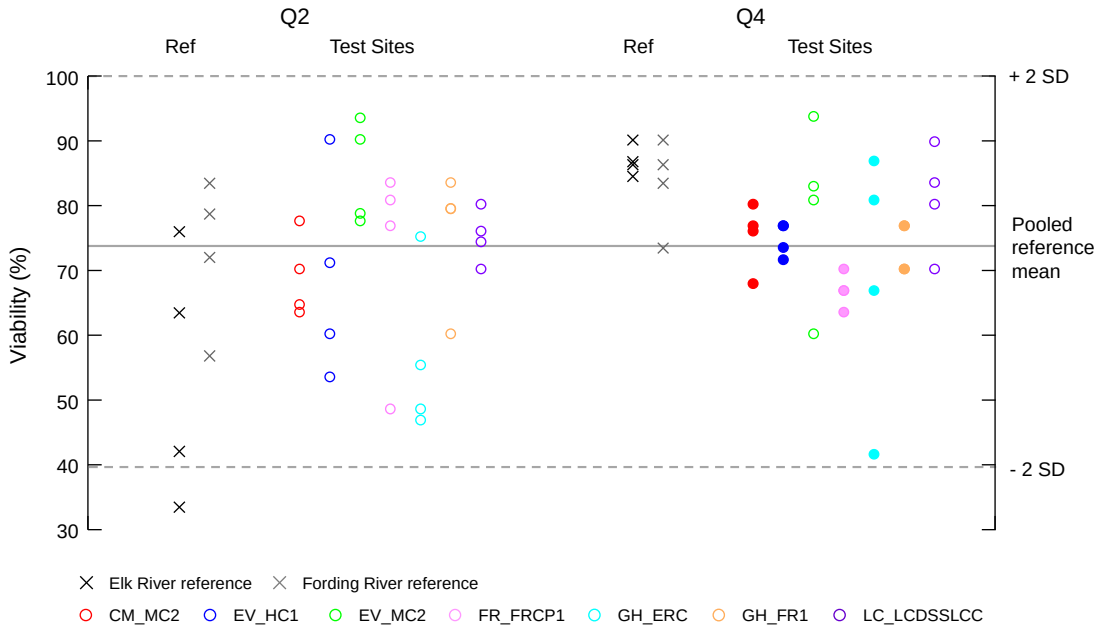
Concentration-response analyses for *O. mykiss endpoints* are presented in Section 2.3.4.

Figure 2-17: Individual replicate results for O. mykiss survival in reference (Ref) and test site waters.



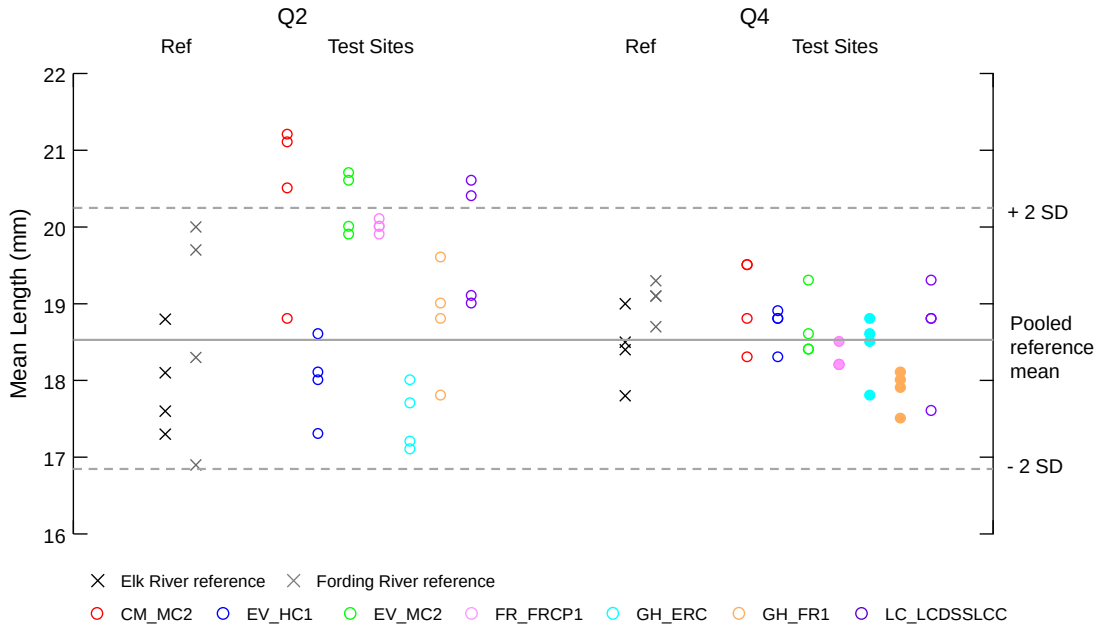
Note: Lines are mean of Elk and Fording River references (solid grey line) plus or minus two standard deviations (± 2 SD) (dashed grey lines). Filled symbols represent tests with mean response significantly lower than one or both references tested that quarter (Table 3).

Figure 2-18: Individual replicate results for O. mykiss viability in reference (Ref) and test site waters.



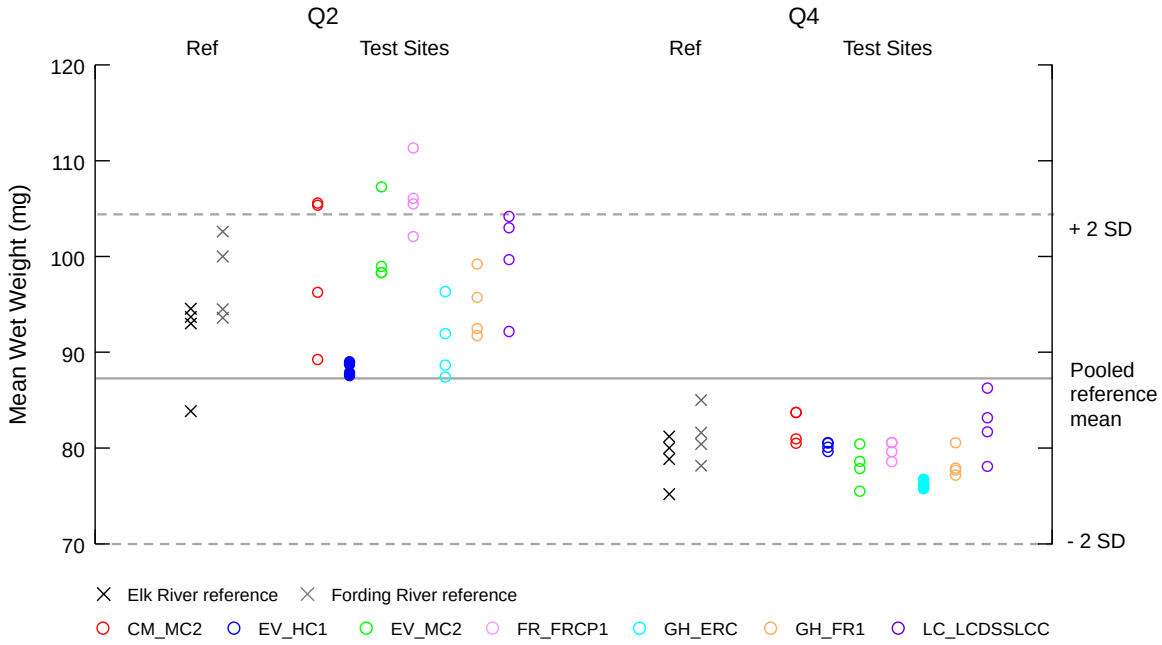
Note: Lines are mean of Elk and Fording River references (solid grey line) plus or minus two standard deviations (± 2 SD) (dashed grey lines). Filled symbols represent tests with mean response significantly lower than one or both references tested that quarter (Table 3).

Figure 2-19: Individual replicate results for O. mykiss length in reference (Ref) and test site waters.



Note: Lines are mean of Elk and Fording River references (solid grey line) plus or minus two standard deviations (± 2 SD) (dashed grey lines). Filled symbols represent tests with mean response significantly lower than one or both references tested that quarter (Table 3).

Figure 2-20: Individual replicate results for O. mykiss weight in reference (Ref) and test site waters.



Note: Lines are mean of Elk and Fording River references (solid grey line) plus or minus two standard deviations (± 2 SD) (dashed grey lines). Filled symbols represent tests with mean response significantly lower than one or both references tested that quarter (Table 3).

Pimephales promelas

There was no evidence of adverse effects on hatch, length, or normal development in any test. As discussed in Section 2.3.2, variable responses for *P. promelas* survival and biomass were shown to be caused by microbiological components of the samples, rather than by chemical toxicants (Appendix C). Therefore, these endpoints were not included in the concentration-response analysis.

2.3.4 Concentration-Response Analysis

Concentration-response analysis was conducted for *C. dubia* reproduction, *P. subcapitata* cell yield, *H. azteca* growth, and *O. mykiss* survival, viability, length, and weight. Response data paired with water chemistry data are shown in Appendix D, Tables D-1 to D-4. Spearman rank order correlations are shown in Appendix D, Tables D-5 to D-8. If a parameter had a significant rank-order correlation, then concentrations of that parameter in tests with statistically significant responses were screened against chronic BC WQGs in Table D-9. The following sections present the results of the concentration-response analysis for each endpoint listed above.

Ceriodaphnia dubia Reproduction

The four Order parameters (dissolved cadmium, nitrate, sulphate, total selenium; Figure 2-21) and two parameters with statistically significant negative Spearman rank correlations (total silicon, total strontium; Figure 2-22) and that did not screen out when compared to water quality guidelines were carried through to graphical analysis (Table D-5). Although total beryllium and total tin had significant negative correlations, they were not included in graphical analysis because of low detection frequency[4].

None of the evaluated parameters exhibited a consistent concentration-response relationship across all tests (Figure 2-21 and 2-22). Concentrations of most parameters in tests with a significant result were equal to or lower than concentrations in reference waters and/or test site waters with non-significant results (Table D-2) and/or were lower than a chronic BC WQG (Table D-9). Such parameters are not expected to contribute to toxicity in these tests. Parameters that were greater than concentrations in reference waters and/or test site waters with non-significant results, and that were greater than a chronic BC WQG (when such exists), were:

- **CM_MC2 (Q2)**: Turbidity in this test (5.8 Nephelometric Turbidity Units [NTU]) was five to ten times higher than in other tests from this site (Table D-1) but only slightly higher than the Q2 EV_MC2 test (4.7 NTU) that had non-significant results. Therefore, turbidity is unlikely to be the cause of observed responses. Overall, no water quality parameter was identified as a potential cause of the statistically significant result in this test.
- **CM_MC2 (Q4)**: The strontium concentration in this test was higher than reference waters and test site waters with non-significant results. However, the strontium concentration in this test (0.3 mg/L) was more than an order of magnitude lower than the reported IC_{20} of 11 mg/L for *C. dubia* (McPherson et al. 2014), indicating that it is not likely contributing to toxicity. Alkalinity and sodium were also higher than test site waters with non-significant results, but this difference was small (less than 10%). Therefore, alkalinity and sodium are unlikely to be the cause of observed responses. Overall, no water quality parameter was identified as a potential cause of the statistically significant result in this test.
- **FR_FRCP1 (Q1)**. Concentrations of nitrate, selenium, sulphate, and uranium in this test were greater than chronic BC WQGs (Table D-9).[5] The uranium concentration in this test (0.016 mg/L) was lower than the IC_{10} of 0.073 mg/L for *C. dubia* (CCME 2011), indicating that it is likely not contributing to toxicity. Concentrations of nitrate (30 mg/L NO_3-N) and sulphate (1,430 mg/L) in this test were greater than the IC_{20} values for nitrate in Fording River water (25.1 mg/L NO_3-N) and sulphate in alkalinity-supplemented Fording River water (840 mg/L) (Golder 2013), indicating that these parameters may have contributed to the observed response in this test. The selenium concentration in this test (497 µg/L) was higher than the maximum concentration tested in a mixture toxicity study that resulted in no adverse effects (149 µg/L) (Golder 2013), so it cannot be ruled out that selenium may have also contributed to the observed response in this test. In addition to these parameters, lithium, titanium, TDS, and several parameters related to TDS (e.g., calcium) were also higher in this test than concentrations in reference waters and/or test site waters with non-significant results. The lithium concentration in this test (0.056 mg/L) was lower than the reported IC_{25} of 0.32 mg/L for *C. dubia*

[4] Of 34 samples, two had detected concentrations of total beryllium and four had detected concentrations of total tin (Table D-1).

[5] As discussed further in Section 2.4, water quality under winter low flow conditions at FR_FRCP1 is not representative of conditions in the upper Fording River to satisfy its primary intent which is to monitor and evaluate cumulative discharges from Fording River Operations in the receiving environment (Teck 2016, pers. comm., 28 March).

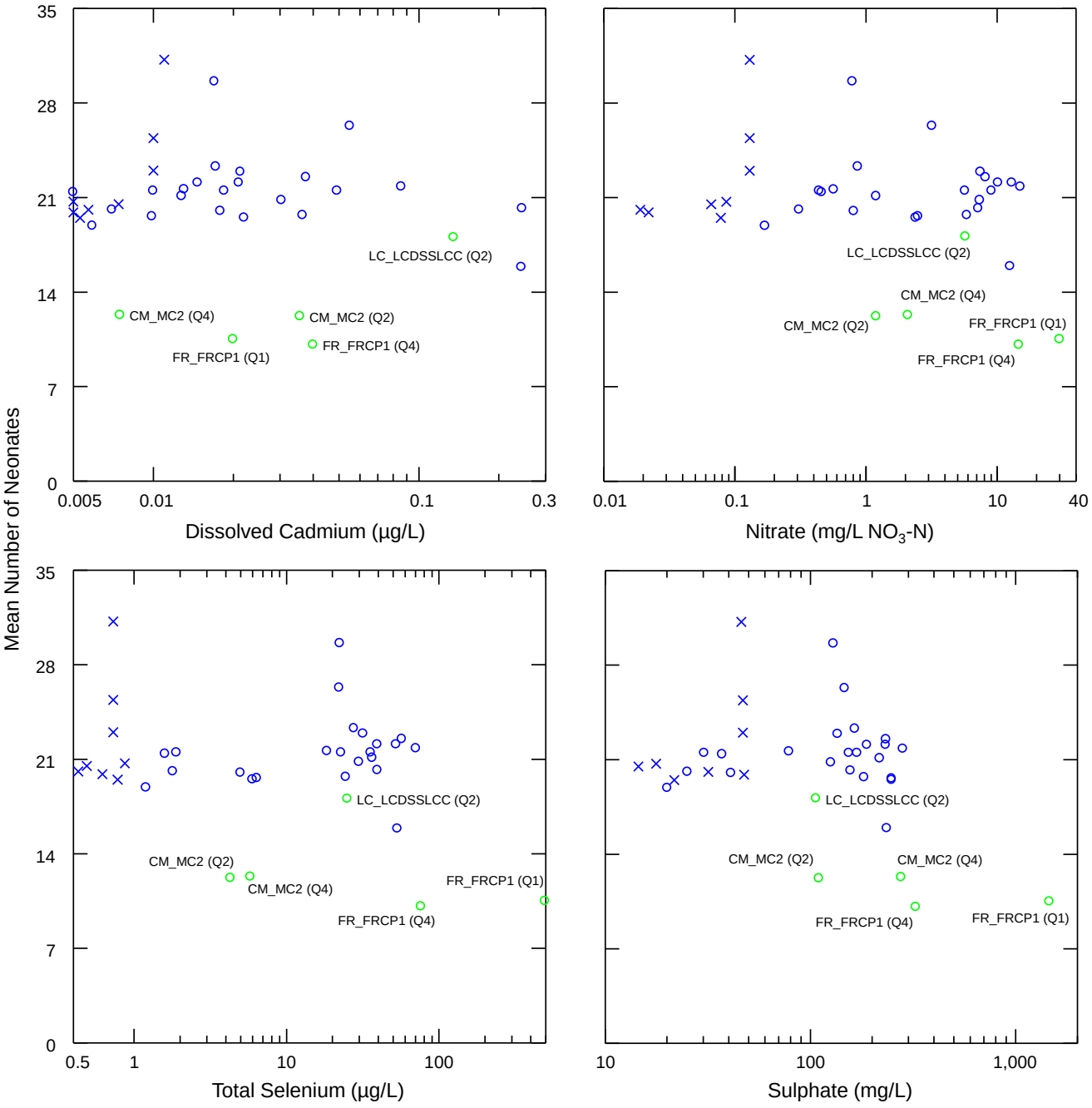
(Kszos et al. 2003)[6], indicating that it is not likely contributing to toxicity. TDS in this test (2,580 mg/L) was higher than the IC_{20} for TDS in alkalinity-supplemented Fording River water (1,322 mg/L) (Golder 2013), indicating that TDS may have contributed to the observed response in this test. Parameters that may have contributed to the observed response in this test are nitrate, selenium sulphate, and TDS.

- **FR_FRCP1 (Q4)**. The lithium concentration in this test was higher than reference waters and test site waters with non-significant results. However, the lithium concentration in this test (0.037 mg/L) was lower than the reported IC_{25} of 0.32 mg/L for *C. dubia* (Kszos et al. 2003)[4], indicating that it is not likely contributing to toxicity. Selenium, sulphate, and several parameters related to TDS (e.g., calcium, hardness) were also higher than test site waters with non-significant results.[7] Concentrations of selenium (76 µg/L), sulphate (327 mg/L), and TDS (765 mg/L) in this test were lower than effect concentrations reported for *C. dubia* in mixture tests in Fording River water (effects concentration for selenium > 139 µg/L; IC_{20} for sulphate = 595 mg/L; IC_{20} for TDS = 1,012 mg/L) (Golder 2013). Therefore, even considering that multiple constituents were higher than test site waters with non-significant results, these parameters are unlikely to be the cause of observed responses. Overall, no water quality parameter was identified as a potential cause of the statistically significant result in this test.
- **LC_LCDSSLCC (Q2).** Concentrations of all parameters were equal to or lower than concentrations in reference waters and/or test site waters with non-significant results (Table D-1). No water quality parameter was identified as a potential cause of the significant result in this test.

[6] Sodium has been shown to ameliorate lithium toxicity (Kszos et al. 2003). The sodium concentration in the Q1 FR_FRCP1 test (2.1 mg/L) was similar to conditions in which the IC_{25} was derived (2.8 mg/L), making the effect concentration from Kszos et al. (2003) relevant to the FR_FRCP1 test.

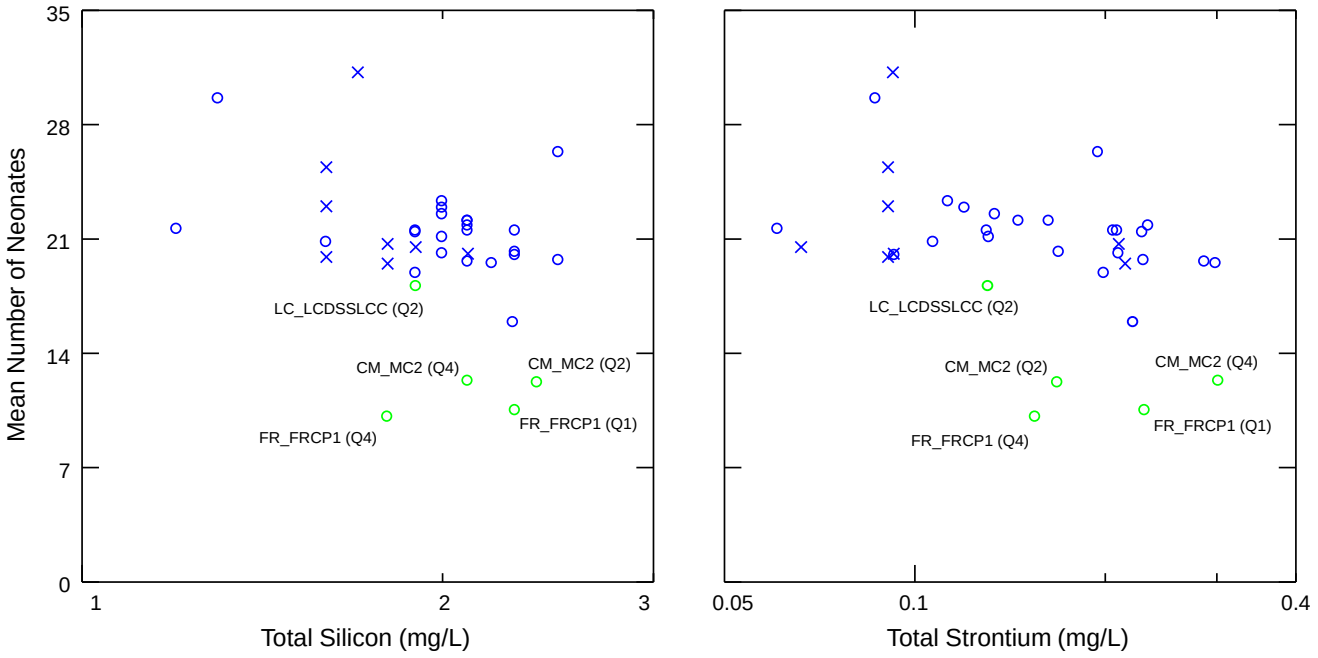
[7] As discussed further in Section 2.4, water quality under winter low flow conditions at FR_FRCP1 is not representative of conditions in the upper Fording River to satisfy its primary intent which is to monitor and evaluate cumulative discharges from Fording River Operations in the receiving environment (Teck 2016, pers. comm., 28 March).

Figure 2-21: Mean number of neonates and concentration of dissolved cadmium (top left), nitrate (top right), total selenium (bottom left), and sulphate (bottom right).



Note: Symbols indicate reference waters (blue ×), test site waters with mean results statistically similar to the paired reference (blue ○), and test site waters with mean results significantly lower than the paired reference (green ○; labelled with the test site and quarter).

Figure 2-22: Mean number of neonates and concentration of total silicon (left) and total strontium (right).



Note: Symbols indicate reference waters (blue ×), test site waters with mean results statistically similar to the paired reference (blue ○), and test site waters with mean results significantly lower than the paired reference (green ○; labelled with the test site and quarter).

Pseudokirchneriella subcapitata Cell Yield

The four Order parameters (dissolved cadmium, nitrate, sulphate, total selenium; Figure 2-23) and two parameters with statistically significant negative Spearman rank correlations (total bismuth, total vanadium; Figure 2-24) were carried through to graphical analysis (Table D-6). Parameters related to TDS (e.g., calcium, magnesium) also had significant correlations but were not evaluated separately from TDS.

None of the evaluated parameters exhibited a consistent concentration-response relationship across all tests (Figures 2-23 and 2-24). Concentrations of most parameters in tests with a significant result were equal to or lower than concentrations in reference waters and/or test site waters with non-significant results (Table D-2) and/or were lower than the chronic BC WQG (Table D-9). Such parameters are not expected to contribute to toxicity in these tests.

- **EV_HC1 (Q1) and LC_LCDSSLCC (Q2)**. Concentrations of all parameters were equal to or lower than concentrations in reference waters and/or test site waters with non-significant results (Table D-2). No water quality parameter was identified as a potential cause of the significant result in this test.

- **FR_FRCP1 (Q1)**. Four parameters were detected at concentrations greater than the chronic BC WQG (nitrate, selenium, sulphate, and uranium; Table D-9).[8] The uranium concentration in this test (0.016 mg/L) was lower than the reported IC_{10} of 0.04 mg/L for *P. subcapitata* (CCME 2011), indicating that it is not likely contributing to toxicity. Nitrate is also not expected to have contributed to toxicity in this test because the test site concentration (30 mg/L NO_3-N) was lower than the highest concentration tested in the Golder (2013) mixture toxicity study that reported no adverse effects (41 mg/L NO_3-N). Concentrations of TDS (2,580 mg/L), sulphate (1,430 mg/L) and selenium (497 µg/L) in this test were higher than the range tested in the mixture toxicity study. Concentrations of lithium and titanium in this test were also greater (more than 20%) relative to reference waters and/or test site waters with non-significant results. It could not be determined whether one or more of these parameters may have contributed to the statistically significant response in this test.

- **CM_MC2 (Q2)**. Turbidity in this test was 1.5 to 40 times higher than concentrations in reference waters and/or test site waters with non-significant results. Total suspended solids was 1.2 to 10 times higher than concentrations in reference waters and/or test site waters with non-significant results. Turbidity and/or total suspended solids may have contributed to the statistically significant response in this test.

- **EV_MC2 (Q2)**. Dissolved organic carbon, total organic carbon, and turbidity in this test were higher than reference waters and/or test site waters with non-significant results, but this difference was small (less than 20%). Therefore, these parameters are unlikely to be the cause of observed responses. Phosphorus, total Kjeldahl nitrogen, total suspended solids, and vanadium in this test were also higher than test site waters with non-significant results. Relative to the maximum concentration of these parameters in reference waters and test site waters with non-significant results, concentrations of these parameters in this test were 1.5 to 3 times higher. It is unknown whether one or more of these parameters may have contributed to the statistically significant response in this test.

- **CM_MC2, EV_MC2, GH_FR1, LC_LCDSSLCC (Q3)**. Total Kjeldahl nitrogen was higher in the EV_MC2 test than test site waters with non-significant results, but this difference was small (approximately 10%). Therefore, total Kjeldahl nitrogen is unlikely to be the cause of observed responses. Overall, no water quality parameter was identified as a potential cause of the statistically significant results in these tests.

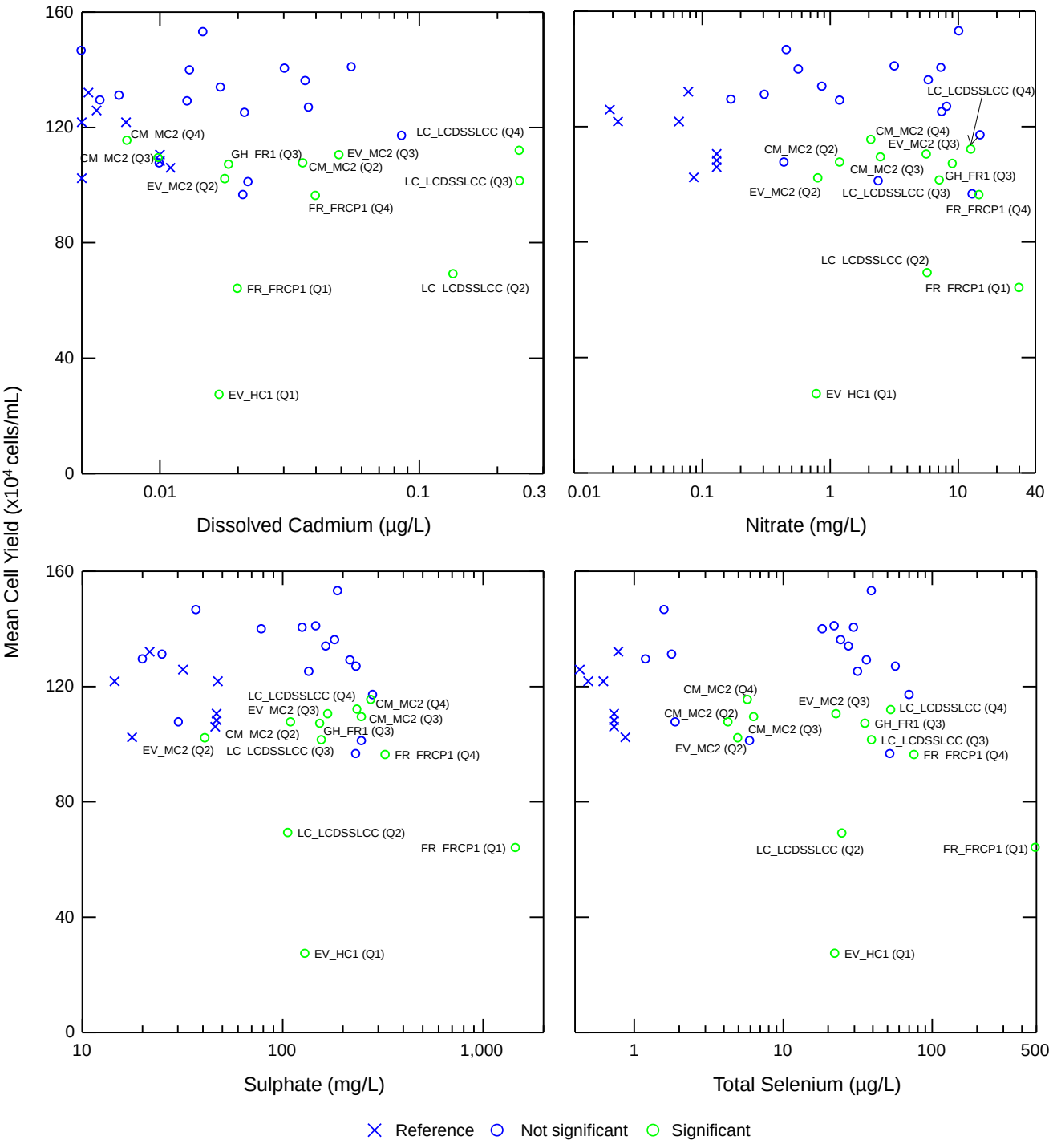
- **CM_MC2 (Q4)**. The strontium concentration in this test was higher than reference waters and test site waters with non-significant results. However, the strontium concentration in this test (0.3 mg/L) was more than two orders of magnitude lower than the reported IC_{20} of 36 mg/L for *P. subcapitata* (McPherson et al. 2014), indicating that it is not likely contributing to toxicity. Alkalinity and sodium were also higher than test site waters with non-significant results, but this difference was small (less than 10%). Therefore, alkalinity and sodium are unlikely to be the cause of observed responses. Overall, no water quality parameter was identified as a potential cause of the statistically significant result in this test.

[8] As discussed further in Section 2.4, water quality under winter low flow conditions at FR_FRCP1 is not representative of conditions in the upper Fording River to satisfy its primary intent which is to monitor and evaluate cumulative discharges from Fording River Operations in the receiving environment (Teck 2016, pers. comm., 28 March).

- **FR_FRCP1 (Q4)**. Alkalinity, calcium, conductivity, and potassium concentrations in this test were higher than test site waters with non-significant results, but this difference was small (less than 10%). Lithium, selenium, sulphate, and several parameters related to TDS (i.e., hardness, magnesium, major cation sum, major anion sum) were also higher than test site waters with non-significant results.[9] Concentrations of selenium (76 µg/L), sulphate (327 mg/L), and TDS (765 mg/L) in this test were lower than the highest concentrations in the Golder (2013) mixture toxicity test that resulted in no significant adverse effects to *P. subcapitata* cell yield (selenium = 139 µg/L; sulphate = 931 mg/L; TDS = 1,498 mg/L). Therefore, even considering that multiple constituents were higher than test site waters with non-significant results, these parameters are not expected to contribute to toxicity in this test. The lithium concentration in this test was less than 20% higher than tests with non-significant results. Therefore, lithium is unlikely to be the cause of observed responses. Overall, no water quality parameter was identified as a potential cause of the statistically significant result in this test.
- **LC_LCDSSLCC (Q4).** Several parameters in this test had concentrations below detection but elevated detection limits (e.g., beryllium). The lithium concentration in this test was less than 20% higher than tests with non-significant results. Therefore, lithium is unlikely to be the cause of observed responses. Overall, no water quality parameter was identified as a potential cause of the statistically significant result in this test.

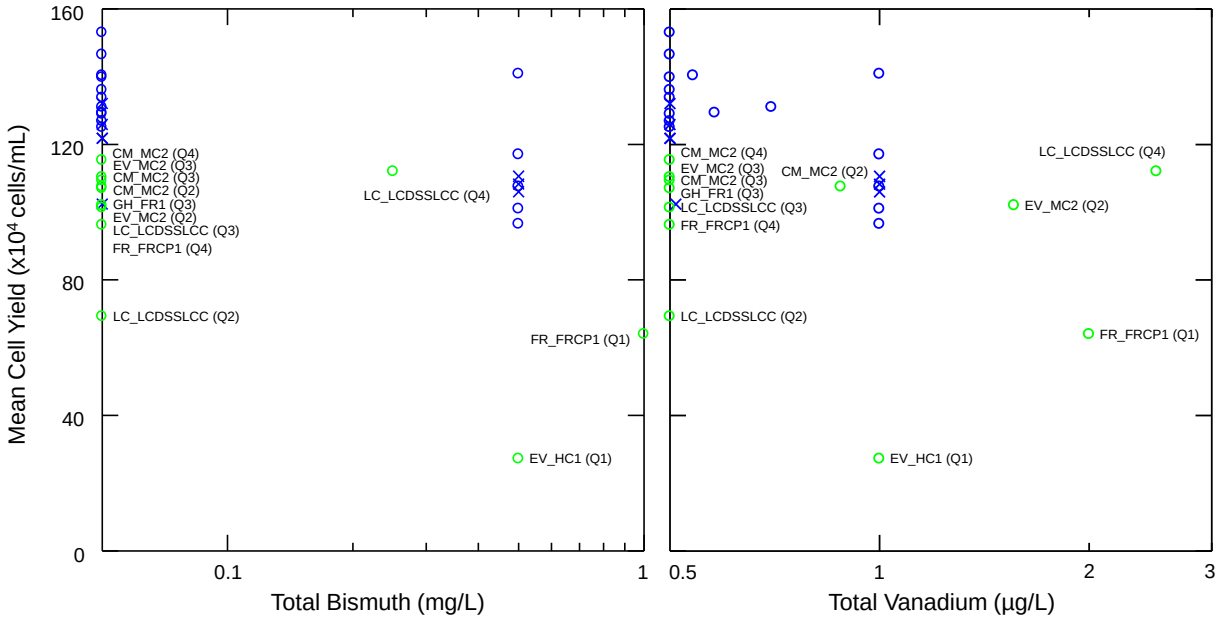
[9] As discussed further in Section 2.4, water quality under winter low flow conditions at FR_FRCP1 is not representative of conditions in the upper Fording River (Teck 2016, pers. comm., 28 March).

Figure 2-23: Mean cell yield and concentration of dissolved cadmium (top left), nitrate (top right), sulphate (bottom left), and total selenium (bottom right).



Note: Symbols indicate reference waters (blue ×), test site waters with mean results statistically similar to the paired reference (blue ○), and test site waters with mean results significantly lower than the paired reference (green ○; labelled with the test site and quarter).

Figure 2-24: Mean cell yield and concentration of total bismuth (left) and total vanadium (right).



Note: Symbols indicate reference waters (blue ×), test site waters with mean results statistically similar to the paired reference (blue ○), and test site waters with mean results significantly lower than the paired reference (green ○; labelled with the test site and quarter).

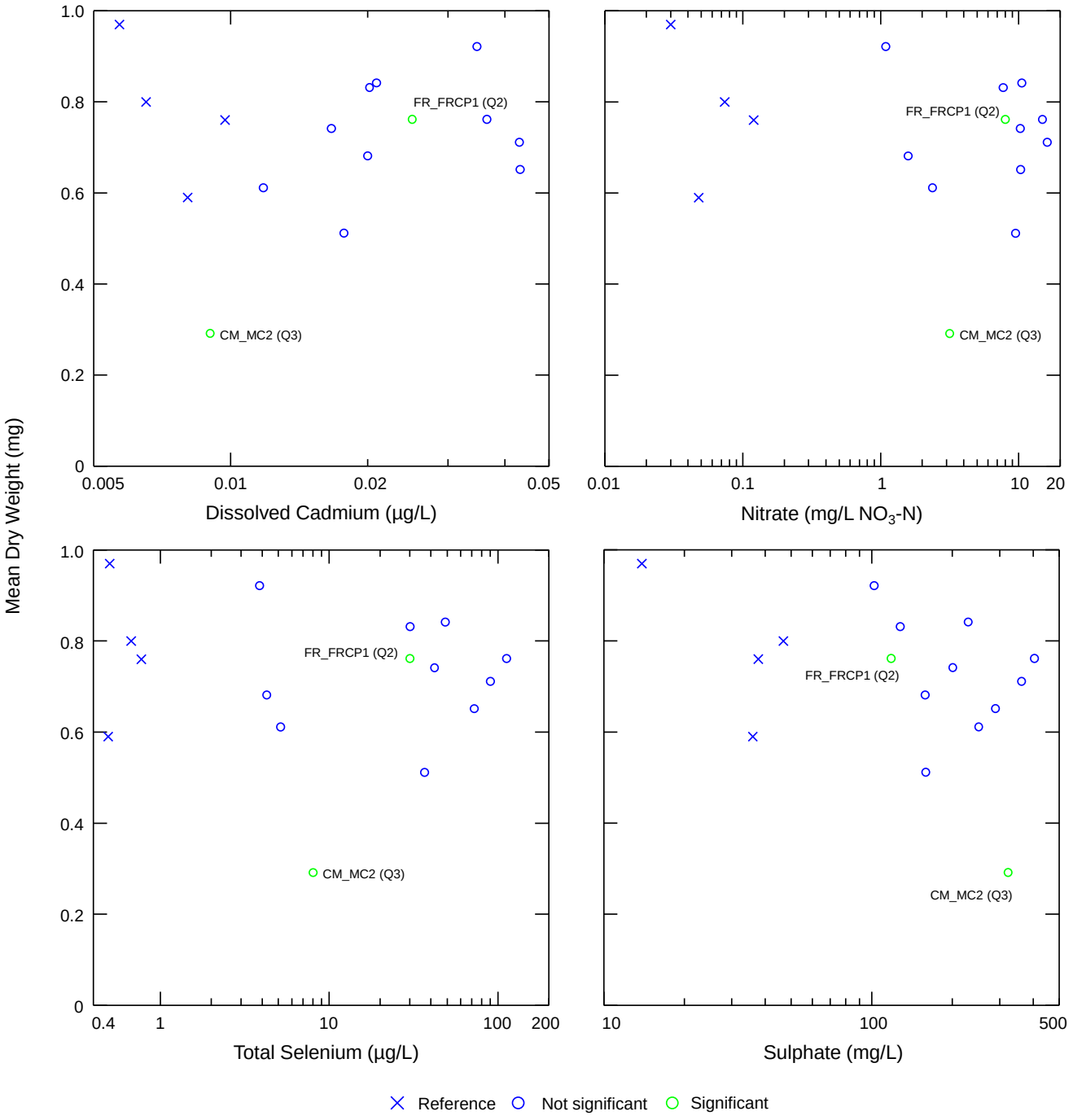
Hyalella azteca Growth

The four Order parameters (dissolved cadmium, nitrate, sulphate, total selenium; Figure 2-25) and two parameters with statistically significant negative Spearman rank correlations (total strontium and TDS; Figure 2-26) that did not screen out when compared to water quality guidelines were carried through to graphical analysis (Table D-7). Parameters related to TDS (e.g., alkalinity) also had significant correlations but were not evaluated separately from TDS.

None of the evaluated parameters exhibited a consistent concentration-response relationship across all tests (Figures 2-25 and 2-26). Concentrations of most parameters in tests with a significant result were equal to or lower than concentrations in reference waters and/or test site waters with non-significant results (Table D-3), and/or were lower than the chronic BC WQG (Table D-9). Such parameters are not expected to contribute to toxicity in these tests. Parameters that were greater than concentrations in reference waters and/or test site waters with non-significant results, and that were greater than a chronic BC WQG (when such exists), were:

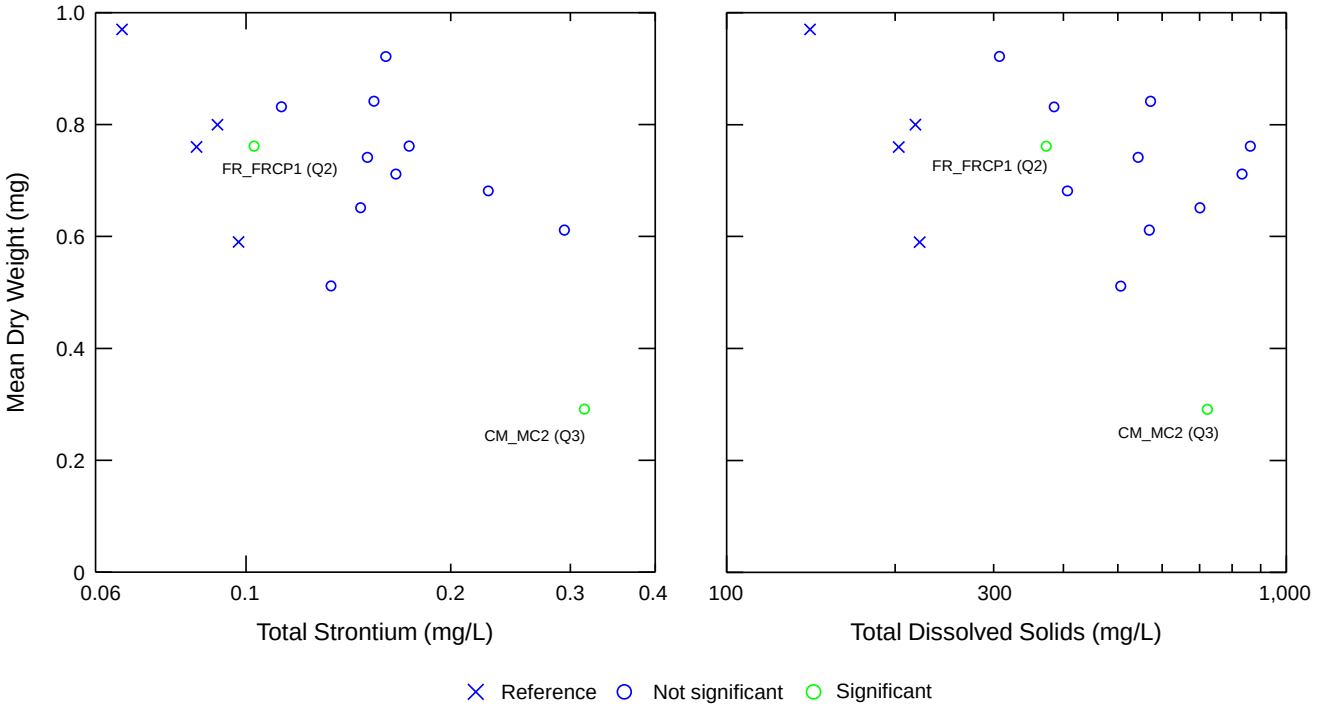
- **CM_MC2 (Q3)**. The strontium concentration in this test was higher than reference waters and test site waters with non-significant results. However, the strontium concentration (0.32 mg/L) was approximately two orders of magnitude lower than the IC_{20} of 31.2 mg/L for *H. azteca* (McPherson et al. 2014), indicating that it is not likely contributing to toxicity. Sodium was also higher than test site waters with non-significant results, but this difference was small (5%). Therefore, sodium is unlikely to be the cause of observed responses. Overall, no water quality parameter was identified as a potential cause of the statistically significant result in this test.
- **FR_FRCP1 (Q2)**. No water quality parameter was identified as a potential cause of the statistically significant result in this test.

Figure 2-25: Mean dry weight and concentration of dissolved cadmium (top left), nitrate (top right), total selenium (bottom left), and sulphate (bottom right).



Note: Symbols indicate reference waters (blue ×), test site waters with mean results statistically similar to the paired reference (blue ○), and test site waters with mean results significantly lower than the paired reference (green ○; labelled with the test site and quarter).

Figure 2-26: Mean dry weight and concentration of total strontium (left) and total dissolved solids (right).



Note: Symbols indicate reference waters (blue ×), test site waters with mean results statistically similar to the paired reference (blue ○), and test site waters with mean results significantly lower than the paired reference (green ○; labelled with the test site and quarter).

Oncorhynchus mykiss - Survival and Viability

The four Order parameters (dissolved cadmium, nitrate, sulphate, total selenium) were carried through to graphical analysis (Table D-8) for survival (Figure 2-27) and viability (Figure 2-28). As shown in Table D-8, viability and survival were not statistically significantly correlated with any water chemistry parameter.

None of the evaluated parameters exhibited a consistent concentration-response relationship across all tests (Figures 2-27 and 2-28). Concentrations of most parameters in tests with a significant result were equal to or lower than concentrations in reference waters and/or test site waters with non-significant results (Table D-4), and/or were lower than the chronic BC WQG (Table D-9). Such parameters are not expected to contribute to toxicity in these tests. Parameters that were greater than concentrations in reference waters and/or test site waters with non-significant results, and that were greater than a chronic BC WQG (when such exists), were:

- **CM_MC2 (Q4)**. The strontium concentration in this test was higher than reference waters and test site waters with non-significant results. However, the strontium concentration (0.29 mg/L) was more than two orders of magnitude lower than the reported LC_{10} of 67 mg/L for *O. mykiss* (McPherson et al. 2014), indicating that it is not likely contributing to toxicity. Titanium was also higher than test site waters with non-significant results, but this difference was small (less than 10%). Sodium in this test (9.5 mg/L) was 1.3 to 16 times higher than test site waters with non-significant results. It could not be determined whether sodium may have contributed to the observed response in this test.

- **EV_HC1 (Q4)**. Concentrations of magnesium, ortho-phosphate, and titanium in this test were higher than reference waters and test site waters with non-significant results, but this difference was small (less than 10%). Therefore, these parameters are unlikely to be the cause of observed responses. Alkalinity carbonate in this test (8.3 mg/L $CaCO_3$) was 1.3 to 8 times higher than test site waters with non-significant results. It could not be determined whether alkalinity carbonate may have contributed to the observed response in this test.

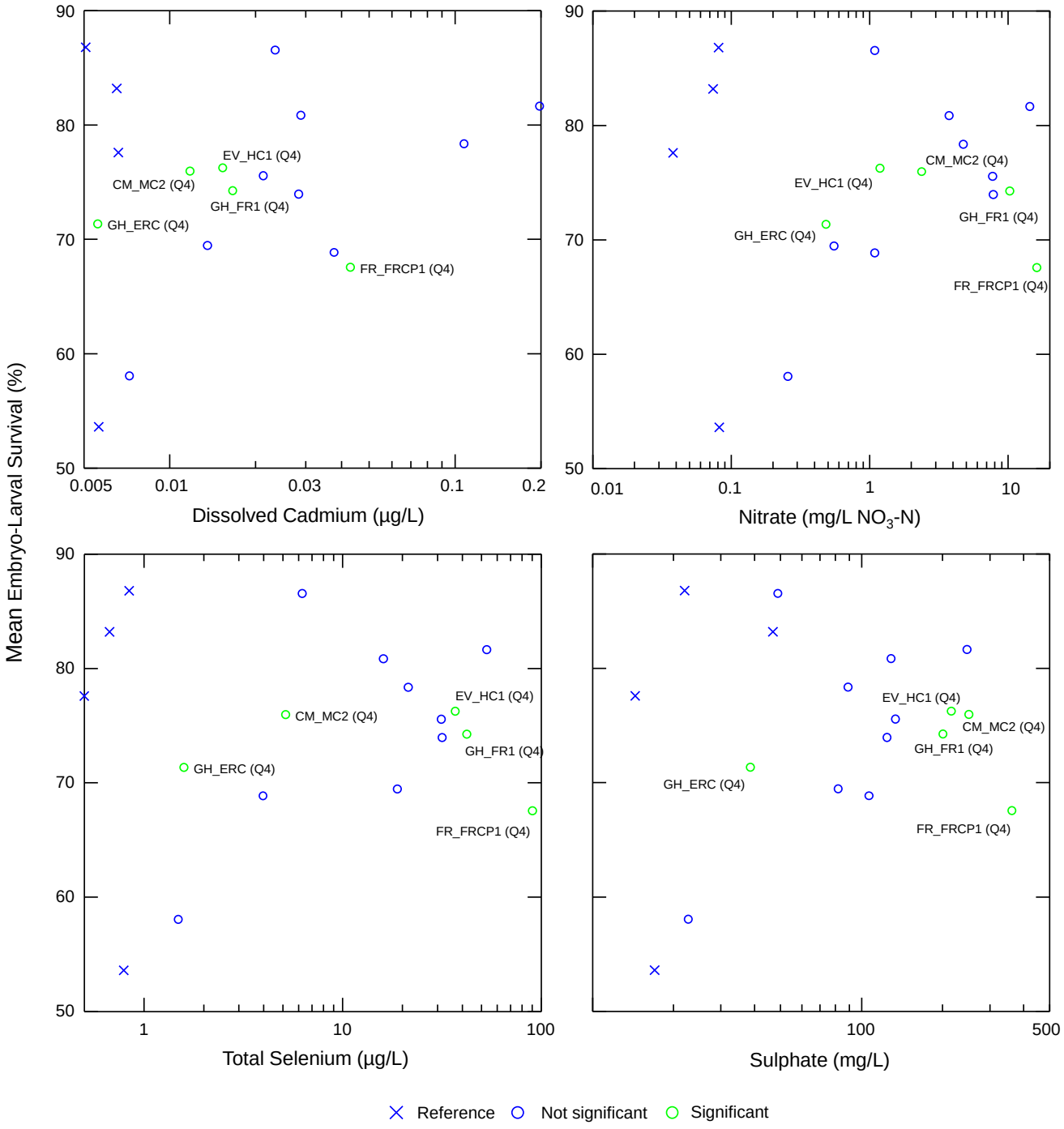
- **FR_FRCP1 (Q4)**. Concentrations of alkalinity, titanium, and uranium in this test were higher than reference waters and test site waters with non-significant results, but this difference was small (less than 10%). Therefore, these parameters are unlikely to be the cause of observed responses. Lithium, nitrate, selenium, sulphate, and several parameters related to TDS (i.e., calcium, conductivity, magnesium, major anion sum, major cation sum, and potassium) were also higher than reference waters and test site waters with non-significant results.[10] The lithium concentration in this test (0.04 mg/L) was more than an order of magnitude lower than the reported no observed effect concentration of 1.1 mg/L for embryo-larval survival (Emery et al. 1981), indicating that it is not likely contributing to toxicity. Concentrations of nitrate (16 mg/L NO_3-N), selenium (91 µg/L), sulphate (364 mg/L), and TDS (836 mg/L) in this test were also lower than the effect concentrations reported in the Golder (2013) mixture toxicity study in Fording River water (nitrate IC_{20} = 25 mg/L NO_3-N; selenium no observed effect concentration >139 µg/L; sulphate IC_{20} = 530 mg/L; TDS = 923 mg/L). Therefore, even considering that multiple constituents were higher than test site waters with non-significant results, these parameters are unlikely to be the cause of observed responses. Overall, no water quality parameter was identified as a potential cause of the significant result in this test.

- **GH_ERC (Q4)**. The strontium concentration in this test was higher than test site waters with non-significant results, but this difference was small (less than 5%). Therefore, strontium is unlikely to be the cause of observed responses. Overall, no water quality parameter was identified as a potential cause of the significant result in this test.

- **GH_FR1 (Q4)**. The titanium concentration in this test was higher than test site waters with non-significant results, but this difference was small (less than 5%). Therefore, titanium is unlikely to be the cause of observed responses. Overall, no water quality parameter was identified as a potential cause of the significant result in this test.

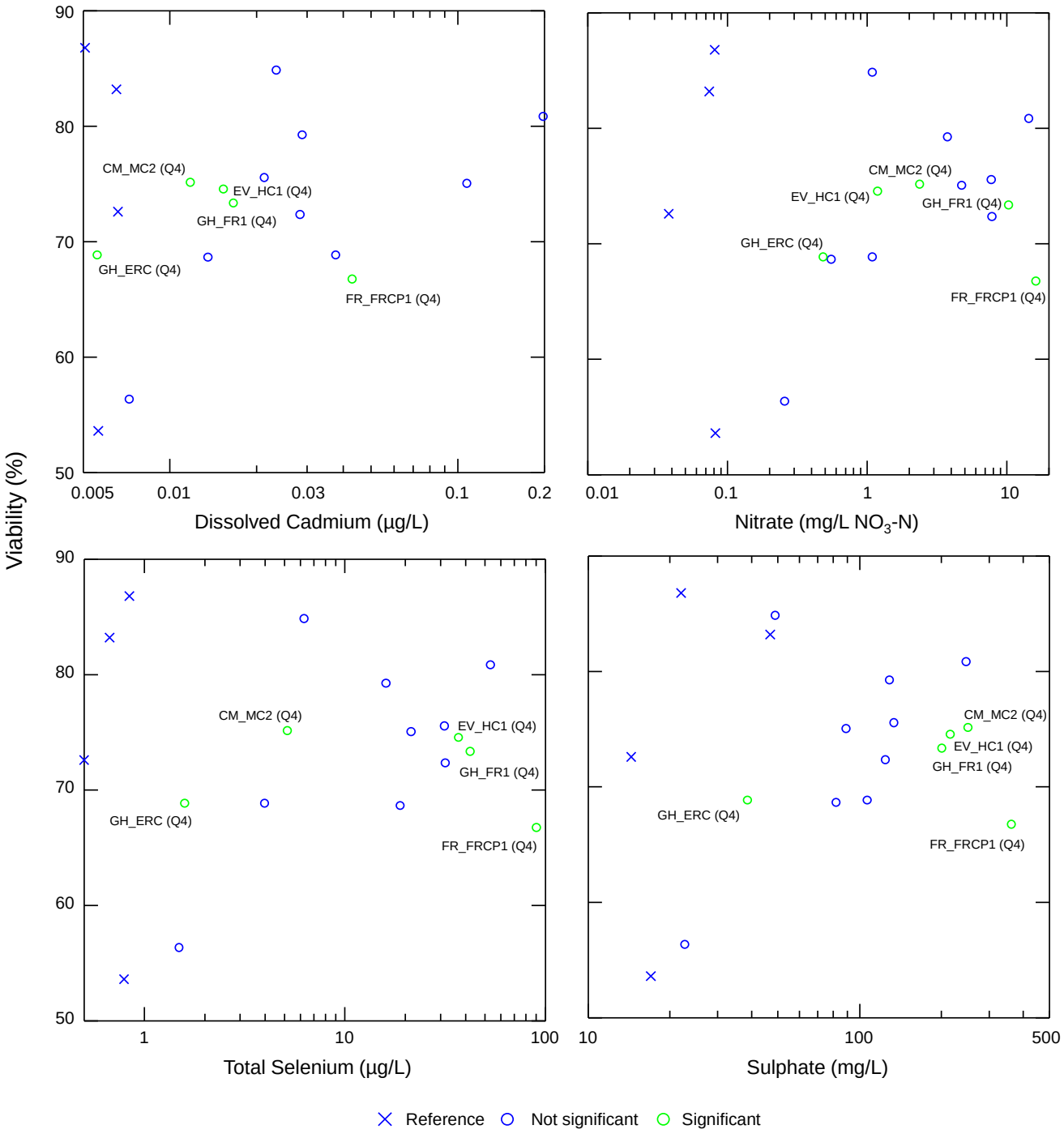
[10] As discussed further in Section 2.4, water quality under winter low flow conditions at FR_FRCP1 is not representative of conditions in the upper Fording River (Teck 2016, pers. comm., 28 March).

Figure 2-27: Mean embryo-larval survival and concentration of dissolved cadmium (top left), nitrate (top right), total selenium (bottom left), and sulphate (bottom right).



Note: Symbols indicate reference waters (blue ×), test site waters with mean results statistically similar to the paired reference (blue ○), and test site waters with mean results significantly lower than the paired reference (green ○; labelled with the test site and quarter).

Figure 2-28: Mean viability and concentration of dissolved cadmium (top left), nitrate (top right), total selenium (bottom left), and sulphate (bottom right).



Note: Symbols indicate reference waters (blue ×), test site waters with mean results statistically similar to the paired reference (blue ○), and test site waters with mean results significantly lower than the paired reference (green ○; labelled with the test site and quarter).

Oncorhynchus mykiss - Length

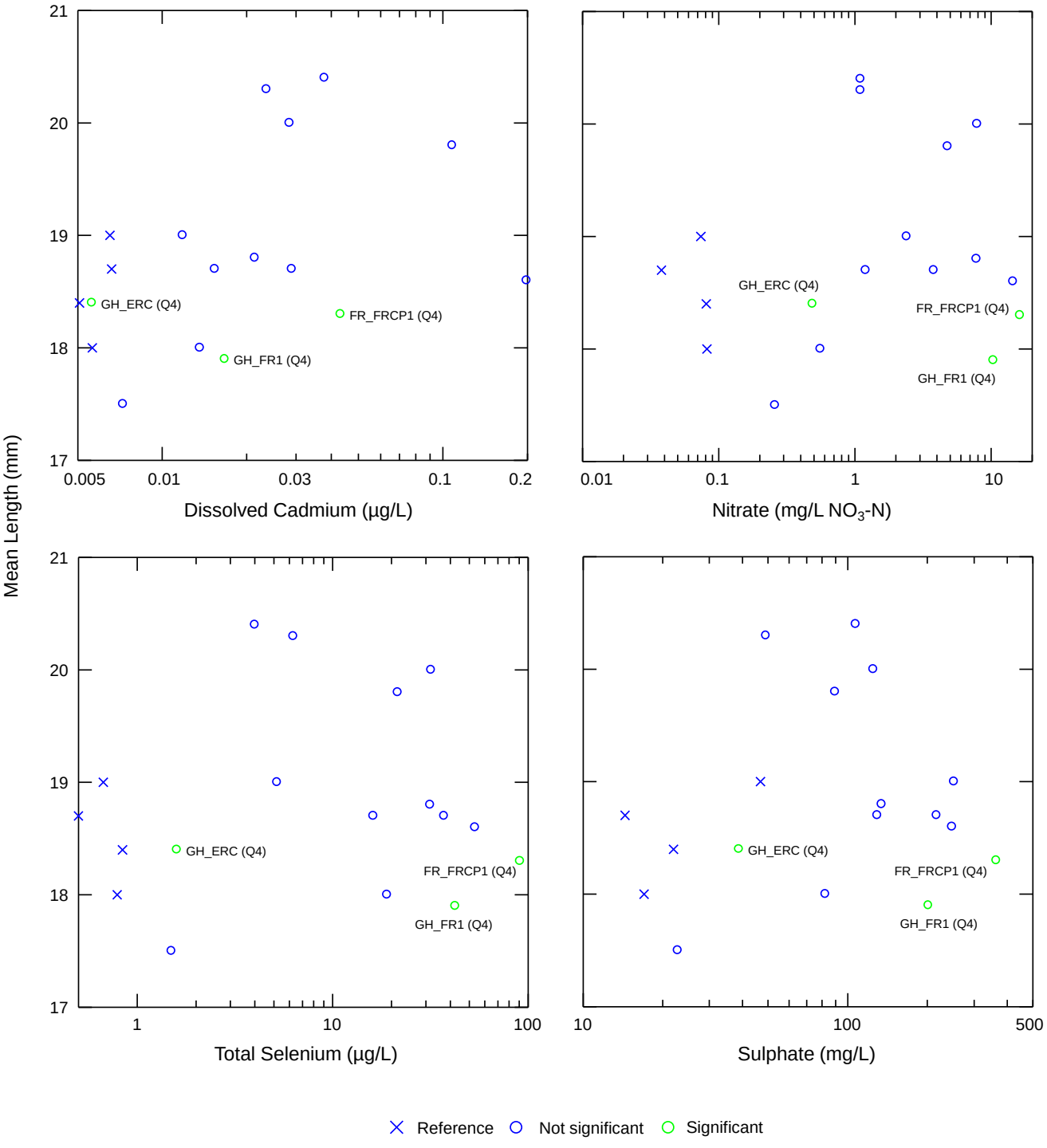
The four Order parameters (dissolved cadmium, nitrate, sulphate, total selenium; Figure 2-29) and one parameter with a statistically significant negative Spearman rank correlation (TDS; Figure 2-30) that did not screen out when compared to water quality guidelines were carried through to graphical analysis (Table D-8). Parameters related to TDS (e.g., alkalinity) also had significant correlations but were not evaluated separately from TDS.

None of the evaluated parameters exhibited a consistent concentration-response relationship across all tests (Figures 2-29 and 2-30). Concentrations of most parameters in tests with a significant result were equal to or lower than concentrations in reference waters and/or test site waters with non-significant results (Table D-4), and/or were lower than the chronic BC WQG (Table D-9). Such parameters are not expected to contribute to toxicity in these tests. Parameters that were greater than concentrations in reference waters and/or test site waters with non-significant results, and that were greater than a chronic BC WQG (when such exists), were:

- **FR_FRCP1 (Q4)**. Concentrations of alkalinity, lithium, and uranium in this test were higher than reference waters and test site waters with non-significant results, but this difference was small (less than 10%). Therefore, these parameters are unlikely to be the cause of observed responses. Lithium, nitrate, selenium, sulphate, and several parameters related to TDS (i.e., calcium, conductivity, hardness, magnesium, major anion sum, major cation sum, and potassium) were also higher than reference waters and test site waters with non-significant results.[11] The lithium concentration in this test was approximately 10% higher than reference waters and/or test site waters with non-significant results, indicating that it is not likely contributing to toxicity. Concentrations of nitrate (16 mg/L NO_3-N), selenium (91 µg/L), sulphate (364 mg/L), and TDS (836 mg/L) in this test were lower than effect concentrations reported in the Golder (2013) mixture toxicity study in Fording River water (nitrate IC_{20} = 25 mg/L NO_3-N; selenium >139 µg/L; sulphate IC_{20} = 530 mg/L; TDS = 923 mg/L). Therefore, even considering that multiple constituents were higher than test site waters with non-significant results, these parameters are unlikely to be the cause of observed responses. Overall, no water quality parameter was identified as a potential cause of the statistically significant result in this test.
- **GH_ERC and GH_FR1 (Q4)**. No water quality parameter was identified as a potential cause of the statistically significant results in these tests.

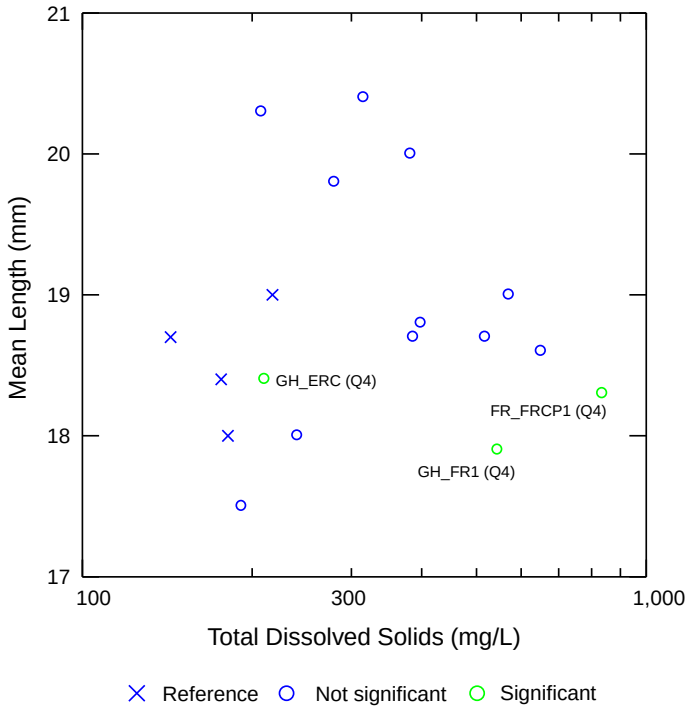
[11] As discussed further in Section 2.4, water quality under winter low flow conditions at FR_FRCP1 is not representative of conditions in the upper Fording River (Teck 2016, pers. comm., 28 March).

Figure 2-29: Mean length and concentration of dissolved cadmium (top left), nitrate (top right), total selenium (bottom left), and sulphate (bottom right).



Note: Symbols indicate reference waters (blue ×), test site waters with mean results statistically similar to the paired reference (blue ○), and test site waters with mean results significantly lower than the paired reference (green ○; labelled with the test site and quarter).

Figure 2-30: Mean length and concentration of total dissolved solids.



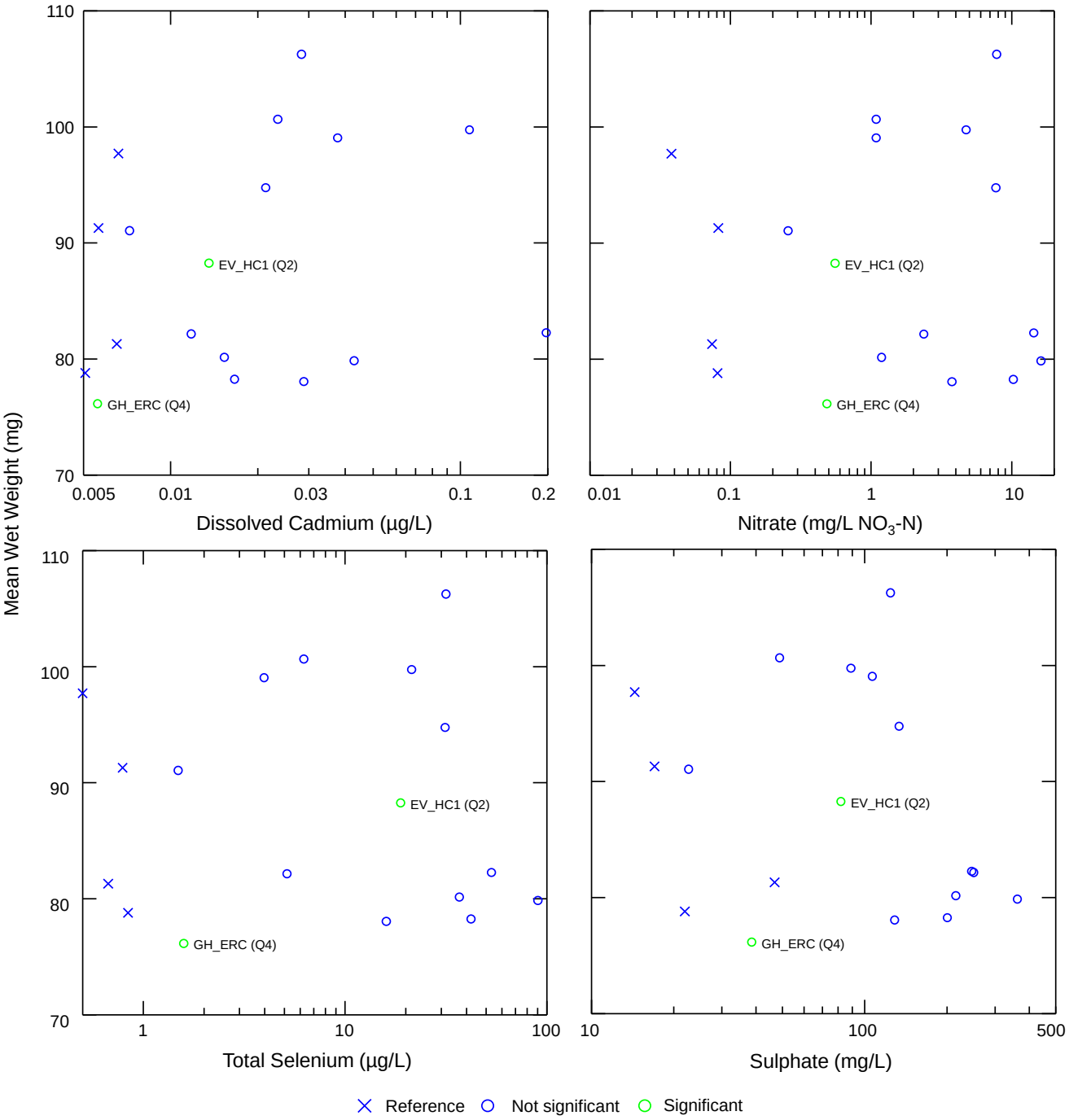
Note: Symbols indicate reference waters (blue ×), test site waters with mean results statistically similar to the paired reference (blue ○), and test site waters with mean results significantly lower than the paired reference (green ○; labelled with the test site and quarter).

Oncorhynchus mykiss - Weight

The four Order parameters (dissolved cadmium, nitrate, sulphate, total selenium; Figure 2-31) and two parameters with statistically significant negative Spearman rank correlations (total strontium, TDS; Figure 2-32) that did not screen out when compared to water quality guidelines were carried through to graphical analysis (Table D-8). Parameters related to TDS (e.g., alkalinity) also had significant correlations but were not evaluated separately from TDS.

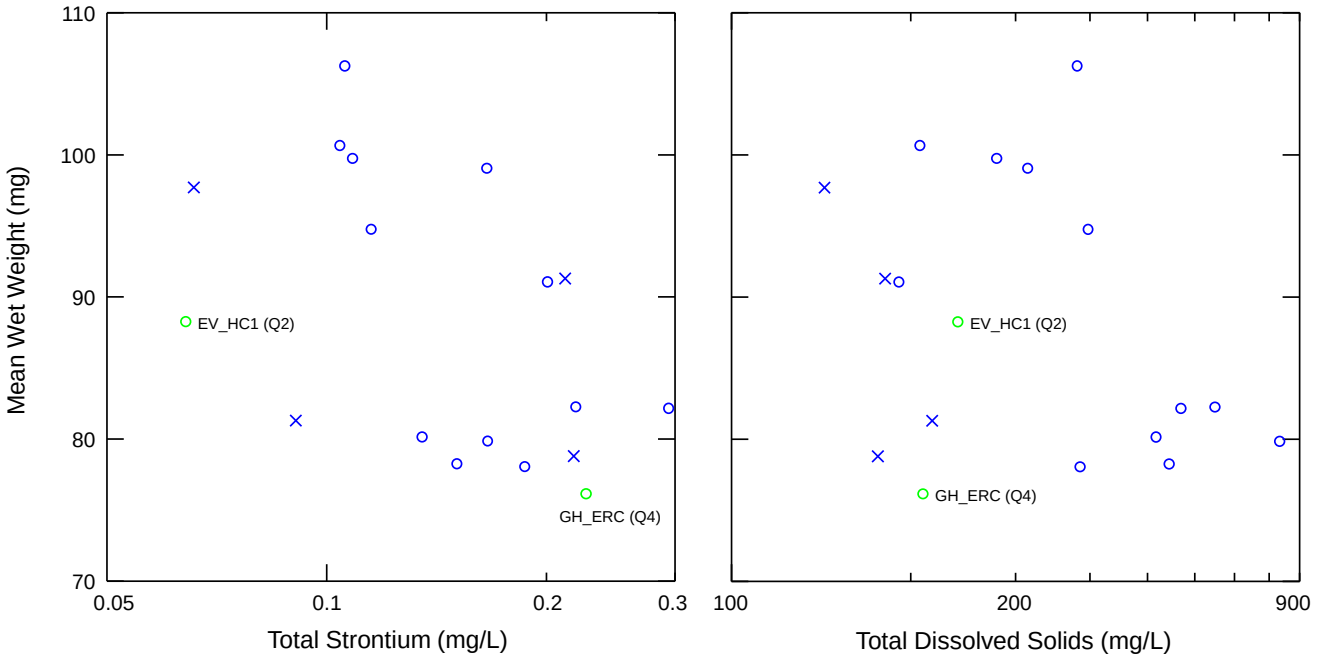
None of the evaluated parameters exhibited a consistent concentration-response relationship across all tests (Figures 2-31 and 2-32). Wet weight was significantly reduced in only two tests (Q2 EV_HC1, Q4 GH_ERC) relative to reference waters. Concentrations of all parameters in these tests were equal to or lower than concentrations in reference waters and/or test site waters with non-significant results (Table D-4). Therefore, no water quality parameter was identified as a potential cause of the statistically significant results in these tests.

Figure 2-31: Mean weight and concentration of dissolved cadmium (top left), nitrate (top right), total selenium (bottom left), and sulphate (bottom right).



Note: Symbols indicate reference waters (blue ×), test site waters with mean results statistically similar to the paired reference (blue ○), and test site waters with mean results significantly lower than the paired reference (green ○; labelled with the test site and quarter).

Figure 2-32: Mean weight and concentration of dissolved total strontium (left) and total dissolved solids (right).



Note: Symbols indicate reference waters (blue ×), test site waters with mean results statistically similar to the paired reference (blue ○), and test site waters with mean results significantly lower than the paired reference (green ○; labelled with the test site and quarter).

2.4 Summary

Ceriodaphnia dubia

A total of 36 tests were conducted with *C. dubia* in 2015, including eight tests with reference waters and 28 tests with waters collected from test sites. There was no evidence of adverse effects on *C. dubia* survival in any of the tests. Reproduction was significantly reduced relative to reference in two FR_FRCP1 tests (Q1 and Q4), two CM_MC2 tests (Q2 and Q4), and one LC_LCDSSLCC test (Q2). With the exception of the LC_LCDSSLCC test, responses in one or more (but not all) replicates in these tests were lower than the normal variability observed in the Fording River and Elk River reference tests in 2015.

In four of the five tests, no water quality parameter was identified as a potential cause of the statistically significant results in these tests. In the FR_FRCP1 Q1 test, there were several parameters that may have contributed to the observed response in this test, including nitrate, selenium, sulphate, and TDS.

Pseudokirchneriella subcapitata

A total of 36 tests were conducted with *P. subcapitata* in 2015, including eight tests with reference waters and 28 tests with waters collected from test sites. Cell yield was significantly reduced in 12 tests relative to either the Fording River or Elk River reference water. For nine of those statistically significant responses, evidence for adverse effects was equivocal because cell yield was significantly reduced relative to one but not both reference waters and/or was within the normal range of responses for pooled reference tests. In three tests (Q1 EV_HC1 and FR_FRCP1; Q2 LC_LCDSSLCC), cell yield was significantly lower than reference and all replicates were lower than the normal variability observed in reference waters.

For nine of the tests with statistically significant results, including the Q1 EV_HC1 and Q2 LC_LCDSSLCC tests in which all replicates were lower than the normal variability observed in reference waters, no water quality parameter was identified as a potential cause of the significant result.

For three of the tests with statistically significant results, including the Q1 FR_FRCP1 test in which all replicates were lower than the normal variability observed in reference waters, one or more parameters was identified that may have contributed to the observed response. Parameters that may have contributed to the response in the Q1 FR_FRCP1 test include selenium, sulphate, TDS, lithium, and titanium.

Hyalella azteca

A total of 16 tests were conducted with *H. azteca* in 2015, including 4 tests with reference waters and 12 tests with waters collected from test sites. There was no evidence of adverse effects on *H. azteca* survival in any test, with the exception of a significant reduction in one Q3 test (CM_MC2) that had an unusual distribution of mortality among replicates and therefore may not reflect an adverse response to the test water. Dry weight was significantly reduced compared to the reference in two tests, although one of those was similar to the mean reference response in 2015 and within the normal range of responses for pooled reference tests, and the statistically significant result appears to reflect higher-than-average performance of the paired reference test. No water quality parameter was identified as a potential cause of either statistically significant result.

Oncorhynchus mykiss

A total of 18 tests were conducted with *O. mykiss* in 2015, including two Q2 tests and two Q4 tests with reference waters and seven Q2 tests and seven Q4 tests with waters collected from test sites. The only adverse effect on *O. mykiss* endpoints in any Q2 test was a reduction in weight in one test (EV_HC1). In Q4, survival and viability were significantly reduced in five tests (FR_FRCP1, GH_FR1, GH_ERC, EV_HC1, CM_MC2), length was significantly reduced in three tests (FR_FRCP1, GH_FR1, GH_ERC), and weight was significantly reduced in one test (GH_ERC) relative to one or both reference waters. Evidence for adverse effects was equivocal in all cases. Mean responses in test waters were similar to the mean reference response in 2015 and all replicates were within the normal range of responses for pooled reference tests. The statistically significant results appear to reflect higher-than-average performance of the paired reference tests, combined with relatively low variability among replicates in the test waters. It is unlikely that these responses indicate an adverse response to the test waters.

For tests with statistically significant reductions in length and weight, as well as three of the five tests with statistically significant reductions in survival and viability (FR_FRCP1, GH_FR1, GH_ERC), no water quality parameter was identified as a potential cause of the result. A single parameter was identified in the Q4 CM_MC2 test (sodium) and Q4 EV_HC1 test (alkalinity carbonate) as having a concentration higher than tests with non-significant results.

Pimephales promelas

There was no evidence of adverse effects on hatch, length, or normal development of *P. promelas*. Survival and biomass were reduced relative to the Fording River reference water in three tests, but a toxicity identification evaluation showed that these effects were likely caused by microbiological components of the river water under laboratory test conditions, rather than by chemical toxicants.

Overall Summary

There was no evidence of adverse effects in the majority of quarterly and semi-annual toxicity tests conducted in test site waters with *C. dubia* (23 of 28 tests), *P. subcapitata* (16 of 28 tests), *H. azteca* (10 of 12 tests), and *O. mykiss* (8 of 14 tests). Of the tests for which a statistically significant response was identified in the laboratory reports, most were consistent with normal variability in the performance of test organisms and water chemistry did not indicate any parameters with potential to cause adverse effects.

Two tests exhibited a response that was statistically significantly different from reference, outside the normal range of variability of test organism performance, and that were potentially attributable to water quality constituents in test waters. Statistically significant adverse responses in Q1 tests with *C. dubia* and *P. subcapitata* at FR_FRCP1 were associated with the highest concentrations of most parameters across all tests, and several parameters, including nitrate and sulphate, were higher than chronic BC WQG and/or effects concentrations determined in previous mixture toxicity testing with Elk Valley waters.

Water quality under winter low flow conditions at FR_FRCP1 is not representative of conditions in the upper Fording River (Teck 2016, pers. comm). The reach of the river upstream of FR_FRCP1 goes dry during low flow periods of the year. Current water quality and quantity data indicate that surface water present at FR_FRCP1 during low flow conditions is predominantly mine discharge water from Cataract Creek rather than receiving environment conditions in the Fording River. This observation may assist in explaining water quality data and chronic toxicity results obtained at FR_FRCP1 during low flow periods (Q1 and Q4) in 2015.

2.5 Uncertainty Assessment

Sources of uncertainty associated with the interpretation of the quarterly and semi-annual toxicity testing program were:

- **Natural variability in reference response**. Variability observed in reference responses in 2015 may reflect normal variability in test organism performance, but could also reflect seasonal variation in reference water chemistry. Because test organism responses showed similar seasonal trends in laboratory control water (which is consistent across quarters) and reference waters, the variability in reference response appears to be related to the natural variability in the test organisms themselves, rather than seasonal changes in water quality.
- **Pairing of water quality and response data**. For the *H. azteca* and *O. mykiss* tests, fresh water samples were collected on a weekly basis for the duration of the test. The effects data for these tests were paired with the mean concentration of the weekly samples. In the concentration-response analysis, potential causes of toxicity were evaluated by comparing the mean water quality to water quality observed in tests that did not have significant effects, chronic BC WQGs, and effect concentrations reported in the literature. If concentrations of water quality parameters were higher in one of the weekly samples, then examination of weekly samples may have resulted in different conclusions regarding potential causes of test responses. Conversely, elevated concentrations in one of the weekly samples may have caused mean parameter concentrations to be higher than concentrations measured in tests that did not have significant effects. These parameters may have been identified as potential causes of toxicity, even though adverse effects were not related to these parameters. Water quality is expected to have low variability across consecutive weekly samples, and average concentrations are expected to provide a reasonable estimate of relevant exposure

conditions for the test organisms; therefore, this uncertainty is not expected to affect the overall interpretation of the quarterly and semi-annual toxicity testing program.

- **Confounding effects in the *P. promelas* test**. The *P. promelas* test has been shown to be susceptible to confounding microbiological factors, and may need to be modified for testing natural site waters from the Elk Valley. The toxicity identification evaluation conducted by Nautilus provided supporting information for the interpretation of test results. However, the confounding effects impaired the usefulness of this test in the chronic toxicity testing program.

2.6 Recommendations

Recommendations for future quarterly and semi-annual toxicity testing programs are:

- **Modify *P. promelas* test procedures**. Nautilus concluded that it is highly likely that adverse effects observed in the *P. promelas* quarterly tests have been caused by microbiological components of the samples, rather than by chemical toxicants. This conclusion is supported by the fact that adverse effects were observed in samples collected upstream and downstream of mine operations, and that this type of effect on *P. promelas* has been documented elsewhere. The usefulness of this test for the chronic toxicity testing program would be improved by modifying the test procedure to avoid confounding microbiological effects.
- **Continue toxicity testing with Elk River and Fording River reference waters**. Test organism responses in Elk River and Fording River references were usually comparable within a given season. However, in some quarterly tests, responses were significantly different in the two reference waters. Inclusion of both references provided useful information about the natural variability in reference responses and important context for the interpretation of test site results.

3.0 SITE PERFORMANCE OBJECTIVE MIXTURE STUDY

3.1 Overview

The site performance objectives (SPO) mixture study addresses Permit Section 9.8.2 requirements to confirm that when nitrate, selenium, sulphate, and cadmium are present together in surface waters at the long-term SPO concentrations, the waters are not toxic to sensitive aquatic species relevant to the Elk Valley. To address this permit requirement, mixture toxicity tests were undertaken with *C. dubia*, *P. subcapitata*, *H. azteca*, *P. promelas*, and *O. mykiss*. A study design for the mixture toxicity tests was submitted to BC MOE on 30 April, 2015 (Golder 2015).

This section provides an overview of the 2015 SPO mixture study, including methods (Section 3.2), results (Section 3.3), summary of findings (Section 3.3.3), uncertainty (Section 3.5), and recommendations (Section 3.6).

3.2 Methods

3.2.1 Field

Water samples were collected from the reference locations (upstream of mining areas) and test sites (downstream of mining areas) on four occasions (November 30 and December 7, 14 and 21, 2015) at approximately weekly intervals during the studies as shown in Table 4. Water samples were submitted to the Nautilus laboratories in Burnaby, BC and Calgary, AB for toxicity testing (Section 3.2.2) and to ALS for chemical analysis. Water collection dates and locations of reference and test sites are provided in Appendix E.

Table 4: Reference Locations and Tests Sites used in the SPO Mixture Toxicity Testing

Watercourse	Reference or Test Site	Teck Station ID[(a)]	EMS Location ID
Fording River	Reference	FR_UFR1	E216777
	Test Site	GH_FR1	200378
Elk River	Reference	GH_ER2	200389
	Test Site	EV_ER4	200027

(a) Stations are listed from upstream to downstream for a given watercourse.

3.2.2 Laboratory

Test organisms and procedures used in the SPO mixture program followed requirements outlined in Permit Section 9.8(ii). An overview of the program is provided in Table 5. The laboratory report (Appendix E) presents detailed methodology, raw data, laboratory notes, quality assurance overview, and statistical significance tests, per protocol requirements.

Ceriodaphnia dubia, *P. subcapitata*, *H. azteca,* and *O. mykiss* tests were conducted at the Nautilus laboratory in Burnaby, BC. *Pimephales promelas* tests were conducted at the Nautilus laboratory in Calgary, AB.

Table 5: Summary of SPO Mixture Testing

Test Species	Test Duration [days]	Endpoint(s)	Test Protocol
Ceriodaphnia dubia	7	Survival and reproduction	Environment Canada (2007a)
Pseudokirchneriella subcapitata	3	Cell yield	Environment Canada (2007b)
Hyalella azteca	28	Survival and growth	Modified from US EPA (2000), as described in Norberg-King et al. (2014)
Pimephales promelas	28	Survival, hatch, length, biomass, normal development	US EPA (1996) and ASTM (2013)
Oncorhynchus mykiss	30	Survival, viability, length, weight	Environment Canada (1998)

Upon receipt at the laboratory, subsamples of test site waters (GH_FR1 and EV_ER4) were collected and submitted for laboratory analysis of calcium, magnesium, sulphate, selenium and cadmium concentrations. Test site waters were then spiked with sodium nitrate, calcium sulphate, magnesium sulphate, sodium selenate and cadmium chloride to increase concentrations to the long-term SPOs for each location (Table 6; chemistry of amended samples is reported in Appendix E). Sulphate was added as calcium sulphate and magnesium sulphate to produce a calcium to magnesium ratio consistent with mine-influenced waters in the Elk Valley. The resulting test water hardness was then used to calculate hardness-dependent SPOs for nitrate in Fording River water and cadmium in both waters. For the *P. promelas* test, 20 µg/L copper was added to the reference and full strength amended SPO mixtures to inhibit microbial growth (see Section 2.3.2). Reference waters were not amended.

Table 6: Analytical Chemistry Summary for Site Performance Objective Mixtures

Analyte	SPO mixture Target	Burnaby SPO Mixture	Calgary SPO Mixture
Elk River – EV_ER4			
Nitrate [mg/L as N]	3	3.7 ± 0.3	3.7 ± 0.2
Sulphate [mg/L]	429	466 ± 23	517 ± 65
Cadmium [µg/L]	0.64	0.6 ± 0.03	1.02 ± 0.03
Selenium [µg/L]	19	22 ± 3	18 ± 2
Hardness [mg/L as $CaCO_3$]	n/a	631 ± 18	685 ± 76
Fording River – GH_FR1			
Nitrate [mg/L as N]	20	21.6 ± 0.7	21.0 ± 0.3
Sulphate [mg/L]	429	452 ± 23	502 ± 49
Cadmium [µg/L]	0.64	0.56 ± 0.04	0.97 ± 0.09
Selenium [µg/L]	57	57 ± 4	54 ± 2
Hardness [mg/L as $CaCO_3$]	n/a	642 ± 68	716 ± 32

Notes: Burnaby SPO mixture was used in *C. dubia, P. subcapitata, H. azteca,* and *O. mykiss* tests. Calgary SPO mixture was used in *P. promelas* tests.

Results presented as mean ± standard deviation.

SPO = site performance objective; n/a = not applicable; mg/L = milligrams per litre; ± = plus or minus.

The SPO mixtures summarized in Table 6 were tested in a dilution series at 100% vol/vol, 67% vol/vol, 44% vol/vol, and 30% vol/vol. The treatments are expressed as percentages of full strength SPO mixtures on a volumetric basis (vol/vol), not on a contaminant mass or concentration basis. This is because the dilution waters contain background concentrations of each substance so the percentages of long-term SPO concentrations represented by these treatments will vary by constituent. The dilution series for *P. subcapitata* (following nutrient addition per test protocols) was 95.2% vol/vol, 63.8% vol/vol, 42.7% vol/vol, and 28.6% vol/vol.

3.2.3 Data Analysis

Quality Assurance

The laboratory report for the SPO mixture tests (Appendix E) includes a quality assurance section. Quality assurance information was reviewed and summarized to establish that organism performance in laboratory control water met acceptability criteria for the protocol as it pertains to the health histories and sensitivity of the organisms.

Evaluation of Control and Reference Performance

Test organism responses in laboratory control water, Fording River reference water, and Elk River reference water were compared. Where there was no statistically significant difference in responses between Fording and Elk River reference waters, response data were pooled. Where a statistically significant difference was observed, results from the Elk River reference water were used for comparison to the Elk River SPO mixture, and results from the Fording River reference water were used for comparison to the Fording River SPO mixture.

Evaluation of Test Results

Results of each test were compared to the relevant reference water results. Statistical analyses were conducted using CETIS™ (Tidepool Scientific Software 2013) to identify test waters with mean results significantly lower than mean response in Fording or Elk River reference waters.

3.3 Results

3.3.1 Quality Assurance/Quality Control

Detailed laboratory QA/QC information is provided in the Nautilus report (Appendix E). In summary:

- Health histories of the test organisms used in the exposures were acceptable and met requirements of the Environment Canada protocols.
- Tests met all control acceptability criteria.
- Water quality parameters remained within ranges specified in the protocol throughout the tests[12,13].
- There were no deviations from test methodologies.
- Results of the reference toxicant tests fell within the acceptable range for organism performance of mean and two standard deviations, based on historical results obtained by the laboratory (i.e., the sensitivity of the organisms used in the tests was acceptable).

[12] For the *P. promelas* test on day 23 some of the test solution temperatures fell to 22 to 23ºC, which is below the 25±1ºC specified by the test method. Additionally, dissolved oxygen was slightly above the recommended range of saturation (40-100%) in the same *P. promelas* test on days 23, 24 and 25.

[13] A number of the water samples were partially frozen upon arrival at the laboratory due to the locations being frozen and containing ice at the time of collection. Samples were thawed and composited before use in toxicity testing.

3.3.2 Evaluation of Control and Reference Performance

No significant difference in endpoint response was observed for any test species between laboratory control and reference waters. Results are provided in Appendix E, summarized in Table 7, and discussed below.

Ceriodaphnia dubia

Survival was 100% in all tests conducted with reference and laboratory control waters. Mean reproduction was slightly higher in reference waters compared with control water, although the difference was not statistically significant.

Pseudokirchneriella subcapitata

Cell density was significantly higher in the Fording and Elk River reference waters compared to laboratory control water. This is a common response, which is consistent with the higher nutrient concentrations and higher ionic strength in natural waters compared to standard laboratory control water.

Hyalella azteca

Survival and growth showed no statistically significant differences between laboratory control water and reference waters.

Pimephales promelas

Hatch success, survival, biomass, length, and normal development showed no statistically significant differences between the laboratory control water and reference waters. An additional copper control was included in the *P. promelas* tests because low doses of copper were added to reference and full strength SPO amended test waters to inhibit microbial growth (see Section 2.3.2). Results for the copper control were not significantly different from the laboratory control or reference waters.

Oncorhynchus mykiss

Survival, viability, length, and weight showed no statistically significant differences between reference and laboratory control waters.

Table 7: Summary of Site Performance Objective Mixture Toxicity Test Results

Test	*C. dubia*		*P. subcapitata*[(a)]	*H. azteca*		*P. promelas*					*O. mykiss*				Summary of Responses
	Survival [%]	Reproduction [neonates]	Cell Density [x 10^4 cells/mL]	Survival [%]	Growth [mg dry weight]	Hatch [%]	Survival [%]	Biomass [mg]	Length [mm]	Normal Development [%]	Survival [%]	Viability [%]	Length [mm]	Wet Weight [mg]	
Fording River – GH_FR1															
Laboratory water control	100	17.0 ± 3.3	28.6 ± 2.5	100 ± 0.0	0.92 ± 0.03	96.7 ± 3.8	88.3 ± 3.3	0.9 ± 0.0	8.1 ± 0.4	100.0 ± 0.0	83.1 ± 6.4	79.7 ± 8.6	18.6 ± 0.4	83.3 ± 5.1	Control response
Copper Control	-	-	-	-	-	98.3 ± 3.3	73.3 ± 18.9	1.0 ± 0.2	8.8 ± 0.3	98.1 ± 3.8	-	-	-	-	Control response
Fording River Reference	100	22.4 ± 3.9	82.1 ± 6.0	94.0 ± 5.5	0.87 ± 0.07	98.3 ± 3.3	86.7 ± 7.7	1.0 ± 0.1	8.7 ± 0.2	100.0 ± 0.0	74.4 ± 8.9	70.2 ± 11.4	18.6 ± 0.4	83.4 ± 3.7	Control response
30% vol/vol	100	25.0 ± 1.9	72.4 ± 10.2	98.0 ± 4.5	0.86 ± 0.13	98.3 ± 3.3	80.0 ± 16.3	1.1 ± 0.0	9.5 ± 0.2	100.0 ± 0.0	79.9 ± 3.7	74.8 ± 1.7	18.0 ± 0.2	80.7 ± 3.2	No adverse effects in any test
44% vol/vol	100	22.8 ± 3.8	73.1 ± 7.9	98.0 ± 4.5	0.85 ± 0.16	100.0 ± 0.0	90.0 ± 8.6	1.2 ± 0.2	8.8 ± 0.2	100.0 ± 0.0	79.0 ± 13.2	77.4 ± 13.6	18.1 ± 0.5	80.6 ± 6.6	No adverse effects in any test
67% vol/vol	100	23.4 ± 3.2	96.9 ± 16.2	100 ± 0.0	0.77 ± 0.13	100.0 ± 0.0	85.0 ± 6.4	1.1 ± 0.1	9.5 ± 0.3	100.0 ± 0.0	76.2 ± 11.6	73.0 ± 9.5	16.6 ± 0.9	77.3 ± 4.1	No adverse effects in any test
100% vol/vol	100	19.9 ± 4.1	98.6 ± 14.6	96 ± 7.0	0.76 ± 0.10	100.0 ± 0.0	86.7 ± 10.7	1.1 ± 0.2	9.5 ± 0.3	100.0 ± 0.0	70.0 ± 9.6	67.5 ± 8.0	17.1 ± 0.5	74.6 ± 6.5	No adverse effects in any test
Elk River – EV_ER4															
Laboratory water control	100	17.7 ± 3.2	28.6 ± 2.5	98.0 ± 4.5	0.85 ± 0.12	96.7 ± 3.8	88.3 ± 3.3	0.9 ± 0.0	8.1 ± 0.4	100.0 ± 0.0	83.5 ± 2.7	79.3 ± 3.3	18.2 ± 0.4	87.3 ± 9.0	Control response
Copper Control	-	-	-	-	-	98.3 ± 3.3	73.3 ± 18.9	1.0 ± 0.2	8.8 ± 0.3	98.1 ± 3.8	-	-	-	-	Control response
Elk River Reference	100	22.1 ± 2.8	89.8 ± 7.6	100.0 ± 0.0	0.84 ± 0.12	96.7 ± 6.7	78.3 ± 10.0	1.1 ± 0.1	8.7 ± 0.4	96.2 ± 7.7	70.5 ± 17.4	69.6 ± 18.2	18.1 ± 0.3	81.5 ± 1.2	Control response
30% vol/vol	100	21.4 ± 3.6	88.8 ± 6.7	98.0 ± 4.5	0.85 ± 0.11	98.3 ± 3.3	81.7 ± 16.7	1.0 ± 0.2	9.4 ± 0.4	100.0 ± 0.0	78.2 ± 2.2	73.8 ± 4.0	18.2 ± 0.6	91.6 ± 9.9	No adverse effects in any test
44% vol/vol	100	19.7 ± 5.1	95.0 ± 7.5	96.0 ± 8.9	0.75 ± 0.31	98.3 ± 3.3	90.0 ± 3.8	1.0 ± 0.1	8.3 ± 0.2	100.0 ± 0.0	78.2 ± 8.5	76.6 ± 8.4	19.0 ± 0.3	89.7 ± 8.7	No adverse effects in any test
67% vol/vol	100	19.2 ± 4.6	114.5 ± 6.8	100.0 ± 0.0	0.79 ± 0.31	100.0 ± 0.0	93.3 ± 7.7	1.1 ± 0.0	8.7 ± 0.2	100.0 ± 0.0	83.2 ± 9.4	78.1 ± 8.5	19.1 ± 0.5	97.2 ± 3.3	No adverse effects in any test
100% vol/vol	90	18.6 ± 6.5	94.9 ± 12.5	64.0 ± 47.6	0.63 ± 0.18	99.2 ± 2.4	87.5 ± 13.5	1.1 ± 0.1	8.9 ± 0.4	100.0 ± 0.0	86.6 ± 7.1	83.3 ± 8.4	19.0 ± 0.5	97.0 ± 5.0	No adverse effects in any test

[(a)] Test dilutions for algae were 28.6% vol/vol, 42.7% vol/vol, 63.8% vol/vol and 95.2% vol/vol.

Note: Results presented as mean ± standard deviation except *C. dubia* survival for which only a single survival percentage was reported.

- = not tested; mg = milligrams; cells/mL = cells per millimetre; mm = millimetres; % = percent; vol = volume; ± = plus or minus.

3.3.3 Test Results

Results of the SPO mixture toxicity tests are presented in Table 7. There was no evidence of adverse effects of the SPO mixtures on any test species at any test dilution in either SPO mixture. A discussion of the results for each species is presented below:

Ceriodaphnia dubia Reproduction and Survival

There was no statistically significant adverse effect of either SPO mixture on survival or reproduction of *C. dubia* at any dilution. The LC_{50} was > 100% vol/vol for both SPO mixtures, as were the IC_{25} and IC_{50} (reproduction).

Pseudokirchneriella subcapitata Growth

There was no statistically significant adverse effect of either SPO mixture on *P. subcapitata* cell yield at any dilution. The IC_{25} and IC_{50} (cell density) were > 95.2% vol/vol (the highest dilution tested) for both SPO mixtures.

Hyalella azteca Survival and Growth

There was no statistically significant adverse effect of either SPO mixture on *H. azteca* survival or growth at any dilution. Mean survival in the Elk River SPO mixture at 100% vol/vol was 60% and variability in survival among replicates was very high (standard deviation = 47.6%), although it is uncertain whether this reflected an adverse response to the test mixture. The reduction in mean survival at 100% vol/vol resulted from zero to 10% survival in four replicates, despite 90% to 100% survival in the remaining six replicates. This inconsistency in response among replicates, and consistency in response within each replicate (i.e., survival was either very high or very low), suggests that the mortality may not be attributable to the test mixture, and may instead reflect a confounding factor that affected some but not all replicates in this test. A similar inconsistent response in *H. azteca* survival was seen in the quarterly testing in Q3 at CM_MC2 (Figure 2-15).

For the Fording River SPO mixture, the LC_{50} was > 100% vol/vol, as were the IC_{25} and IC_{50} (growth). For the Elk River SPO mixture, the LC_{50} and IC_{50} (growth – dry weight) were both > 100% vol/vol. The IC_{25} was 99.5% vol/vol for growth (dry weight).

Pimephales promelas Hatch, Survival, Biomass, Length, and Normal Development

There was no statistically significant adverse effect of either SPO mixture on *P. promelas* hatch, survival, biomass, length, or development at any dilution. The EC_{25} and EC_{50} (hatch, survival, and normal development) were > 100% vol/vol, as were the IC_{25} and IC_{50} (biomass and length).

Oncorhynchus mykiss Survival, Viability, Length, and Weight

There was no statistically significant adverse effect of either SPO mixture on *O. mykiss* survival, viability, length, or weight at any dilution. The EC_{25} and EC_{50} (survival and viability) were > 100% vol/vol, as were the IC_{25} and IC_{50} (length and wet weight).

3.4 Summary

There was no evidence of adverse effects of either SPO mixture on *C. dubia, P. subcapitata, P. promelas* or *O. mykiss* at any dilution. There were unexplained mortalities in four of ten replicates in the *H. azteca* test in the 100% vol/vol Elk River SPO mixture only. However, as discussed above, these mortalities may not be attributable to the SPO mixture. There was no statistically significant effect on survival or growth of *H. azteca* at any dilution.

These results confirm that Elk and Fording River waters meeting the SPOs specified in Permit 107517 are not toxic to sensitive aquatic receptors. Overall, the test results reported herein are consistent with test results that were used to develop water quality benchmarks for the EVWQP.

3.5 Uncertainty Assessment

The findings discussed above are considered to have low uncertainty, given the acceptable QA/QC results and consistently acceptable performance of control and reference organisms for all test species. With a single exception, all test species and endpoints provided consistent support for the overall finding that SPO mixtures are not toxic to sensitive aquatic organisms.

There is residual uncertainty as to the cause of the unexplained *H. azteca* mortalities in the 100% vol/vol Elk River SPO mixture. These mortalities may have reflected a confounding factor that affected some but not all replicates in that test.

3.6 Recommendations

To address residual uncertainty in the cause of unexplained *H. azteca* mortalities, it is recommended that, if similar results are observed in future *H. azteca* testing, a toxicity identification evaluation be undertaken to assess whether microbial or other confounding factors may have contributed to the observed response.

4.0 WESTSLOPE CUTTHROAT TROUT GAMETE STUDY

4.1 Overview

The Fording River westslope cutthroat trout (WCT) gamete study addresses Permit Section 9.8(i) requirements to evaluate survival and development of WCT gametes obtained from fish utilizing habitats in the Fording River, tributaries, and associated lentic habitats once every three years. This study also addresses requirements of Section 9.8.2 to confirm that surface waters meeting the site performance objectives are not toxic to sensitive aquatic receptors.

This section provides an overview of the 2015 study of WCT gametes reared in water collected from the Fording River and amended with nitrate, sulphate, cadmium and selenium at concentrations corresponding to the SPOs for the Fording River, including methods (Section 4.2), results (Section 4.3), summary of findings (Section 4.4), uncertainty (Section 4.5), and recommendations (Section 4.6).

4.2 Methods

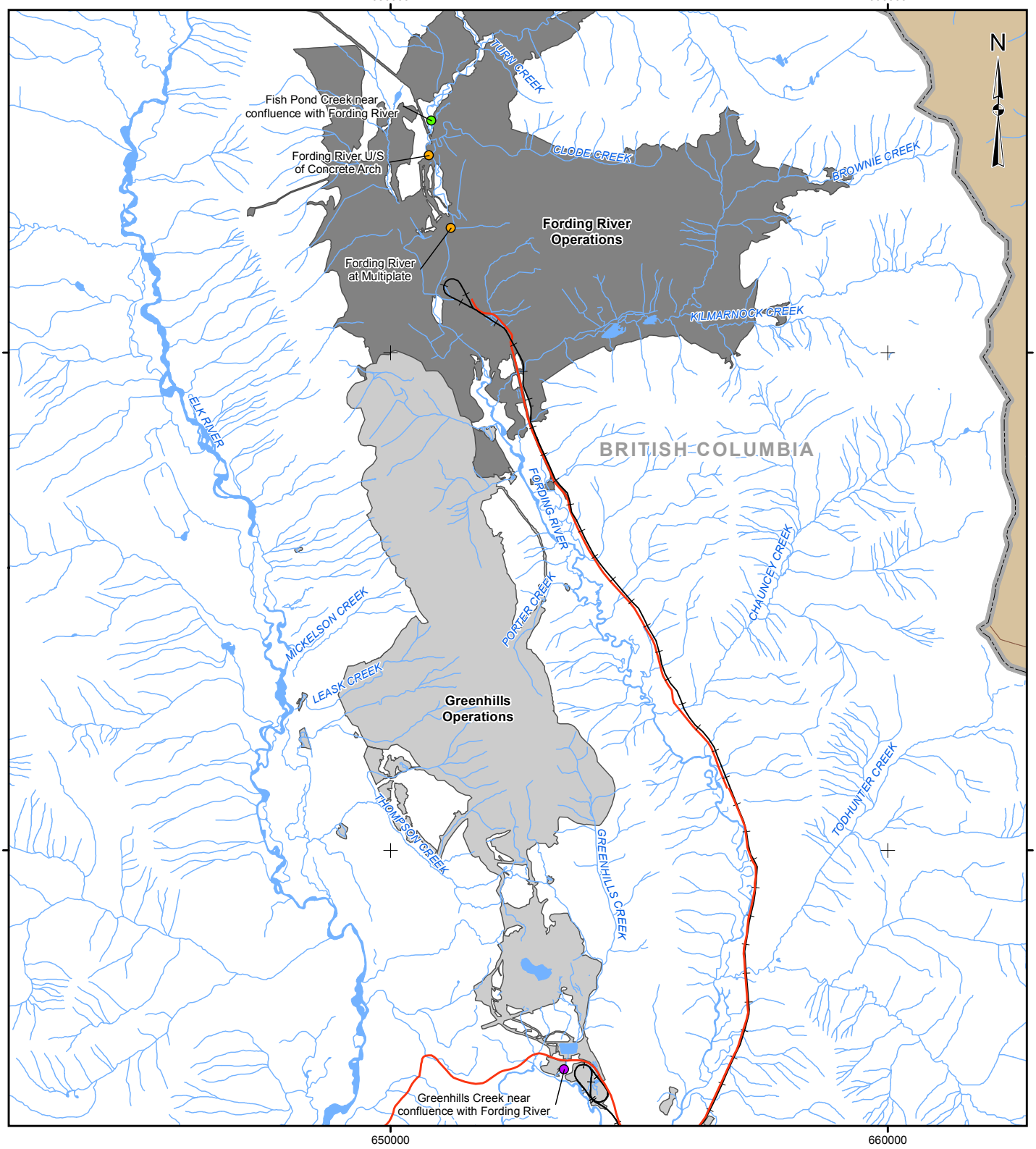
An overview of the field and laboratory methods are provided below. Detailed methodology is provided in Appendix F.

4.2.1 Field

Teck personnel collected water samples from the upper Fording River near the highway bridge, approximately 3.4 km upstream of Order Station FR4 (EMS 200378), on eight occasions at approximately weekly intervals in late spring and early summer. Water samples were submitted to the Burnaby Nautilus laboratory for toxicity testing and to ALS for chemical analysis.

Fish capture was undertaken by Lotic Environmental from May 25 to June 29, 2015, during the time in which fish were migrating to spawn. Fish were captured from the Fording River (U/S Concrete Arch and Multiplate), Greenhills Creek near its confluence with the Fording River, and Fish Pond Creek near its confluence with the Fording River (Figure 4-1). Capture locations were selected on the basis of being representative of fish from the Fording River, since the fish were undergoing active migration to spawning habitat. It was not possible to collect fish in lentic locations because fish would have already migrated into lotic habitats to spawn. Regardless, the fish that were collected would be expected to reflect the Fording River as a whole.

Fish were either spawned on the same day as capture, or were held in a containment area built into a creek if fish were not yet ripe. During collection of gametes, captured adult fish were measured for length (mm). Gamete samples were flown to Vancouver and driven to the Nautilus laboratory were toxicity testing was initiated on the day of receipt. Successful spawning events occurred on June 1, 3, 5, 11, 18, and 29 and eggs from 33 females were delivered to the laboratory.



LEGEND

- CANADIAN PACIFIC RAILWAY
- ROAD
- WATERCOURSE
- BRITISH COLUMBIA - ALBERTA BORDER
- FRO C-3 PERMIT BOUNDARY
- GHO C-137 PERMIT BOUNDARY
- PROVINCIAL PARK / PROTECTED AREA
- WATERBODY

GAZETTED NAME

- FORDING RIVER
- GREENHILLS CREEK
- UNNAMED

2.5 0 2.5

SCALE 1:110,000 KILOMETRES

REFERENCE

Provincial boundaries obtained from The Atlas of Canada, Natural Resources Canada. Alberta hydrography data obtained from NTDB. BC hydrography and transportation obtained from Teck Coal Limited. Provincial Parks/Protected Areas obtained from GeoGratis. Projection: UTM Zone 11 Datum: NAD 83

PROJECT

ELK VALLEY ANNUAL INTERPRETIVE REPORT
2015 CHRONIC TOXICITY TESTING PROGRAM

TITLE

2015 FISH SAMPLING LOCATIONS

Golder Associates

PROJECT No. 1523293			SCALE AS SHOWN	REV. 0
DESIGN	MJ	30 Mar. 2016		
GIS	DR	30 Mar. 2016		
CHECK	EJC	30 Mar. 2016		
REVIEW	ADB	30 Mar. 2016		

FIGURE 4-1

I:\CLIENTS\TECK_COAL\1523293\Mapping\MXD\FishB-Fish-001-2015_FishSampling_Loc.mxd

4.2.2 Laboratory

Upon receipt at the laboratory, a subsample of the collected upper Fording River water was submitted to ALS for analysis of calcium, magnesium, sulphate, selenium and cadmium. Test waters were then spiked with sodium nitrate, calcium sulphate, magnesium sulphate, sodium selenate, and cadmium chloride to increase concentrations to the long-term SPOs for the Fording River (Table 6). Sulphate was added as calcium sulphate and magnesium sulphate to produce a calcium to magnesium ratio consistent with mine-influenced waters in the Elk Valley. Constituent concentrations in the SPO-amended water (± standard deviation) were 21.0 ± 1.3 mg/L nitrate-N, 433 ± 33 mg/L sulphate, 65 ± 16.6 µg/L selenium, and 0.77 ± 0.45 µg/L cadmium.

Upon arrival at the laboratory, eggs and milt were transferred to a temperature-controlled environmental chamber at 12°C. Egg quality was inspected using a dissecting microscope for presence of blood and indicators of ripeness. Eggs from each female were subsampled for analysis of selenium and percent moisture, and the remaining eggs were fertilized. Selenium measurement was conducted by Brooks Applied Labs (Bothwell, WA, USA). Of the 33 egg samples collected (plus three duplicates), two contained too few eggs to be used for the rearing study. One sample was terminated shortly after test initiation as the eggs were not viable.

Milt motility was inspected using a microscope and adding water to the milt on a slide. Milt samples with good mobility, exhibiting vigorous activity, were pooled. Of the seven fertilization events, two were conducted with milt from one male, two were from milt from two males and the remaining three fertilization events were with milt from three or four males.

Fertilization of eggs was conducted in batches by manual addition of milt to the eggs. Twenty minutes after fertilization, eggs were divided into replicates containing either laboratory control water or Fording River water amended with nitrate, sulphate, cadmium, and selenium at concentrations corresponding to SPOs. Four replicates of 30 eggs each were tested for all but two females (further detail is provided in Appendix F). As described in the April 30, 2015 study design (Golder 2015), eggs were reared in laboratory water to fulfill the requirements of Section 9.8(i)[14] and were reared in the SPO mixture water to address Section 9.8.2 (i.e., examine effects of maternal selenium transfer along with water-borne exposure to nitrate, selenium, sulphate and cadmium at long-term SPOs).

Culturing methods were adapted from methodology described by Environment Canada (1998) for conducting early life-stage tests with salmonids. Developing larvae were inspected daily with mortalities removed and recorded. Once the fish reached swim-up stage, lengths and weights were recorded and fish were evaluated for deformities. Deformities were assessed using a graduated severity index.

4.2.3 Data Analysis

Quality Assurance

The laboratory report (Appendix F) includes a quality assurance section. Quality assurance information was reviewed and summarized to establish that organism performance in laboratory control water met acceptability criteria for the protocol as it pertains to the health histories and sensitivity of the organisms. Survival to swim up stage ≥ 70% was the criterion for acceptable performance.

[14] Section 9.8(i) of Permit 107517 states "*Once every three years beginning in 2015, bioassays to evaluate the survival and development (incidence of deformities) of westslope cutthroat trout using gametes obtained from fish utilizing habitats in the Fording River, tributaries, and associated lentic habitats (e.g., Fording River oxbow).The concentrations of selenium in the eggs of each female spawned must be measured.*"

Evaluation of Test Results

As described in Appendix F, Nautilus used linear regression to evaluate the relationship between egg selenium concentration and toxicological endpoints (i.e., survival, length, weight and deformities). Nautilus conducted statistical analyses with the statistical program JMP 12 (SAS Institute 2015).

Mean results for each female were further compared between the two test waters using graphical analysis. Results were interpreted as follows:

- Embryo survival > 70% (i.e., meeting the test acceptability criterion for survival) in both waters indicated good-quality eggs and no adverse effects of selenium or the SPO mixture.
- Embryo survival < 70% in both waters indicated either reduced egg quality or an effect of some constituent of the eggs (i.e., not a water quality effect). A greater degree of reduction in survival in the SPO-amended site water could indicate an effect of the SPO mixture or a confounding effect associated with the site water itself (e.g., microbial effects), although this interpretation is uncertain given the potential for reduced egg quality.
- Embryo survival > 70% in SPO-amended site water but < 70% in laboratory control water indicated variability in test organism performance.
- Embryo survival > 70% in laboratory control water but < 70% in SPO-amended site water indicated either variability in test organism performance (for small reductions in survival), an effect of the SPO mixture, or a confounding effect associated with the site water itself (e.g., microbial effects).

4.3 Results

4.3.1 Quality Assurance/Quality Control

Detailed laboratory QA/QC information is provided in Appendix F. In summary:

- Upon receipt, gametes appeared normal with no indication of damage during handling and transport, and therefore were considered viable for testing.
- Tests met all control acceptability criteria.
- Water quality parameters remained within ranges specified in the protocol throughout the tests. Batch 3 was not sampled for chemistry, but conductivity in batch 3 was similar to other batches, suggesting that water quality was likely similar.
- Replicate subsamples of egg selenium concentrations were within 10% of secondary measurements, indicating reproducibility of results.
- There were no deviations from test methodologies.
- There were minor differences between the analyst scores for fish deformities, but these were minimal and were considered not to affect the results.

4.3.2 Test Results

Effect of Maternally Derived Selenium

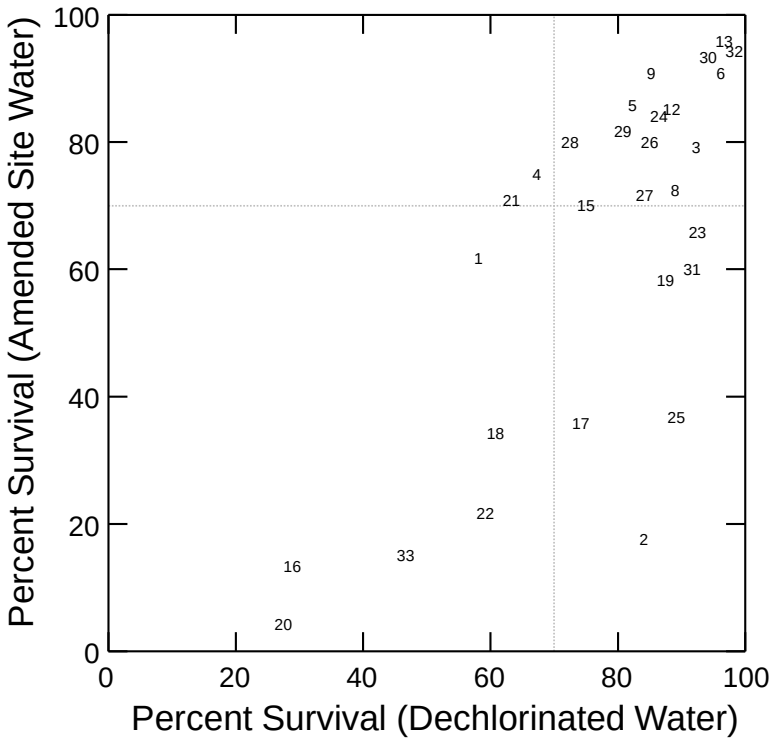
Selenium concentrations in eggs that were successfully reared ranged from 7.1 to 17.4 mg/kg dry weight (dw). All measured selenium concentrations in these eggs were less than the reported EC_{10} of 24.8 mg/kg dw (Nautilus 2011), and no relationship was observed between egg selenium concentration and effect on fry survival, frequency of deformity, length, or weight. A single female was captured with an egg selenium concentration of 38.2 mg/kg dw, but these eggs were not viable and could not be reared. Therefore, it was not possible to develop concentration-response curves for maternally derived selenium, nor to conduct planned statistical comparisons of concentration-response curves between the two test waters (Golder 2015).

Effect of Test Waters

There was no difference between test waters in length or weight of fry or frequency of deformity. There was a significant difference between test waters in fry survival (analysis of covariance; $p < 0.0001$), with on average 21.7% lower survival in SPO-amended site water compared to laboratory control water. However, as shown in Figure 4-2, there was wide variability in responses among females and the relative performance of replicates from the same female in the two test waters was highly variable. Key findings were:

- Eggs from 15 fish had > 70% survival in both waters, indicating good egg quality and no effects of the SPO mixture. As noted in Appendix F, these fish had higher concentrations of maternally-derived selenium than fish that exhibited reduced fry survival. The absence of any adverse response in these fish indicates that the SPO mixture was not toxic, even in combination with maternally-derived selenium.
- Eggs from two fish had slightly reduced survival in laboratory control water only (fish IDs 4 and 21), eggs from three fish had slightly reduced survival in SPO-amended site water only (fish IDs 19, 23, and 31), and eggs from one fish had slightly reduced survival in both test waters (fish ID 1). These responses were similar in magnitude and likely reflect normal variability in the performance of test organisms. In several cases, slightly reduced mean survival was associated with high variability among replicates, indicating that apparent effects may reflect reduced performance of eggs in a single replicate. This observation suggests that effects might have been caused by some confounding factor that varied among test vessels (e.g., microbial components of the site water).
- Eggs from five fish had reduced survival in both waters, and generally greater reductions in survival in SPO-amended site water compared to laboratory control water (fish IDs 16, 18, 20, 22, 33). All egg selenium concentrations were lower than the EC_{10}, and therefore this reduced survival is not expected to be related to maternally derived selenium. These responses likely reflect reduced egg quality (survival in laboratory control water was < 70%) and may reflect an additional effect of the SPO mixture or some other confounding effect of the site water (e.g. microbial components). Given that eggs from 15 fish exposed to the same SPO mixture exhibited no effects, it is more likely that reduced survival was caused by some confounding factor that varied among test vessels.
- Three fish had reduced survival in SPO-amended site water only (fish IDs 2, 17, and 25). These responses could reflect an effect of the SPO mixture or some other component of the site water. As noted in the previous bullet, the overall pattern of responses indicates that reduced survival was more likely caused by some confounding factor that varied among test vessels.

Figure 4-2: Comparison of WCT embryo-alevin survival in dechlorinated water and Fording River water amended to SPO concentrations; dashed lines are 70% survival (the test acceptability criterion); numbers indicate fish identification number.



4.4 Summary

Of the 33 females that were captured, only one had an egg selenium concentration greater than the reported EC_{10} for reproductive effects to WCT, and eggs from that female were inviable. For the eggs that were reared, no effects of maternally derived selenium were observed on fry survival, frequency of deformity, length, or weight. The results of this study support previous selenium toxicity studies with WCT, confirming that reproductive effects are not observed at egg selenium concentrations lower than the EC_{10}.

The range of egg selenium concentrations observed in this study indicates that the majority of fish had not been exposed to elevated dietary selenium. The present study had the objective of characterizing selenium exposures in upper Fording River fish from all habitats, and therefore sampling was conducted at a range of locations to obtain fish moving to spawning areas. The observation that only a single fish was captured with an egg selenium concentration reflective of elevated dietary exposure is consistent with only a small proportion of individuals in the upper Fording River population having egg selenium concentrations higher than the EC_{10}.

A statistically significant difference was found in fry survival between eggs reared in laboratory control water and those reared in Fording River water amended to SPO concentrations; however, the overall pattern of responses did not support attributing these differences to the SPO mixture. The more likely explanation is that there was a confounding factor that affected one or more replicates from some but not all females. The nature of this confounding factor could not be determined, but the results were generally consistent with the sporadic mortality phenomenon observed in quarterly *P. promelas* testing (Section 2.3.2), suggesting that microbial factors may have affected site water test results.

There was no effect of test waters on frequency of deformity, length, or weight of fry.

4.5 Uncertainty Assessment

There is residual uncertainty as to the cause of variable survival of WCT fry in some replicates. As discussed above, the overall pattern of responses implicates a confounding factor, rather than effects of the SPO mixture. However, because the test did not include a site water control, it cannot be confirmed that the effect occurs in the absence of the SPO mixture.

4.6 Recommendations

To address residual uncertainty in the cause of variable fry survival, it is recommended that the study design for the next cycle of the WCT gamete study be refined to evaluate this uncertainty. One option that could be considered would be the addition of a site water control, although this addition would involve splitting each female's complement of eggs into three treatments rather than two, and would thereby reduce the number of eggs in each treatment. Another option would involve prophylactic addition of an antimicrobial treatment, or inclusion of some components of toxicity identification evaluation, as was conducted for *P. promelas*.

5.0 AMPHIBIAN PILOT STUDY

5.1 Overview

Amphibian testing is required as part of the nitrate and sulphate chronic testing program. Section 9.8.1 of the Permit lists amphibians as candidate sensitive species for sulphate testing at high hardness, and the RAEMP approval letter requires additional nitrate toxicity testing, including "amphibian toxicity testing to assess the sensitivity of representative species to nitrate using long-term metamorphosis tests."

This section provides an overview of a pilot study of nitrate and sulphate toxicity to Leopard frog (*Lithobates pipiens*), including methods (Section 5.2), results (Section 5.3), findings (Section 5.4), and recommendations (Section 5.5).

5.2 Methods

A chronic survival, growth and development pilot study was conducted with *L. pipiens* exposed to nitrate and sulphate. Nominal exposure concentrations for the tests ranged from 3.3 to 270 mg/L nitrate-N for nitrate and 500 to 1,000 mg/L for sulphate with dechlorinated municipal tap water as the diluent and control. Solutions for the sulphate test used calcium and magnesium sulphate to obtain a calcium to magnesium ratio typical of mine-influenced waters of the Elk Valley. A reconstituted hard water control (hardness 180 mg/L as $CaCO_3$) was also tested to assess the effect of water hardness on growth and development of *L. pipiens* compared to the soft laboratory control water (hardness 10 mg/L as $CaCO_3$).

Test conditions for the pilot study were adapted from draft methodology described by Environment Canada (Lo et al. 2014). Pre-metamorphosis (Gosner Stage 27) tadpoles were exposed to five treatments of nitrate (3.3, 10, 30, 90 and 270 mg/L nitrate-N) and two treatments of sulphate (500 and 1,000 mg/L) until at least 70% of the control tadpoles reached the onset of metamorphosis (Gosner Stage 42). Three replicates were tested per concentration for nitrate, and two replicates per concentration for sulphate. Endpoints for the test included survival, days to metamorphosis and growth (weight, snout to vent length, length). The laboratory report is provided in Appendix G.

5.2.1 Data Analysis

Quality Assurance

Mean control survival and average time to metamorphosis were compared to data from tests conducted by Environment Canada (Lo et al. 2014). Based on the comparison, the testing procedures, control water type, and test organisms were suitable to provide acceptable control performance.

Evaluation of Test Results

The results of each test were evaluated relative to laboratory control waters to assess whether statistically significant adverse responses could be detected. For each test, Nautilus conducted statistical analyses using CETIS™ (Tidepool Scientific Software 2013) to identify test waters with mean results significantly lower than mean response in the laboratory control water.

5.3 Results

Results of the amphibian pilot study are summarized in Table 8 and presented in detail in Appendix G. A discussion of the results is presented below.

Table 8: Toxicity Test Results for the Amphibian Pilot Study

Test	Survival [%]	Days to Metamorphosis	Length [mm]	Snout to Vent Length [mm]	Wet Weight [g]
Control	96.7 ± 5.8	44.2 ± 4.0	48.8 ± 2.9	16.1 ± 0.1	0.65 ± 0.06
Hard water	**83.3 ± 5.8**	**51.6 ± 1.1**	45.3 ± 2.2	15.1 ± 0.8	0.58 ± 0.05
Nitrate (as N) [mg/L]					
4.2	100.0 ± 0.0	43.3 ± 2.9	46.2 ± 1.4	15.1 ± 0.6	0.63 ± 0.03
11.7	93.3 ± 5.8	45.4 ± 2.1	46.1 ± 2.1	15.5 ± 0.8	0.63 ± 0.07
35.1	**36.7 ± 5.8**	28.8 ± 24.1	47.4 ± 2.9	17.1 ± 2.2	0.71 ± 0.11
87.7	**0.0 ± 0.0**	-	-	-	-
289	**0.0 ± 0.0**	-	-	-	-
Sulphate [mg/L]					
531	**75.0 ± 7.1**	46.4 ± 2.8	40.7 ± 2.2	13.6 ± 0.6	0.47 ± 0.06
1,047	90.0 ± 14.1	41.0 ± 1.3	44.8 ± 0.5	14.9 ± 0.7	0.57 ± 0.02

Notes: Results are presented as mean ± standard deviation.

Bold values = result significantly lower than the laboratory control.

- = not measured; % = percent; mm = millimetres; g = grams; mg/L = milligrams per litre.

Survival was significantly reduced compared to the laboratory control at 35.1 mg/L nitrate-N. The LC_{50} for nitrate was 28.8 mg/L nitrate-N and the LC_{20} was 19.2 mg/L nitrate-N. For growth and developmental endpoints, no statistically significant adverse effects were observed at any concentration where mortality was less than 100%.

There was no effect of sulphate on growth or development endpoints at either exposure concentration. There was a statistically significant difference in survival between the 531 mg/L sulphate solution and the laboratory control, but there was no effect on survival in the 1,047 mg/L sulphate solution. Therefore, the observed response in the lower test concentration may not be attributable to sulphate toxicity.

Rearing in reconstituted hard water resulted in a statistically significant decrease in survival compared to the laboratory control and a statistically significant increase in time to metamorphosis. There was no significant effect of reconstituted hard water on growth endpoints.

5.4 Summary

The results of the pilot study indicate that the testing conditions used in this study were suitable for testing with *L. pipiens.* The test was able to detect effects of nitrate and provided preliminary estimates of LC_{20} and LC_{50} values for this species in very soft water. No effects were detected that could be attributed to sulphate. No effects were observed for any growth endpoint at any exposure concentration for either nitrate or sulphate.

There was a statistically significant difference in survival and days to metamorphosis between a soft laboratory water control and reconstituted hard water. This effect would need to be considered in designing tests relevant to the hard waters of the Elk Valley.

5.5 Recommendations

Further amphibian testing is scheduled for 2016. The final study design for this testing should consider the results described above, including relevant ranges of nitrate and sulphate to test and the potential effect of water hardness on *L. pipiens* survival and time to metamorphosis.

6.0 CLOSURE

We trust the above meets your present requirements. If you have any questions or require additional details, please contact the undersigned.

GOLDER ASSOCIATES LTD.

Reviewed by:

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APPENDIX A

Summary of Legal Requirements for Chronic Toxicity Testing

Permit #107517 issued under the Environmental Management Act (Elk Valley EMA Permit) – Section 9.8

9.8 CHRONIC TOXICITY TESTING PROGRAM

The Permittee must develop and implement a toxicity testing program for receiving environments affected by coal mining operations. The purpose of the program is to evaluate chronic toxicity at the compliance points and other locations throughout the Elk Valley.

The toxicity testing program must include, at a minimum, the following elements:

i. Once every three years beginning in 2015, bioassays to evaluate the survival and development (incidence of deformities) of westslope cutthroat trout using gametes obtained from fish utilizing habitats in the Fording River, tributaries, and associated lentic habitats (e.g., Fording River oxbow). The concentrations of selenium in the eggs of each female spawned must be measured;

ii. Quarterly or semi-annual surface-water chronic toxicity testing using a suite of toxicity tests:

The following toxicity test must be conducted during each semi-annual (spring and fall) sampling event:

- 30-day early life-stage test with the rainbow trout (*Oncorhynchus mykiss;* EPS1/RM/28) using <24-hour post-fertilization eggs; **endpoints:** survival, hatching, growth, deformity, behaviour;

The following toxicity tests must be conducted during each quarterly sampling event at all compliance points:

- 7-day water-only test with the cladoceran, *Ceriodaphnia dubia* (EPS1/RM/21); **endpoints:** survival, reproduction;

- 72-hour test with the alga, *Pseudokirchneriella subcapitata* (EPS1/RM/25); **endpoints:** growth inhibition;

The following toxicity tests must be conducted during each quarterly sampling event at compliance points in the Fording River (specifically FRO and GHO Fording) and Michel Creek (CMO):

- 28-day water-only test with amphipod, *Hyalella Azteca* (adapted from USEPA 2000); **endpoints:** survival, growth; and
- 30-day early life-stage test with the fathead minnow, *Pimephales promelas* (USEPA 1996) using <24-hour post-fertilization eggs; **endpoints:** survival, hatching, growth, deformity.

iii. Toxicity testing methods must be consistent with Environment Canada's, U.S. Environmental Protection Agency's, or ASTM's approved biological test methods;

iv. A Quality Assurance/Quality Control component; and

v. A proposed schedule of dates that coincide with water quality sampling and that target predicted worst-case times such as low flow, during flocculant use, or when discharge quality is expected to be reduced.

The suite of toxicity tests will be reviewed on an annual basis by the EMC and recommendations provided to the Director for consideration.

9.8.1 Sulphate Toxicity at High Hardness Concentrations

The Permittee must develop with input from the EMC, and implement a toxicity testing program specifically to assess sulphate toxicity at high hardness concentrations. Results will be used to support finalization of long term sulphate site performance objectives.

The following toxicity test shall be conducted as a component of the Sulphate toxicity testing program.

- 30-day early life-stage test with the fathead minnow, *Pimephales promelas* (USEPA 1996) using <24-hour post-fertilization eggs; **endpoints:** survival, hatching, growth, deformity.
- Other sensitive species (amphibian, trout, water flea, etc.) shall be included.

Monitoring results and interpretation must be compiled into a written report and submitted to the satisfaction of the Director by December 31, 2017.

9.8.2 Sublethal Toxicity Study

The Permittee must develop with input from the EMC, and implement a sublethal toxicity study to confirm that surface waters meeting the Site Performance Objectives for the order stations are not toxic to sensitive aquatic receptors. The Permittee must submit the study design to the Director by March 31, 2015.

Letter from the British Columbia (B.C.) Ministry of Environment (MOE) approving the study design for the Regional Aquatic Effects Monitoring Program (RAEMP)

Excerpt of toxicity testing requirements:

Teck shall work in collaboration with the Ministry and Ktunaxa Nation representatives ideally in a monitoring committee forum to prioritize the following studies for discussion and implementation. Recommendations from the monitoring committee must include brief study designs and be submitted to the Director for approval. These studies shall consider, at a minimum, the following studies previously recommended by the Technical Advisory Committee (TAC) established for the ABMP.

Nitrate Toxicity

Additional toxicity testing to study the effects of nitrate, including:

a. Amphibian toxicity testing to assess the sensitivity of representative species to nitrate using long-term metamorphosis tests;
b. Chronic toxicity testing to assess the sensitivity of invertebrates to nitrate using long-term tests; and
c. Early life stage rainbow trout toxicity testing to assess the relationship between water hardness and nitrate toxicity across a range of hardness representative of the Elk and Fording Rivers.

APPENDIX B

Nautilus Reports - Quarterly and Semi-Annual Toxicity Testing

Section B-1: 1st Quarter 2015 Results

Nautilus Environmental

Toxicity testing on Elk Valley samples with *Ceriodaphnia dubia, Pseudokirchneriella subcapitata, Hyalella azteca* and *Pimephales promelas*

1st Quarter 2015 Results

Final Report

Report date:
July 30, 2015

Submitted to:

Teck Coal Ltd.
Sparwood, BC

8664 Commerce Court
Burnaby, BC
V5A 4N7

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SIGNATURE PAGE

Krystal Pearcy, B.Sc.
Laboratory Biologist

James Elphick, R.P.Bio.
Senior Reviewer

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

1.0 INTRODUCTION

Nautilus Environmental conducted toxicity tests for Teck Coal Ltd. on samples collected from various locations in the Elk Valley as part of a quarterly chronic toxicity testing program required under BC Ministry of Environment permit number 107517. Test species included a cladoceran (*Ceriodaphnia dubia*), a unicellular green alga (*Pseudokirchneriella subcapitata*), an amphipod (*Hyalella azteca*) and the fathead minnow (*Pimephales promelas*). Table 1 outlines the toxicity tests that were conducted on each sample and Figure 1 shows the locations of sample sites. Samples were transported in 20-L plastic containers in coolers containing ice packs. Samples were received at temperatures ranging from 4.4 to 10.4°C and were stored in the dark at 4 ± 2°C prior to testing.

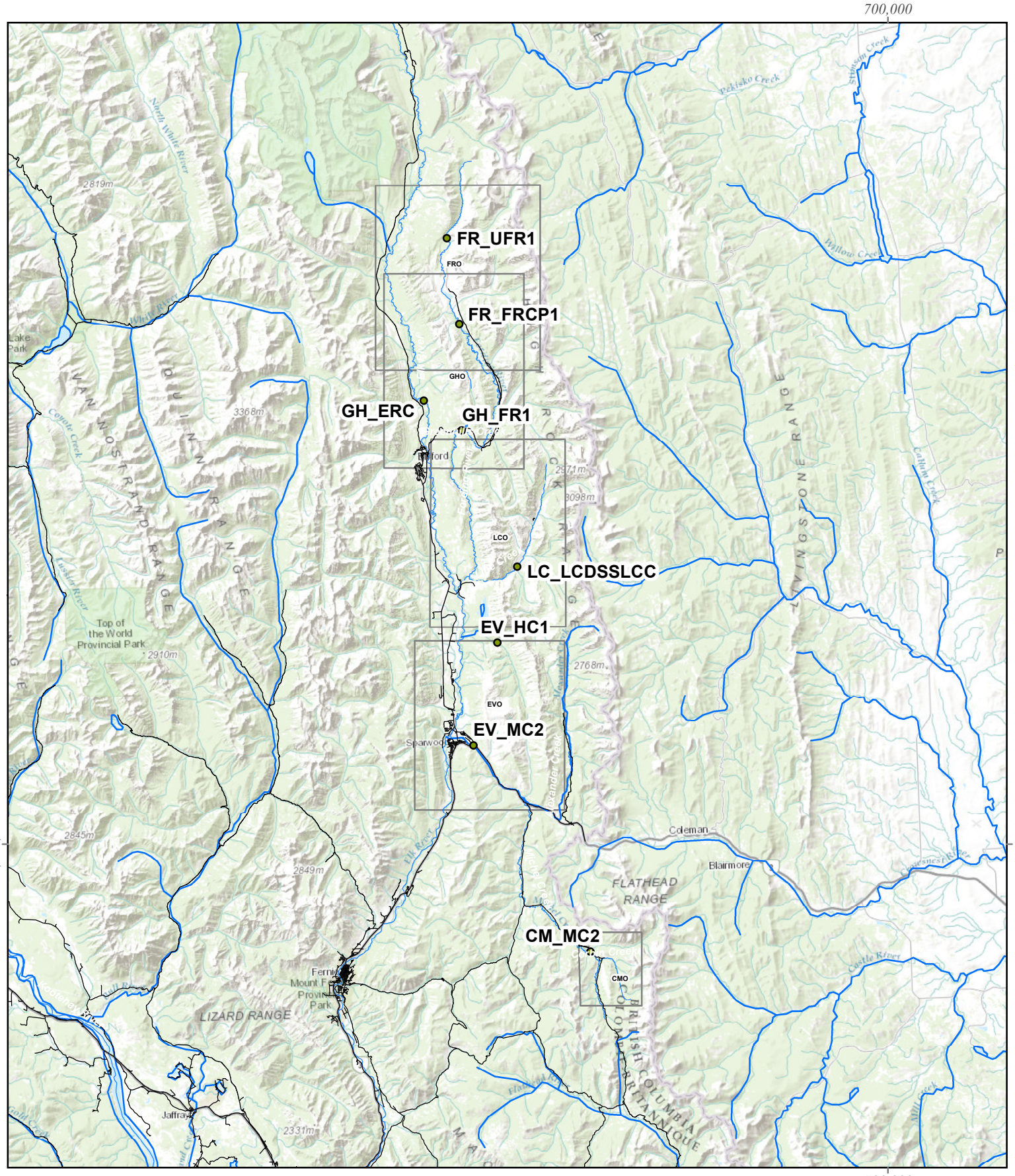
The tests using *C. dubia* and *P. subcapitata* were initiated on three occasions as a result of the samples being collected over a range of dates; however, sample FR_UFR1 (EMS ID – E216777) was tested concurrently with each of the three batches of tests, and served as a site water control. Tests using *H. azteca* and *P. promelas* were initiated simultaneously for the site water control and the three site waters that were tested using these species. Refresh samples were collected and delivered weekly for the duration of the *H. azteca* and *P. promelas* tests on the dates shown in Table 1.

This report describes the results of the toxicity tests conducted on these samples using *C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*. Copies of laboratory data sheets and printouts of statistical analyses are provided in Appendices A to D. Results of analytical chemistry that was performed on the samples tested in this program are provided in Appendix E. These samples were collected by Teck personnel at the same time the samples were collected for toxicity testing. The chain of custody forms are provided in Appendix F.

Table 1. Summary of toxicity testing program.

Sample ID	EMS Location ID	Species Tested	Sample Collection Dates
FR_UFR1*	E216777	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	March 2, 11, 18, 25, April 1 and 8, 2015
FR_FRCP1	E300071	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	March 2, 11, 18, 25, April 1 and 8, 2015
CM_MC2	E258937	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	March 3, 10, 16, 23, 30 and April 8, 2015
GH_FR1	0200378	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	March 2, 9, 16, 23, 30 and April 8, 2015
LC_LCDSSLCC	E297110	*C. dubia* and *P. subcapitata*	March 2, 2015
GH_ERC	E300090	*C. dubia* and *P. subcapitata*	March 3, 2015
EV_MC2	E300091	*C. dubia* and *P. subcapitata*	March 4, 2015
EV_HC1	E102682	*C. dubia* and *P. subcapitata*	March 10, 2015

*Site water control



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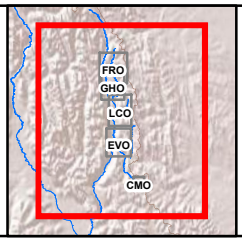

Chronic Toxicity Monitoring Locations

- Roads
- Rivers
- Monitoring Locations

N

0 4,000 8,000 16,000 Meters

DATE:	MINE OPERATION:
7/24/2015	Elk Valley
SCALE:	COORDINATE SYSTEM:
1:550,000	NAD 1983 UTM Zone 11N

Document Path: \\teckcominco.loc\CGO\Groups\TCGIS\Data\Operations\SPO\Dan_Vasiga\BaseLandscape_letter.mxd

2.0 METHODS

Methods for the toxicity tests using *C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas* are summarized in Tables 2 through 5. Laboratory control water involved use of 20% Perrier water prepared with deionized water for *C. dubia*, addition of reagent grade salts to dechlorinated municipal tapwater for *P. promelas* according to a recipe provided by ASTM (1980), and addition of reagent grade salts to dechlorinated municipal tapwater for *H. azteca* according to a recipe provided in Environment Canada (2013).

For the *H. azteca* tests, all of the site waters were supplemented with 15 mg/L chloride and 0.02 mg/L bromide using NaCl and NaBr, respectively, according to recommendations of the *Hyalella* Advisory Group (chaired by Chris Ingersoll, USGS) (Norberg-King et al., 2014), since low concentrations of these halides are known to impair growth of this species. The laboratory control water contained approximately 75 mg/L chloride and 0.8 mg/L bromide, respectively.

Statistical analyses were performed using CETIS (Tidepool Scientific Software, 2013), and involved comparison of results to both the laboratory and site water controls.

Table 2. Summary of test conditions: *Ceriodaphnia dubia* survival and reproduction test.

Test organism	*Ceriodaphnia dubia*
Test organism source	In-house culture
Test organism age	<24 h old neonates produced within 12 h
Test type	Static-renewal
Test duration	7 ± 1 day
Test vessel	20 mL test tube
Test volume	15 mL
Test replicates	10 test replicates per treatment
Number of organisms	1 per replicate
Control water	20% Perrier water
Test solution renewal	Daily
Test temperature	25 ± 1°C
Feeding	*Pseudokirchneriella subcapitata* and YCT
Light intensity	100 to 600 lux at water surface
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test protocol	Environment Canada (2007a)
Statistical software	CETIS
Test endpoint	Survival and reproduction
Test acceptability criteria for controls	≥80% survival; ≥15 young per surviving control producing three broods; ≥60% of controls producing three or more broods
Reference toxicant	Sodium chloride

Table 3. Summary of test conditions: *Pseudokirchneriella subcapitata* growth inhibition test.

Test organism	*Pseudokirchneriella subcapitata*, strain CPCC #37
Test organism source	In-house axenic culture, obtained from Canadian Phycological Culture Centre, and originally isolated from Nitelva River, Norway.
Test organism age	3-to 7-day old culture in logarithmic growth phase
Test type	Static
Test duration	72 hours
Test vessel	Microplate
Test volume	220 µL
Test replicates	4 replicates per treatment; 8 replicates for control
Number of organisms	10, 000 cells/mL
Control water	Deionized water with nutrients added
Test solution renewal	None
Test temperature	24 ± 2°C
Feeding	None
Light intensity	3600 to 4400 lux
Photoperiod	24 hours light
Sample filtration	Through a preconditioned membrane filter of 0.45 µm using a vacuum pump
Aeration	None
pH adjustment	None
Test protocol	Environment Canada (2007b)
Statistical software	CETIS
Test endpoint	Algal cell growth inhibition
Test acceptability criteria for controls	>16-fold increase in number of algal cells; CV ≤20%; no trend when analyzed using Mann-Kendall test
Reference toxicant	Zinc

Table 4. Summary of test conditions: *Hyalella azteca* survival and growth test.

Test organism	*Hyalella azteca*
Test organism source	Aquatic Research Organisms, NH
Test organism age	7-8 days old
Test type	Static-renewal
Test duration	28 days
Test vessel	375 mL glass container
Test volume	300 mL of water
Test replicates	5 test replicates per treatment
Number of organisms	10 per replicate
Control water	Moderately-hard water (hardness 80-100 mg/L $CaCO_3$) containing ~28 mg/L Cl and supplemented with 0.02 mg/L Br. Samples also supplemented with 25 mg/L Cl and 0.02 mg/L Br.
Test solution renewal	Twice daily
Test temperature	23 ± 1°C
Feeding	1 mL of YCT daily to each container. Tetramin daily, with amounts increasing weekly: Week 1: 0.5 mg, Week 2: 0.75 mg, Week 3: 1 mg, Week 4: 1.5 mg in each test container.
Light intensity	500 to 1000 lux at water surface
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test protocol	Modified from US EPA (2000), as described in Norberg-King et al. (2014)
Statistical software	CETIS
Test endpoint	Survival and dry weight
Test acceptability criteria for controls	Mean control survival of ≥80% survival
Reference toxicant	Sodium chloride

Table 5. Summary of test conditions: *Pimephales promelas* survival and growth test.

Test organism	*Pimephales promelas*
Test organism source	Aquatic BioSystems, Fort Collins, CO
Test organism age	<24 hours
Test type	Static renewal
Test duration	28 days post hatch
Test vessel	1-L plastic container
Test volume	1-L
Test replicates	4 test replicates per treatment
Number of organisms	10 per replicate
Control water	Moderately-hard water (hardness 80-100 mg/L $CaCO_3$)
Test solution renewal	Daily
Test temperature	25 ± 1°C
Feeding	Twice a day, after hatch, with newly hatched brine shrimp *(Artemia nauplii)*
Light intensity	100 – 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	Provided post hatch (<100 bubbles/min)
Test protocol	US EPA (1996) and ASTM (2013)
Statistical software	CETIS
Test endpoint	Hatch, survival, length, biomass, normal development (which assesses incidence of deformities)
Test acceptability criteria for controls	>66% hatch; ≥70% post-hatch survival
Reference toxicant	Copper

3.0 RESULTS

Results of the toxicity tests using *C. dubia* are provided in Table 6. The site water and laboratory water controls performed similarly for this species, indicating that there was no adverse or stimulatory effect associated with the upstream Fording River station. No adverse effects were observed on survival of *C. dubia*; survival ranged from 90 to 100% in the samples. An adverse effect on *C. dubia* reproduction was observed in one of the seven samples (FR_FRCP1); reproduction in this sample was statistically significantly reduced relative to both the laboratory water and site water controls. Reproduction was reduced by approximately 50% compared with both controls.

Results of toxicity tests using *P. subcapitata* are summarized in Table 7. In these tests, the site water control produced 2.5- to 3.3-fold greater growth than the laboratory water control. This finding is not unusual, since the higher ionic strength associated with the site water control would be expected to stimulate cell growth of this species relative to the very low ionic strength associated with the laboratory control water. Similarly, the samples generally exhibited a stimulation of cell growth relative to the laboratory control.

Samples FR_FRCP1 and EV_HC1 exhibited a statistically significant reduction in cell yield compared to the site water control (41 and 74% reduction, respectively). None of the samples exhibited a statistically significant reduction in cell growth relative to the laboratory water control with the exception of EV_HC1, which had cell growth that was approximately 15% lower than the laboratory water control.

Results of the toxicity tests using *H. azteca* are provided in Table 8. Survival in the site water control was statistically significantly reduced compared to the laboratory control (28% reduction). No adverse effects were observed on *H. azteca* survival in the samples; survival ranged from 94 to 98%. Dry weight in the site water control was not statistically significantly different compared to the laboratory control. None of the samples exhibited a statistically significant reduction in dry weight compared with the site water control; however, dry weight in samples FR_FRCP1 and CM_MC2 was statistically significantly reduced compared to the laboratory control (19 and 28% reduction, respectively).

Results of the toxicity tests using *P. promelas* are provided in Table 9. None of the samples exhibited a statistically significant reduction in survival relative to the site water control. There

were no adverse effects for the hatch, biomass, length, or normal development endpoints relative to either the laboratory or site water controls. Survival of *P. promelas* was statistically significantly reduced in the site water control and all of the samples compared to the laboratory control. Percent reduction in survival compared to the laboratory control was 26, 29, 18 and 41% for the site control and samples FR_FRCP1, CM_MC2 and GH_FR1, respectively.

Table 6. Results: *Ceriodaphnia dubia* survival and reproduction test.

Sample ID	Survival (%) (Mean)	Reproduction (Mean ± SD)
Test Date: March 5, 2015		
Laboratory Control	90	22.3 ± 6.6
Site Control (FR_UFR1)	100	23.0 ± 3.9
FR_FRCP1	90	10.5 ± 4.0 * †
CM_MC2	100	19.5 ± 3.1
LC_LCDSSLCC	100	21.8 ± 3.1
GH_ERC	90	21.5 ± 8.2
GH_FR1	100	22.1 ± 2.4
Test Date: March 6, 2015		
Laboratory Control	100	27.4 ± 1.8
Site Control (FR_UFR1)	100	25.4 ± 3.9
EV_MC2	100	26.3 ± 6.5
Test Date: March 12, 2015		
Laboratory Control	100	30.6 ± 1.5
Site Control (FR_UFR1)	100	31.2 ± 2.7
EV_HC1	100	29.6 ± 2.3

SD = Standard Deviation
* Reproduction was significantly less than the laboratory control
† Reproduction was significantly less than the site control

Table 7. Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Sample ID	Cell Yield (x 10^4 cells/mL) (Mean ± SD)	Stimulation relative to laboratory control (%)
	Test Date: March 5, 2015	
Laboratory Control	38.9 ± 3.9	-
Site Control (FR_UFR1)	108.3 ± 6.1	178.5
FR_FRCP1	64.0 ± 8.9 †	64.6
CM_MC2	101.0 ± 11.9	159.8
LC_LCDSSLCC	117.0 ± 2.2	201.0
GH_ERC	107.5 ± 12.1	176.5
GH_FR1	96.5 ± 5.9	148.2
	Test Date: March 6, 2015	
Laboratory Control	43.6 ± 3.5	-
Site Control (FR_UFR1)	110.6 ± 6.8	153.6
EV_MC2	140.8 ± 19.5	222.6
	Test Date: March 13, 2015	
Laboratory Control	32.1 ± 3.1	-
Site Control (FR_UFR1)	106.0 ± 6.8	230.0
EV_HC1	27.2 ± 3.9 * †	-

SD = Standard Deviation
* Cell yield was significantly lower than the laboratory control
† Cell yield was significantly lower than the site control

Table 8. Results: *Hyalella azteca* survival and growth test.

Sample ID	Survival (%) (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Laboratory Control	100 ± 0.0	0.93 ± 0.06
Site Control (FR_UFR1)	72.0 ± 25.9 *	0.76 ± 0.23
FR_FRCP1	94.0 ± 5.5	0.76 ± 0.05 †
CM_MC2	94.0 ± 5.5	0.68 ± 0.21 †
GH_FR1	98.0 ± 4.5	0.84 ± 0.10

SD = Standard Deviation
* Survival was significantly lower than the laboratory control
† Dry weight was significantly lower than the laboratory control

Table 9. Results: *Pimephales promelas* survival and growth test.

Sample ID	Hatch (%) (Mean ± SD)	Survival (%) (Mean ± SD)	Biomass (mg) (Mean ± SD)	Length (mm) (Mean ± SD)	Normal development (%) (Mean ± SD)
Laboratory Control	100.0 ± 0.0	98.3 ± 3.3	10.9 ± 0.6	18.4 ± 0.3	100.0 ± 0.0
Site Control (FR_UFR1)	96.7 ± 3.8	73.3 ± 16.3 *	10.7 ± 0.4	19.6 ± 1.2	100.0 ± 0.0
FR_FRCP1	96.7 ± 3.8	70.0 ± 20.7 *	10.7 ± 1.2	19.2 ± 1.3	98.1 ± 3.8
CM_MC2	100.0 ± 0.0	80.0 ± 14.4 *	10.7 ± 0.7	19.2 ± 1.1	100.0 ± 0.0
GH_FR1	98.3 ± 3.3	58.3 ± 19.9 *	10.2 ± 1.2	20.4 ± 1.0	100.0 ± 0.0

SD = Standard Deviation
* Survival was significantly lower than the laboratory control.

4.0 QA/QC

The health histories of the test organisms used in the exposures were acceptable and met the requirements of the Environment Canada protocols. The tests met all control acceptability criteria and water quality parameters remained within ranges specified in the protocol throughout the tests. There were no deviations from the test methodologies. Uncertainty associated with these tests is best described by the standard deviation around the mean.

The site water control (FR_UFR1), which was collected on March 2, 2015, was tested concurrently with each of the three rounds of *C. dubia* and *P. subcapitata* tests and so was eleven days post collection when the final test was initiated. This holding time was considered acceptable because this water was being tested as a control, and not as a sample. Thus, there were no concerns about the potential for degradation of toxicants in this water. This water type performed similarly in each of the tests, demonstrating that the holding time did not affect the sample.

Hardness and alkalinity were not measured on samples that arrived March 25 and 26, 2015 for the *P. promelas* test. Hardness and alkalinity measurements were performed on all other samples.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 10. Results for these tests fell within the acceptable range for organism performance of mean and two standard deviations, based on historical results obtained by the laboratory with these tests. Thus, the sensitivity of the organisms used in these tests was appropriate.

Table 10. Reference toxicant test results.

Test Species	Endpoint	Historical Mean (2 SD Range)	CV (%)	Test Date
C. dubia	Survival (LC50): 2.0 g/L NaCl	2.0 (1.6–2.4)	11	February 25, 2015
	Reproduction (IC50): 1.4 g/L NaCl	1.5 (1.1–2.0)	16	
P. subcapitata	Growth (IC50): 30.8 µg/L Zn	25.6 (13.6–48.2)	37	March 11, 2015
H. azteca	Survival (LC50): 4.9 g/L NaCl	5.1 (4.2–6.1)	10	March 12, 2015
P. promelas	Survival (LC50): 308.0 µg/L Cu	148.0 (57.7–379.7)	60	March 23, 2015

SD = Standard Deviation, CV= Coefficient of Variation, LC = Lethal Concentration, IC = Inhibition Concentration.

5.0 REFERENCES

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6.0 END OF REPORT

APPENDIX A – *Ceriodaphnia dubia* Toxicity Test Data

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 15155, 15161, 15149, 15144

Start Date/Time: March 5/15 @ 1300h
Set up by: EMM

Sample Information:

Sample ID: Various, see results table for IDs
Sample Date: March 2-3, 2015
Date Received: ~~March 3~~ 5, 2015
Sample Volume: Various EMM

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: ~~02202015~~ EMM 022015
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: EMM ~~46~~ 36
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd126
Stock Solution ID: 15NaCl
Date Initiated: Feb 25/15

7-d LC50 (95% CL): 2.0 (1.7-2.3) g/L NaCl
7-d IC50 (95% CL): 1.4 (1.2-1.7) g/L NaCl

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.6-2.4) g/L NaCl CV (%): 11
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.1-2.0) g/L NaCl CV (%): 16

Test Results:

	Survival (%) (Mean ± SD) %	Reproduction (Mean ± SD)
Negative Control	90 ± 0.3 31.6	22.3 ± 6.6
Site Control①	100 ± 0.0 0.0	23.0 ± 3.9
FR-FRCP1_M_02032015_N	90 ± 0.3 31.6	10.5 ± 4.0 ②③
CM_MC2_MON_WS_20150303_N	100 ± 0.0 0.0	19.5 ± 3.1
LC_LCDSSLCC_WS_2015-03-02_N	100 ± 0.0 0.0	21.8 ± 3.1
GH_ERC_WS_2015-03-03_N	90 ± 0.3 31.6	21.5 ± 8.2
GH_FRL_WS_2015-03-02_N	100 ± 0.0 0.0	22.1 ± 2.4
		±
		±

①FR-UFRL_M_~~e2015~~ 02032015_N

②Reproduction was significantly less than the negative control. ③Reproduction was significantly less than the site control.

Reviewed by: JOL
Date reviewed: Apr. 29/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck coal
Sample ID: Teck coal Samples pH.
Work Order #: 15155, 15162, 15149, 15144

Start Date & Time: March 5/15 @ 1300h
Stop Date & Time: March 11/15 @ 1300h
Test Species: *Ceriodaphnia dubia*

emm

Concentration: 20% Perner Ctrl	Days 0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	
DO (mg/L)	8.0	8.0	8.2	7.9	8.1	7.4	8.2	7.8	8.0	7.8	8.0	7.4	8.1	
pH	7.9	7.8	7.9	7.7	8.0	7.7	7.9	7.8	8.0	7.7	8.0	7.7	7.9	
Cond. (µS/cm)	225	224		222		222 MLT		224		228		226		
Initials	Emm	MLT		EMM		MLT		EMM		MLT		EMM		

① 8.0

emm

100% (v/v) Concentration: site control FR-UFR1	Days 0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.5	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	
DO (mg/L)	8.2	8.2	8.2	8.0	8.1	7.5	8.1	7.8	8.2	7.4	8.2	7.4	8.2	
pH	7.8	7.9	7.7	7.8	7.7	7.8	7.9	7.8	7.9	7.7	7.8	7.8	7.8	
Cond. (µS/cm)	368	370		370		368		371		380		382		
Initials	Emm	MLT		EMM		MLT		EMM		MLT		EMM		

emm

100% (v/v) Concentration: FR-FRCP1	Days 0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.5	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	
DO (mg/L)	8.2	8.1	8.0	8.0	8.1	7.4	8.1	7.8	8.2	7.4	8.3	7.4	8.2	
pH	7.9	7.9	7.7	7.9	7.7	7.5	7.9	7.7	7.9	7.7	7.9	7.7	7.9	
Cond. (µS/cm)	2620	2650		2660		2620		2610		2620		2660		
Initials	Emm	MLT		EMM		MLT		EMM		MLT		EMM		

cm

100% (v/v) Concentration: CM MC2	Days 0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	
DO (mg/L)	8.2	8.1	8.2	7.9	8.1	7.5	8.1	7.8	8.2	7.4	8.2	7.4	8.2	
pH	7.9	8.0	7.8	8.0	7.9	8.0	7.9	8.0	7.9	8.0	7.9	7.9	7.9	
Cond. (µS/cm)	829	831		837		820		837		839		842		
Initials	Emm	MLT		EMM		MLT		EMM		MLT		EMM		

	Control	Site control	FR-FRCP1	CM MC2
Hardness*	100	210	1670	450
Alkalinity*	88	150	320	220

Analysts: AWD, EMM, MLT
Reviewed by: JOL
Date reviewed: Apr. 16/15

* mg/L as $CaCO_3$

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L) ; pH = 6 to 8.5

Sample Description: all samples are clear

Comments: **Broodboard Used:** 022015 (CH# 1→13)

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: Teck samples off
Work Order #: 15155, 15161, 15149, 15144

Start Date & Time: March 5/15 @ 1300h
Stop Date & Time: March 11/15 @ 1300h
Test Species: *Ceriodaphnia dubia*

emm

100% (v/v) Concentration: LC-LCDSSLCGWS	Days													
	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	
DO (mg/L)	8.2	8.1	8.2	8.0	8.2	7.9	8.1	7.9	8.2	7.4	8.2	7.4	8.2	
pH	7.9	8.0	7.8	8.0	7.8	7.8	7.9	8.0	7.9	7.9	7.9	7.9	7.9	
Cond. (µS/cm)	944	953		952		953		949		951		943		
Initials	Emm	MCT		EMM		MCT		EMM		MCT		Emm		

emm

100% (v/v) Concentration: GH-ERC	Days													
	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.5	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	
DO (mg/L)	8.2	8.2	8.2	7.9	8.2	7.5	8.1	7.9	8.2	7.4	8.3	7.4	8.2	
pH	7.7	7.9	7.6	7.9	7.6	7.9	7.8	7.9	7.9	7.8	7.9	7.9	7.9	
Cond. (µS/cm)	355	356		357		351		356		360		359		
Initials	Emm	MCT		EMM		MCT		EMM		MCT		Emm		

emm

100% (v/v) Concentration: GH-FRI-WS	Days													
	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	
DO (mg/L)	8.1	8.1	8.2	7.9	8.2	7.5	8.1	7.8	8.2	7.4	8.3	7.5	8.2	
pH	7.8	8.0	7.8	8.0	7.8	8.0	7.9	8.0	8.0	7.9	7.9	7.9	7.9	
Cond. (µS/cm)	859	870		870		861		864		861		880		
Initials	Emm	MCT		EMM		MCT		EMM		MCT		Emm		

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

	Control	Site control	LC-LCDSSLCGWS	GH-ERC	GH-FRI-WS
Hardness*	100	210	530	192	510
Alkalinity*	88	150	180	148	200

Analysts: AWD, Emm, MCT
Reviewed by: JGL
Date reviewed: Apr. 16/15

* mg/L as CaCO3

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L) ; pH = 6 to 8.5

Sample Description: all samples are clear

Comments: **Broodboard Used:** 022015 (CH 1-13)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck coal
Sample ID: Teck coal Samples ME Cpass/Hall tested
Work Order: 15155, 15156, 15149, 15144

Start Date & Time: March 5/1500 1300
Stop Date & Time: March 11/1500 1300
Set up by: EMM

100% CV(V)

Concentration: control - 20% Dilution

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	3	3	✓	✓	3	✓	✓	✓	3	~
4	7	✓	✓	6	7	✓	✓	3	5	✓	MW
5	✓	8	9	MW X14	MW ✓14	9	6	8	11	9	MW
6	✓	15	15	X14	✓	15	12	12	15	11	EMM
7				↓							
8											
Total	7	26	27	20	21	27	18	23	31	23	EMM

Concentration: Site control - FR-UFR1

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	3	3	3	✓	3	✓	3	✓	✓	✓	~
4	✓	✓	✓	✓	✓	4	✓	6	✓	✓	MW
5	9	10	9	6	12	9	10	✓	7	6	MW
6	11	14	12	11	13	13	12	11	16	14	EMM
7											
8											
Total	23	27	24	17	28	26	25	17	23	20	EMM

Concentration: FR-FREP1

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	~	~	~	~	~	~	~	~	~	~	~
4	✓	3	✓	✓	✓	4	2	4	3X	3	MW
5	✓	✓	2	2	6	✓	2	✓	↓	6	MW
6	8	7	9	9	✓	10	8	9	↓	8	EMM
7											
8											
Total	8	10	11	11	6	14	12	13	3X	17	EMM

Concentration: CM MC2

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	~	~	~	~	~	~	~	~	~	~	~
4	3	3	4	4	6	3	3	3	2	6	MW
5	9	6	8	8	✓	5	7	5	6	✓	MW
6	13	9	10	10	9	9	11	8	12	13	EMM
7											
8											
Total	25	18	22	22	15	17	21	16	20	19	EMM

Concentration: LGLEDSSL-WS

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	~3	3	✓	✓	✓	✓	✓	✓	~
4	3	✓	✓	✓	2	3	3	✓	3	4	MW
5	8	8	10	9	9	7	8	7	7	9	MW
6	10	11	12	13	12	12	10	9	10	13	EMM
7											
8											
Total	21	19	25	25	23	22	21	16	20	26	EMM

Concentration: GH-FR6

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	3	2	3	3	3	✓	✓	✓	✓	✓	~
4	✓	✓	✓	✓	✓	4	✓	6	4	3	MW
5	9	9	9	11	10	7	X	12	9	9	MW
6	11	12	14	12	15	8	↓	✓	14	13	EMM
7											
8	23 EMM										
Total	21	23	26	26	28	19	OK	18	27	25	EMM

Concentration: GH-FR1-WS

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	2	3	3	✓	✓	✓	2 4	✓	✓	3	~
4	✓	✓	✓	2	4	6	MW AA ✓	4	6	✓	MW
5	7	8	8	8	8	8	8	10	✓	9	MW
6	8	12	11	12	12	8	9	12	13	12	EMM
7											
8											
Total	18	23	22	22	24	22	21	26	19	24	EMM

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: all samples are clear
Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JGu
Date reviewed: Apr. 16/15

CETIS Summary Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Batch ID:	05-3026-9517	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	05 Mar-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	11 Mar-15 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	08-3649-5027	05 Mar-15	05 Mar-15	13h	Teck Coal	
FR_UFRI_M_02015	11-3388-6819	02 Mar-15 11:55	04 Mar-15 ✓	73h (10.4 °C)		
FR_FRCP1_M	07-2279-3211	02 Mar-15 14:30	04 Mar-15 ✓	70h		
CM_MC2_MON_WS	03-5347-2106	03 Mar-15 08:50	05 Mar-15 ✓	52h (6.3 °C)		
LC_LCDSSLCC_WS	12-2313-9393	02 Mar-15 10:36	04 Mar-15 ✓	74h (7.2 °C)		
GH_ERC_WS_2015	15-5191-6042	03 Mar-15 15:16	05 Mar-15	46h (6.4 °C)		
GH_FR1_WS_2015	20-0368-3125	02 Mar-15 14:22	04 Mar-15	71h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFRI_M_02015	Water Sample	Teck Coal	FR_UFR1_M_02032015_N (site c		
FR_FRCP1_M	Water Sample	Teck Coal	FR_FRCP1_M_02032015_N		
CM_MC2_MON_WS	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
LC_LCDSSLCC_WS	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-03-02		
GH_ERC_WS_2015	Water Sample	Teck Coal	GH_ERC_WS_2015-03-03_N		
GH_FR1_WS_2015	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		

6d Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	10	0.9	0.6738	1	0	1	0.1	0.3162	35.14%	0.0%
FR_UFRI_M_02015	10	1	1	1	1	1	0	0	0.0%	-11.11%
FR_FRCP1_M	10	0.9	0.6738	1	0	1	0.1	0.3162	35.14%	0.0%
CM_MC2_MON_WS	10	1	1	1	1	1	0	0	0.0%	-11.11%
LC_LCDSSLCC_WS	10	1	1	1	1	1	0	0	0.0%	-11.11%
GH_ERC_WS_2015	10	0.9	0.6738	1	0	1	0.1	0.3162	35.14%	0.0%
GH_FR1_WS_2015	10	1	1	1	1	1	0	0	0.0%	-11.11%

6d Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1	1	1	0	1	1	1	1	1	1
FR_UFRI_M_02015	1	1	1	1	1	1	1	1	1	1
FR_FRCP1_M	1	1	1	1	1	1	1	1	0	1
CM_MC2_MON_WS	1	1	1	1	1	1	1	1	1	1
LC_LCDSSLCC_WS	1	1	1	1	1	1	1	1	1	1
GH_ERC_WS_2015	1	1	1	1	1	1	0	1	1	1
GH_FR1_WS_2015	1	1	1	1	1	1	1	1	1	1

6d Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFRI_M_02015	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1_M	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
CM_MC2_MON_WS	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLCC_WS	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC_WS_2015	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
GH_FR1_WS_2015	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

CETIS Analytical Report

Report Date: 17 Apr-15 11:23 (p 1 of 1)
Test Code: 15144, 15149, 1 | 03-2706-1367

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	02-5932-1189	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 12:35	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	05-3026-9517	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	05 Mar-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	11 Mar-15 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	08-3649-5027	05 Mar-15	05 Mar-15	13h	Teck Coal	
FR_UFRI_M_02015	11-3388-6819	02 Mar-15 11:55	04 Mar-15	73h (10.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFRI_M_02015	Water Sample	Teck Coal	FR_UFR1_M_02032015_N (site c		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C <> T	NA	NA	

Fisher Exact Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFRI_M_02015	1	1.0000	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
Lab Control	Negative Contr	9	1	10	0.9	0.1	0.0%
FR_UFRI_M_02015	Upstream Contr	10	0	10	1	0	-11.11%

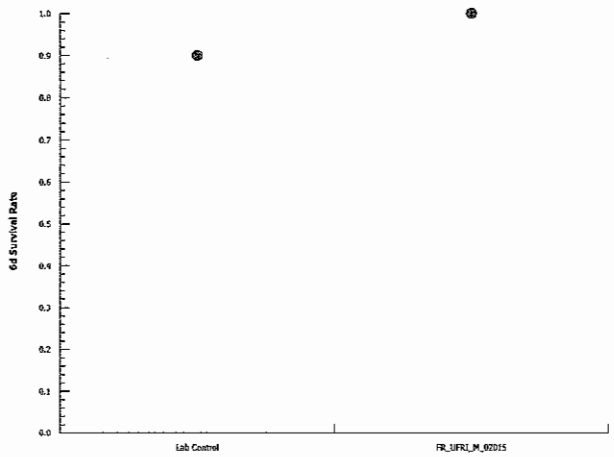
6d Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1	1	1	0	1	1	1	1	1	1
FR_UFRI_M_02015	1	1	1	1	1	1	1	1	1	1

6d Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFRI_M_02015	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



① lab control = 20% Perner lab water control
FR_UFR1_M_02015 = upstream site water control

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	15-3586-5936	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 12:34	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes
Batch ID:	05-3026-9517	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	05 Mar-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	11 Mar-15 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	08-3649-5027	05 Mar-15	05 Mar-15	13h	Teck Coal	
FR_FRCP1_M	07-2279-3211	02 Mar-15 14:30	04 Mar-15	70h		
CM_MC2_MON_WS	03-5347-2106	03 Mar-15 08:50	05 Mar-15	52h (6.3 °C)		
LC_LCDSSLCC_WS	12-2313-9393	02 Mar-15 10:36	04 Mar-15	74h (7.2 °C)		
GH_ERC_WS_2015	15-5191-6042	03 Mar-15 15:16	05 Mar-15	46h (6.4 °C)		
GH_FR1_WS_2015	20-0368-3125	02 Mar-15 14:22	04 Mar-15	71h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_FRCP1_M	Water Sample	Teck Coal	FR_FRCP1_M_02032015_N		
CM_MC2_MON_WS	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
LC_LCDSSLCC_WS	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-03-02		
GH_ERC_WS_2015	Water Sample	Teck Coal	GH_ERC_WS_2015-03-03_N		
GH_FR1_WS_2015	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact/Bonferroni-Holm Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_FRCP1_M	0.7632	1.0000	Exact	Non-Significant Effect
Lab Control		CM_MC2_MON_WS	1	1.0000	Exact	Non-Significant Effect
Lab Control		LC_LCDSSLCC_WS	1	1.0000	Exact	Non-Significant Effect
Lab Control		GH_ERC_WS_2015	0.7632	1.0000	Exact	Non-Significant Effect
Lab Control		GH_FR1_WS_2015	1	1.0000	Exact	Non-Significant Effect

Data Summary

C-%		NR	R	NR + R	Prop NR	Prop R	%Effect
Lab Control	Negative Contr	9	1	10	0.9	0.1	0.0%
FR_FRCP1_M		9	1	10	0.9	0.1	0.0%
CM_MC2_MON_WS		10	0	10	1	0	-11.11%
LC_LCDSSLCC_WS		10	0	10	1	0	-11.11%
GH_ERC_WS_2015		9	1	10	0.9	0.1	0.0%
GH_FR1_WS_2015		10	0	10	1	0	-11.11%

6d Survival Rate Detail

C-%	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1	1	1	0	1	1	1	1	1	1
FR_FRCP1_M	1	1	1	1	1	1	1	1	0	1
CM_MC2_MON_WS	1	1	1	1	1	1	1	1	1	1
LC_LCDSSLCC_WS	1	1	1	1	1	1	1	1	1	1
GH_ERC_WS_2015	1	1	1	1	1	1	0	1	1	1
GH_FR1_WS_2015	1	1	1	1	1	1	1	1	1	1

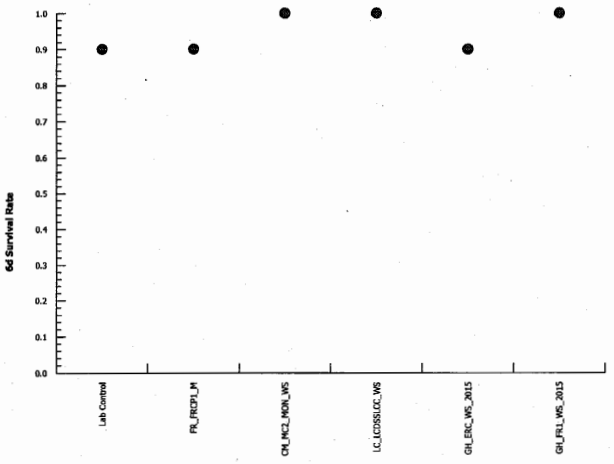
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	15-3586-5936	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 12:34	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes

6d Survival Rate Binomials

C-%	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1_M	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
CM_MC2_MON_WS	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLCC_WS	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC_WS_2015	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
GH_FR1_WS_2015	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	19-4708-2687	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 12:34	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes
Batch ID:	05-3026-9517	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	05 Mar-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	11 Mar-15 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFRI_M_02015	11-3388-6819	02 Mar-15 11:55	04 Mar-15	73h (10.4 °C)	Teck Coal	
FR_FRCP1_M	07-2279-3211	02 Mar-15 14:30	04 Mar-15	70h		
CM_MC2_MON_WS	03-5347-2106	03 Mar-15 08:50	05 Mar-15	52h (6.3 °C)		
LC_LCDSSLCC_WS	12-2313-9393	02 Mar-15 10:36	04 Mar-15	74h (7.2 °C)		
GH_ERC_WS_2015	15-5191-6042	03 Mar-15 15:16	05 Mar-15	46h (6.4 °C)		
GH_FR1_WS_2015	20-0368-3125	02 Mar-15 14:22	04 Mar-15	71h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFRI_M_02015	Water Sample	Teck Coal	FR_UFR1_M_02032015_N (site control)		
FR_FRCP1_M	Water Sample	Teck Coal	FR_FRCP1_M_02032015_N		
CM_MC2_MON_WS	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
LC_LCDSSLCC_WS	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-03-02		
GH_ERC_WS_2015	Water Sample	Teck Coal	GH_ERC_WS_2015-03-03_N		
GH_FR1_WS_2015	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact/Bonferroni-Holm Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
FR_UFRI_M_02015		FR_FRCP1_M	0.5	1.0000	Exact	Non-Significant Effect
FR_UFRI_M_02015		CM_MC2_MON_WS	1	1.0000	Exact	Non-Significant Effect
FR_UFRI_M_02015		LC_LCDSSLCC_WS	1	1.0000	Exact	Non-Significant Effect
FR_UFRI_M_02015		GH_ERC_WS_2015	0.5	1.0000	Exact	Non-Significant Effect
FR_UFRI_M_02015		GH_FR1_WS_2015	1	1.0000	Exact	Non-Significant Effect

Data Summary

C-%	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFRI_M_02015 (Upstream Contr	10	0	10	1	0	0.0%
FR_FRCP1_M	9	1	10	0.9	0.1	10.0%
CM_MC2_MON_WS	10	0	10	1	0	0.0%
LC_LCDSSLCC_WS	10	0	10	1	0	0.0%
GH_ERC_WS_2015	9	1	10	0.9	0.1	10.0%
GH_FR1_WS_2015	10	0	10	1	0	0.0%

6d Survival Rate Detail

C-%	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFRI_M_02015	1	1	1	1	1	1	1	1	1	1
FR_FRCP1_M	1	1	1	1	1	1	1	1	0	1
CM_MC2_MON_WS	1	1	1	1	1	1	1	1	1	1
LC_LCDSSLCC_WS	1	1	1	1	1	1	1	1	1	1
GH_ERC_WS_2015	1	1	1	1	1	1	0	1	1	1
GH_FR1_WS_2015	1	1	1	1	1	1	1	1	1	1

FR_UFRI_M_02015 = Site control

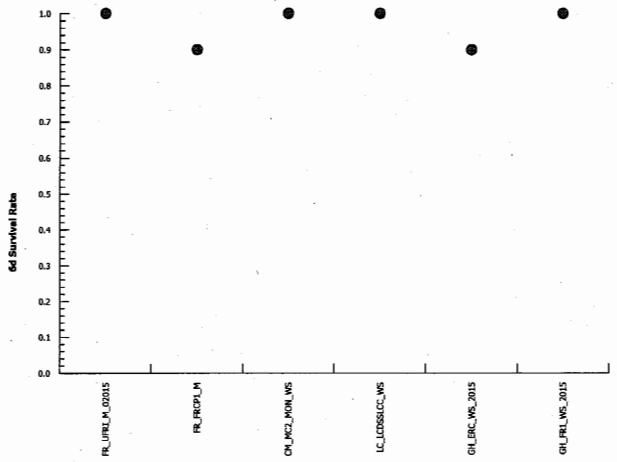
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	19-4708-2687	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 12:34	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes

6d Survival Rate Binomials

C-%	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFRI_M_02015	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1_M	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
CM_MC2_MON_WS	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLCC_WS	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC_WS_2015	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
GH_FR1_WS_2015	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Summary Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Batch ID:	05-3026-9517	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	05 Mar-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	11 Mar-15 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	08-3649-5027	05 Mar-15	05 Mar-15	13h	Teck Coal	
FR_UFRI_M_02015	11-3388-6819	02 Mar-15 11:55	04 Mar-15	73h (10.4 °C)		
FR_FRCP1_M	07-2279-3211	02 Mar-15 14:30	04 Mar-15	70h		
CM_MC2_MON_WS	03-5347-2106	03 Mar-15 08:50	05 Mar-15	52h (6.3 °C)		
LC_LCDSSLCC_WS	12-2313-9393	02 Mar-15 10:36	04 Mar-15	74h (7.2 °C)		
GH_ERC_WS_2015	15-5191-6042	03 Mar-15 15:16	05 Mar-15	46h (6.4 °C)		
GH_FR1_WS_2015	20-0368-3125	02 Mar-15 14:22	04 Mar-15	71h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFRI_M_02015	Water Sample	Teck Coal	FR_UFR1_M_02032015_N (site c		
FR_FRCP1_M	Water Sample	Teck Coal	FR_FRCP1_M_02032015_N		
CM_MC2_MON_WS	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
LC_LCDSSLCC_WS	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-03-02		
GH_ERC_WS_2015	Water Sample	Teck Coal	GH_ERC_WS_2015-03-03_N		
GH_FR1_WS_2015	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		

Reproduction Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	10	22.3	17.57	27.03	7	31	2.093	6.617	29.67%	0.0%
FR_UFRI_M_02015	10	23	20.22	25.78	17	28	1.229	3.887	16.9%	-3.14%
FR_FRCP1_M	10	10.5	7.614	13.39	3	17	1.276	4.035	38.42%	52.91%
CM_MC2_MON_WS	10	19.5	17.28	21.72	15	25	0.9804	3.1	15.9%	12.56%
LC_LCDSSLCC_WS	10	21.8	19.59	24.01	16	26	0.9752	3.084	14.15%	2.24%
GH_ERC_WS_2015	10	21.5	15.61	27.39	0	28	2.604	8.236	38.31%	3.59%
GH_FR1_WS_2015	10	22.1	20.4	23.8	18	26	0.752	2.378	10.76%	0.9%

Reproduction Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	7	26	27	20	21	27	18	23	31	23
FR_UFRI_M_02015	23	27	24	17	28	26	25	17	23	20
FR_FRCP1_M	8	10	11	11	6	14	12	13	3	17
CM_MC2_MON_WS	25	18	22	22	15	17	21	16	20	19
LC_LCDSSLCC_WS	21	19	25	25	23	22	21	16	20	26
GH_ERC_WS_2015	23	23	26	26	28	19	0	18	27	25
GH_FR1_WS_2015	18	23	22	22	24	22	21	26	19	24

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	13-0396-0773	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 12:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	05-3026-9517	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	05 Mar-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	11 Mar-15 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
(1) Lab Control	08-3649-5027	05 Mar-15	05 Mar-15	13h	Teck Coal	
FR_UFRI_M_02015	11-3388-6819	02 Mar-15 11:55	04 Mar-15	73h (10.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
(1) Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFRI_M_02015	Water Sample	Teck Coal	FR_UFR1_M_02032015_N (site control)		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C <> T	NA	NA	22.9%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
(1) Lab Control		FR_UFRI_M_02015	0.2884	2.101	5.099	18	0.7763	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.45	2.45	1	0.08319	0.7763	Non-Significant Effect
Error	530.1	29.45	18			
Total	532.55		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.898	6.541	0.1288	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9225	0.866	0.1106	Normal Distribution

Reproduction Summary

C-%	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
(1) Lab Control	10	22.3	17.57	27.03	23	7	31	2.093	29.67%	0.0%
FR_UFRI_M_02015	10	23	20.22	25.78	23.5	17	28	1.229	16.9%	-3.14%

Reproduction Detail

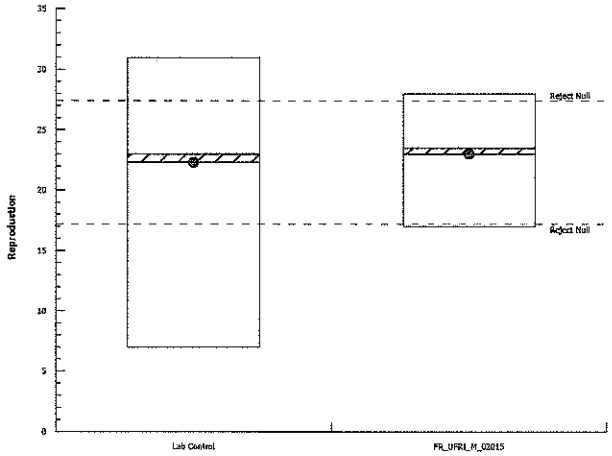
C-%	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
(1) Lab Control	7	26	27	20	21	27	18	23	31	23
FR_UFRI_M_02015	23	27	24	17	28	26	25	17	23	20

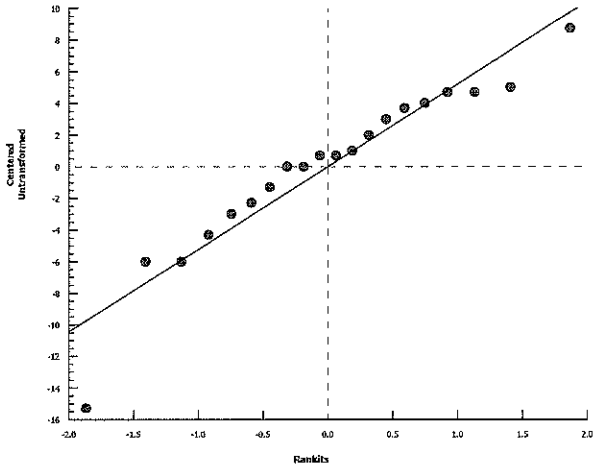
(1) lab control = 20% perm lab water control
FR_UFRI_M_02015 = upstream site water control

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID:	13-0396-0773	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 12:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	11-9441-0592	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 12:34	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	05-3026-9517	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	05 Mar-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	11 Mar-15 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	08-3649-5027	05 Mar-15	05 Mar-15	13h	Teck Coal	
FR_FRCP1_M	07-2279-3211	02 Mar-15 14:30	04 Mar-15	70h		
CM_MC2_MON_WS	03-5347-2106	03 Mar-15 08:50	05 Mar-15	52h (6.3 °C)		
LC_LCDSSLCC_WS	12-2313-9393	02 Mar-15 10:36	04 Mar-15	74h (7.2 °C)		
GH_ERC_WS_2015	15-5191-6042	03 Mar-15 15:16	05 Mar-15	46h (6.4 °C)		
GH_FR1_WS_2015	20-0368-3125	02 Mar-15 14:22	04 Mar-15	71h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_FRCP1_M	Water Sample	Teck Coal	FR_FRCP1_M_02032015_N		
CM_MC2_MON_WS	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
LC_LCDSSLCC_WS	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-03-02		
GH_ERC_WS_2015	Water Sample	Teck Coal	GH_ERC_WS_2015-03-03_N		
GH_FR1_WS_2015	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	23.2%	

Steel Many-One Rank Sum Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_FRCP1_M	63	75	0	18	0.0034	Asymp	Significant Effect
		CM_MC2_MON_WS	81.5	75	3	18	0.1312	Asymp	Non-Significant Effect
		LC_LCDSSLCC_W	95	75	4	18	0.5278	Asymp	Non-Significant Effect
		GH_ERC_WS_2015	104.5	75	4	18	0.8218	Asymp	Non-Significant Effect
		GH_FR1_WS_2015	97.5	75	4	18	0.6152	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1048.083	209.6167	5	8.238	<0.0001	Significant Effect
Error	1374.1	25.4463	54			
Total	2422.183		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	20.58	15.09	0.0010	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8598	0.9459	<0.0001	Non-normal Distribution

Reproduction Summary

C-%	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	10	22.3	17.57	27.03	23	7	31	2.093	29.67%	0.0%
FR_FRCP1_M	10	10.5	7.614	13.39	11	3	17	1.276	38.42%	52.91%
CM_MC2_MON_WS	10	19.5	17.28	21.72	19.5	15	25	0.9804	15.9%	12.56%
LC_LCDSSLCC_WS	10	21.8	19.59	24.01	21.5	16	26	0.9752	14.15%	2.24%
GH_ERC_WS_2015	10	21.5	15.61	27.39	24	0	28	2.604	38.31%	3.59%
GH_FR1_WS_2015	10	22.1	20.4	23.8	22	18	26	0.752	10.76%	0.9%

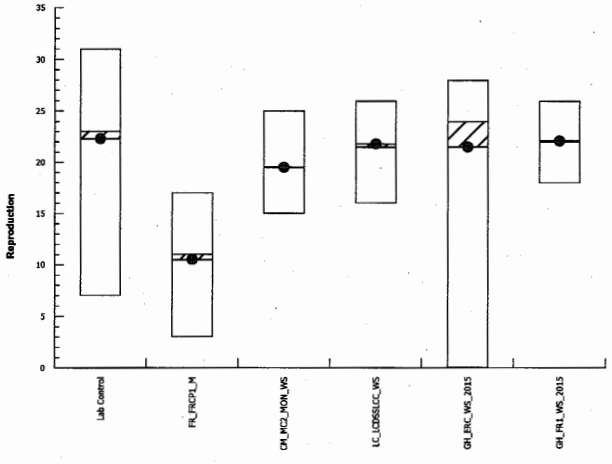
Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

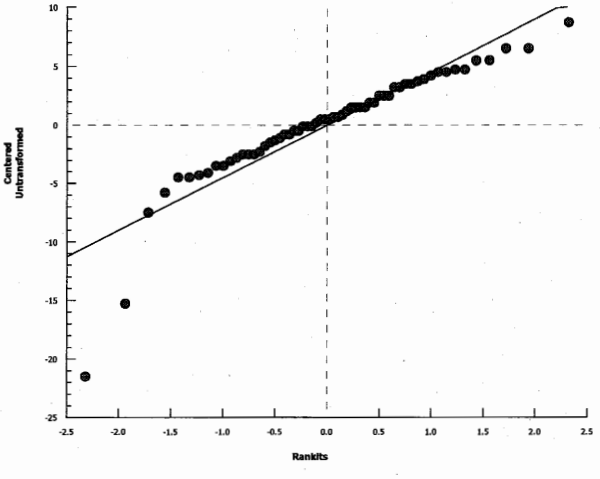
Analysis ID: 11-9441-0592 **Endpoint:** Reproduction **CETIS Version:** CETISv1.8.7
Analyzed: 17 Mar-15 12:34 **Analysis:** Nonparametric-Control vs Treatments **Official Results:** Yes

Reproduction Detail

C-%	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	7	26	27	20	21	27	18	23	31	23
FR_FRCP1_M	8	10	11	11	6	14	12	13	3	17
CM_MC2_MON_WS	25	18	22	22	15	17	21	16	20	19
LC_LCDSSLCC_WS	21	19	25	25	23	22	21	16	20	26
GH_ERC_WS_2015	23	23	26	26	28	19	0	18	27	25
GH_FR1_WS_2015	18	23	22	22	24	22	21	26	19	24

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	00-9457-8285	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 12:34	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	05-3026-9517	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	05 Mar-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	11 Mar-15 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
(1) FR_UFRI_M_02015	11-3388-6819	02 Mar-15 11:55	04 Mar-15	73h (10.4 °C)	Teck Coal	
FR_FRCP1_M	07-2279-3211	02 Mar-15 14:30	04 Mar-15	70h		
CM_MC2_MON_WS	03-5347-2106	03 Mar-15 08:50	05 Mar-15	52h (6.3 °C)		
LC_LCDSSLCC_WS	12-2313-9393	02 Mar-15 10:36	04 Mar-15	74h (7.2 °C)		
GH_ERC_WS_2015	15-5191-6042	03 Mar-15 15:16	05 Mar-15	46h (6.4 °C)		
GH_FR1_WS_2015	20-0368-3125	02 Mar-15 14:22	04 Mar-15	71h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
(1) FR_UFRI_M_02015	Water Sample	Teck Coal	FR_UFR1_M_02032015_N (site c		
FR_FRCP1_M	Water Sample	Teck Coal	FR_FRCP1_M_02032015_N		
CM_MC2_MON_WS	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
LC_LCDSSLCC_WS	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-03-02		
GH_ERC_WS_2015	Water Sample	Teck Coal	GH_ERC_WS_2015-03-03_N		
GH_FR1_WS_2015	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	20.2%	

Steel Many-One Rank Sum Test

Sample Code vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
(1) FR_UFRI_M_02015	FR_FRCP1_M	56	75	1	18	0.0005	Asymp	Significant Effect
	CM_MC2_MON_WS	78	75	3	18	0.0771	Asymp	Non-Significant Effect
	LC_LCDSSLCC_W	93	75	4	18	0.4569	Asymp	Non-Significant Effect
	GH_ERC_WS_2015	106.5	75	5	18	0.8650	Asymp	Non-Significant Effect
	GH_FR1_WS_2015	93.5	75	3	18	0.4745	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1089.733	217.9467	5	10.55	<0.0001	Significant Effect
Error	1116	20.66667	54			
Total	2205.733		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	18.99	15.09	0.0019	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8555	0.9459	<0.0001	Non-normal Distribution

Reproduction Summary

C-%	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
(1) FR_UFRI_M_02015	10	23	20.22	25.78	23.5	17	28	1.229	16.9%	0.0%
FR_FRCP1_M	10	10.5	7.614	13.39	11	3	17	1.276	38.42%	54.35%
CM_MC2_MON_WS	10	19.5	17.28	21.72	19.5	15	25	0.9804	15.9%	15.22%
LC_LCDSSLCC_WS	10	21.8	19.59	24.01	21.5	16	26	0.9752	14.15%	5.22%
GH_ERC_WS_2015	10	21.5	15.61	27.39	24	0	28	2.604	38.31%	6.52%
GH_FR1_WS_2015	10	22.1	20.4	23.8	22	18	26	0.752	10.76%	3.91%

(1) FR_UFRI_M_02015 = site water control (upstream)

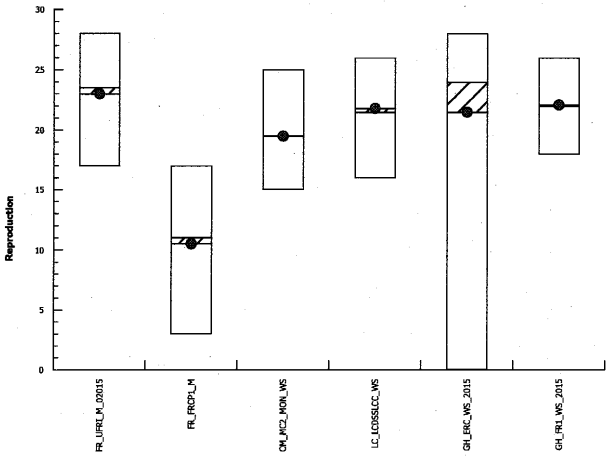
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

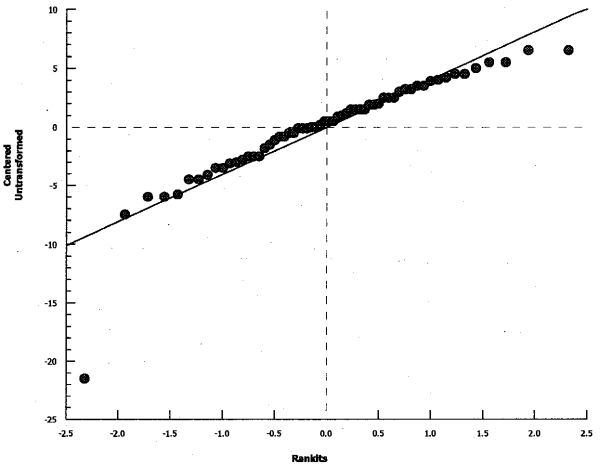
Analysis ID:	00-9457-8285	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 12:34	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Reproduction Detail

C-%	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFRI_M_02015	23	27	24	17	28	26	25	17	23	20
FR_FRCP1_M	8	10	11	11	6	14	12	13	3	17
CM_MC2_MON_WS	25	18	22	22	15	17	21	16	20	19
LC_LCDSSLCC_WS	21	19	25	25	23	22	21	16	20	26
GH_ERC_WS_2015	23	23	26	26	28	19	0	18	27	25
GH_FR1_WS_2015	18	23	22	22	24	22	21	26	19	24

Graphics





Client: Teck Coal

W.O.#: 15155, 15161, 15149, 15144

Hardness and Alkalinity Datasheet

	Alkalinity					Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity (mg/L$CaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness (mg/L $CaCO_3$)	Technician
20% Perrier	Mar 5/15	50	4.5	4.6	88	50	5.0	100	KLP ~~[illegible]~~ KLP
FR-UFR1-M②	↓	10①	1.6	1.7	150	10①	~~16.7~~ 2.1	~~1670~~ 210	↓
FR-FRCP1	↓	10①	3.3	3.4	320	10①	16.7	1670	↓
CM-MC2-MON	↓	10①	2.3	2.4	220	10①	4.5	450	↓
LC-LCOSSLCC-WS	↓	10①	1.9	2.0	180	10①	5.3	530	↓
GH-ERC-WS	↓	50	7.6	7.8	148	50	9.6	192	↓
GH-FR1-WS-2015	↓	10①	2.1	2.2	200	10①	5.1	510	↓

Notes: ① Diluted to 100mL w/ DI water
② Site control

Reviewed by: JGu

Date Reviewed: Apr. 16/15

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 15170

Start Date/Time: March 6/15 @1200h
Set up by: EMM/MLT

Sample Information:

Sample ID: EV_MC2_WS_2015-03-04_N
Sample Date: March 4/15
Date Received: March 6/15
Sample Volume: 1x20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 022615A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 25
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: 1,2,3,4,5,6,7,8,9,10

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd126
Stock Solution ID: 15Na01
Date Initiated: Feb 25/15

7-d LC50 (95% CL): 2.0 (1.7-2.3) g/L NaCL
7-d IC50 (95% CL): 1.4 (1.2-1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.6-2.4) g/L NaCL CV (%): 11
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.1-2.0) g/L NaCL CV (%): 16

Test Results:

	Survival (%) (Mean ± SD) %	Reproduction (Mean ± SD)
Negative Control	100 ± 0.0	27.4 ± 1.8
Site Control ①	100 ± 0.0	25.4 ± 3.9
EV_MC2_WS_2015-03-04_N	100 ± 0.0	26.3 ± 6.5
		±
		±
		±
		±
		±
		±

① FR_UFR1_M_02032015_N

Reviewed by: JOL
Date reviewed: Apr. 29/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: EVO MC2
Work Order #: 15155, 15170

Start Date & Time: March 6/15 @ 1215 1200h MLJ
Stop Date & Time: March 12/15 @ 1215h
Test Species: *Ceriodaphnia dubia*

20% Perrier Ctrl

Concentration	Days 0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0		
DO (mg/L)	8.2	8.0	8.1	7.4	8.2	7.8	8.0	7.1	8.0	7.2	8.1	7.3 MLJ		
pH	7.9	7.8	8.0	7.9	8.0	7.8 MLJ	8.0	7.7	8.0	7.7	8.0	7.7		
Cond. (µS/cm)	224	222		222		224		228		226		224		
Initials	MLJ	EMM		MLJ		EMM		EMM		EMM		MLJ		

① 7.8 ② 7.4

100% (v/v) Site control

Concentration	Days 0	1		2		3		4		5		6		7
FR-UFR1	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.6	24.0	25.0	24.0	24.0		
DO (mg/L)	8.3	8.1	8.1	7.6	8.2	7.8	8.2	7.1	8.2	7.2	8.2	7.3		
pH	7.7	7.7	7.7	7.8	7.8	7.8	7.9	7.8	7.8	7.7	7.8	7.8		
Cond. (µS/cm)	365	370		368		371		380		382		372		
Initials	MLJ	EMM		MLJ		EMM		MLJ		EMM		MLJ		

100% (v/v)

Concentration	Days 0	1		2		3		4		5		6		7
EVO MC2	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.5	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0		
DO (mg/L)	7.8	7.9	8.1	7.5	8.1	7.8	8.2	7.1	8.2	7.1	8.2	7.3		
pH	7.6	7.7	7.7	7.8	7.8	7.8	7.9	7.9	7.8	7.8	7.8	7.9		
Cond. (µS/cm)	598	603		592		602		608		611		595		
Initials	MLJ	EMM		MLJ		EMM		MLJ		EMM		MLJ		

Concentration	Days 0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

	Control (permer)	EV-MC2-WS 100% (v/v)	FR_UFR1_M (site control) 100% (v/v)	
Hardness*	8100	310	210	
Alkalinity*	88	190	150	

Analysts: AWD, MLJ, EMM
Reviewed by: JW
Date reviewed: Apr. 17/15

* mg/L as CaCO3

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L) ; pH = 6 to 8.5

Sample Description: all clear

Comments: **Broodboard Used:** 022615A (#1 → 10/3)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: EVO-MC2
Work Order: 15155, 15170

100% (v/v)

Start Date & Time: March 6/15 @ 1200h
Stop Date & Time: March 12/15 @ 1215h
Set up by: EMM / MCT

Concentration: Control 20% Perrier

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	^
3	4	✓	✓	✓	4	✓	✓	✓	4	✓	MC
4	✓	4	3	5	✓	3	4	4	✓	5	EMM
5	9	9	8	10	8	8	9	8	10	8	EMM
6	17	12	15	14	18	15	13	16	12	15	MC
7											
8											
Total	30	25	26	29	30	26	26	28	26	28	MC

Concentration: Site Control - FR - UFR1

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	^
3	✓	4	✓	3	✓	✓	✓	✓	✓	3	MC
4	3	✓	3	✓	3	4	5	✓	4	✓	EMM
5	9	8	9	10	7	7	10	5	9	8	EMM
6	13	16	16 MC 15	16	14	12	14	11	16 13 MC	16	MC
7											
8									MC		
Total	25	28	27	29	24	23	29	16	29 26	27	MC

Concentration: EVO - MC2

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	^
3	4	4	4	✓	5	4	4	✓	✓	4	MC
4	✓	✓	✓	4	✓	✓	✓	3	3	✓	EMM
5	9	10	11	9	10	10	9	✓	10	11	EMM
6	12	16	16	16	13	16	12	6	13	15	MC
7											
8											
Total	25	30	31	29	28	30	25	9	26	30	MC

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: all clear

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JCM

Date reviewed: Apr. 17/15

CETIS Summary Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Batch ID:	21-4566-7642	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	06 Mar-15 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	12 Mar-15 12:15	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	08-3649-5027	05 Mar-15	05 Mar-15	36h	Teck Coal	
FR_UFRI_M_02015	11-3388-6819	02 Mar-15 11:55	04 Mar-15	4d 0h (10.4 °C)		
EV_MC2_WS_2015	12-4159-5329	04 Mar-15 13:15	06 Mar-15 09:50	47h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFRI_M_02015	Water Sample	Teck Coal	FR_UFR1_M_02032015_N (site c		
EV_MC2_WS_2015	Water Sample	Teck Coal	EV_MC2_WS_2015-03-04_N		

6d Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	10	1	1	1	1	1	0	0	0.0%	0.0%
FR_UFRI_M_02015	10	1	1	1	1	1	0	0	0.0%	0.0%
EV_MC2_WS_2015	10	1	1	1	1	1	0	0	0.0%	0.0%

Reproduction Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	10	27.4	26.09	28.71	25	30	0.5812	1.838	6.71%	0.0%
FR_UFRI_M_02015	10	25.4	22.64	28.16	16	29	1.222	3.864	15.21%	7.3%
EV_MC2_WS_2015	10	26.3	21.68	30.92	9	31	2.044	6.464	24.58%	4.02%

6d Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1	1	1	1	1	1	1	1	1	1
FR_UFRI_M_02015	1	1	1	1	1	1	1	1	1	1
EV_MC2_WS_2015	1	1	1	1	1	1	1	1	1	1

Reproduction Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	30	25	26	29	30	26	26	28	26	28
FR_UFRI_M_02015	25	28	27	29	24	23	29	16	26	27
EV_MC2_WS_2015	25	30	31	29	28	30	25	9	26	30

6d Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFRI_M_02015	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_MC2_WS_2015	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	19-7515-5444	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 13:01	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	21-4566-7642	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	06 Mar-15 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	12 Mar-15 12:15	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	08-3649-5027	05 Mar-15	05 Mar-15	36h	Teck Coal	
FR_UFRI_M_02015	11-3388-6819	02 Mar-15 11:55	04 Mar-15	4d 0h (10.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFRI_M_02015	Water Sample	Teck Coal	FR_UFR1_M_02032015_N (site c		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C <> T	NA	NA	

Fisher Exact Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFRI_M_02015	1	1.0000	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
Lab Control	Negative Contr	10	0	10	1	0	0.0%
FR_UFRI_M_02015	Upstream Contr	10	0	10	1	0	0.0%

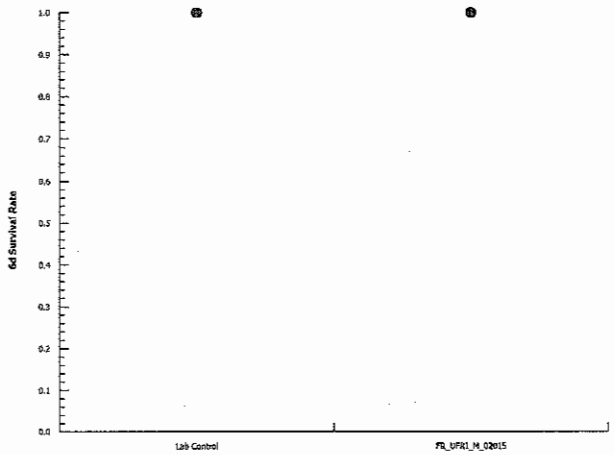
6d Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1	1	1	1	1	1	1	1	1	1
FR_UFRI_M_02015	1	1	1	1	1	1	1	1	1	1

6d Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFRI_M_02015	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	08-3726-3222	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 13:01	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	21-4566-7642	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	06 Mar-15 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	12 Mar-15 12:15	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	08-3649-5027	05 Mar-15	05 Mar-15	36h	Teck Coal	
EV_MC2_WS_2015	12-4159-5329	04 Mar-15 13:15	06 Mar-15 09:50	47h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
EV_MC2_WS_2015	Water Sample	Teck Coal	EV_MC2_WS_2015-03-04_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
Lab Control		EV_MC2_WS_2015	1	1.0000	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
Lab Control	Negative Contr	10	0	10	1	0	0.0%
EV_MC2_WS_2015		10	0	10	1	0	0.0%

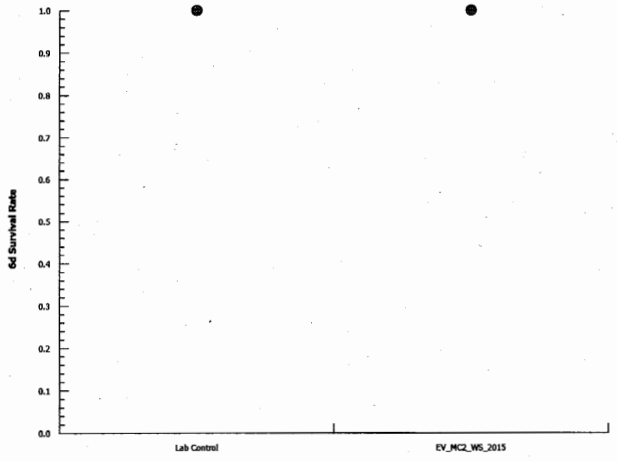
6d Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1	1	1	1	1	1	1	1	1	1
EV_MC2_WS_2015	1	1	1	1	1	1	1	1	1	1

6d Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_MC2_WS_2015	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	14-6932-3258	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Apr-15 16:39	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	21-4566-7642	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	06 Mar-15 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	12 Mar-15 12:15	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFRI_M_02015	11-3388-6819	02 Mar-15 11:55	04 Mar-15	4d 0h (10.4 °C)	Teck Coal	
EV_MC2_WS_2015	12-4159-5329	04 Mar-15 13:15	06 Mar-15 09:50	47h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFRI_M_02015	Water Sample	Teck Coal	FR_UFR1_M_02032015_N (site c		
EV_MC2_WS_2015	Water Sample	Teck Coal	EV_MC2_WS_2015-03-04_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
FR_UFRI_M_02015		EV_MC2_WS_2015	1	1.0000	Exact	Non-Significant Effect

Data Summary

Sample Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFRI_M_02015	10	0	10	1	0	0.0%
EV_MC2_WS_2015	10	0	10	1	0	0.0%

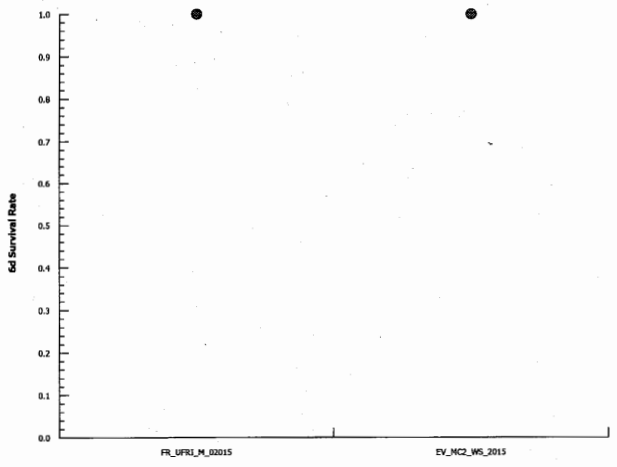
6d Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFRI_M_02015	1	1	1	1	1	1	1	1	1	1
EV_MC2_WS_2015	1	1	1	1	1	1	1	1	1	1

6d Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFRI_M_02015	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_MC2_WS_2015	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	06-7048-1502	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 13:01	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	21-4566-7642	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	06 Mar-15 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	12 Mar-15 12:15	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	08-3649-5027	05 Mar-15	05 Mar-15	36h	Teck Coal	
FR_UFRI_M_02015	11-3388-6819	02 Mar-15 11:55	04 Mar-15	4d 0h (10.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFRI_M_02015	Water Sample	Teck Coal	FR_UFR1_M_02032015_N (site c		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C <> T	NA	NA	10.4%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFRI_M_02015	89.5	NA	4	18	0.2492	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	20	20	1	2.184	0.1567	Non-Significant Effect
Error	164.8	9.155556	18			
Total	184.8		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	4.421	6.541	0.0373	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8494	0.866	0.0052	Non-normal Distribution

Reproduction Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	10	27.4	26.09	28.71	27	25	30	0.5812	6.71%	0.0%
FR_UFRI_M_02015	10	25.4	22.64	28.16	26.5	16	29	1.222	15.21%	7.3%

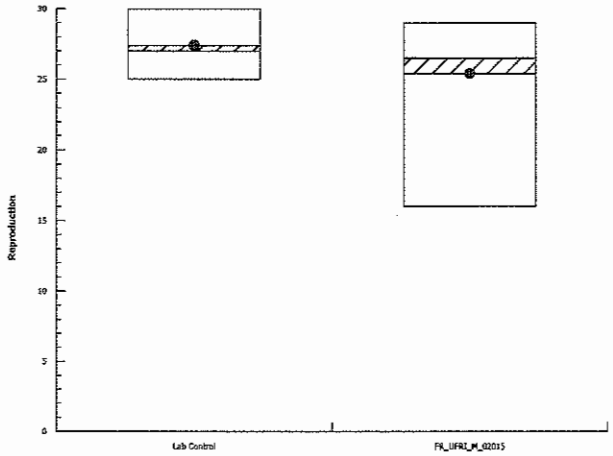
Reproduction Detail

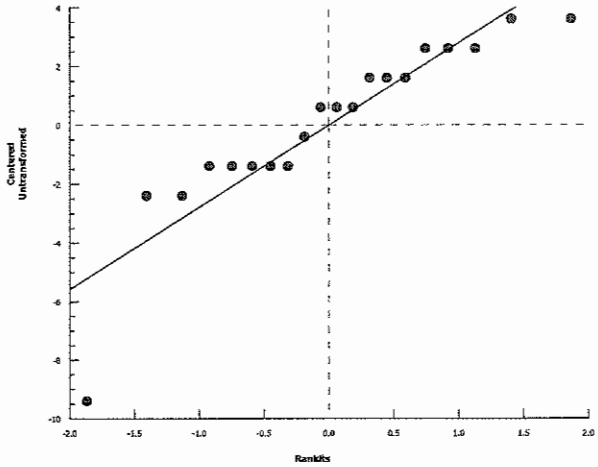
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	30	25	26	29	30	26	26	28	26	28
FR_UFRI_M_02015	25	28	27	29	24	23	29	16	26	27

Ceriodaphnia 7-d Survival and Reproduction Test | **Nautilus Environmental**

Analysis ID:	06-7048-1502	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 13:01	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	15-6380-7696	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Apr-15 10:50	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	21-4566-7642	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	06 Mar-15 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	12 Mar-15 12:15	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	08-3649-5027	05 Mar-15	05 Mar-15	36h	Teck Coal	
EV_MC2_WS_2015	12-4159-5329	04 Mar-15 13:15	06 Mar-15 09:50	47h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
EV_MC2_WS_2015	Water Sample	Teck Coal	EV_MC2_WS_2015-03-04_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	13.5%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		EV_MC2_WS_2015	109.5	NA	6	18	0.6417	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.05	6.05	1	0.2679	0.6110	Non-Significant Effect
Error	406.5	22.58333	18			
Total	412.55		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	12.37	6.541	0.0009	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.6827	0.866	<0.0001	Non-normal Distribution

Reproduction Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	10	27.4	26.09	28.71	27	25	30	0.5812	6.71%	0.0%
EV_MC2_WS_2015	10	26.3	21.68	30.92	28.5	9	31	2.044	24.58%	4.02%

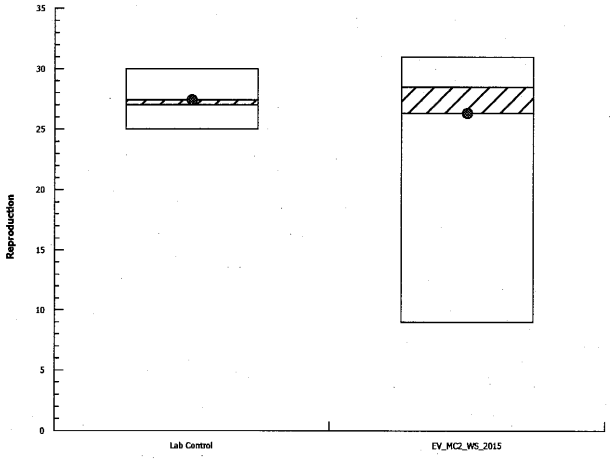
Reproduction Detail

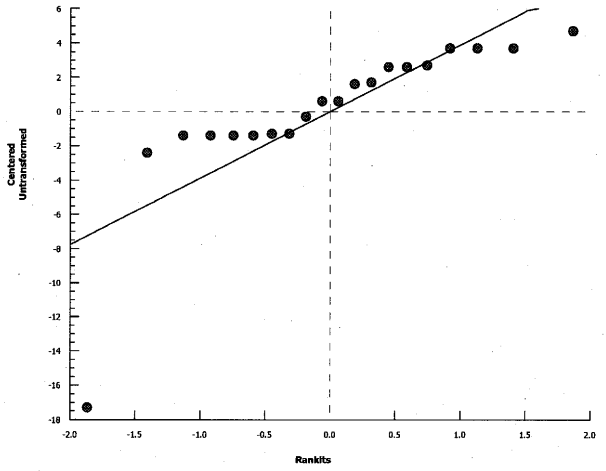
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	30	25	26	29	30	26	26	28	26	28
EV_MC2_WS_2015	25	30	31	29	28	30	25	9	26	30

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID:	15-6380-7696	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Apr-15 10:50	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	12-0537-7183	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Apr-15 16:39	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	21-4566-7642	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	06 Mar-15 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	12 Mar-15 12:15	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFRI_M_02015	11-3388-6819	02 Mar-15 11:55	04 Mar-15	4d 0h (10.4 °C)	Teck Coal	
EV_MC2_WS_2015	12-4159-5329	04 Mar-15 13:15	06 Mar-15 09:50	47h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFRI_M_02015	Water Sample	Teck Coal	FR_UFR1_M_02032015_N (site c		
EV_MC2_WS_2015	Water Sample	Teck Coal	EV_MC2_WS_2015-03-04_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	16.3%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
FR_UFRI_M_02015		EV_MC2_WS_2015	123	NA	5	18	0.9162	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.05	4.05	1	0.1428	0.7099	Non-Significant Effect
Error	510.5	28.36111	18			
Total	514.55		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.798	6.541	0.1413	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.7296	0.866	<0.0001	Non-normal Distribution

Reproduction Summary

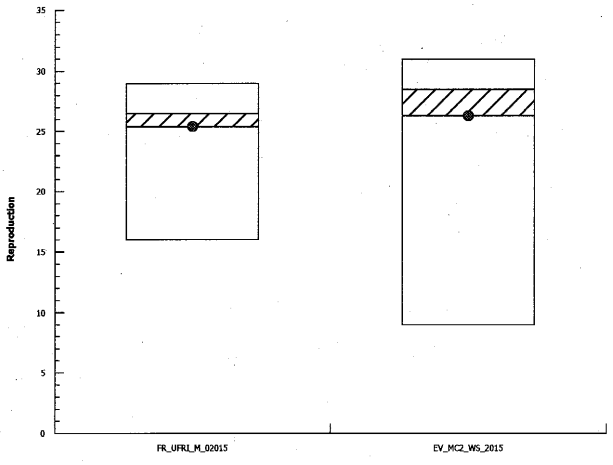
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFRI_M_02015	10	25.4	22.64	28.16	26.5	16	29	1.222	15.21%	0.0%
EV_MC2_WS_2015	10	26.3	21.68	30.92	28.5	9	31	2.044	24.58%	-3.54%

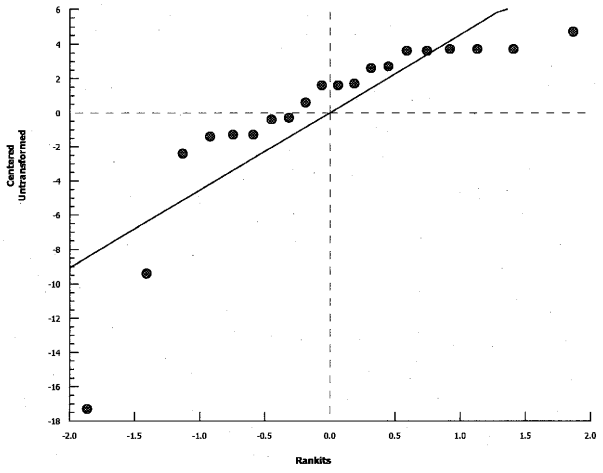
Reproduction Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFRI_M_02015	25	28	27	29	24	23	29	16	26	27
EV_MC2_WS_2015	25	30	31	29	28	30	25	9	26	30

Analysis ID:	12-0537-7183	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Apr-15 16:39	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Graphics





Client: Teck Coal

W.O.#: 15170

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
20% Perrier	Mar 6/15	50	4.5	4.6	88		50	5.0	100	KLP
FR_UFR1_M②	↓	100①	1.6	1.7	150		100①	2.1	210	↓
EV_MC2_WS_2015	↓	100①	2.0	2.1	190		100①	3.1	310	↓

Notes: ①Diluted sample to 100mL w/ DI water
②Site control.

Reviewed by: JCh

Date Reviewed: Apr. 17/15

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 151866

Start Date/Time: March 12/15 @ 1545h
Set up by: EMM/MLT

Sample Information:

Sample ID: EV_HCl_WS_2015-03-10_N
Sample Date: Mar 10/15
Date Received: Mar 12/15
Sample Volume: 1x20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 030415
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 25
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: 12,14,15,17,18,19,20

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd126
Stock Solution ID: 15Na01
Date Initiated: Feb 25/15

7-d LC50 (95% CL): 2.0 (1.7-2.3) g/L NaCL
7-d IC50 (95% CL): 1.4 (1.2-1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.6-2.4) g/L NaCL CV (%): 11
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.1-2.0) g/L NaCL CV (%): 16

Test Results:

	Survival (%) (Mean ± SD) %	Reproduction (Mean ± SD)
Negative Control	100 ± 0.0	30.6 ± 1.5
Site Control①	100 ± 0.0	31.2 ± 2.7
EV_HCl_WS_2015-03-10_N	100 ± 0.0	29.6 ± 2.3
		±
		±
		±
		±
		±
		±

①FR_UFR1-WS-20150311042

Reviewed by: JGL
Date reviewed: Apr. 23/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: EV-HCl
Work Order #: MLT ~~15143~~ 15186 emm

Start Date & Time: March 12/15 @ 1545h
Stop Date & Time: March 19/15 @ 1250h
Test Species: *Ceriodaphnia dubia*

20% Perrier H2O Concentration Control	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.0	7.9	8.0	7.7	8.0	7.5	8.1	7.7	8.0	7.9	8.0	7.7	8.0	6.8
pH	7.9	7.7	8.0	7.7	7.9	7.7	7.9	7.7	7.9	7.7	7.9	7.7	7.9	7.6
Cond. (µS/cm)	224	224		228		224		227		227		226		219
Initials	MLT	Emm		Emm		AD		MLT		Emm		Emm		Emm

site control FR-UFR1 Concentration 100% (v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.1	7.8	8.2	7.6	8.1	7.5	8.1	7.6	8.1	~~7.5~~	8.2	7.6	8.1	6.8
pH	7.7	7.7	7.7	7.8	7.8	7.8	8.0	7.8	8.0	7.8	8.0	7.8	7.8	7.8
Cond. (µS/cm)	350	374		358		354		361		362		361		359
Initials	MLT	Emm		Emm		AD		MLT		Emm		Emm		Emm

① 7.8

EV-HCl Concentration 100% (v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	25.0	24.0	25.0
DO (mg/L)	7.9	7.9	8.2	7.8	8.1	7.5	8.1	7.6	8.1	~~7.8~~	8.2	7.6	8.1	6.8
pH	7.9	7.9	7.9	8.0	8.0	8.0	7.9	8.0	8.0	7.9	8.0	8.0	7.8	7.9
Cond. (µS/cm)	713	727		715		715		714		709		710		713
Initials	MLT	Emm		Emm		AD		MLT		Emm		Emm		Emm

① 7.8

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

	20% Perrier Control	EV-HCl 100% (v/v)	FR UFR1 100% (v/v)	(Site control)
Hardness*	100	470	220	
Alkalinity*	~~88~~	188	156	

* mg/L as CaCO3

Analysts: MLT, Emm, AWD
Reviewed by: JOU
Date reviewed: Apr. 17/15

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L) ; pH = 6 to 8.5

Sample Description: clear

Comments: **Broodboard Used:** 030415 (#12, 14, 15, 17, 18, 19, 20)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: EV_HCl
Work Order: ~~MLT 15143~~ 15186

Start Date & Time: March 12/15 @ 1545h
Stop Date & Time: March 19/15 @ 1250h
Set up by: MLT

100%(v/v)

Days	Concentration: Control 20% Perrier										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	4	5	4	5	3	6	5	6	5	4	MLT
5	12	11	11	12	9	✓	11	✓	11	10	MLT
6	17	✓	17	✓	✓	11	✓	9	14	✓	MLT
7	14	15	16	15	16	14	13	15	✓	16	FMM
8											
Total	33	31	32	32	28	31	29	30	30	30	FMM

Days	Concentration: Site control - FR-UFR1										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	4	6	5	4	3	5	5	5	4	4	MLT
5	11	✓	11	10	11	✓	✓	✓	✓	✓	MLT
6	✓	12	✓	13	✓	11	14	11	11	16	MLT
7	16	15	15	13	13	16	16	16	15	19	FMM
8											
Total	31	33	31	27	27	32	35	32	30	34	FMM

Days	Concentration: EV_HCl										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	5	6	5	4	4	4	3	5	4	4	MLT
5	10	9	10	10	11	11	11	10	✓	✓	MLT
6	~~14~~ ✓	14	✓	✓	✓	✓	✓	✓	8	12	MLT
7	~~19~~	16	15	15	16	16	16	15	12	17	FMM
8											
Total	29	29	30	29	31	31	30	30	24	33	FMM

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: clear
Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JOh
Date reviewed: Apr. 17/15

CETIS Summary Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Batch ID:	15-1769-0727	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	12 Mar-15 15:45	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	19 Mar-15 12:50	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 21h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	05-2341-1464	12 Mar-15	12 Mar-15	16h	Teck Coal	
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	29h (8 °C)		
EV_HC1_WS_2015	08-2902-0605	10 Mar-15 08:15	12 Mar-15 12:45	56h (7.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
EV_HC1_WS_2015	Water Sample	Teck Coal	EV_HC1_WS_2015-03-10_N		

7d Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	10	1	1	1	1	1	0	0	0.0%	0.0%
FR_UFR1	10	1	1	1	1	1	0	0	0.0%	0.0%
EV_HC1_WS_2015	10	1	1	1	1	1	0	0	0.0%	0.0%

Reproduction Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	10	30.6	29.52	31.68	28	33	0.4761	1.506	4.92%	0.0%
FR_UFR1	10	31.2	29.3	33.1	27	35	0.8406	2.658	8.52%	-1.96%
EV_HC1_WS_2015	10	29.6	27.94	31.26	24	33	0.7333	2.319	7.83%	3.27%

7d Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1	1	1	1	1	1	1	1	1	1
FR_UFR1	1	1	1	1	1	1	1	1	1	1
EV_HC1_WS_2015	1	1	1	1	1	1	1	1	1	1

Reproduction Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	33	31	32	32	28	31	29	30	30	30
FR_UFR1	31	33	31	27	27	32	35	32	30	34
EV_HC1_WS_2015	29	29	30	29	31	31	30	30	24	33

7d Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFR1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1_WS_2015	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	01-8703-7513	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	26 Mar-15 9:30	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	15-1769-0727	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	12 Mar-15 15:45	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	19 Mar-15 12:50	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 21h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	05-2341-1464	12 Mar-15	12 Mar-15	16h	Teck Coal	
FR_UFR1-WS	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	29h (8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFR1-WS	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C <> T	NA	NA	

Fisher Exact Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFR1-WS	1	1.0000	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
Lab Control	Negative Contr	10	0	10	1	0	0.0%
FR_UFR1-WS	Upstream Contr	10	0	10	1	0	0.0%

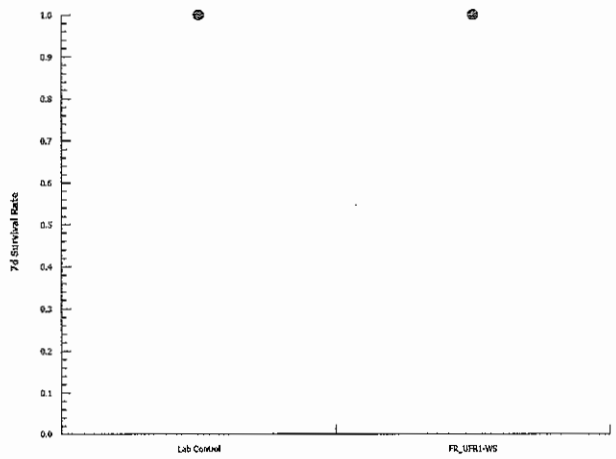
7d Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1	1	1	1	1	1	1	1	1	1
FR_UFR1-WS	1	1	1	1	1	1	1	1	1	1

7d Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFR1-WS	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	20-3598-4886	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Apr-15 10:37	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	15-1769-0727	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	12 Mar-15 15:45	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	19 Mar-15 12:50	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 21h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	05-2341-1464	12 Mar-15	12 Mar-15	16h	Teck Coal	
EV_HC1_WS_2015	08-2902-0605	10 Mar-15 08:15	12 Mar-15 12:45	56h (7.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
EV_HC1_WS_2015	Water Sample	Teck Coal	EV_HC1_WS_2015-03-10_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
Lab Control		EV_HC1_WS_2015	1	1.0000	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
Lab Control	Negative Contr	10	0	10	1	0	0.0%
EV_HC1_WS_2015		10	0	10	1	0	0.0%

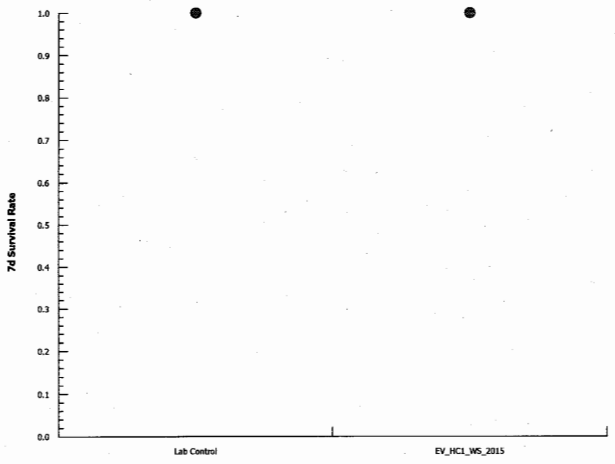
7d Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1	1	1	1	1	1	1	1	1	1
EV_HC1_WS_2015	1	1	1	1	1	1	1	1	1	1

7d Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1_WS_2015	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	12-1026-8967	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Apr-15 10:37	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	15-1769-0727	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	12 Mar-15 15:45	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	19 Mar-15 12:50	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 21h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	29h (8 °C)	Teck Coal	
EV_HC1_WS_2015	08-2902-0605	10 Mar-15 08:15	12 Mar-15 12:45	56h (7.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
EV_HC1_WS_2015	Water Sample	Teck Coal	EV_HC1_WS_2015-03-10_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
FR_UFR1		EV_HC1_WS_2015	1	1.0000	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1	Pooled Control	20	0	20	1	0	0.0%
EV_HC1_WS_2015		10	0	10	1	0	0.0%

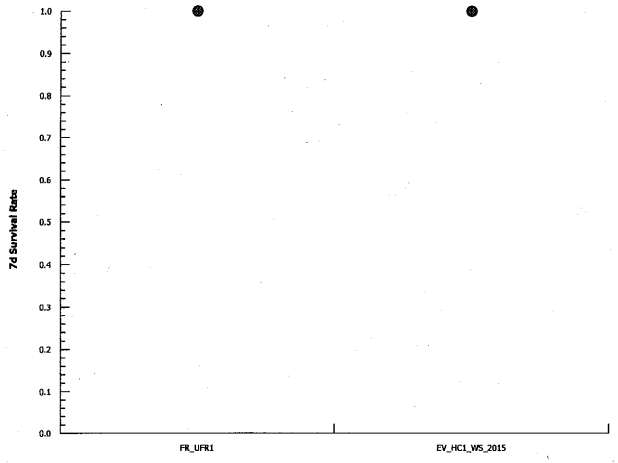
7d Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1	1	1	1	1	1	1	1	1	1	1
	1	1	1	1	1	1	1	1	1	1
EV_HC1_WS_2015	1	1	1	1	1	1	1	1	1	1

7d Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1_WS_2015	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



① FR_UFR1 = site control

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	00-9758-3773	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	26 Mar-15 9:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	15-1769-0727	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	12 Mar-15 15:45	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	19 Mar-15 12:50	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 21h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	05-2341-1464	12 Mar-15	12 Mar-15	16h	Teck Coal	
FR_UFR1-WS	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	29h (8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFR1-WS	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C <> T	NA	NA	6.63%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFR1-WS	0.6211	2.101	2.03	18	0.5423	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.8	1.8	1	0.3857	0.5423	Non-Significant Effect
Error	84	4.666667	18			
Total	85.8		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.118	6.541	0.1056	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9658	0.866	0.6646	Normal Distribution

Reproduction Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	10	30.6	29.52	31.68	30.5	28	33	0.4761	4.92%	0.0%
FR_UFR1-WS	10	31.2	29.3	33.1	31.5	27	35	0.8406	8.52%	-1.96%

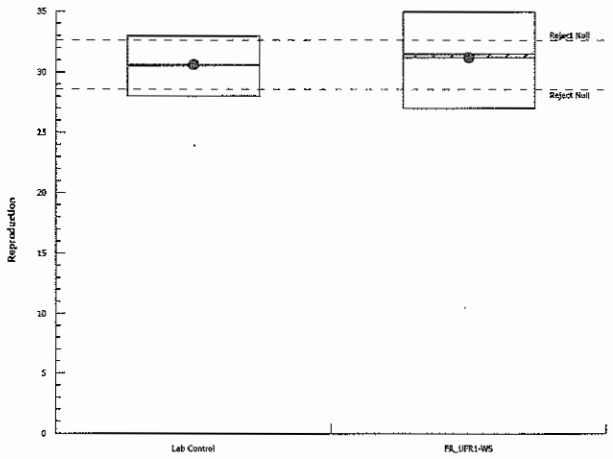
Reproduction Detail

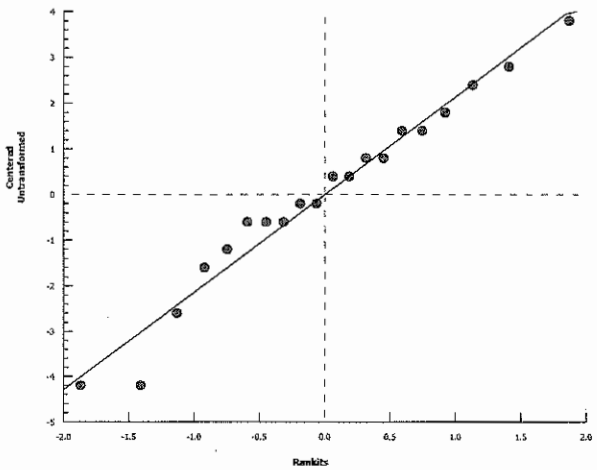
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	33	31	32	32	28	31	29	30	30	30
FR_UFR1-WS	31	33	31	27	27	32	35	32	30	34

Ceriodaphnia 7-d Survival and Reproduction Test | **Nautilus Environmental**

Analysis ID:	00-9758-3773	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	26 Mar-15 9:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	00-1103-4282	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	26 Mar-15 9:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	15-1769-0727	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	12 Mar-15 15:45	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	19 Mar-15 12:50	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 21h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	05-2341-1464	12 Mar-15	12 Mar-15	16h	Teck Coal	
EV_HC1_WS_2014	08-2902-0605	10 Mar-15 08:15	12 Mar-15 12:45	56h (7.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
EV_HC1_WS_2014	Water Sample	Teck Coal	EV_HC1_WS_2014-03-10_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	4.95%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		EV_HC1_WS_2014	1.144	1.734	1.516	18	0.1339	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5	5	1	1.308	0.2677	Non-Significant Effect
Error	68.8	3.822222	18			
Total	73.8		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.373	6.541	0.2141	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9007	0.866	0.0426	Normal Distribution

Reproduction Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	10	30.6	29.52	31.68	30.5	28	33	0.4761	4.92%	0.0%
EV_HC1_WS_2014	10	29.6	27.94	31.26	30	24	33	0.7333	7.83%	3.27%

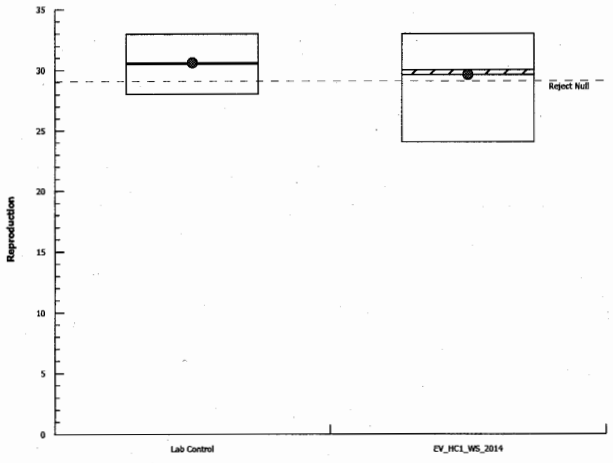
Reproduction Detail

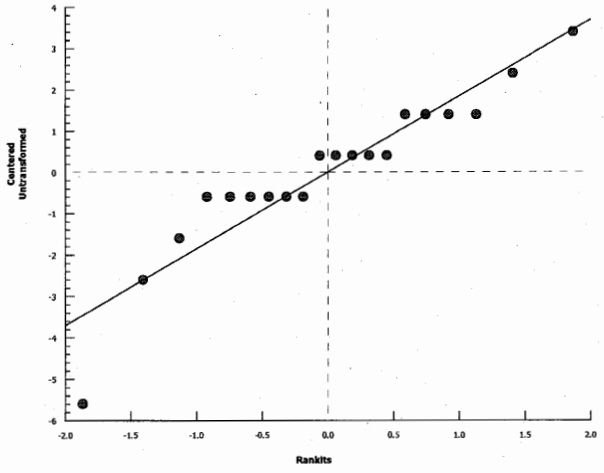
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	33	31	32	32	28	31	29	30	30	30
EV_HC1_WS_2014	29	29	30	29	31	31	30	30	24	33

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID:	00-1103-4282	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	26 Mar-15 9:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	17-2711-3924	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	26 Mar-15 9:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	15-1769-0727	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	12 Mar-15 15:45	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	19 Mar-15 12:50	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 21h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1-WS	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	29h (8 °C)	Teck Coal	
EV_HC1_WS_2014	08-2902-0605	10 Mar-15 08:15	12 Mar-15 12:45	56h (7.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1-WS	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
EV_HC1_WS_2014	Water Sample	Teck Coal	EV_HC1_WS_2014-03-10_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	6.2%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1-WS		EV_HC1_WS_2014	1.434	1.734	1.934	18	0.0843	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	12.8	12.8	1	2.057	0.1686	Non-Significant Effect
Error	112	6.222222	18			
Total	124.8		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.314	6.541	0.6907	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9203	0.866	0.1005	Normal Distribution

Reproduction Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1-WS	10	31.2	29.3	33.1	31.5	27	35	0.8406	8.52%	0.0%
EV_HC1_WS_2014	10	29.6	27.94	31.26	30	24	33	0.7333	7.83%	5.13%

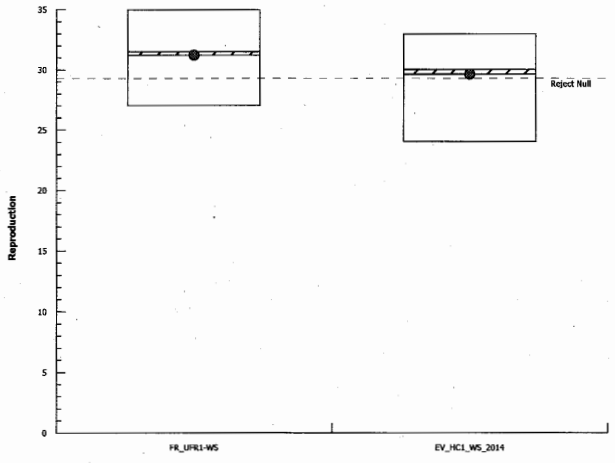
Reproduction Detail

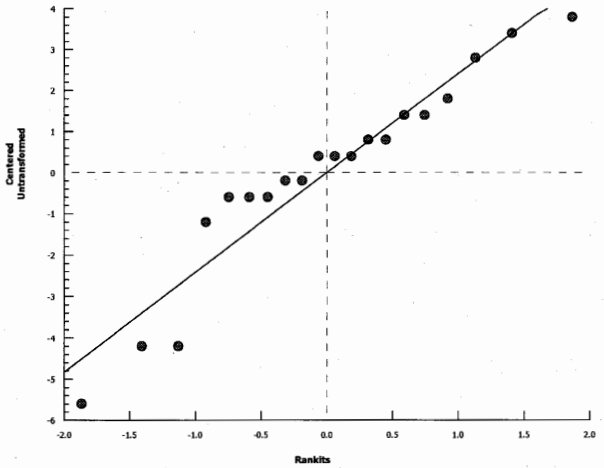
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1-WS	31	33	31	27	27	32	35	32	30	34
EV_HC1_WS_2014	29	29	30	29	31	31	30	30	24	33

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	17-2711-3924	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	26 Mar-15 9:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Client: Teck Coal

W.O.#: 15186

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
EV_HCl_WS 2015	Mar 12/15	50	9.6	9.8	188		100①	4.2	420	MLT
20% Perner Ctrl	↓	50	4.5	4.6	88		50	5.0	100	EMM
FR_UFR1②	↓	50	8.0	8.2	156		50	11.0	220	KLP

Notes: ① Diluted sample to 100mL w/ D.I. water
② Site control.

Reviewed by: JGu

Date Reviewed: Apr. 17/15

APPENDIX B – *Pseudokirchneriella subcapitata* Toxicity Test Data

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15156, 15162, 15145, 15148

Start Date: March 5/15
Set up by: GMM

Sample Information:

Sample ID: Various, see results table for ID's.
Sample Date: March 2-3, 2015
Date Received: March 4 & 5, 2015
Sample Volume: Various

Test Organism Information:

Culture Date: Feb 27/15
Age of culture (Day 0): 6d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC127
Stock Solution ID: 15Zn01
Date Initiated: March 11/15

72-h IC50 (95% CL): 30.8 (27.3 - 34.4) mg/L Zn

72-h IC50 Reference Toxicant Mean and Range: 25.6 (13.6 - 48.2) mg/L Zn CV (%): 37

Test Results:

	Cell Yield (Mean ± SD)
Negative Control	38.9 ± 3.9
Site Control ①	108.3 ± 6.1
①FR_UFR1_M_02032015_N FR_FRCP1_M_02032015-N	64.0 ± 8.9 ②
CM-MC2-MON-WS_20150303_N	101.0 ± 11.9
LC_LCDSSLCC_WS_2015-03-02_N	117.0 ± 2.2
GH_ERC_WS_2015-03-03_N	107.5 ± 12.1
GH_FR1_WS_2015-03-02_N	96.5 ± 5.9
	±
	±

②Cell yield was significantly less than the site control.

Reviewed by: JOL
Date reviewed: Apr. 17/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal **Setup by:** MW/EMM

Sample ID: Teck samples - march 5/15 **Test Date/Time:** March 5/15 @1600h

Work Order No.: 15156, 15148, 15145, 15162 **Test Species:** *Pseudokirchneriella subcapitata*

Culture Date: Feb 27/15 **Age of Culture:** 6 days **Culture Health:** Good

Culture Count: 1 260 2 275 **Average:** 267.5 **Culture Cell Density (c1):** 267.5 x10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 267.5x10⁴ cells/ml = 8 mL

Time Zero Counts: 1 22 2 24 **Average:** 23

No. of Cells/mL: 23 x 10⁴ **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 10455 Cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	6.8	22.0	25.0	~~25.1~~ error ①	24.5	25.0	✓	✓	✓	✓
site control ER-UFR1	7.7	22.0	↓	↓	↓	↓	✓	✓	✓	✓
FR-FRCP1	8.0	22.0					✓	✓	✓	✓
CH MC2	8.0	22.0					✓	✓	✓	✓
LC-LCDSSLCC-WS	8.0	22.0					✓	✓	✓	✓
GH-ERC	7.9	22.0					✓	✓	✓	✓
GH-FR1-WS	8.0	22.0					✓	✓	✓	✓
Initials	MW	MW	MW	MW	EMM	MW	MW	MW	EMM	MW

Initial control pH: Well 1: 6.8 Well 2: ~~6.8~~ MW 6.8

Final control pH: Well 1: ~~6.8~~ MW 6.5 Well 2: ~~6.7~~ MW ~~6.8~~ 6.5

Light intensity (lux): 3750 **Date measured:** March 5/15

Instruments: Thermometer 4 pH meter 4 Light meter 1

Sample Description: all samples are clear

Comments: ① 25.0

Reviewed: JGL **Date reviewed:** Apr. 17/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal
Start Date/Time: March 5/15 @ 1600h
Work Order #: 1514515156, 15162, 15148
Termination Date: March 8/15 @ 1600h
Sample ID: Teck Samples-March 5/15
Test set up by: MLT/EMM

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control (regular lab water)	A	38					MLT
	B	36					
	C	40					
	D	45					
	E	37					
	F	46					
	G	36					
	H	41					
Site control FR-UFR1	A	103					
	B	114					
	C	116					
	D	109					
	E	109					
	F	100					
	G	106					
	H	117					
FR-FRCP1	A	60					
	B	72					
	C	MM 7573					
	D	55					
CM ME2	A	88					
	B	98					
	C	116					
	D	106					
LC-LCDSSUC-WS	A	118					
	B	118					
	C	120					
	D	119					
GH-ERC	A	MM 87 106	100				
	B	94					
	C	118					
	D	119					
GH-FR1-WS	A	106					
	B	94					
	C	97					
	D	93					

Comments: Condensation present

Reviewed by: JOL
Date Reviewed: Apr. 17/15

Pseudokirchneriella subcapitata Algal Counts

Client: Teck Coal
WO#: 15156, 15162, 15148, 15145
Sample ID: Teck Coal samples pass/fail

Start Date/Time: 05-Mar-15 @ 1600h
Termination Date: 08-Mar-15 @ 1600h

Initial Cell Density: 10455 cell/mL

									230000
									0.22
									0.01
Concentration	Rep	Count 1 ($\times 10^4$)	Count 2 ($\times 10^4$)	Count 3 ($\times 10^4$)	Count 4 ($\times 10^4$)	Mean ($\times 10^4$)	Cell Yield ($\times 10^4$) cell/mL		10454.55
Control Lab Water	A	38				38	37.0	mean	38.8
	B	36				36	35.0	SD	3.907411
	C	40				40	39.0	CV	10.06298
	D	45				45	44.0		
	E	37				37	36.0		
	F	46				46	45.0		
	G	36				36	35.0		
	H	41				41	40.0		
Control Site Water (FR-UFRI) **100% (v/v)**	A	103				103	102.0	mean	108.2
	B	114				114	113.0	SD	6.135378
	C	116				116	115.0	CV	5.670166
	D	109				109	108.0		
	E	109				109	108.0		
	F	100				100	99.0		
	G	106				106	105.0		
	H	117				117	116.0		
FR-FRCPI **100% (v/v)**	A	60				60	59.0		
	B	72				72	71.0		
	C	73				73	72.0		
	D	55				55	54.0		
CM MC2 **100% (v/v)**	A	88				88	87.0		
	B	98				98	97.0		
	C	116				116	115.0		
	D	106				106	105.0		
LC **100% (v/v)**	A	115				115	114.0		
	B	118				118	117.0		
	C	120				120	119.0		
	D	119				119	118.0		
ERC **100% (v/v)**	A	106	100			103	102.0		
	B	94				94	93.0		
	C	118				118	117.0		
	D	119				119	118.0		
FRI-WS **100% (v/v)**	A	106				106	105.0		
	B	94				94	93.0		
	C	97				97	96.0		
	D	93				93	92.0		

JGL Apr. 17/15

CETIS Summary Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Batch ID:	11-3837-8149	**Test Type:**	Cell Growth	**Analyst:**	Emma Marus
Start Date:	05 Mar-15 16:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	08 Mar-15 16:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	6d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	08-3649-5027	05 Mar-15	05 Mar-15	16h	Teck Coal	
FR_UFRI_M_02015	11-3388-6819	02 Mar-15 11:55	04 Mar-15	76h (10.4 °C)		
FR_FRCP1_M	07-2279-3211	02 Mar-15 14:30	04 Mar-15	74h		
CM_MC2_MON_WS	03-5347-2106	03 Mar-15 08:50	05 Mar-15	55h (6.3 °C)		
LC_LCDSSLCC_WS	12-2313-9393	02 Mar-15 10:36	04 Mar-15	77h (7.2 °C)		
GH_ERC_WS_2015	15-5191-6042	03 Mar-15 15:16	05 Mar-15	49h (6.4 °C)		
GH_FR1_WS_2015	20-0368-3125	02 Mar-15 14:22	04 Mar-15	74h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFRI_M_02015	Water Sample	Teck Coal	FR_UFR1_M_02032015_N (site c		
FR_FRCP1_M	Water Sample	Teck Coal	FR_FRCP1_M_02032015_N		
CM_MC2_MON_WS	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
LC_LCDSSLCC_WS	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-03-02		
GH_ERC_WS_2015	Water Sample	Teck Coal	GH_ERC_WS_2015-03-03_N		
GH_FR1_WS_2015	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		

Cell Yield Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	8	38.88	35.61	42.14	35	45	1.381	3.907	10.05%	0.0%
FR_UFRI_M_02015	8	108.3	103.1	113.4	99	116	2.169	6.135	5.67%	-178.5%
FR_FRCP1_M	4	64	49.83	78.17	54	72	4.453	8.907	13.92%	-64.63%
CM_MC2_MON_WS	4	101	82.08	119.9	87	115	5.944	11.89	11.77%	-159.8%
LC_LCDSSLCC_WS	4	117	113.6	120.4	114	119	1.08	2.16	1.85%	-201.0%
GH_ERC_WS_2015	4	107.5	88.21	126.8	93	118	6.062	12.12	11.28%	-176.5%
GH_FR1_WS_2015	4	96.5	87.09	105.9	92	105	2.958	5.916	6.13%	-148.2%

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	37	35	39	44	36	45	35	40
FR_UFRI_M_02015	102	113	115	108	108	99	105	116
FR_FRCP1_M	59	71	72	54				
CM_MC2_MON_WS	87	97	115	105				
LC_LCDSSLCC_WS	114	117	119	118				
GH_ERC_WS_2015	102	93	117	118				
GH_FR1_WS_2015	105	93	96	92				

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-8885-1344	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 Apr-15 18:23	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	11-3837-8149	**Test Type:**	Cell Growth	**Analyst:**	Emma Marus
Start Date:	05 Mar-15 16:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	08 Mar-15 16:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	6d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	08-3649-5027	05 Mar-15	05 Mar-15	16h	Teck Coal	
FR_FRCP1_M	07-2279-3211	02 Mar-15 14:30	04 Mar-15	74h		
CM_MC2_MON_WS	03-5347-2106	03 Mar-15 08:50	05 Mar-15	55h (6.3 °C)		
LC_LCDSSLCC_WS	12-2313-9393	02 Mar-15 10:36	04 Mar-15	77h (7.2 °C)		
GH_ERC_WS_2015	15-5191-6042	03 Mar-15 15:16	05 Mar-15	49h (6.4 °C)		
GH_FR1_WS_2015	20-0368-3125	02 Mar-15 14:22	04 Mar-15	74h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_FRCP1_M	Water Sample	Teck Coal	FR_FRCP1_M_02032015_N		
CM_MC2_MON_WS	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
LC_LCDSSLCC_WS	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-03-02		
GH_ERC_WS_2015	Water Sample	Teck Coal	GH_ERC_WS_2015-03-03_N		
GH_FR1_WS_2015	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	29.7%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_FRCP1_M	-5.279	2.43	11.56	10	1.0000	CDF	Non-Significant Effect
		CM_MC2_MON_WS	-13.05	2.43	11.56	10	1.0000	CDF	Non-Significant Effect
		LC_LCDSSLCC_W	-16.42	2.43	11.56	10	1.0000	CDF	Non-Significant Effect
		GH_ERC_WS_2015	-14.42	2.43	11.56	10	1.0000	CDF	Non-Significant Effect
		GH_FR1_WS_2015	-12.11	2.43	11.56	10	1.0000	CDF	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7195	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	25900.09	5180.018	5	85.76	<0.0001	Significant Effect
Error	1328.875	60.40341	22			
Total	27228.96		27			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	11.55	15.09	0.0415	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9724	0.8975	0.6449	Normal Distribution

Cell Yield Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	8	38.88	35.61	42.14	38	35	45	1.381	10.05%	0.0%
FR_FRCP1_M	4	64	49.83	78.17	65	54	72	4.453	13.92%	-64.63%
CM_MC2_MON_WS	4	101	82.08	119.9	101	87	115	5.944	11.77%	-159.8%
LC_LCDSSLCC_WS	4	117	113.6	120.4	117.5	114	119	1.08	1.85%	-201.0%
GH_ERC_WS_2015	4	107.5	88.21	126.8	109.5	93	118	6.062	11.28%	-176.5%
GH_FR1_WS_2015	4	96.5	87.09	105.9	94.5	92	105	2.958	6.13%	-148.2%

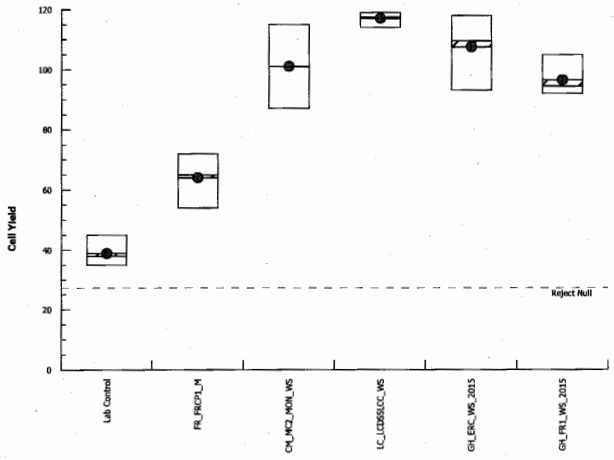
EC Alga Growth Inhibition Test — **Nautilus Environmental**

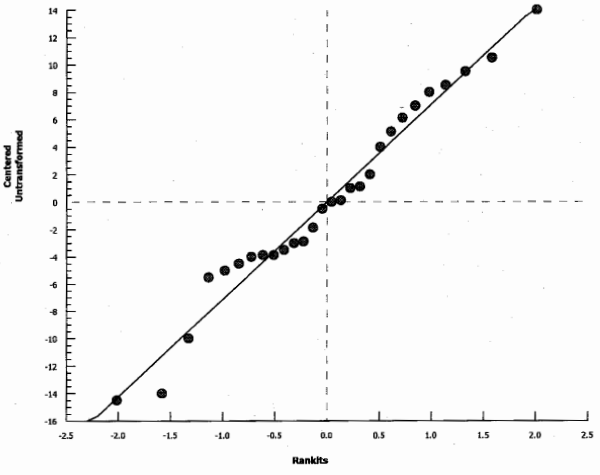
Analysis ID: 06-8885-1344 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 22 Apr-15 18:23 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	37	35	39	44	36	45	35	40
FR_FRCP1_M	59	71	72	54				
CM_MC2_MON_WS	87	97	115	105				
LC_LCDSSLCC_WS	114	117	119	118				
GH_ERC_WS_2015	102	93	117	118				
GH_FR1_WS_2015	105	93	96	92				

Graphics





CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	03-6318-0310	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 12:11	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	11-3837-8149	**Test Type:**	Cell Growth	**Analyst:**	Emma Marus
Start Date:	05 Mar-15 16:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	08 Mar-15 16:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	6d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	08-3649-5027	05 Mar-15	05 Mar-15	16h	Teck Coal	
FR_FRCP1_M	07-2279-3211	02 Mar-15 14:30	04 Mar-15	74h		
CM_MC2_MON_WS	03-5347-2106	03 Mar-15 08:50	05 Mar-15	55h (6.3 °C)		
LC_LCDSSLCC_WS	12-2313-9393	02 Mar-15 10:36	04 Mar-15	77h (7.2 °C)		
GH_ERC_WS_2015	15-5191-6042	03 Mar-15 15:16	05 Mar-15	49h (6.4 °C)		
GH_FR1_WS_2015	20-0368-3125	02 Mar-15 14:22	04 Mar-15	74h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
① Lab Control	Water Sample	Teck Coal	Lab Control		
FR_FRCP1_M	Water Sample	Teck Coal	FR_FRCP1_M_02032015_N		
CM_MC2_MON_WS	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
LC_LCDSSLCC_WS	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-03-02		
GH_ERC_WS_2015	Water Sample	Teck Coal	GH_ERC_WS_2015-03-03_N		
GH_FR1_WS_2015	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C < T	NA	NA	29.7%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
① Lab Control		FR_FRCP1_M	5.279	2.43	11.56	10	<0.0001	CDF	Significant Effect
		CM_MC2_MON_WS	13.05	2.43	11.56	10	<0.0001	CDF	Significant Effect
		LC_LCDSSLCC_W	16.42	2.43	11.56	10	<0.0001	CDF	Significant Effect
		GH_ERC_WS_2015	14.42	2.43	11.56	10	<0.0001	CDF	Significant Effect
		GH_FR1_WS_2015	12.11	2.43	11.56	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
① Control Trend	Mann-Kendall Trend			0.7195	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	25900.09	5180.018	5	85.76	<0.0001	Significant Effect
Error	1328.875	60.40341	22			
Total	27228.96		27			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	11.55	15.09	0.0415	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9724	0.8975	0.6449	Normal Distribution

Cell Yield Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
① Lab Control	8	38.88	35.61	42.14	38	35	45	1.381	10.05%	0.0%
FR_FRCP1_M	4	64	49.83	78.17	65	54	72	4.453	13.92%	-64.63%
CM_MC2_MON_WS	4	101	82.08	119.9	101	87	115	5.944	11.77%	-159.8%
LC_LCDSSLCC_WS	4	117	113.6	120.4	117.5	114	119	1.08	1.85%	-201.0%
GH_ERC_WS_2015	4	107.5	88.21	126.8	109.5	93	118	6.062	11.28%	-176.5%
GH_FR1_WS_2015	4	96.5	87.09	105.9	94.5	92	105	2.958	6.13%	-148.2%

① lab control = D.I. w/ nutrients

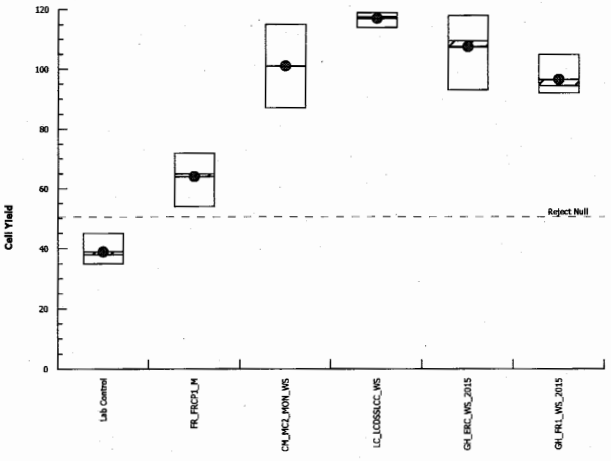
EC Alga Growth Inhibition Test — **Nautilus Environmental**

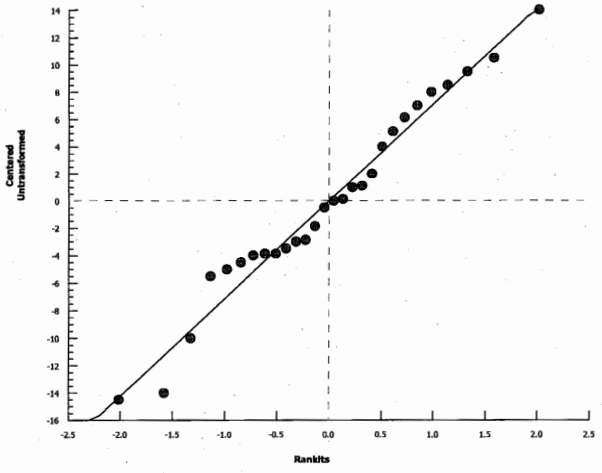
Analysis ID:	03-6318-0310	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 12:11	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	37	35	39	44	36	45	35	40
FR_FRCP1_M	59	71	72	54				
CM_MC2_MON_WS	87	97	115	105				
LC_LCDSSLCC_WS	114	117	119	118				
GH_ERC_WS_2015	102	93	117	118				
GH_FR1_WS_2015	105	93	96	92				

Graphics





CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	08-7675-5172	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 12:07	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	11-3837-8149	**Test Type:**	Cell Growth	**Analyst:**	Emma Marus
Start Date:	05 Mar-15 16:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	08 Mar-15 16:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	6d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFRI_M_02015	11-3388-6819	02 Mar-15 11:55	04 Mar-15	76h (10.4 °C)	Teck Coal	
FR_FRCP1_M	07-2279-3211	02 Mar-15 14:30	04 Mar-15	74h		
CM_MC2_MON_WS	03-5347-2106	03 Mar-15 08:50	05 Mar-15	55h (6.3 °C)		
LC_LCDSSLCC_WS	12-2313-9393	02 Mar-15 10:36	04 Mar-15	77h (7.2 °C)		
GH_ERC_WS_2015	15-5191-6042	03 Mar-15 15:16	05 Mar-15	49h (6.4 °C)		
GH_FR1_WS_2015	20-0368-3125	02 Mar-15 14:22	04 Mar-15	74h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
(1) FR_UFRI_M_02015	Water Sample	Teck Coal	FR_UFR1_M_02032015_N (site c		
FR_FRCP1_M	Water Sample	Teck Coal	FR_FRCP1_M_02032015_N		
CM_MC2_MON_WS	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
LC_LCDSSLCC_WS	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-03-02		
GH_ERC_WS_2015	Water Sample	Teck Coal	GH_ERC_WS_2015-03-03_N		
GH_FR1_WS_2015	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	11.3%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
(1) FR_UFRI_M_02015		FR_FRCP1_M	8.794	2.43	12.23	10	<0.0001	CDF	Significant Effect
		CM_MC2_MON_WS	1.441	2.43	12.23	10	0.2783	CDF	Non-Significant Effect
		LC_LCDSSLCC_W	-1.739	2.43	12.23	10	0.9995	CDF	Non-Significant Effect
		GH_ERC_WS_2015	0.149	2.43	12.23	10	0.8443	CDF	Non-Significant Effect
		GH_FR1_WS_2015	2.335	2.43	12.23	10	0.0604	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	7158.929	1431.786	5	21.2	<0.0001	Significant Effect
Error	1485.5	67.52273	22			
Total	8644.429		27			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	8.092	15.09	0.1512	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9755	0.8975	0.7326	Normal Distribution

Cell Yield Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
(1) FR_UFRI_M_02015	8	108.3	103.1	113.4	108	99	116	2.169	5.67%	0.0%
FR_FRCP1_M	4	64	49.83	78.17	65	54	72	4.453	13.92%	40.88%
CM_MC2_MON_WS	4	101	82.08	119.9	101	87	115	5.944	11.77%	6.7%
LC_LCDSSLCC_WS	4	117	113.6	120.4	117.5	114	119	1.08	1.85%	-8.08%
GH_ERC_WS_2015	4	107.5	88.21	126.8	109.5	93	118	6.062	11.28%	0.69%
GH_FR1_WS_2015	4	96.5	87.09	105.9	94.5	92	105	2.958	6.13%	10.85%

(1) FR_UFRI_M_02015 = upstream site control

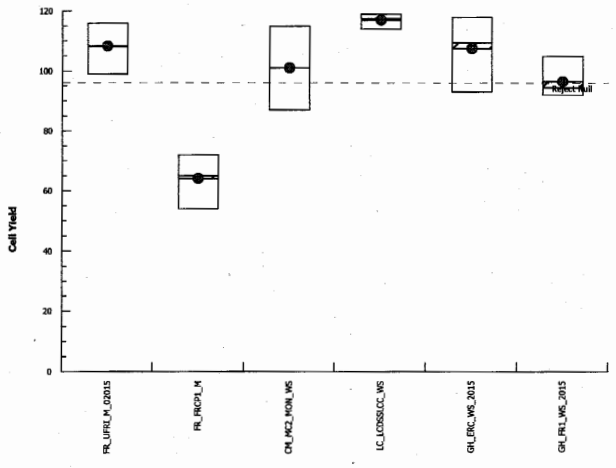
EC Alga Growth Inhibition Test — **Nautilus Environmental**

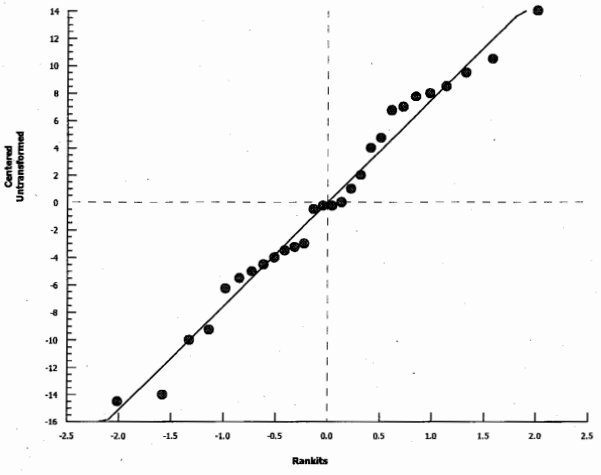
Analysis ID:	08-7675-5172	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 12:07	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFRI_M_02015	102	113	115	108	108	99	105	116
FR_FRCP1_M	59	71	72	54				
CM_MC2_MON_WS	87	97	115	105				
LC_LCDSSLCC_WS	114	117	119	118				
GH_ERC_WS_2015	102	93	117	118				
GH_FR1_WS_2015	105	93	96	92				

Graphics





(1) FR_UFRI_M_02015 = upstream site control

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	15-2953-8190	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 12:07	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	11-3837-8149	**Test Type:**	Cell Growth	**Analyst:**	Emma Marus
Start Date:	05 Mar-15 16:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	08 Mar-15 16:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	6d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFRI_M_02015	11-3388-6819	02 Mar-15 11:55	04 Mar-15	76h (10.4 °C)	Teck Coal	
FR_FRCP1_M	07-2279-3211	02 Mar-15 14:30	04 Mar-15	74h		
CM_MC2_MON_WS	03-5347-2106	03 Mar-15 08:50	05 Mar-15	55h (6.3 °C)		
LC_LCDSSLCC_WS	12-2313-9393	02 Mar-15 10:36	04 Mar-15	77h (7.2 °C)		
GH_ERC_WS_2015	15-5191-6042	03 Mar-15 15:16	05 Mar-15	49h (6.4 °C)		
GH_FR1_WS_2015	20-0368-3125	02 Mar-15 14:22	04 Mar-15	74h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
① FR_UFRI_M_02015	Water Sample	Teck Coal	FR_UFR1_M_02032015_N (site control)		
FR_FRCP1_M	Water Sample	Teck Coal	FR_FRCP1_M_02032015_N		
CM_MC2_MON_WS	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
LC_LCDSSLCC_WS	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-03-02		
GH_ERC_WS_2015	Water Sample	Teck Coal	GH_ERC_WS_2015-03-03_N		
GH_FR1_WS_2015	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C < T	NA	NA	11.3%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
① FR_UFRI_M_02015		FR_FRCP1_M	-8.794	2.43	12.23	10	1.0000	CDF	Non-Significant Effect
		CM_MC2_MON_WS	-1.441	2.43	12.23	10	0.9986	CDF	Non-Significant Effect
		LC_LCDSSLCC_W	1.739	2.43	12.23	10	0.1776	CDF	Non-Significant Effect
		GH_ERC_WS_2015	-0.149	2.43	12.23	10	0.9188	CDF	Non-Significant Effect
		GH_FR1_WS_2015	-2.335	2.43	12.23	10	1.0000	CDF	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
① Control Trend	Mann-Kendall Trend			1.0000	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	7158.929	1431.786	5	21.2	<0.0001	Significant Effect
Error	1485.5	67.52273	22			
Total	8644.429		27			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	8.092	15.09	0.1512	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9755	0.8975	0.7326	Normal Distribution

Cell Yield Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
① FR_UFRI_M_02015	8	108.3	103.1	113.4	108	99	116	2.169	5.67%	0.0%
FR_FRCP1_M	4	64	49.83	78.17	65	54	72	4.453	13.92%	40.88%
CM_MC2_MON_WS	4	101	82.08	119.9	101	87	115	5.944	11.77%	6.7%
LC_LCDSSLCC_WS	4	117	113.6	120.4	117.5	114	119	1.08	1.85%	-8.08%
GH_ERC_WS_2015	4	107.5	88.21	126.8	109.5	93	118	6.062	11.28%	0.69%
GH_FR1_WS_2015	4	96.5	87.09	105.9	94.5	92	105	2.958	6.13%	10.85%

① FR_UFR1_M_02015 = upstream site control

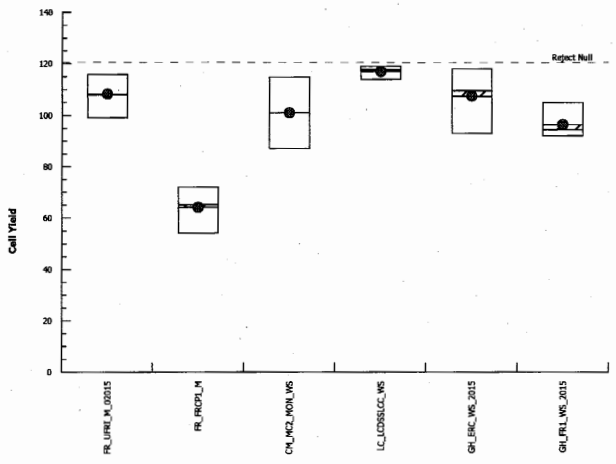
EC Alga Growth Inhibition Test — **Nautilus Environmental**

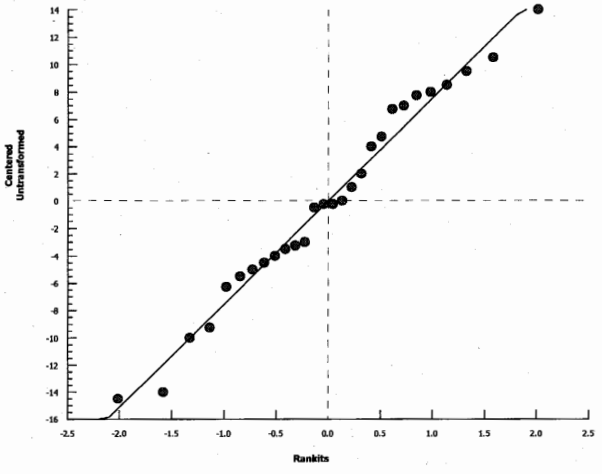
Analysis ID: 15-2953-8190 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 17 Mar-15 12:07 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFRI_M_02015	102	113	115	108	108	99	105	116
FR_FRCP1_M	59	71	72	54				
CM_MC2_MON_WS	87	97	115	105				
LC_LCDSSLCC_WS	114	117	119	118				
GH_ERC_WS_2015	102	93	117	118				
GH_FR1_WS_2015	105	93	96	92				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Tecx Coal
Work Order No.: 15171

Start Date: March 6/15
Set up by: EMM

Sample Information:

Sample ID: EV_MC2_WS_2015-03-04-N
Sample Date: March 4/15
Date Received: March 6/15
Sample Volume: 1 x 20L

Test Organism Information:

Culture Date: Feb 27/15
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: Sc127
Stock Solution ID: 15Zn01
Date Initiated: March 11/15

72-h IC50 (95% CL): 30.8 (27.3-34.4) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 25.6 (13.6 - 48.2) ug/L Zn CV (%): 37

Test Results:

	Cell Yield (Mean± SD)
Negative Control	43.6 ± 3.5
Site Control①	110.6 ± 6.8
EV_MC2_WS_2015-03-04-N	140.8 ± 19.5②
	±
	±
	±
	±
	±
	±

① FR_UFR1_M_02032015_N

② cell yield was significantly higher than the site water and lab control.

Reviewed by: JGL

Date reviewed: Apr. 29/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: Emm

Sample ID: EVO-mc2-WS | Test Date/Time: March 6/15 @ 1320

Work Order No.: 15171, 15156 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Feb 27/15 | Age of Culture: 7d | Culture Health: Good

Culture Count: 1 248 2 310 | Average: 279 | Culture Cell Density (c1): 279 x 10^4 cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) cells/ml =

Time Zero Counts: 1 22 2 24 | Average: 23

No. of Cells/mL: 23 x 10^4 | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 10455 cells/mL

Concentration %(v/v) 100	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	6.8	24.0	24.5	24.5	25.0	25.0	✓	✓	✓	✓
site control FR-UFR1	7.6	24.0	↓	↓	MLT ↓	↓	✓	✓	✓	✓
~~EVO-mc2~~	7.7	24.0	↓	↓	MLT ↓	↓	✓	✓	✓	✓
EV-MC2 -WS										
Initials	Emm	Emm	Emm	Emm	MLT	MLT	Emm	Emm	MLT	MLT

Initial control pH: Well 1: 6.8 Well 2: 6.8

Final control pH: Well 1: 6.5 Well 2: 6.5

Light intensity (lux): 3900 Date measured: March 6/15 @ 1320

Instruments: Thermometer 4 pH meter 4 Light meter 1

Sample Description: clear

Comments:

Reviewed: JOH Date reviewed: Apr. 23/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal
Work Order #: 15171, 15156
Sample ID: EVØ-mc2-WS
%(v/v)

Start Date/Time: March 6/15 @ 1320
Termination Date: March 9/15 @ 1320
Test set up by: EMM

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control (regular lab)	A	50					EMM
	B	42					
	C	48					
	D	44					
	E	47					
	F	43					
	G	39					
	H	44					
Site control (FR-UFR1)	A	113					
	B	108					
	C	114					
	D	99					
	E (A conc)	121					
	F (B)	107					
	G (C)	115					
	H (D)	116					
EVØ-mc2-WS (our conc)	A	143					
	B	168					
	C	122					
	D	134					
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						

Comments:

Reviewed by: JGL Date Reviewed: Apr. 20/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	06-Mar-15 @ 1320h
WO#:	15171 ,15156	Termination Date:	09-Mar-15 @ 1320h
Sample ID:	Teck samples - EVØ-MC2		
		Initial Cell Density:	10455 cell/mL

									230000
									0.22
									0.01
Concentration	Rep	Count 1 ($\times 10^4$)	Count 2 ($\times 10^4$)	Count 3 ($\times 10^4$)	Count 4 ($\times 10^4$)	Mean ($\times 10^4$)	Cell Yield ($\times 10^4$) cell/mL		10454.55
Control	A	50				50	49.0	mean	43.6
Lab Water	B	42				42	41.0	SD	3.543102
	C	48				48	47.0	CV	8.130195
	D	44				44	43.0		
	E	47				47	46.0		
	F	43				43	42.0		
	G	39				39	38.0		
	H	44				44	43.0		
Control	A	113				113	112.0	mean	110.6
Site Water	B	108				108	107.0	SD	6.759913
(FR-UFRI)	C	114				114	113.0	CV	6.113168
100% (v/v)	D	99				99	98.0		
	E	121				121	120.0		
	F	107				107	106.0		
	G	115				115	114.0		
	H	116				116	115.0		
EVO-MC2	A	143				143	142.0		
100% (v/v)	B	168				168	167.0		
	C	122				122	121.0		
	D	134				134	133.0		

JCK
Apr. 20/15

CETIS Summary Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Batch ID:	11-3912-6171	**Test Type:**	Cell Growth	**Analyst:**	Emma Marus
Start Date:	06 Mar-15 13:20	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	09 Mar-15 13:20	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	08-3649-5027	05 Mar-15	05 Mar-15	37h	Teck Coal	
FR_UFRI_M_02015	11-3388-6819	02 Mar-15 11:55	04 Mar-15	4d 1h (10.4 °C)		
EV_MC2_WS_2015	12-4159-5329	04 Mar-15 13:15	06 Mar-15 09:50	48h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFRI_M_02015	Water Sample	Teck Coal	FR_UFR1_M_02032015_N (site c		
EV_MC2_WS_2015	Water Sample	Teck Coal	EV_MC2_WS_2015-03-04_N		

Cell Yield Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	8	43.63	40.66	46.59	38	49	1.253	3.543	8.12%	0.0%
FR_UFRI_M_02015	8	110.6	105	116.3	98	120	2.39	6.76	6.11%	-153.6%
EV_MC2_WS_2015	4	140.8	109.7	171.8	121	167	9.75	19.5	13.85%	-222.6%

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	49	41	47	43	46	42	38	43
FR_UFRI_M_02015	112	107	113	98	120	106	114	115
EV_MC2_WS_2015	142	167	121	133				

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-3985-9902	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 Apr-15 18:21	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	11-3912-6171	**Test Type:**	Cell Growth	**Analyst:**	Emma Marus
Start Date:	06 Mar-15 13:20	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	09 Mar-15 13:20	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	08-3649-5027	05 Mar-15	05 Mar-15	37h	Teck Coal	
EV_MC2_WS_2015	12-4159-5329	04 Mar-15 13:15	06 Mar-15 09:50	48h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
EV_MC2_WS_2015	Water Sample	Teck Coal	EV_MC2_WS_2015-03-04_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	53.0%	

Unequal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		EV_MC2_WS_2015	-9.88	2.353	23.13	3	0.9989	CDF	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.1788	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	25155.38	25155.38	1	204.7	<0.0001	Significant Effect
Error	1228.625	122.8625	10			
Total	26384		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	30.29	10.88	0.0004	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8713	0.8025	0.0678	Normal Distribution

Cell Yield Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	8	43.63	40.66	46.59	43	38	49	1.253	8.12%	0.0%
EV_MC2_WS_2015	4	140.8	109.7	171.8	137.5	121	167	9.75	13.85%	-222.6%

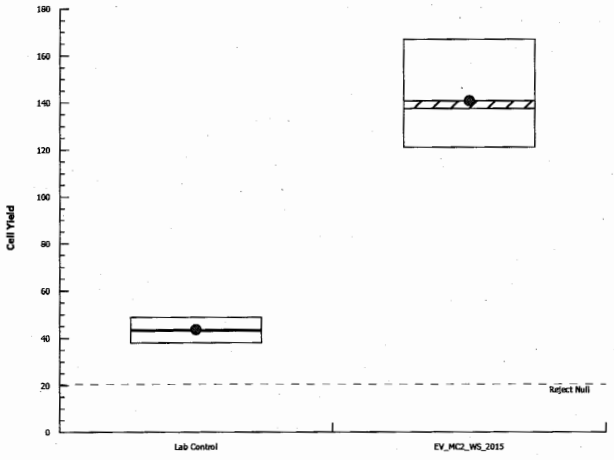
Cell Yield Detail

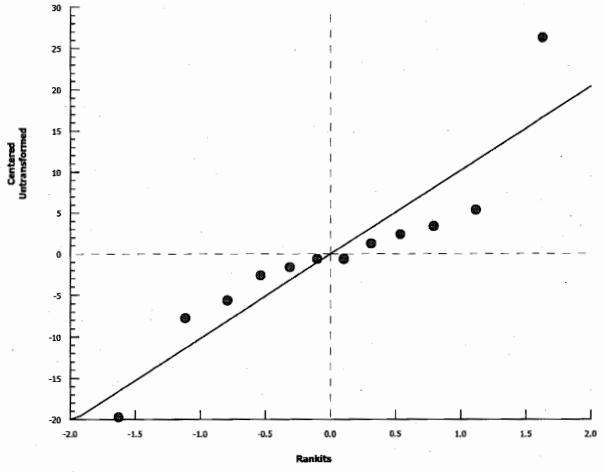
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	49	41	47	43	46	42	38	43
EV_MC2_WS_2015	142	167	121	133				

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	06-3985-9902	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 Apr-15 18:21	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	14-6776-2225	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 13:11	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	11-3912-6171	**Test Type:**	Cell Growth	**Analyst:**	Emma Marus
Start Date:	06 Mar-15 13:20	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	09 Mar-15 13:20	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	08-3649-5027	05 Mar-15	05 Mar-15	37h	Teck Coal	
EV_MC2_WS_2015	12-4159-5329	04 Mar-15 13:15	06 Mar-15 09:50	48h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
EV_MC2_WS_2015	Water Sample	Teck Coal	EV_MC2_WS_2015-03-04_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C < T	NA	NA	53.0%	

Unequal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		EV_MC2_WS_2015	9.88	2.353	23.13	3	0.0011	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.1788	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	25155.38	25155.38	1	204.7	<0.0001	Significant Effect
Error	1228.625	122.8625	10			
Total	26384		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	30.29	10.88	0.0004	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8713	0.8025	0.0678	Normal Distribution

Cell Yield Summary

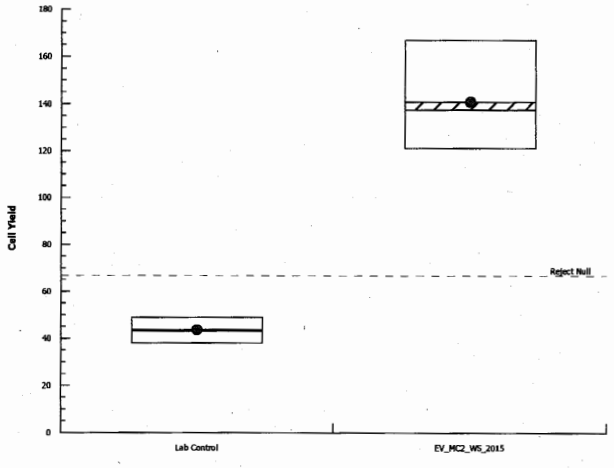
C-%	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	8	43.63	40.66	46.59	43	38	49	1.253	8.12%	0.0%
EV_MC2_WS_2015	4	140.8	109.7	171.8	137.5	121	167	9.75	13.85%	-222.6%

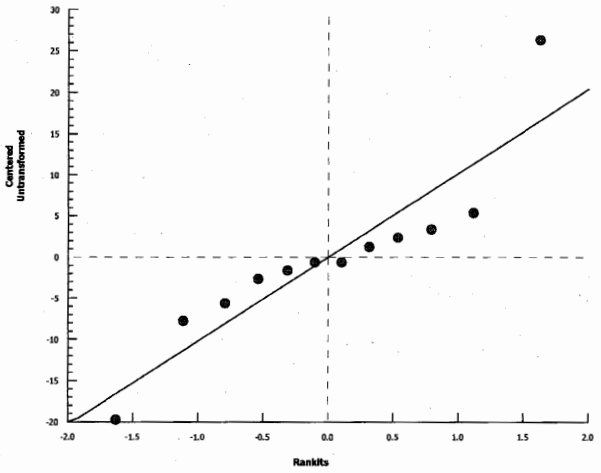
Cell Yield Detail

C-%	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	49	41	47	43	46	42	38	43
EV_MC2_WS_2015	142	167	121	133				

Analysis ID:	14-6776-2225	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 13:11	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Test Code: 15156, 15171 | 12-2475-2529

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	03-0209-3116	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 Apr-15 18:22	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	11-3912-6171	**Test Type:**	Cell Growth	**Analyst:**	Emma Marus
Start Date:	06 Mar-15 13:20	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	09 Mar-15 13:20	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFRI_M_02015	11-3388-6819	02 Mar-15 11:55	04 Mar-15	4d 1h (10.4 °C)	Teck Coal	
EV_MC2_WS_2015	12-4159-5329	04 Mar-15 13:15	06 Mar-15 09:50	48h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFRI_M_02015	Water Sample	Teck Coal	FR_UFR1_M_02032015_N (site c		
EV_MC2_WS_2015	Water Sample	Teck Coal	EV_MC2_WS_2015-03-04_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.1%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFRI_M_02015		EV_MC2_WS_2015	-4.07	1.812	13.41	10	0.9989	CDF	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.3987	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2420.042	2420.042	1	16.57	0.0022	Significant Effect
Error	1460.625	146.0625	10			
Total	3880.667		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	8.321	10.88	0.0208	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.946	0.8025	0.5792	Normal Distribution

Cell Yield Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFRI_M_02015	8	110.6	105	116.3	112.5	98	120	2.39	6.11%	0.0%
EV_MC2_WS_2015	4	140.8	109.7	171.8	137.5	121	167	9.75	13.85%	-27.23%

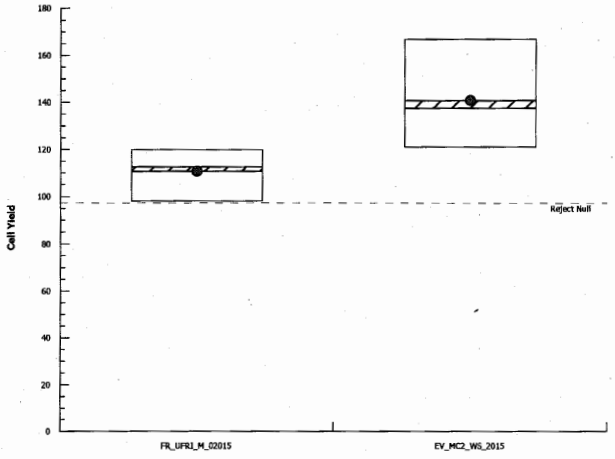
Cell Yield Detail

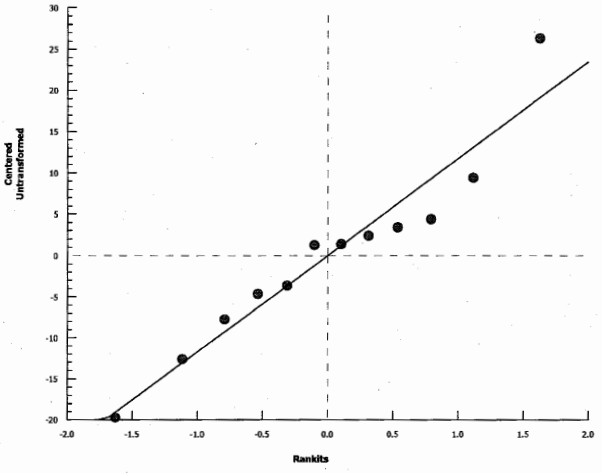
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFRI_M_02015	112	107	113	98	120	106	114	115
EV_MC2_WS_2015	142	167	121	133				

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	03-0209-3116	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 Apr-15 18:22	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	01-9731-3711	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 13:11	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	11-3912-6171	**Test Type:**	Cell Growth	**Analyst:**	Emma Marus
Start Date:	06 Mar-15 13:20	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	09 Mar-15 13:20	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFRI_M_02015	11-3388-6819	02 Mar-15 11:55	04 Mar-15	4d 1h (10.4 °C)	Teck Coal	
EV_MC2_WS_2015	12-4159-5329	04 Mar-15 13:15	06 Mar-15 09:50	48h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFRI_M_02015	Water Sample	Teck Coal	FR_UFR1_M_02032015_N (site c		
EV_MC2_WS_2015	Water Sample	Teck Coal	EV_MC2_WS_2015-03-04_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C < T	NA	NA	12.1%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFRI_M_02015		EV_MC2_WS_2015	4.07	1.812	13.41	10	0.0011	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.3987	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2420.042	2420.042	1	16.57	0.0022	Significant Effect
Error	1460.625	146.0625	10			
Total	3880.667		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	8.321	10.88	0.0208	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.946	0.8025	0.5792	Normal Distribution

Cell Yield Summary

C-%	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFRI_M_02015	8	110.6	105	116.3	112.5	98	120	2.39	6.11%	0.0%
EV_MC2_WS_2015	4	140.8	109.7	171.8	137.5	121	167	9.75	13.85%	-27.23%

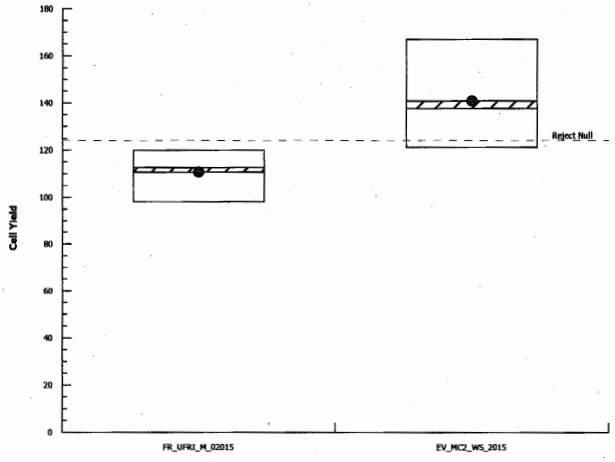
Cell Yield Detail

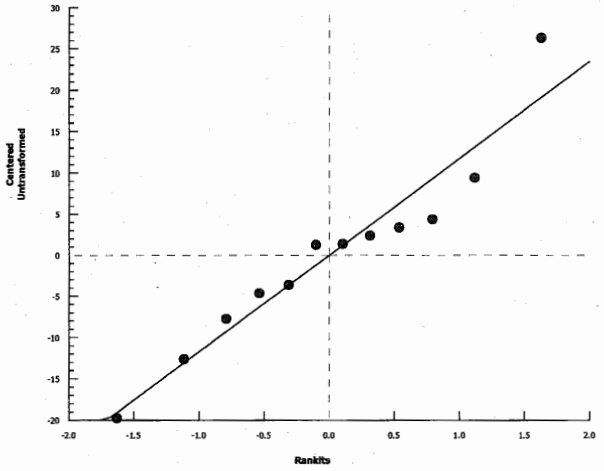
C-%	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFRI_M_02015	112	107	113	98	120	106	114	115
EV_MC2_WS_2015	142	167	121	133				

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	01-9731-3711	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Mar-15 13:11	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15187

Start Date: March 13/15
Set up by: EMM

Sample Information:

Sample ID: EV-HCl-WS-2015-03-10-N
Sample Date: March 10/15
Date Received: March 12/15
Sample Volume: 1 x 20L

Test Organism Information:

Culture Date: March 6/15
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: Sc127
Stock Solution ID: 15Zn01
Date Initiated: March 11/15

72-h IC50 (95% CL): 30.8 (27.3-34.4) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 25.6 (13.6-48.2) ug/L Zn CV (%): 37

Test Results:

	Cell Yield (Mean ± SD)
Negative Control	32.1 ± 3.1
Site Control ①	106.0 ± 6.8
EV-HCl-WS-2015-03-10-N	27.2 ± 3.9 ②,③
	±
	±
	±
	±
	±
	±

①FR-UFR1-WS-2015 03111042

② Cell yield was significantly less than the negative control.
③ Cell yield was significantly less than the site control.

Reviewed by: JCK

Date reviewed: Apr. 20/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: Emm

Sample ID: EV-HCL-WS | Test Date/Time: March 13/15 @ 730h

Work Order No.: 15187 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: March 6/15 | Age of Culture: 7d | Culture Health: Good

Culture Count: 1 321 | 2 340 | Average: 330.5 | Culture Cell Density (c1): 330.5 x 10^4 cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 330.5x10^4 cells/ml = 7mL

Time Zero Counts: 1 18 | 2 23 | Average: 20.5

No. of Cells/mL: 20.5x10^4 | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9318 cells/mL

Concentration %(v/v)	Water Quality ~~temp(°C) pH~~ pH ~~Temp (°C)~~ Temp (°C)		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
lab Control	24.5	6.7	25.0	25.5	25.0	25.0	✓	✓	✓	✓
site Ctrl UFR1	24.5	7.7	25.0	25.5	↓	↓	✓	✓	✓	✓
EV-HCL-WS	25.0	7.9	25.0	25.5	↓	↓	✓	✓	✓	✓
Initials	~~Emm~~	~~Emm~~	~~Emm~~	~~Emm~~	ρ	~~Emm~~	~~Emm~~	~~Emm~~	~~Emm~~	~~Emm~~

Initial control pH: Well 1: 6.8 | Well 2: 6.8

Final control pH: Well 1: 6.5 | Well 2: 6.5

Light intensity (lux): 4000 | Date measured: March 13/15

Instruments: Thermometer 4 | pH meter 4 | Light meter 1

Sample Description: clear samples

Comments:

Reviewed: JGL | Date reviewed: Apr. 20/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal | Start Date/Time: March 13/15 @ 0730h
Work Order #: 15187 | Termination Date: March 16/15 @ 0730h
Sample ID: EV-HCl-WS | Test set up by: EMM
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	35					EMM
	B	38					
	C	32					
	D	29					
	E	36					
	F	34					
	G	30					
	H	31					
Site control UFR1	A	109 (error)					
	B	98					
	C	115					
	D	110					
↓	E (A)	105					
	F (B)	96					
	G (C)	113					
	H (D)	110					
EV_HCl_WS 100%(v/v)	A	28					
	B	22	24				
	C	32					
	D	30					↓
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						

Comments:

Reviewed by: JBM | Date Reviewed: Apr. 20/15

Pseudokirchneriella subcapitata Algal Counts

Client: Teck Coal
WO#: 15187
Sample ID: EV_HC1_WS

Start Date/Time: 13-Mar-15 730h
Termination Date: 16-Mar-15 730h

Initial Cell Density: 9318 cell/mL

									205000
									0.22
									0.01
Concentration	Rep	Count 1 ($\times 10^4$)	Count 2 ($\times 10^4$)	Count 3 ($\times 10^4$)	Count 4 ($\times 10^4$)	Mean ($\times 10^4$)	Cell Yield ($\times 10^4$) cell/mL		9318.182
Control	A	35				35	34.1	mean	32.2
Lab Water	B	38				38	37.1	SD	3.136764
	C	32				32	31.1	CV	9.743565
	D	29				29	28.1		
	E	36				36	35.1		
	F	34				34	33.1		
	G	30				30	29.1		
	H	31				31	30.1		
Control	A	109				109	108.1	mean	106.1
Site Water	B	98				98	97.1	SD	6.845228
(FR-UFRI)	C	115				115	114.1	CV	6.453611
100% (v/v)	D	110				110	109.1		
	E	105				105	104.1		
	F	96				96	95.1		
	G	113				113	112.1		
	H	110				110	109.1		
EV_HC1_WS	A	28				28	27.1		
100% (v/v)	B	22	24			23	22.1		
	C	32				32	31.1		
	D	30				30	29.1		

JCL
Apr. 20/15

CETIS Summary Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Batch ID:	16-5484-5106	**Test Type:**	Cell Growth	**Analyst:**	Emma Marus
Start Date:	13 Mar-15 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	16 Mar-15 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	05-2341-1464	12 Mar-15	12 Mar-15	32h	Teck Coal	
FR_UFR1-WS	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	45h (8 °C)		
EV_HC1_WS_2015	08-2902-0605	10 Mar-15 08:15	12 Mar-15 12:45	71h (7.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFR1-WS	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
EV_HC1_WS_2015	Water Sample	Teck Coal	EV_HC1_WS_2015-03-10_N		

Cell Yield Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	8	32.13	29.5	34.75	28	37	1.109	3.137	9.76%	0.0%
FR_UFR1-WS	8	106	100.3	111.7	95	114	2.42	6.845	6.46%	-230.0%
EV_HC1_WS_2015	4	27.25	21.1	33.4	22	31	1.931	3.862	14.17%	15.18%

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	34	37	31	28	35	33	29	30
FR_UFR1-WS	108	97	114	109	104	95	112	109
EV_HC1_WS_2015	27	22	31	29				

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	08-8850-2182	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	26 Mar-15 10:09	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	16-5484-5106	**Test Type:**	Cell Growth	**Analyst:**	Emma Marus
Start Date:	13 Mar-15 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	16 Mar-15 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	05-2341-1464	12 Mar-15	12 Mar-15	32h	Teck Coal	
EV_HC1_WS_2015	08-2902-0605	10 Mar-15 08:15	12 Mar-15 12:45	71h (7.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
EV_HC1_WS_2015	Water Sample	Teck Coal	EV_HC1_WS_2015-03-10_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	11.6%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		EV_HC1_WS_2015	2.362	1.812	3.741	10	0.0199	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.2751	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	63.375	63.375	1	5.578	0.0398	Significant Effect
Error	113.625	11.3625	10			
Total	177		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.516	10.88	0.5842	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9711	0.8025	0.9220	Normal Distribution

Cell Yield Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	8	32.13	29.5	34.75	32	28	37	1.109	9.76%	0.0%
EV_HC1_WS_2015	4	27.25	21.1	33.4	28	22	31	1.931	14.17%	15.18%

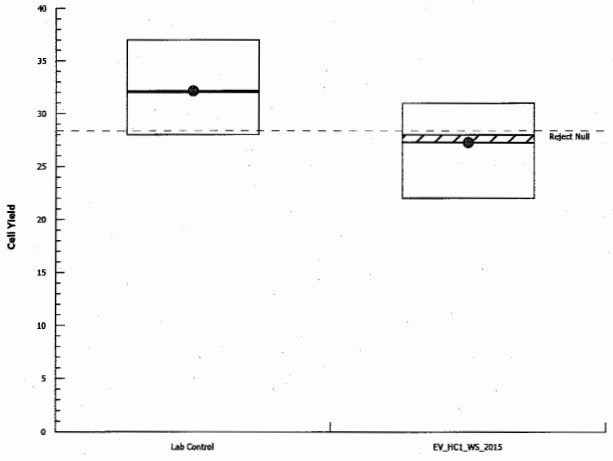
Cell Yield Detail

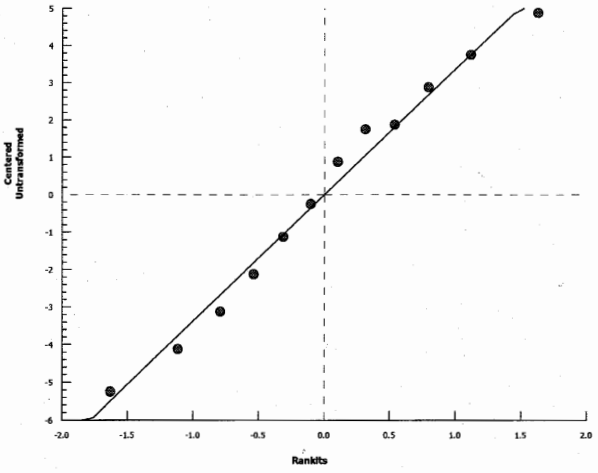
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	34	37	31	28	35	33	29	30
EV_HC1_WS_2015	27	22	31	29				

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	08-8850-2182	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	26 Mar-15 10:09	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	07-7113-0826	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	26 Mar-15 10:06	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	16-5484-5106	**Test Type:**	Cell Growth	**Analyst:**	Emma Marus
Start Date:	13 Mar-15 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	16 Mar-15 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1-WS	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	45h (8 °C)	Teck Coal	
EV_HC1_WS_2015	08-2902-0605	10 Mar-15 08:15	12 Mar-15 12:45	71h (7.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1-WS	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
EV_HC1_WS_2015	Water Sample	Teck Coal	EV_HC1_WS_2015-03-10_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	6.39%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1-WS		EV_HC1_WS_2015	21.06	1.812	6.776	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			1.0000	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	16537.5	16537.5	1	443.7	<0.0001	Significant Effect
Error	372.75	37.275	10			
Total	16910.25		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.141	44.43	0.3757	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9284	0.8025	0.3638	Normal Distribution

Cell Yield Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1-WS	8	106	100.3	111.7	108.5	95	114	2.42	6.46%	0.0%
EV_HC1_WS_2015	4	27.25	21.1	33.4	28	22	31	1.931	14.17%	74.29%

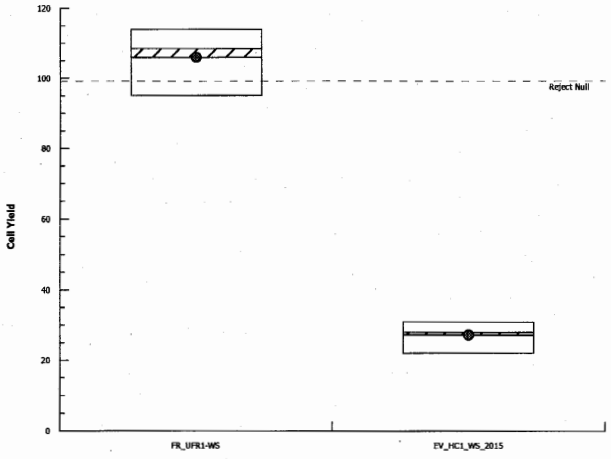
Cell Yield Detail

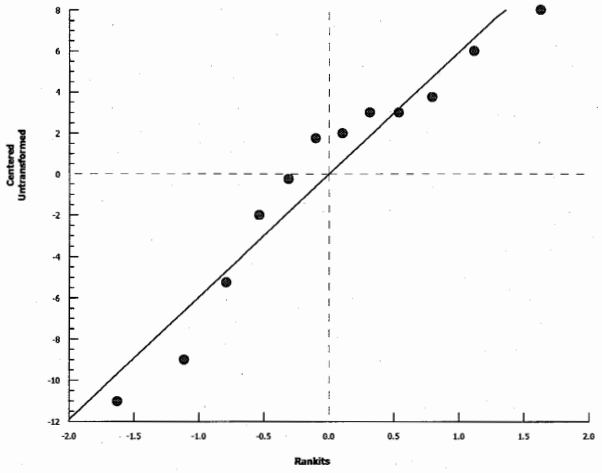
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1-WS	108	97	114	109	104	95	112	109
EV_HC1_WS_2015	27	22	31	29				

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	07-7113-0826	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	26 Mar-15 10:06	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





APPENDIX C – *Hyalella azteca* Toxicity Test Data

Hyalella azteca Test Summary Sheet

Client: Teck
Work Order No.: 15181, 15185, 15190

Start Date: 12-Mar-15
Set up by: KJL

Sample Information:

Sample ID: See below
Sample Date: Between March 9 - April 8, 2015
Date Received: Between March 11 - April 10, 2015
Sample Volume: 2x 20L per sample per refresh

Test Organism Information:

Species: *Hyalella azteca*
Supplier: Aquatic Research Organisms, NH
Date received: 12-Mar-15
Age or size (Day 0): 8-days

NaCl Reference Toxicant Results:

Reference Toxicant ID: HA92
Stock Solution ID: n/a
Date Initiated: 12-Mar-15

96-h LC50 (95% CL): 4.9 (4.1 - 5.8)

96-h LC50 Reference Toxicant Mean and Range: 5.1 (4.2 - 6.1) CV (%): 10

Test Results:

Sample ID	Survival ± SD (%)	Average Dry Wt. ± SD (mg)
Control	100.0 ± 0.0	0.93 ± 0.06
GH_FR1_WS	98.0 ± 4.5	0.84 ± 0.10
CM_MC2	94.0 ± 5.5	0.68 ± 0.21*
FR_UFR1	72.0 ± 25.9*	0.76 ± 0.23
FR_CP1	94.0 ± 5.5	0.76 ± 0.05*

* Samples that are significantly different from Control.

Reviewed by: JM

Date reviewed: May 5/15

Chronic *H. azteca* Sediment Toxicity Test Data Sheet

Freshwater Sediment Water Quality

Client: Teck
WO #: 15181, 15185, 15190,
Sample ID: See below

Start Date: March 12/15
Termination Date: Apr 9/15
Test Organism: *H. azteca*

Temperature (°C)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control	22.5	24.0	24.0	23.0	23.0	22.5	23.0	24.0	23.5	24.0	23.5	22.5	23.0	23.0	23.0
GH-FR1-WS	23.0	23.5	24.0	23.0	23.0	23.0	23.0	24.0	23.5	24.0	23.5	22.5	23.0	23.0	23.0
CM_MC2	23.0	24.0	24.0	23.0	23.0	23.0	23.0	24.0	23.5	24.0	23.5	22.5	23.0	23.0	23.0
FR-UFR1	23.0	23.5	24.0	23.0	23.0	23.0	23.0	24.0	23.5	24.0	23.5	22.5	23.0	23.0	23.0
FR-cp1	23.0	23.0	24.0	23.0	23.0	23.0	23.0	24.0	23.5	24.0	23.5	22.5	23.0	23.0	23.0
Technician Initials	MW	JW	[illegible]	KJ	KJ	JW	JW	JW	JW	AS	KJ	JW	SSD	JW	JW

Conductivity (µS)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control	407	411	416	424	422	429	423	400	405	429	420	429	419	432	415
GH-FR1-WS	995	999	999	996	993	992	995	935	903	920	920	905	895	892	886
CM_MC2	896	890	897	899	894	874	890	838	616	563	560	525	518	524	521
FR_UFR1	495	493	449	463	457	491	453	434	423	435	424	426	450	474	479
FR_CP1	1699	1698	1706	1700	1690	1642	1650	1575	1255	1208	1179	1120	1082	1080	1066
Technician Initials	MW	JW	[illegible]	KJ	KJ	JW	JW	JW	JW	AS	KJ	JW	SSD	JW	JW

Comments:

Reviewed by: JW

Date Reviewed: May 5/15

Chronic *H. azteca* Sediment Toxicity Test Data Sheet

Freshwater Sediment Water Quality

Client: Teck
WO #: 15181, 15185, 15190
Sample ID: See below

Start Date: Mar 12/15
Termination Date: Apr 9/15
Test Organism: *H. azteca*

Temperature (°C)

Sample ID	Day													
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Control	23.5	24.0	24.0	23.0	23.0	24.0	23.5	23.0	23.0	23.0	23.0	23.0	22.0	23.5
GH - FR1 - WS	24.0	24.0	24.0	23.0	23.0	24.0	23.5	23.5	23.0	23.0	23.0	23.0	23.5	23.5
CM - MC2	23.5	24.0	24.0	24.0	23.0	24.0	23.5	23.5	23.0	23.0	23.0	23.0	23.5	23.5
FR - UFR 1	24.0	24.0	24.0	23.5	23.0	24.0	23.5	23.5	23.0	23.0	23.0	23.0	23.5	23.5
FR - CP 1	23.5	24.0	24.0	23.0	23.0	24.0	23.5	23.5	23.0	23.0	23.0	23.0	24.0	23.5
Technician Initials	JW	AD	A	JW	SSD	JW	MLT	JW	MW		KJ	SSD	KJ	SSD

Conductivity (µS)

Sample ID	Day													
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Control	395	413	397	405	400	401	399	399	404	445	479	426	~~388~~ 460	460
GH - FR1 - WS	881	905	865	879	880	894	896	842	850	848	853	851	842	847
CM - MC 2	612	671	672	708	702	677	680	605	612	610	611	610	603	626
FR - UFR 1	443	439	428	415	427	414	417	391	393	395	400	409	390	392
FR - CP 1	1112	1175	1147	1124	1132	1120	1124	931	908	895	913	904	895	898
Technician Initials	JW	AD	A	JW	SSD	JW	MLT	JW	MW	JW	KJ	SSD	KJ	SSD

Comments:

Reviewed by: JOh

Date Reviewed: Apr. 30/15

Chronic *H. azteca* Sediment Toxicity Test Data Sheet

Freshwater Sediment Water Quality

Client: Teck
Test #: 15181, 15185, 15190

Start Date: March 12/15
Termination Date: Apr 9/15
Test Organism: *H. azteca*

Dissolved oxygen (mg/L)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control	8.4	6.7	7.1	7.2	7.5	6.5	6.6	6.5	6.1	5.9	6.2	5.7	5.8	5.7	5.8
GH-FR1_WS	8.3	6.7	7.2	7.3	7.1	6.3	6.6	6.5	6.0	6.0	6.3	5.5	5.9	6.7	6.1
CM_MC2	8.5	6.7	7.1	7.2	7.2	6.4	6.7	6.7	6.3	6.0	6.2	5.7	6.1	6.1	6.2
FR-UFR1	8.2	6.6	7.2	7.1	7.3	6.3	6.4	6.4	6.2	5.9	6.3	5.4	6.1	5.8	6.1
FR_CP1	8.4	6.7	7.2	7.1	7.2	6.4	6.6	6.5	6.2	6.0	6.1	5.2	6.0	5.8	5.9
Technician Initials	MM	JW	AB	KJL	KJL	JW	JW	JW	JW	AB	KJL	JW	SSD	JW	JW

pH

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control	7.7	7.4	7.8	7.4	7.3	7.2	7.3	7.4	7.4	7.7	7.3	7.2	7.2	7.4	7.4
GH-FR1_WS	8.0	8.1	8.1	8.1	8.1	7.9	8.0	8.0	7.9	7.8	7.9	7.9	7.9	8.1	8.1
CM_MC2	8.1	8.0	8.2	8.1	8.2	8.0	8.0	8.0	7.9	7.8	7.9	7.8	7.8	7.9	8.0
FR-UFR1	8.1	7.9	8.1	8.1	8.1	7.9	7.9	7.9	7.9	7.9	7.8	7.6	7.8	7.8	7.8
FR-CP1	8.1	8.0	8.1	8.0	8.1	8.0	8.0	8.0	8.0	7.9	8.0	7.9	7.9	8.0	8.0
Technician Initials	MM	JW	AB	KJL	KJL	JW	JW	JW	JW	AB	KJL	JW	SSD	JW	JW

Comments:

Reviewed by: JW Date Reviewed: Apr. 30/15

Chronic *H. azteca* Sediment Toxicity Test Data Sheet

Freshwater Sediment Water Quality

Client: Teck

Test #: 15181, 15185, 15195

Start Date: Mar 12/15

Termination Date: Apr 9/15

Test Organism: *H. azteca*

Dissolved oxygen (mg/L)

Sample ID	Day													
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Control	5.4	6.2	6.1	6.6	6.0	5.2	5.8	5.3	5.9	5.4	6.0	5.8	5.9	6.1
GH - FR1 - WS	5.8	6.3	6.5	6.8	6.0	5.2	5.8	5.3	6.0	5.4	6.1	6.8	5.7	5.9
CM - MC2	5.9	6.3	6.1	6.5	6.1	4.9	5.9	5.7	5.5	5.6	6.0	5.6	5.6	5.8
FR - UFR 1	5.7	6.2	6.3	6.5	6.0	5.5	6.0	5.9	5.6	5.5	5.9	5.7	5.3	5.7
FR - CP 1	5.7	6.3	6.2	6.4	5.9	5.2	5.9	6.0	5.8	5.6	5.9	5.6	5.8	5.9
Technician Initials	JW	[illegible]	[illegible]	JW	SSD	JW	MLT	JW	[illegible]	JW	KJV	SSD	KJV	SSD

pH

Sample ID	Day													
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Control	7.4	7.5	7.3	7.6	7.3	7.4	7.3	7.3	7.2	7.2	7.3	7.2	7.5	7.2
GH-FR1-WS	8.0	8.0	8.1	8.2	8.0	7.9	7.8	7.8	7.8	7.8	8.0	7.9	8.0	7.8
CM - MC 2	7.9	8.1	8.0	8.2	7.9	7.8	7.9	7.9	7.8	7.9	8.0	7.9	7.8	7.8
FR - UFR 1	7.8	8.0	8.0	8.1	7.9	7.8	7.8	7.9	7.8	7.9	7.9	7.8	7.7	7.6
FR - CP 1	8.0	8.1	8.1	8.1	8.0	7.9	7.9	8.0	8.0	8.1	8.0	7.9	7.8	7.7
Technician Initials	JW	[illegible]	[illegible]	JW	SSD	JW	MLT	JW	[illegible]	JW	KJV	SSD	KJV	SSD

Comments:

Reviewed by: JW

Date Reviewed: Apr. 30/15

Nautilus Environmental

H. azteca Toxicity Test Data Sheet

Freshwater Sediment 28-d Survival and Weight

Client: Teck
Work Order No: 15181, 15185, 15190
Sample ID: See below

Start Date: 12-Mar-15
Termination Date: 09-Apr-15
Test Organism: *Hyalella azteca*

Sample ID	TE Pan No. Red	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
Control	1	A	10①	0	0	KLP	965.29	975.03	10	NY
	2	B	10①	0	0	KLP	972.14	981.28	10	
	3	C	10①	0	0	KLP	962.03	971.95	10	
	4	D	10①	0	0	KLP	982.04	991.61	10	
	5	E	10①	0	0	KLP	957.57	965.94	10	
GH_FR1_WS	6	A	9①	0	1	KL	961.21	968.87	9	
	7	B	10①	0	0	KL	962.34	972.06	10	
	8	C	10①	0	0	KL	952.93	960.91	10	
	9	D	10①	0	0	KS	963.73	972.69	10	
	10	E	10①	0	0	KS	973.10	980.16	10	
CM_MC2	11	A	9①	0	1	KLP	977.26	984.45	9	
	12	B	10①	0	0, d	KLP	NY ~~987~~.01	991.31	10	
	13	C	9①	0	~~0~~ 1	KLP	967.54	975.14	9	
	14	D	10①	0	0	KLP	977.49	985.86	10	
	15	E	9①, est	0	~~2~~ 1	KLP	958.91	963.21	9	
FR-UFR1	16	A	8①②	0	2	KL	949.33	956.16	8	
	17	B	11①	0	0	KL	959.90	968.54	11	
	18	C	7①②	0	3	KL	978.43	984.52	7	
	19	D	3①②	2	5	KL	958.90	959.96	3	
	20	E	8①②	0	2	KL	970.88	978.30	8	✓

Comments: ① Young present. ② Checked by KLP

re weighed pans - 7 - 972.06
14 - 985.79
22 - 980.10

Reviewed by: JCh

Date Reviewed: Apr. 30/15

H. azteca Toxicity Test Data Sheet

Freshwater Sediment 28-d Survival and Weight

Client: Teck
Work Order No: 15181, 15185, 15190
Sample ID: See below

Start Date: 12-Mar-15
Termination Date: 09-Apr-15
Test Organism: *Hyalella azteca*

Sample ID	TE Pan No. Red	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
FR-CP1	21	A	10①	0	0	KS	963.72	972.15	10	NY
	22	B	10①	0	0	KS	973.15	980.19	10	1
	23	C	9	0	1	KS	975.20	981.72	9	
	24	D	9①	0	1	KS	958.31	965.02	9	
	25	E	9①	0	1	KS	960.30	967.15	9	↓
		A								
		B								
		C								
		D								
		E								
		A								
		B								
		C								
		D								
		E								
		A								
		B								
		C								
		D								
		E								

Comments: ① young present

Reviewed by: JOL

Date Reviewed: Apr. 30/15

CETIS Summary Report

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Batch ID:	03-9911-9775	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	12 Mar-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	
Ending Date:	09 Apr-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-3817-2510	12 Mar-15	12 Mar-15	NA	Teck Coal	
GH_FR1	21-3664-3662	09 Mar-15 10:05	11 Mar-15 10:10	62h (9.4 °C)		
CM_MC2	17-8817-4739	10 Mar-15 11:30	12 Mar-15 10:00	37h (7.1 °C)		
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	13h (8 °C)	Teck Coal	
FR_FRCP1	14-3483-9304	11 Mar-15 11:36	12 Mar-15 12:45	12h (7.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1-WS-201503111136		

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
02-1320-9669	Survival Rate	Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	5	1	1	1	1	1	0	0	0.0%	0.0%
GH_FR1	5	0.98	0.9245	1	0.9	1	0.02	0.04472	4.56%	2.0%
CM_MC2	5	0.94	0.872	1	0.9	1	0.02449	0.05477	5.83%	6.0%
FR_UFR1	5	0.72	0.3986	1	0.3	1	0.1158	0.2588	35.95%	28.0%
FR_FRCP1	5	0.94	0.872	1	0.9	1	0.02449	0.05477	5.83%	6.0%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	1	1	1	1	1
GH_FR1	0.9	1	1	1	1
CM_MC2	0.9	1	0.9	1	0.9
FR_UFR1	0.8	1	0.7	0.3	0.8
FR_FRCP1	1	1	0.9	0.9	0.9

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	10/10	10/10	10/10	10/10	10/10
GH_FR1	9/10	10/10	10/10	10/10	10/10
CM_MC2	9/10	10/10	9/10	10/10	9/10
FR_UFR1	8/10	11/11	7/10	3/10	8/10
FR_FRCP1	10/10	10/10	9/10	9/10	9/10

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	02-1320-9669	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Apr-15 17:05	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	03-9911-9775	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	12 Mar-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	
Ending Date:	09 Apr-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-3817-2510	12 Mar-15	12 Mar-15	NA	Teck Coal	
GH_FR1	21-3664-3662	09 Mar-15 10:05	11 Mar-15 10:10	62h (9.4 °C)		
CM_MC2	17-8817-4739	10 Mar-15 11:30	12 Mar-15 10:00	37h (7.1 °C)		
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	13h (8 °C)	Teck Coal	
FR_FRCP1	14-3483-9304	11 Mar-15 11:36	12 Mar-15 12:45	12h (7.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1-WS-201503111136		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Angular (Corrected)	NA	C > T	NA	NA	

Kolmogorov-Smirnov Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		GH_FR1	0.2	NA		8	0.5000	CDF	Non-Significant Effect
		CM_MC2	0.6	NA		8	0.1786	CDF	Non-Significant Effect
		FR_UFR1	0.8	NA		8	0.0397	CDF	Significant Effect
		FR_FRCP1	0.6	NA		8	0.1786	CDF	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.4304024	0.1076006	4	4.758	0.0073	Significant Effect
Error	0.4523135	0.02261568	20			
Total	0.8827159		24			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	2.107	4.893	0.1306	Equal Variances
Variances	Levene Equality of Variance	3.355	4.431	0.0296	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8112	0.8877	0.0004	Non-normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	5	1	1	1	1	1	1	0	0.0%	0.0%
GH_FR1	5	0.98	0.9245	1	1	0.9	1	0.02	4.56%	2.0%
CM_MC2	5	0.94	0.872	1	0.9	0.9	1	0.02449	5.83%	6.0%
FR_UFR1	5	0.72	0.3986	1	0.8	0.3	1	0.1158	35.95%	28.0%
FR_FRCP1	5	0.94	0.872	1	0.9	0.9	1	0.02449	5.83%	6.0%

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	02-1320-9669	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Apr-15 17:05	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	5	1.412	1.412	1.412	1.412	1.412	1.412	0	0.0%	0.0%
GH_FR1	5	1.379	1.289	1.47	1.412	1.249	1.412	0.03259	5.28%	2.31%
CM_MC2	5	1.314	1.203	1.425	1.249	1.249	1.412	0.03992	6.79%	6.93%
FR_UFR1	5	1.041	0.6646	1.417	1.107	0.5796	1.419	0.1355	29.11%	26.28%
FR_FRCP1	5	1.314	1.203	1.425	1.249	1.249	1.412	0.03992	6.79%	6.93%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	1	1	1	1	1
GH_FR1	0.9	1	1	1	1
CM_MC2	0.9	1	0.9	1	0.9
FR_UFR1	0.8	1	0.7	0.3	0.8
FR_FRCP1	1	1	0.9	0.9	0.9

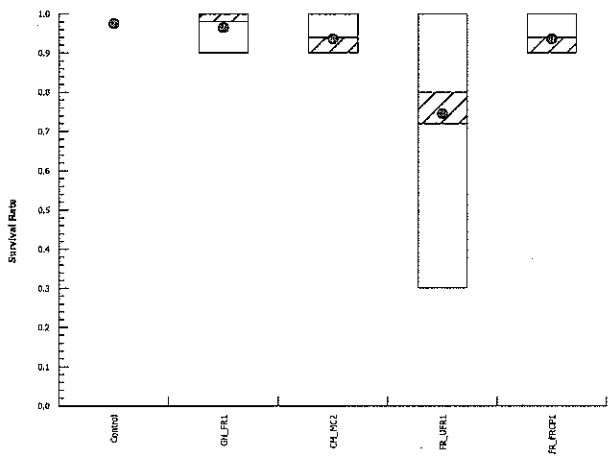
Angular (Corrected) Transformed Detail

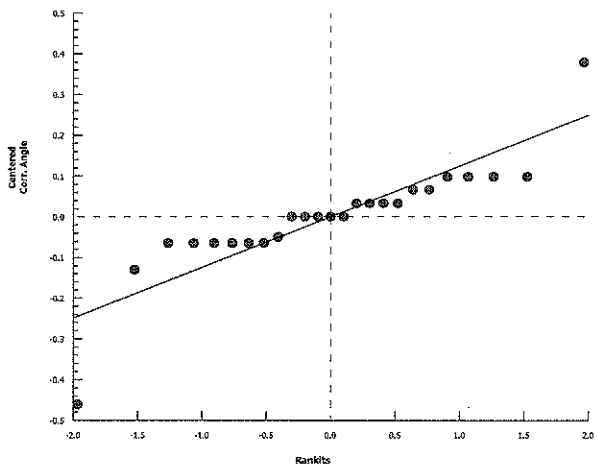
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	1.412	1.412	1.412	1.412	1.412
GH_FR1	1.249	1.412	1.412	1.412	1.412
CM_MC2	1.249	1.412	1.249	1.412	1.249
FR_UFR1	1.107	1.419	0.9912	0.5796	1.107
FR_FRCP1	1.412	1.412	1.249	1.249	1.249

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	10/10	10/10	10/10	10/10	10/10
GH_FR1	9/10	10/10	10/10	10/10	10/10
CM_MC2	9/10	10/10	9/10	10/10	9/10
FR_UFR1	8/10	11/11	7/10	3/10	8/10
FR_FRCP1	10/10	10/10	9/10	9/10	9/10

Graphics





CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	10-4962-6223	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Apr-15 15:01	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	18-4749-0808	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	12 Mar-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	
Ending Date:	09 Apr-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	13h (8 °C)	Teck Coal	
GH_FR1	21-3664-3662	09 Mar-15 10:05	11 Mar-15 10:10	62h (9.4 °C)		
CM_MC2	17-8817-4739	10 Mar-15 11:30	12 Mar-15 10:00	37h (7.1 °C)		
FR_FRCP1	14-3483-9304	11 Mar-15 11:36	12 Mar-15 12:45	12h (7.1 °C)	Teck Coal	

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1-WS-201503111136		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Angular (Corrected)	NA	C > T	NA	NA	

Kolmogorov-Smirnov Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_FR1	0	NA		8	0.5000	CDF	Non-Significant Effect
		CM_MC2	0	NA		8	0.5000	CDF	Non-Significant Effect
		FR_FRCP1	0	NA		8	0.5000	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.3406233	0.1135411	3	4.016	0.0262	Significant Effect
Error	0.4523135	0.0282696	16			
Total	0.7929369		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	10.96	11.34	0.0119	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8373	0.866	0.0033	Non-normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	5	0.72	0.3986	1	0.8	0.3	1	0.1158	35.95%	0.0%
GH_FR1	5	0.98	0.9245	1	1	0.9	1	0.02	4.56%	-36.11%
CM_MC2	5	0.94	0.872	1	0.9	0.9	1	0.02449	5.83%	-30.56%
FR_FRCP1	5	0.94	0.872	1	0.9	0.9	1	0.02449	5.83%	-30.56%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	5	1.041	0.6646	1.417	1.107	0.5796	1.419	0.1355	29.11%	0.0%
GH_FR1	5	1.379	1.289	1.47	1.412	1.249	1.412	0.03259	5.28%	-32.52%
CM_MC2	5	1.314	1.203	1.425	1.249	1.249	1.412	0.03992	6.79%	-26.26%
FR_FRCP1	5	1.314	1.203	1.425	1.249	1.249	1.412	0.03992	6.79%	-26.26%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1	0.8	1	0.7	0.3	0.8
GH_FR1	0.9	1	1	1	1
CM_MC2	0.9	1	0.9	1	0.9
FR_FRCP1	1	1	0.9	0.9	0.9

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	10-4962-6223	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Apr-15 15:01	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

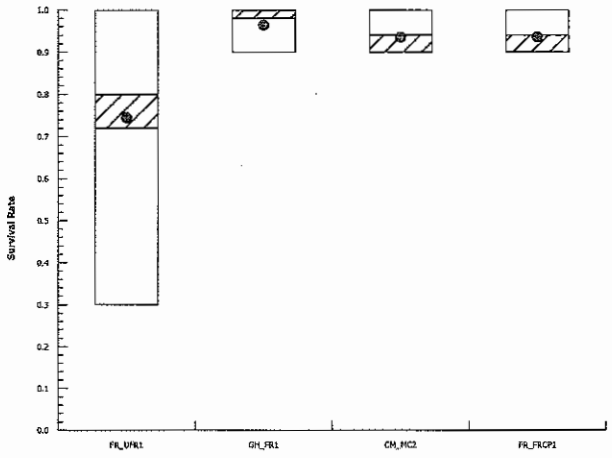
Angular (Corrected) Transformed Detail

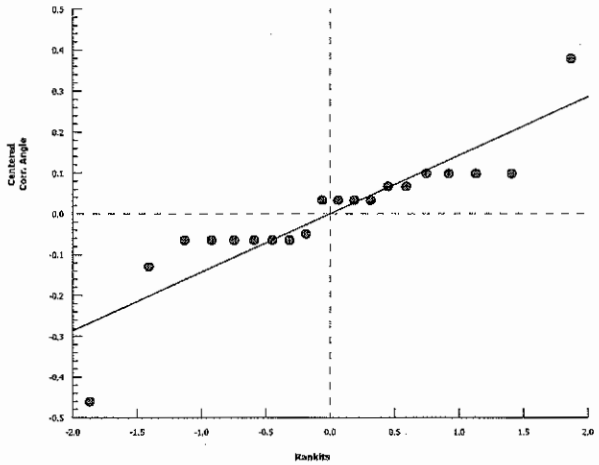
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1	1.107	1.419	0.9912	0.5796	1.107
GH_FR1	1.249	1.412	1.412	1.412	1.412
CM_MC2	1.249	1.412	1.249	1.412	1.249
FR_FRCP1	1.412	1.412	1.249	1.249	1.249

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1	8/10	11/11	7/10	3/10	8/10
GH_FR1	9/10	10/10	10/10	10/10	10/10
CM_MC2	9/10	10/10	9/10	10/10	9/10
FR_FRCP1	10/10	10/10	9/10	9/10	9/10

Graphics





CETIS Summary Report

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Batch ID:	03-9911-9775	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	12 Mar-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	
Ending Date:	09 Apr-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-3817-2510	12 Mar-15	12 Mar-15	NA	Teck Coal	
GH_FR1	21-3664-3662	09 Mar-15 10:05	11 Mar-15 10:10	62h (9.4 °C)		
CM_MC2	17-8817-4739	10 Mar-15 11:30	12 Mar-15 10:00	37h (7.1 °C)		
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	13h (8 °C)	Teck Coal	
FR_FRCP1	14-3483-9304	11 Mar-15 11:36	12 Mar-15 12:45	12h (7.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1-WS-201503111136		

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	5	0.9348	0.858	1.012	0.837	0.992	0.02766	0.06184	6.62%	0.0%
GH_FR1	5	0.8446	0.72	0.9692	0.706	0.972	0.04489	0.1004	11.88%	9.65%
CM_MC2	5	0.6776	0.4223	0.933	0.43	0.8444	0.09198	0.2057	30.35%	27.51%
FR_UFR1	5	0.758	0.4702	1.046	0.3533	0.9275	0.1037	0.2318	30.58%	18.91%
FR_FRCP1	5	0.7556	0.6893	0.8219	0.704	0.843	0.02388	0.0534	7.07%	19.17%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	0.974	0.914	0.992	0.957	0.837
GH_FR1	0.8511	0.972	0.798	0.896	0.706
CM_MC2	0.7989	0.43	0.8444	0.837	0.4778
FR_UFR1	0.8537	0.7855	0.87	0.3533	0.9275
FR_FRCP1	0.843	0.704	0.7244	0.7456	0.7611

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	06-1943-2959	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Apr-15 17:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	03-9911-9775	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	12 Mar-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	
Ending Date:	09 Apr-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-3817-2510	12 Mar-15	12 Mar-15	NA	Teck Coal	
GH_FR1	21-3664-3662	09 Mar-15 10:05	11 Mar-15 10:10	62h (9.4 °C)		
CM_MC2	17-8817-4739	10 Mar-15 11:30	12 Mar-15 10:00	37h (7.1 °C)		
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	13h (8 °C)	Teck Coal	
FR_FRCP1	14-3483-9304	11 Mar-15 11:36	12 Mar-15 12:45	12h (7.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1-WS-201503111136		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	7.27%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		GH_FR1	1.71	1.86	0.098	8	0.0628	CDF	Non-Significant Effect
		CM_MC2	2.678	1.86	0.179	8	0.0140	CDF	Significant Effect
		FR_UFR1	1.648	1.86	0.2	8	0.0690	CDF	Non-Significant Effect
		FR_FRCP1	4.904	1.86	0.068	8	0.0006	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1934955	0.04837387	4	2.145	0.1128	Non-Significant Effect
Error	0.4511416	0.02255708	20			
Total	0.6446371		24			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	11.46	13.28	0.0218	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9052	0.8877	0.0238	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	5	0.9348	0.858	1.012	0.957	0.837	0.992	0.02766	6.62%	0.0%
GH_FR1	5	0.8446	0.72	0.9692	0.8511	0.706	0.972	0.04489	11.88%	9.65%
CM_MC2	5	0.6776	0.4223	0.933	0.7989	0.43	0.8444	0.09198	30.35%	27.51%
FR_UFR1	5	0.758	0.4702	1.046	0.8537	0.3533	0.9275	0.1037	30.58%	18.91%
FR_FRCP1	5	0.7556	0.6893	0.8219	0.7456	0.704	0.843	0.02388	7.07%	19.17%

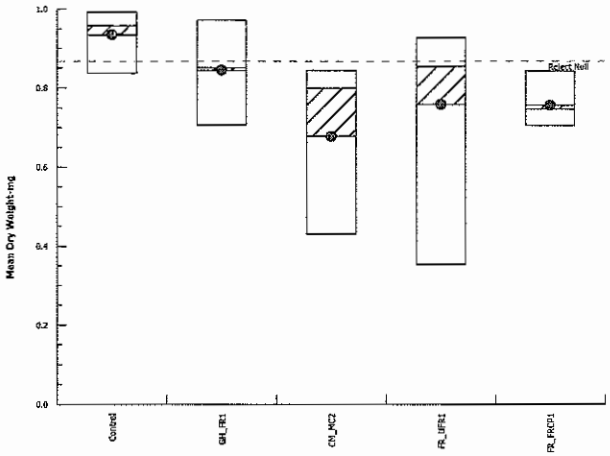
Mean Dry Weight-mg Detail

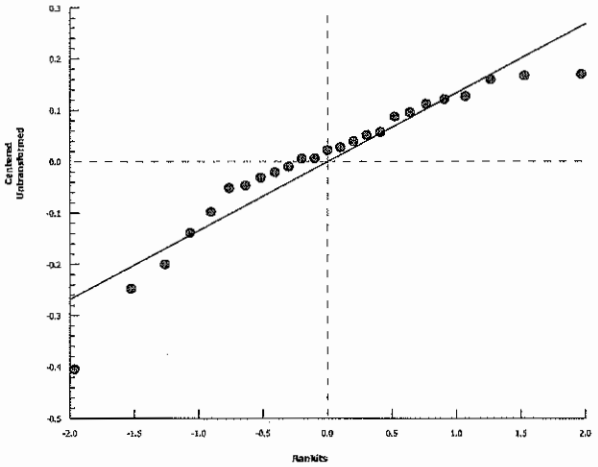
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	0.974	0.914	0.992	0.957	0.837
GH_FR1	0.8511	0.972	0.798	0.896	0.706
CM_MC2	0.7989	0.43	0.8444	0.837	0.4778
FR_UFR1	0.8537	0.7855	0.87	0.3533	0.9275
FR_FRCP1	0.843	0.704	0.7244	0.7456	0.7611

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	06-1943-2959	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Apr-15 17:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	09-1681-4706	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Apr-15 15:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	18-4749-0808	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	12 Mar-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	
Ending Date:	09 Apr-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	13h (8 °C)	Teck Coal	
GH_FR1	21-3664-3662	09 Mar-15 10:05	11 Mar-15 10:10	62h (9.4 °C)		
CM_MC2	17-8817-4739	10 Mar-15 11:30	12 Mar-15 10:00	37h (7.1 °C)		
FR_FRCP1	14-3483-9304	11 Mar-15 11:36	12 Mar-15 12:45	12h (7.1 °C)	Teck Coal	

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1-WS-201503111136		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	26.1%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_FR1	-0.7667	1.86	0.210	8	0.7674	CDF	Non-Significant Effect
		CM_MC2	0.58	1.86	0.258	8	0.2889	CDF	Non-Significant Effect
		FR_FRCP1	0.0224	1.86	0.198	8	0.4913	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.06982715	0.02327571	3	0.8545	0.4846	Non-Significant Effect
Error	0.4358425	0.02724016	16			
Total	0.5056697		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	7.724	11.34	0.0521	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8957	0.866	0.0342	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	5	0.758	0.4702	1.046	0.8537	0.3533	0.9275	0.1037	30.58%	0.0%
GH_FR1	5	0.8446	0.72	0.9692	0.8511	0.706	0.972	0.04489	11.88%	-11.43%
CM_MC2	5	0.6776	0.4223	0.933	0.7989	0.43	0.8444	0.09198	30.35%	10.6%
FR_FRCP1	5	0.7556	0.6893	0.8219	0.7456	0.704	0.843	0.02388	7.07%	0.31%

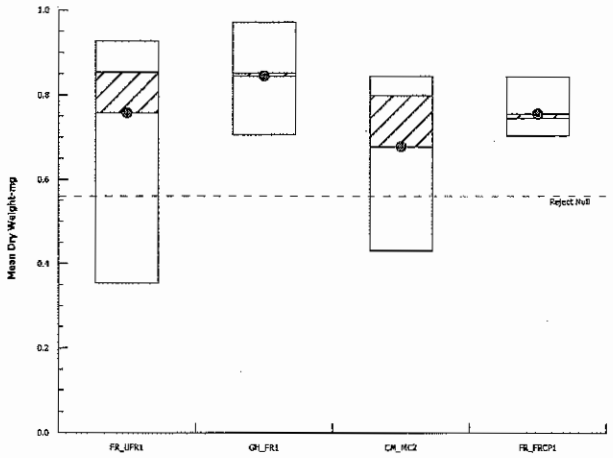
Mean Dry Weight-mg Detail

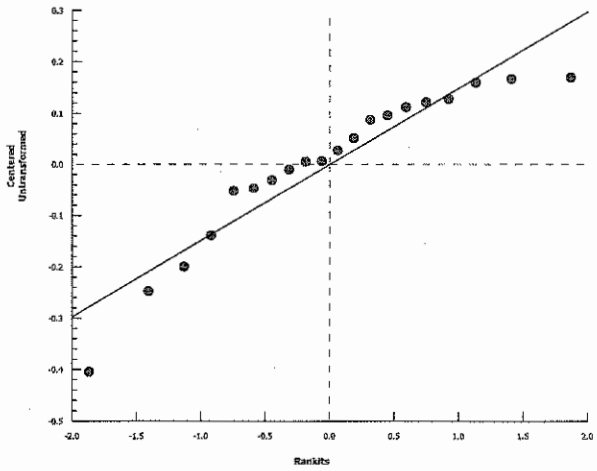
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1	0.8537	0.7855	0.87	0.3533	0.9275
GH_FR1	0.8511	0.972	0.798	0.896	0.706
CM_MC2	0.7989	0.43	0.8444	0.837	0.4778
FR_FRCP1	0.843	0.704	0.7244	0.7456	0.7611

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	09-1681-4706	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Apr-15 15:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Client: Teck Coal

W.O.#: 15181, 15185, 15190

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Hyalella Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Control (Day28)	Apr 9/15	100①	0.6	0.8	40		100①	1.2	120	KS
FR-UFR1 (Day28)	Apr 9/15	50	7.0	7.2	136		50	7.5	150	KS
FR-CP1 (Day28)	Apr 9/15	100①	1.9	2.0	180		100①	KS ~~7.0~~ 4.2	420	KS
CM-MC2 (Day28)	Apr 9/15	100①	1.9	2.0	180		100①	2.6	260	KS
GH-FR1WS (Day28)	Apr 9/15	100①	2.0	2.1	190		100①	4.0	400	KS

Notes: ① Diluted to 100mL with D.I. water

Reviewed by: JGe

Date Reviewed: May 5/15

Client: Tecl C

W.O.#: 15181, 15185, 15190

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
030815 Hgal MHW	Mar 24/15	50	2.6	2.7	50		50	5.1	102	SSD

Notes:

Reviewed by: Jon

Date Reviewed: Apr-30/15

APPENDIX D – *Pimephales promelas* Toxicity Test Data

Fathead Minnow Test Summary Sheet

Client: Teck Coal Start Date & Time: March 12, 2015 @ 1430h

Work Order No.: 15180,15184,15189 Test Species: *Pimephales promelas*

Sample Information:

Sample ID: See below
Sample Date: Between March 9 - April 8, 2015
Date Received: Between March 11 - April 10, 2015
Sample Volume: 2x 20L per sample per refresh

Dilution Water:

Type: Moderately hard water
Hardness (mg/L $CaCO_3$): 100
Alkalinity (mg/L $CaCO_3$): 64, 72

Test Organism Information:

Batch No.: 031215
Source: Aquatic Biosystems, CO
Age (Day 0): 15-somite stage

Cu Reference Toxicant Results:

Reference Toxicant ID: PP-20-28
Stock Solution ID: 15Cu01
Date Initiated: 23-Mar-15
96-h EC50 (95% CL): 308 (208.6 - 454.8) µg/L Cu

Survival:

Reference Toxicant Mean ± 2 SD: 148.0 (57.7 - 379.7) µg/L Cu CV (%): 60

Test Results:

Sample ID	Survival ± SD (%)	Biomass ± SD (mg)	Length ± SD (mm)	Hatched ± SD (%)	Normality ± SD (%)
Control	98.3 ± 3.3	10.9 ± 0.64	18.4 ± 0.29	100 ± 0.0	100 ± 0.0
GH_FR1	58.3 ± 19.9*	10.2 ± 1.16	20.4 ± 1.04	98.3 ± 3.3	100 ± 0.0
CM_MC2	80.0 ± 14.4*	10.7 ± 0.68	19.2 ± 1.06	100 ± 0.0	100 ± 0.0
FR_FRCP1	70.0 ± 20.7*	10.7 ± 1.23	19.2 ± 1.30	96.7 ± 3.8	98.1 ± 3.8
FR_UFR1	73.3 ± 16.3*	10.7 ± 0.43	19.6 ± 1.24	96.7 ± 3.8	100 ± 0.0

* Samples that are significantly different from Control.

Reviewed by: JBr Date reviewed: June 12/15

32-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: See below
Work Order #: 15180, 15184, 15189

Start Date & Time: Mar 12/15 @ 1430h
Stop Date & Time: Apr 13/15 @ 1200h
Test Species: *Pimephales promelas*

-/- (v/v) Concentration Control	Days												
	0	1		2		3		4		5		6	
	init.	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	24.0	26.0	24.0	26.0	24.0	25.5	24.0	24.0	24.0	24.0	24.0	24.5
DO (mg/L)	7.9	8.0	7.5	7.9	7.6	7.6	8.0	7.5	7.8	7.7	7.9	7.8	8.2
pH	7.8	7.9	7.9	7.9	8.0	8.0	7.9	7.8	7.8	7.9	7.8	7.5	8.1
Cond. (µS/cm)	339	353	338	336	337	346	339	352	342	355	351	349	344
Initials	KJL	JW		AD		KJL		KJL		KJL		KJL	

GH-FRI_WS Concentration KJL	Days												
	0	1		2		3		4		5		6	
green 100	init.	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	8.2	7.9	8.4	7.8	8.3	7.7	7.9	7.4	7.7	7.8	7.7	7.9	8.2
pH	8.2	8.3	8.0	8.2	8.2	8.1	8.2	8.0	8.2	8.0	8.0	7.9	8.2
Cond. (µS/cm)	919	930	917	927	913	920	924	920	901	914	916	912	919
Initials	KJL	JW		AD		KJL		KJL		KJL		KJL	

6 (100) Concentration CM MC2	Days												
	0	1		2		3		4		5		6	
red	init.	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	25.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	8.3	8.1	8.4	7.8	8.3	7.5	7.9	7.6	7.7	7.6	7.8	7.8	8.2
pH	8.2	8.3	8.2	8.2	8.2	8.1	8.1	8.1	8.2	8.0	8.0	8.0	8.1
Cond. (µS/cm)	824	831	816	817	817	812	815	816	803	837	816	806	809
Initials	KJL	JW		AD		KJL		KJL		KJL		KJL	

FR-CP1 Concentration 100	Days												
	0	1		2		3		4		5		6	
purple	init.	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	8.3	8.1	8.4	7.9	8.3	7.7	7.8	7.5	7.8	7.7	7.9	7.8	8.1
pH	8.1	8.2	8.1	8.1	8.2	8.0	8.0	8.0	8.1	7.9	7.9	7.9	8.1
Cond. (µS/cm)	1631	1629	1620	1615	1614	1607	1617	1611	1600	1612	1620	1610	1617
Initials	KJL	JW		AD		KJL		KJL		KJL		KJL	

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 4.0 to 8.4 (mg/L); pH = 6 to 9.0

DO meter: DO-3 **pH meter:** pH-3 **Conductivity meter:** C-3

	Control	Highest Conc. (GH-FRI-WS)	CM-MC2	FR-CP1
Hardness*	100	520	440	1060
Alkalinity*	64, 72	200	190	240

Analysts: KJL, JW, AD

Reviewed by: JBL

Date reviewed: Apr 30/15

* mg/L as CaCO3

Sample Description: FR-UFRI ~~GH-FRI-WS~~ KJL clear, pale yellow; CM MC2 and GH-FRI = clear FR-CP1 – clear with some black precipitate.

Version 1.1; Issued Sept. 19, 2014 — Nautilus Environmental

Comments:

32-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: see below
Work Order #: 15180, 15184, 15189
1-(v/v)

Start Date & Time: Mar 12/15 @ 1430h
Stop Date & Time: Apr 13/15 @ 1200h
Test Species: *Pimephales promelas*

blue

FR-UFR1 Concentration 100	Days												
	0	1		2		3		4		5		6	
	init.	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	8.0	8.0	8.4	7.9	8.2	7.7	7.8	7.5	7.7	7.8	8.0	7.9	8.2
pH	8.3	8.3	8.1	8.2	8.2	8.2	8.3	8.3	8.4	8.2	8.2	8.2	8.2
Cond. (µS/cm)	359	369	362	363	359	375	363	371	365	394	345	377	363
Initials	KJL	JW		AD		KJL		KJL		KJL		KJL	

Concentration	Days												
	0	1		2		3		4		5		6	
	init.	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)													
DO (mg/L)													
pH													
Cond. (µS/cm)													
Initials													

Concentration	Days												
	0	1		2		3		4		5		6	
	init.	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)													
DO (mg/L)													
pH													
Cond. (µS/cm)													
Initials													

Concentration	Days												
	0	1		2		3		4		5		6	
	init.	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)													
DO (mg/L)													
pH													
Cond. (µS/cm)													
Initials													

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 4.0 to 8.4 (mg/L); pH = 6 to 9.0

DO meter: DO-3 **pH meter:** pH-3 **Conductivity meter:** C-3

	Control	Highest Conc. (FR_UFR1)		
Hardness*	100	190		
Alkalinity*	64.72	136		

Analysts: KJL, JW, AD.
Reviewed by: JOL
Date reviewed: Apr. 30/15

* mg/L as CaCO3

Sample Description:

Comments:

32-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: See below
Work Order #: 15180, 15184, 15189

Start Date & Time: Mar 12/15 @ 1430h
Stop Date & Time: Apr 14/15 @ 1200h
Test Species: *Pimephales promelas*

% (v/v) Concentration control	7		8		9		10		11		12		13	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0 ~~25.0~~	24.0	24.5	24.0	24.0	24.0	24.5	24.0	24.5
DO (mg/L)	6.5	8.0	7.0	~~8.0~~ 7.0	6.5	8.0	7.8	7.9	6.5	8.1	7.1	7.8	7.9	8.0
pH	7.5	7.8	7.7	7.9	7.9	7.9	8.1	8.0	7.5	7.9	~~7.8~~	7.8	7.9	8.1
Cond. (µS/cm)	327	323	331	322	325	319	335	335	327	338	327	329	335	335
Initials	JW		JW		AD		KJL		JW/KJL		KJL		JW	

GH - FR1 - WS Concentration 100	7		8		9		10		11		12		13	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	6.8	8.4	6.6	8.4	6.4	8.0	7.4	8.0	6.7	8.1	7.2	7.9	7.7	8.2
pH	7.9	8.1	8.0	8.0	8.0	8.0	8.1	8.2	8.1	8.0	8.1	8.1	8.3	8.2
Cond. (µS/cm)	867	860	873	798	826	796	811	794	812	800	809	789	824	790
Initials	JW		JW ①		AD		KJL		JW/KJL		KJL		JW	

CM - MC2 Concentration 100	7		8		9		10		11		12		13	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.5	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	6.9	8.4	7.0	8.4	6.4	8.0	7.5	8.0	6.7	8.2	7.2	7.8	7.8	8.0
pH	8.0	8.1	8.0	8.0	8.0	8.1	8.2	8.2	7.9	7.9	7.9	8.0	8.3	8.1
Cond. (µS/cm)	767	765	779	430	527	429	474	429	452	428	444	428	440	431
Initials	JW		JW ①		AD		KJL		JW/KJL		KJL		JW	

FR - CP L Concentration 100	7		8		9		10		11		12		13	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	7.0	8.4	7.0	8.4	6.5	8.1	7.3	8.1	6.7	8.0	7.3	7.9	7.7	8.0
pH	7.9	8.0	7.9	~~8.0~~ 7.92	8.0	8.1	8.2	8.2	7.9	8.0	8.0	7.9	8.2	8.1
Cond. (µS/cm)	1517	1527	1546	1031①	1184	1031	1083	1058	1044	1020	1040	1013	1009	1037
Initials	JW		JW		AD		KJL		JW/KJL		KJL		JW	

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 4.0 to 8.4 (mg/L); pH = 6 to 9.0

DO meter: 3 **pH meter:** 3 **Conductivity meter:** 3

	Control	Highest Conc. (GH-FR1-WS)	CM-MC2	FR-CP1
Hardness*	100	~~540~~ 450	380	560
Alkalinity*	64, 72	~~156~~ 220	130	204

* mg/L as CaCO3

Analysts: KJL, JW, AW

Reviewed by: JOL

Date reviewed: Apr 30/15

Sample Description: GH-FR1, FR-CP1 - slightly brown; FR-UPR1 - clear
Refresh sample for CM-MC2 murky, light brown, precipitate.

Comments: ① Refresh sample used Aeration initiated day 11

32-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: See below
Work Order #: 15180, 15184, 15189

Start Date & Time: Mar 12/15 @1430h
Stop Date & Time: Apr 13/15 @1200h
Test Species: *Pimephales promelas*

FR-UFR 1

Concentration 100	7		8		9		10		11		12		13	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.5	24.0	24.0	24.0	24.5	24.0	24.0	24.0
DO (mg/L)	7.0	8.4	7.2	8.4	6.5	8.1	7.2	8.0	6.3	8.1	7.2	7.9	7.6	8.1
pH	8.0	8.1	8.0	8.1	8.0	8.1	8.2	8.3	7.9	8.0	8.0	8.0	8.3	8.2
Cond. (µS/cm)	360	329	348	332	340	330	342	326	350	326	344	324	338	331
Initials	JW		JW ①		AD		KJ		JW/KJ		KJ		JW	

Concentration	7		8		9		10		11		12		13	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	7		8		9		10		11		12		13	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	7		8		9		10		11		12		13	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 4.0 to 8.4 (mg/L); pH = 6 to 9.0

DO meter: 3 **pH meter:** 3 **Conductivity meter:** 3

FR-JFR1

	Control	Highest Conc.		
Hardness*	100	240		
Alkalinity*	64.72	136		

* mg/L as CaCO3

Analysts: KJ, JW, AWD
Reviewed by: JW
Date reviewed: Apr. 30/15

Sample Description:

Comments: ① Refresh sample used

32-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: See below
Work Order #: 15180, 15184, 15189

Start Date & Time: Mar 12/15 @ 1430h
Stop Date & Time: Apr 13/15 @ 1200h
Test Species: *Pimephales promelas*

°I-(v/v) Concentration: Control	14		15		16		17		18		19		20	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	23.0 SSD	25.0	24.0	24.5
DO (mg/L)	8.1	8.0	7.5	8.4①	7.5	7.7	7.4	7.8	7.3	7.6	7.5	7.7	7.4	7.7
pH	8.0	7.8	7.9	8.0 JW	8.0	8.1	7.9	8.1	7.9	8.0	7.8	8.0	7.9	8.0
Cond. (µS/cm)	328	327	333	324	348	340	346	339	347	337	348	335	347	342
Initials	KJL		JW		A		A		JW		SSD		JW	

① 7.8

gren

GH-FRI-WS Concentration: 100	14		15		16		17		18		19		20	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	8.2	8.0	7.6	8.4	7.5	8.1	7.2	8.0	7.4	7.9	7.6	8.2	7.6	8.0
pH	8.1	7.9	8.3	8.1	8.2	8.3	8.3	8.3	8.2	8.2	8.2	8.1	7.9①	8.1
Cond. (µS/cm)	795	795	806	802	855	826	808	830	792	795	773	822	769	812
Initials	KJL		JW		A		A		JW		SSD		JW	

① 8.2

red

CM-MCI Concentration: 100	14		15		16		17		18		19		20	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	8.2	8.1	7.8	8.4	7.6	8.1	7.6	8.2	7.6	8.1	7.7	8.1	7.7	8.4
pH	8.2	8.0	8.3	8.1	8.3	8.3	8.3	8.2	8.4	8.2	8.3	8.1	8.3	8.1
Cond. (µS/cm)	438	584	557	593	607	615	614	618	615	601	607	595	615	599
Initials	KJL		JW		A		A		JW		SSD		JW	

orge

FR-CPI Concentration: 100	14		15		16		17		18		19		20	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	8.1	8.3	7.9	8.4	7.6	8.1	7.5	8.1	7.7	8.0	7.8	8.3	7.7	8.4
pH	8.1	8.0	8.2	8.1	8.3	8.3	8.2	8.3	8.2	8.0	8.1	8.0	8.31	8.0
Cond. (µS/cm)	981	1076	1011	1065	1028	1090	1012	1096	1000	1051	1010	1062	1008	1071
Initials	KJL		JW		A		A		JW		SSD		JW	

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 4.0 to 8.4 (mg/L); pH = 6 to 9.0

DO meter: 3 **pH meter:** 3 **Conductivity meter:** 3

	Control	Highest Conc.		
Hardness*	100			
Alkalinity*	64, 72			

* mg/L as CaCO3

Analysts: KJL, JW, AWD
Reviewed by: JW
Date reviewed: Apr. 30/15

Sample Description: CP-1, FR1, GH-FR1, CM-MC2 - clear

Comments: Refresh samples used on Day 14

32-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: See below
Work Order #: 15180, 15184, 15189

Start Date & Time: Mar 12/15 @ 1430h
Stop Date & Time: Apr 13/15 @ 1200h
Test Species: *Pimephales promelas*

Concentration: 1 (v/v) FR-UFR 100	14		15		16		17		18		19		20	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	24.5	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	8.2	8.3	7.8	8.4	7.6	8.2	7.4	8.1	7.7	8.0	7.8	8.4	7.7	8.4
pH	8.2	8.0	8.2	8.2	8.2	8.3	8.3	8.3	8.3	8.2	8.3	8.2	8.3	8.2
Cond. (µS/cm)	337	332	336	323	342	339	348	341	343	325	338	324	338	328
Initials	KJL		JW		AD		A		JW		SSD		JW	

Concentration	14		15		16		17		18		19		20	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	14		15		16		17		18		19		20	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	14		15		16		17		18		19		20	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 4.0 to 8.4 (mg/L); pH = 6 to 9.0

DO meter: 3 **pH meter:** 3 **Conductivity meter:** 3

	Control	Highest Conc.		
Hardness*	100			
Alkalinity*	64, 72			

* mg/L as CaCO3

Analysts: KJL, JW, AWD

Reviewed by: JW

Date reviewed: Apr 30/15

Sample Description:

Comments:

32-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: See below
Work Order #: 15180, 15184, 15189

Start Date & Time: Mar 12/15 @ 1430h
Stop Date & Time: Apr 13/15 @ 1200h
Test Species: *Pimephales promelas*

% (v/v) Concentration: Control	21		22		23		24		25		26		27	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	7.4	7.6	7.0	7.6	7.0	7.8	7.2	8.2	7.2	7.8	7.1	7.3	8.0	7.4
pH	7.8	8.0	8.0	8.0	7.9	8.0	8.0	8.0	7.9	7.9	7.9	8.0	7.8	8.2
Cond. (µS/cm)	352	342	367	353	360	349	392	345	378	339	391	345	388	348
Initials	SSD		JW		YYL		JW		KJL		KJL		KJL	

GH-FRI-WS Concentration: 100	21		22		23		24		25		26		27	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	7.6	8.4	7.3	8.3	7.3	8.0	7.3	8.3	7.4	7.9	7.2	7.5	8.2	8.3
pH	8.1	8.0	8.3	8.2	8.3	8.1	8.3	8.2	8.2	8.3	8.4	8.3	8.2	8.2
Cond. (µS/cm)	778	755	767	792	772	761	787	770	793	761	790	755	785	754
Initials	SSD	MLT	JW		YYL		JW		KJL		KJL		KJL	

CM-MC2 Concentration: 100	21		22		23		24		25		26		27	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	7.6	8.4	7.4	8.3	7.4	8.0	7.4	8.2	7.5	7.9	7.3	7.5	8.2	8.3
pH	8.2	8.0	8.3	8.2	8.3	8.1	8.4	8.3	8.3	8.0	8.3	8.3	8.2	8.1
Cond. (µS/cm)	613	512	558	531	551	516	560	534	547	525	557	511	537	517
Initials	SSD		JW		YYL		JW		KJL		KJL		KJL	

FR-CP1 Concentration: 100	21		22		23		24		25		26		27	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	7.7	8.4	7.4	8.3	7.4	8.1	7.6	8.3	7.7	7.8	7.3	7.6	8.1	8.3
pH	8.2	8.0	8.2	8.2	8.2	8.2	8.3	8.2	8.2	8.2	8.3	8.3	8.2	8.2
Cond. (µS/cm)	1008	812	852	847	814	809	798	819	812	798	832	804	837	808
Initials	SSD		JW		YYL		JW		KJL		KJL		KJL	

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 4.0 to 8.4 (mg/L); pH = 6 to 9.0

DO meter: 3 **pH meter:** 3 (GH-FRI-WS) **Conductivity meter:** 3

	Control	Highest Conc.	CM-MC2	FR-CP1
Hardness*	100	470	~~500~~ 286	490
Alkalinity*	64, 72	190	160	188

* mg/L as CaCO3

Analysts: KJL, JW, YYL
Reviewed by: JW
Date reviewed: Apr. 30/15

Sample Description:

Comments:

32-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: TedC
Sample ID: See below
Work Order #: 15180, 15184, 15189

Start Date & Time: Mar 12/15 @ 1430h
Stop Date & Time: Apr 13/15 @ 1200h
Test Species: *Pimephales promelas*

% (v/v)
FR-UFR1

Concentration 100	21		22		23		24		25		26		27	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	7.7	8.4	7.5	8.3	7.6	8.1	7.7	8.3	7.6	7.6	7.4	7.8	8.1	8.3
pH	8.3	8.0	8.3	8.3	8.3	8.2	8.4	8.3	8.3	8.4	8.4	8.3	8.2	8.2
Cond. (µS/cm)	332	297	314	311	315	301	327	308	329	319	329	295	316	298
Initials	SSD MM		JW		YYL		JW		KJL		KJL		KJL	

Concentration	21		22		23		24		25		26		27	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	21		22		23		24		25		26		27	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	21		22		23		24		25		26		27	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 4.0 to 8.4 (mg/L); pH = 6 to 9.0

DO meter: 3 **pH meter:** 3 **Conductivity meter:** 3

FR-UFR1

	Control	Highest Conc.		
Hardness*	100	178		
Alkalinity*	64, 72	142		

* mg/L as CaCO3

Analysts: KJL, JW, YYL
Reviewed by: JW
Date reviewed: Apr. 30/15

Sample Description:

Comments:

32-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: See below
Work Order #: 15180, 15184, 15189

Start Date & Time: Mar 12/15 @ 1430h
Stop Date & Time: Apr 13/15 @ 1200h
Test Species: *Pimephales promelas*

% (v/v) Concentration: Control	28		29		30		31		32		33		34	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	25.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0					
DO (mg/L)	7.4	7.3	7.5	7.6	7.9	7.8	7.7	7.8	7.8					
pH	7.8	8.0	7.7	7.7	8.4	8.0	8.1	8.1	7.6					
Cond. (µS/cm)	390	353	386	358	388	365	401	372	374					
Initials	SSD		KJL		A		A		KJL					

GH-FRI-WS Concentration: 100	28		29		30		31		32		33		34	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0					
DO (mg/L)	7.5	8.3	7.4	7.4	8.0	7.9	7.7	7.8	7.8					
pH	8.0	8.1	8.1	~~7.8~~ 8.1	8.5	8.1	8.1	8.1	8.2					
Cond. (µS/cm)	791	759	800	752	794	753	839	751	776					
Initials	SSD		KJL		A		A		KJL					

CM-MC2 Concentration: 100	28		29		30		31		32		33		34	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	24.0	24.0	24.0	24.0	~~24.0~~	24.0	24.0	24.0					
DO (mg/L)	7.5	8.4	7.5	7.8	7.8	~~7.9~~	7.8	7.9	7.9					
pH	8.1	8.1	8.1	8.1	8.4	8.2	8.2	8.1	8.1					
Cond. (µS/cm)	537	515	544	511	547	622D	649	624	639					
Initials	SSD		KJL		A		A		KJL					

FR-CP1 Concentration: 100	28		29		30		31		32		33		34	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0					
DO (mg/L)	7.6	8.4	7.6	8.0	7.8	8.0	7.6	8.0	7.8					
pH	8.1	8.2	8.2	8.1	8.4	8.1	8.1	8.1	8.2					
Cond. (µS/cm)	834	829	846	804	856	948D	973	940	943					
Initials	SSD		KJL		A		A		KJL					

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 4.0 to 8.4 (mg/L); pH = 6 to 9.0

DO meter: 3 **pH meter:** 3 **Conductivity meter:** 3

	Control	Highest Conc. (GH-FRI-WS)	CM-MC2	FR-CP1
Hardness*	100	360	300	400
Alkalinity*	64, 72	190	178	210

* mg/L as CaCO3

Analysts: KJL, AWD
Reviewed by: JGC
Date reviewed: Apr 30/15

Sample Description: ① value confirmed – refresh samples.

Comments:

32-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: see below
Work Order #: 15180, 15184, 15189

Start Date & Time: Mar 12/15 @ 1430h
Stop Date & Time: Apr 13/15 @ 1200h
Test Species: *Pimephales promelas*

% (v/v) FR-UFR1														
Concentration 100	28		29		30		31		32		33		34	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0					
DO (mg/L)	7.5	8.5	7.9	8.0	7.9	8.0	7.9	8.0	7.8					
pH	8.2	8.2	8.1	8.1	8.5	8.0	8.2	8.0	8.2					
Cond. (µS/cm)	324	308	330	245	332	306	345	305	327					
Initials	SSD		KJL						KJL					

Concentration	28		29		30		31		32		33		34	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	28		29		30		31		32		33		34	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	28		29		30		31		32		33		34	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 4.0 to 8.4 (mg/L); pH = 6 to 9.0

DO meter: 3 **pH meter:** 3 **Conductivity meter:** 3

FR-UFR1

	Control	Highest Conc.		
Hardness*	100	164		
Alkalinity*	64, 72	138		

* mg/L as CaCO3

Analysts: KJL, AWD
Reviewed by: JCL
Date reviewed: Apr 30/15

Sample Description:

Comments:

32-d Fathead Minnow Toxicity Test
Daily Survival

Client: Teck
Sample ID: See below
Work Order #: 15180, 15184, 15189

Start Date & Time: Mar 12/15 @ 1430h
Stop Date & Time: Apr 13/15 @ 1200h
Test Species: *Pimephales promelas*

Rep A

Conc. % (v/v)	Rep	Day of Test - No. of Survivors												Comments
		1	2	3		4		5		6		7		
		E	E	E	H	E	H	E	H	E	H	E	H	
Control	A	15	13	14	1	4	11	0	15		15		15	
	B	15	14	7	8	3	12	0	15		15		15	
	C	15	15	14	1	5	10	0	15		15		15	
	D	15	15	15	0	1	14	0	15		15		15	
green GH-FR1	A	15	14	15	0	1	14	0	15		15		15	
	B	15	15	15	0	3	12	0	15		15		12	
	C	15	15	9	6	3	12	0	14		14		14	
	D	15	15	2	13	0	15	0	15		15		15	
red CM MCZ	A	15	15	12	3	2	13	0	15		15		15	
	B	15	15	1	14	0	15	0	15		15		15	
	C	15	13	8	7	2	13	0	15		15		15	
	D	15	15	10	5	2	13	0	15		15		15	
Purple ☒ FR-CP1	A	15	12	4	11	1	14	0	15		15		15	
	B	15	15	12	3	5	10	0	15		14		14	
	C	15	15	15	0	4	11	0	14		14		12	
	D	15	14	5	10	1	14	0	13		13		12	
blue FR-UFR1	A	15	14	8	7	3	12	0	15		15		15	
	B	15	14	12	3	4	11	0	14		14		14	
	C	15	14	12	3	8	7	0	14		14		14	
	D	15	14	15	0	10	5	0	15		15		15	
	A													
	B													
	C													
	D													
	A													
	B													
	C													
	D													
	A													
	B													
	C													
	D													
Tech Initials		JW	A	KJL		KJL		KJL		KJL		JW		

E= egg, H=Hatch Start with 30 eggs/rep; cull to 15 on Day 2

Comments: All dead eggs replaced on day 2 for a total of 15 per rep.

Reviewed by: JOL **Date reviewed:** May 6/15

32-d Fathead Minnow Toxicity Test
Daily Survival

Client: Tecle
Sample ID: See below
Work Order #: 15180, 15184, 15189

Start Date & Time: Mar 12/15 @ 1430h
Stop Date & Time: Apr 13/15 @ 1200h
Test Species: *Pimephales promelas*

Concentration % (V/V)	Rep	Day of Test - No. of Survivors							Comments
		8	9	10	11	12	13	14	
CONTROL	A	15	15	15	15	15	15	15	
	B	15	15	15	15	15	15	15	
	C	15	15	15	15	15	15	15	
	D	15	15	15	15	15	15	15	
GH - FRL	A	15	14	12	10	9	8	8	
	B	12	11	11	11	11	11	11	
	C	13	12	12	12	12	12	12	
	D	15	12	10	6	5	5	5	
CM - MC 2	A	15	15	13	11	10	10	10	
	B	15	M&4	14	14	14	14	14	
	C	15	14	14 3 14	14	14	14	14	
	D	15	14	14	14	14	14	14	
FR - QP 1	A	13	13	13	12	11	11	11	
	B	14	14	14	14	14	14	14	
	C	11	9	8	6	6	6	6	
	D	12	12	12	12	12	12	12	
FR - UFR 1	A	15	15	15	15	14	14	14	
	B	14	14	14	14	14	13	13	
	C	14	14	13	12	10	10	10	
	D	15	14	14	14	14	12	12	
	A								
	B								
	C								
	D								
	A								
	B								
	C								
	D								
	A								
	B								
	C								
	D								
Tech Initials		JW	A	KJV	KJV	KJV	JW	KJV	

All eggs hatched, unless otherwise noted

Comments:

Reviewed by: JW

Date reviewed: Apr. 30/15

32-d Fathead Minnow Toxicity Test
Daily Survival

Client: Teck
Sample ID: see below
Work Order #: 15180, 15184, 15189

Start Date & Time: Mar 12/15 @ 1430h
Stop Date & Time: ~~Mar~~ Apr 13/15 @ 1200h
Test Species: *Pimephales promelas*

Concentration	Rep	Day of Test - No. of Survivors							Comments
		15	16	17	18	19	20	21	
CONTROL	A	15	15	15	15	15	15	15	
	B	15	15	15	15	15	15	14	
	C	15	15	15	15	15	15	15	
	D	15	15	15	15	15	15	15	
GH - FR1 - WS	A	8	8	8	8	8	8	8	
	B	11	11	11	11	11	11	11	
	C	12	12	12	12	12	12	12	
	D	5	5	5	5	5	5	5	
CM - MC2	A	10	10	10	10	10	9	9	
	B	14	14	14	13	13	13	13	
	C	14	14	14	14	14	14	14	
	D	14	14	14	14	14	14	14	
FR - CP L	A	11	11	11	11	11	11	11	
	B	14	13	13	13	13	13	13	
	C	6	6	6	6	6	6	6	
	D	12	12	12	12	12	12	12	
FR - UFR 1	A	14	14	14	14	14	13	13	
	B	13	13	13	13	13	13	13	
	C	10	10	10	10	10	10	10	
	D	10	10	9	9	9	9	9	
	A								
	B								
	C								
	D								
	A								
	B								
	C								
	D								
	A								
	B								
	C								
	D								
Tech Initials		JW			JW	JW	JW	JW	

Comments:

Reviewed by: JCL **Date reviewed:** Apr. 30/15

32-d Fathead Minnow Toxicity Test
Daily Survival

Client: Teck
Sample ID: See below
Work Order #: 15180, 15184, 15189

Start Date & Time: Mar 12/15 @ 1430h
Stop Date & Time: Apr 13/15 @ 1200h
Test Species: *Pimephales promelas*

Concentration % (v/v)	Rep	Day of Test - No. of Survivors							Comments
		22	23	24	25	26	27	28	
CONTROL	A	15	15	15	15	15	15	15	
	B	14	14	14	14	14	14	14	
	C	15	15	15	15	15	15	15	
	D	15	15	15	15	15	15	15	
GH-FRI-WS	A	8	8	8	8	8	8	8	
	B	11	10	10	10	10	10	10	
	C	12	12	12	12	12	12	12	
	D	5	5	5	5	5	5	5	
CM - MC2	A	9	9	9	9	9	9	9	
	B	13	13	13	13	13	13	13	
	C	14	14	14	14	14	14	14	
	D	14	14	14	14	14	14	14	
FR - CP 1	A	11	11	11	11	11	11	11	
	B	13	13	13	13	13	13	13	
	C	6	6	6	6	6	6	6	
	D	12	12	12	12	12	12	12	
FR - UFR 1	A	13	13	13	13	13	13	13	
	B	13	13	13	13	13	13	13	
	C	10	10	10	10	10	10	10	
	D	9	8	8	8	8	8	8	
	A								
	B								
	C								
	D								
	A								
	B								
	C								
	D								
	A								
	B								
	C								
	D								
Tech Initials		JW	JW	JW	KJL	KJL	JW	KJL	

Comments:

Reviewed by: JGL **Date reviewed:** Apr. 30/15

32-d Fathead Minnow Toxicity Test
Daily Survival

Client: Teck
Sample ID: See below
Work Order #: 15180, 15184, 15189

Start Date & Time: Mar 12/15 @ 1430h
Stop Date & Time: Apr 13/15 @ 1200h
Test Species: *Pimephales promelas*

Concentration % (v/v)	Rep	Day of Test - No. of Survivors							Comments
		29	30	31	32	33	34	35	
Control	A	15	15	15	15				
	B	14	14	14	14				
	C	15	15	15	15				
	D	15	15	15	15				
GH-FRI-WS	A	8	8	8	8				
	B	10	10	10	10				
	C	12	12	12	12				
	D	5	5	5	5				
CM-MC2	A	9	9	9	9				
	B	13	13	13	12				
	C	14	14	14	14				
	D	14	14	14	13				
FR-CPI	A	11	11	11	11				
	B	13	13	13	13				
	C	6	6	6	6				
	D	12	12	12	12				
FR-UFR1	A	13	13	13	13				
	B	13	13	13	~~13~~ 13				
	C	10	10	10	10				
	D	8	8	8	8				
	A								
	B								
	C								
	D								
	A								
	B								
	C								
	D								
	A								
	B								
	C								
	D								
Tech Initials		KTL	A	A	KTL				

Comments:

Reviewed by: JCu

Date reviewed: Apr. 30/15

32-d Fathead Minnow Toxicity Test
Daily Survival

Client: Teck
Sample ID: See below
Work Order #: 15180, 15184, 1589

Start Date & Time: Mar 12/15 @ 1480h
Stop Date & Time: Apr 13/15 @ 1200h
Test Species: *Pimephales promelas*

Rep B

Conc. % (v/v)	Rep	Day of Test - No. of Survivors												Comments
		1	2	3		4		5		6		7		
		E	E	E	H	E	H	E	H	E	H	E	H	
Control	A	30	29											
	B	30	29											
	C													
	D													
green GH-FR1	A	30	30											
	B	30	26											
	C													
	D													
red CM. MC2	A	30	30											
	B	30	30											
	C													
	D													
purple FR-CP1	A	30	30											
	B	30	30											
	C													
	D													
blue FR-UFR1	A	30	30											
	B	30	30											
	C													
	D													
	A													
	B													
	C													
	D													
	A													
	B													
	C													
	D													
	A													
	B													
	C													
	D													
Tech Initials		JW	KJR	~~KSF~~										

E= egg, H=Hatch Start with 30 eggs/rep; cull to 15 on Day 2

Comments:

Reviewed by: JW **Date reviewed:** Apr 30/15

Nautilus Environmental

Fathead Minnow Toxicity Test Data Sheet

Dry Weight Data

Client: Teck

Start Date & Time: Mar 12/15 @ 1430h

Sample ID: See below

Termination Date & Time: Apr 13/15 @ 1200h

Work Order No.: 15180, 15184, 15189

Sample ID % (v/v)	Rep	FHM Pan No. Green	No. alive	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
Control	A	1	15	KJL	986.97	1139.69	15	NY
	B	2	14		959.24	1125.10	14	
	C	3	15		979.52	1139.94	15	
	D	4	15		980.19	1155.60	15	
GH-FRI-WS	A	5	8		990.61	1140.05	8	
	B	6	10		982.76	1142.99	10	
	C	7	12		974.11	1146.70	12	
	D	8	5		976.92	1108.43	5	
CM-MC2	A	9	9		985.14	1145.90	9	
	B	10	12		985.10	1140.73	12	
	C	11	14		980.71	1155.12	14	
	D	12	13		983.28	1134.27	13	
FR-CP1	A	13	11		989.73	1154.35	11	
	B	14	13		991.27	1166.88	13	
	C	15	6		980.06	1113.52	6	
	D	16	12		981.52	1148.56	12	
FR-UFR1	A	17	13		996.61	1161.52	13	
	B	18	13		989.60	1143.68	13	
	C	19	10		974.09	1141.95	10	
	D	20	8	↓	988.94	1146.40	8	↓
	A							
	B							
	C							
	D							

Comments: re weighed pans - 4- 1156.73
17- 1162.34

Reviewed by: JGL

Date Reviewed: Apr 30/15

Generated: April 9, 2008

32-d Fathead Minnow Toxicity Test
Test Termination

Client: Teck
Sample ID: See below
Work Order #: 15180, 15184, 15185

Start Date & Time: Mar 12/15 @ 1430h ~~Feb 26/15~~ KJV
Stop Date & Time: Apr 13/15 @ 1200h
Test Species: *Pimephales promelas*

Concentration: Control

Replicate # A		
Fish #	Length (mm)	Normal/ Abnormal
1	18.0	N
2	18.0	↓
3	16.5	
4	20.5	
5	19.0	
6	17.0	
7	20.0	
8	19.0	
9	16.0	
10	19.0	
11	18.0	
12	18.0	
13	18.5	
14	18.0	
15	19.0	↓
Initials	KJL	KJL

Replicate # B		
Fish #	Length (mm)	Normal/ Abnormal
1	18.0	N
2	18.0	↓
3	18.0	
4	22.0	
5	19.5	
6	18.0	
7	19.0	
8	20.0	
9	16.0	
10	18.0	
11	17.0	
12	20.0	
13	20.0	
14	18.0	↓
15		
Initials	KJL	KJL

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal,
And note location:
H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Replicate # C		
Fish #	Length (mm)	Normal/ Abnormal
1	20.0	N
2	21.0	↓
3	17.0	
4	19.0	
5	20.5	
6	21.0	
7	15.0	
8	19.0	
9	15.5	
10	16.0	
11	17.0	
12	16.0	
13	19.0	
14	17.0	
15	17.0	↓
Initials	KJL	KJL

Comments:

Replicate # D		
Fish #	Length (mm)	Normal/ Abnormal
1	20.0	N
2	19.0	↓
3	19.5	
4	19.0	
5	14.0	
6	19.0	
7	20.0	
8	17.0	
9	19.5	
10	21.0	
11	19.0	
12	17.0	
13	17.0	
14	18.0	
15	18.0	↓
Initials	KJL	KJL

Reviewed by: JGA

Date reviewed: Apr. 30/15

32-d Fathead Minnow Toxicity Test
Test Termination

Client: Teck
Sample ID: GH-FRI-WS (green)
Work Order #: 15180, 15184, 15187

Start Date & Time: ~~Feb 26/15~~ Mar 12/15 @ 1430h KJL
Stop Date & Time: Apr 13/15 @ 1200h
Test Species: *Pimephales promelas*

Concentration: 100

Replicate # A		
Fish #	Length (mm)	Normal/ Abnormal
1	19.0	N
2	21.0	
3	20.0	
4	18.0	
5	19.5	
6	22.0	
7	23.0	
8	21.0	
9		
10		
11		
12		
13		
14		
15		
Initials	KJL	KJL

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal,
And note location:
H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Replicate # B		
Fish #	Length (mm)	Normal/ Abnormal
1	21.0	N
2	20.0	
3	20.0	
4	19.0	
5	19.0	
6	20.5	
7	22.0	
8	16.0	
9	20.0	
10	22.0	
11		
12		
13		
14		
15		
Initials	KJL	KJL

Replicate # C		
Fish #	Length (mm)	Normal/ Abnormal
1	19.0	N
2	19.5	
3	18.0	
4	17.0	
5	20.0	
6	18.0	
7	19.0	
8	20.0	
9	20.0	
10	22.0	
11	20.0	
12	20.0	
13		
14		
15		
Initials	KJL	KJL

Comments:

Replicate # D		
Fish #	Length (mm)	Normal/ Abnormal
1	22.0	N
2	22.0	
3	24.0	
4	20.0	
5	21.0	
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
Initials	KJL	KJL

Reviewed by: JGL

Date reviewed: Apr. 30/15

32-d Fathead Minnow Toxicity Test
Test Termination

Client: Teck
Sample ID: CM-MC2 (red)
Work Order #: 15180, 15184, 15189

Start Date & Time: Mar 12/15 @ 1430h
Stop Date & Time: Apr 13/15 @ 1200h
Test Species: *Pimephales promelas*

Concentration: 100

Replicate # A		
Fish #	**Length (mm)**	**Normal/ Abnormal**
1	22.0	N
2	22.0	
3	20.0	
4	20.0	
5	19.0	
6	22.0	
7	20.0	
8	21.0	
9	20.0	
10		
11		
12		
13		
14		
15		
Initials	KJL	KJL

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal,
And note location:
H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Replicate # B		
Fish #	**Length (mm)**	**Normal/ Abnormal**
1	21.0	N
2	21.0	
3	19.5	
4	21.0	
5	20.0	
6	18.0	
7	21.0	
8	17.0	
9	20.0	
10	17.0	
11	16.0	
12	16.0	
13		
14		
15		
Initials	KJL	KJL

Replicate # C		
Fish #	**Length (mm)**	**Normal/ Abnormal**
1	20.0	N
2	16.0	
3	20.0	
4	21.0	
5	19.0	
6	18.0	
7	20.0	
8	14.0	
9	20.0	
10	20.0	
11	19.0	
12	20.0	
13	16.5	
14	19.0	
15		
Initials	KJL	KJL

Comments:

Replicate # D		
Fish #	**Length (mm)**	**Normal/ Abnormal**
1	17.0	N
2	20.0	
3	19.0	
4	19.5	
5	19.5	
6	16.5	
7	14.5	
8	19.0	
9	19.0	
10	21.0	
11	20.0	
12	15.0	
13	17.0	
14		
15		
Initials	KJL	KJL

Reviewed by: JCL

Date reviewed: Apr. 30/15

32-d Fathead Minnow Toxicity Test
Test Termination

Client: Teck
Sample ID: FR-CP1 (purple)
Work Order #: 15180, 15184, 15189

Start Date & Time: Mar 12/15 @ 1430h
Stop Date & Time: Apr 13/15 @ 1200h
Test Species: *Pimephales promelas*

Concentration: 100

Replicate # A		
Fish #	Length (mm)	Normal/ Abnormal
1	17.0	N
2	21.0	
3	20.5	
4	17.0	
5	20.5	
6	15.0	
7	19.0	
8	17.0	
9	16.0	
10	22.0	
11	20.0	
12		
13		
14		
15		
Initials	KJL	KJL

Replicate # B		
Fish #	Length (mm)	Normal/ Abnormal
1	20.0	N
2	18.0	
3	18.0	
4	20.0	
5	17.0	
6	21.0	
7	15.0	Spine
8	19.0	N
9	16.0	
10	21.0	
11	19.0	
12	17.0	
13	18.0	
14		
15		
Initials	KJL	KJL

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal,
And note location:
H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Replicate # C		
Fish #	Length (mm)	Normal/ Abnormal
1	19.0	N
2	21.0	
3	23.0	
4	22.0	
5	22.0	
6	20.0	
7		
8		
9		
10		
11		
12		
13		
14		
15		
Initials	KJL	KJL

Comments:

Replicate # D		
Fish #	Length (mm)	Normal/ Abnormal
1	19.5	N
2	19.0	
3	20.0	
4	20.0	
5	16.0	
6	21.0	
7	17.0	
8	20.0	
9	19.0	
10	16.0	
11	21.0	
12	16.0	
13		
14		
15		
Initials	KJL	KJL

Reviewed by: JGL

Date reviewed: Apr. 30/15

32-d Fathead Minnow Toxicity Test
Test Termination

Client: Teck
Sample ID: FR-UFR1 (blue)
Work Order #: 15180, 15184, 15189

Start Date & Time: Mar 12/15 @ 1430h
Stop Date & Time: Apr 13/15 @ 1200h
Test Species: *Pimephales promelas*

Concentration: 100

Replicate # A		
Fish #	Length (mm)	Normal/ Abnormal
1	21.0	N
2	20.0	
3	16.0	
4	15.0	
5	21.0	
6	21.0	
7	20.0	
8	20.0	
9	18.0	
10	18.0	
11	21.0	
12	19.5	
13	18.0	
14		
15		
Initials	KJL	KJL

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal,
And note location:
H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Replicate # B		
Fish #	Length (mm)	Normal/ Abnormal
1	15.0	N
2	19.0	
3	12.5	
4	13.0	
5	22.0	
6	18.0	
7	22.0	
8	18.0	
9	20.0	
10	19.0	
11	20.0	
12	20.0	
13	19.0	
14		
15		
Initials	KJL	KJL

Replicate # C		
Fish #	Length (mm)	Normal/ Abnormal
1	22.0	N
2	19.0	
3	20.0	
4	22.0	
5	20.0	
6	21.0	
7	20.0	
8	18.0	
9	20.0	
10	21.0	
11		
12		
13		
14		
15		
Initials	KJL	KJL

Comments:

Replicate # D		
Fish #	Length (mm)	Normal/ Abnormal
1	21.0	N
2	21.0	
3	22.0	
4	23.0	
5	20.0	
6	20.0	
7	21.0	
8	20.0	
9	~~19.0~~ DO	
10		
11		
12		
13		
14		
15		
Initials	KJL	KJL

Reviewed by: JOL

Date reviewed: Apr. 30/15

CETIS Summary Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Batch ID:	17-1868-4686	**Test Type:**	Survival-Development-Growth	**Analyst:**	Karen Lee
Start Date:	12 Mar-15 14:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	13 Apr-15 12:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-3817-2510	12 Mar-15	12 Mar-15	14h	Teck Coal	
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	28h (8 °C)		
GH_FR1	21-3664-3662	09 Mar-15 10:05	11 Mar-15 10:10	76h (9.4 °C)		
CM_MC2	17-8817-4739	10 Mar-15 11:30	12 Mar-15 10:00	51h (7.1 °C)		
FR_FRCP1	14-3483-9304	11 Mar-15 11:36	12 Mar-15 12:45	27h (7.1 °C)	Teck Coal	

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1-WS-201503111136		

Hatched Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	4	1	1	1	1	1	0	0	0.0%	0.0%
FR_UFR1	4	0.9667	0.9054	1	0.9333	1	0.01925	0.03849	3.98%	3.33%
GH_FR1	4	0.9833	0.9303	1	0.9333	1	0.01667	0.03333	3.39%	1.67%
CM_MC2	4	1	1	1	1	1	0	0	0.0%	0.0%
FR_FRCP1	4	0.9667	0.9054	1	0.9333	1	0.01925	0.03849	3.98%	3.33%

Hatched Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1	1	1	1
FR_UFR1	1	0.9333	0.9333	1
GH_FR1	1	1	0.9333	1
CM_MC2	1	1	1	1
FR_FRCP1	1	1	0.9333	0.9333

Hatched Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	15/15	15/15	15/15	15/15
FR_UFR1	15/15	14/15	14/15	15/15
GH_FR1	15/15	15/15	14/15	15/15
CM_MC2	15/15	15/15	15/15	15/15
FR_FRCP1	15/15	15/15	14/15	14/15

CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	11-3772-1241	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Jun-15 10:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	17-1868-4686	**Test Type:**	Survival-Development-Growth	**Analyst:**	Karen Lee
Start Date:	12 Mar-15 14:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	13 Apr-15 12:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-3817-2510	12 Mar-15	12 Mar-15	14h	Teck Coal	
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	28h (8 °C)		
GH_FR1	21-3664-3662	09 Mar-15 10:05	11 Mar-15 10:10	76h (9.4 °C)		
CM_MC2	17-8817-4739	10 Mar-15 11:30	12 Mar-15 10:00	51h (7.1 °C)		
FR_FRCP1	14-3483-9304	11 Mar-15 11:36	12 Mar-15 12:45	27h (7.1 °C)	Teck Coal	

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1-WS-201503111136		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	4.08%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		FR_UFR1	1.732	1.943	0.074	6	0.0670	CDF	Non-Significant Effect
		GH_FR1	1	1.943	0.064	6	0.1780	CDF	Non-Significant Effect
		CM_MC2	0	1.943		6	1.0000	CDF	Non-Significant Effect
		FR_FRCP1	1.732	1.943	0.074	6	0.0670	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01734401	0.004336001	4	1.364	0.2930	Non-Significant Effect
Error	0.04769601	0.003179734	15			
Total	0.06504002		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	5	4.893	0.0092	Unequal Variances
Variances	Levene Equality of Variance	21	4.893	<0.0001	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.888	0.866	0.0247	Normal Distribution

Hatched Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1	1	1	1	1	1	0	0.0%	0.0%
FR_UFR1	4	0.9667	0.9054	1	0.9667	0.9333	1	0.01924	3.98%	3.33%
GH_FR1	4	0.9833	0.9303	1	1	0.9333	1	0.01667	3.39%	1.67%
CM_MC2	4	1	1	1	1	1	1	0	0.0%	0.0%
FR_FRCP1	4	0.9667	0.9054	1	0.9667	0.9333	1	0.01924	3.98%	3.33%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.441	1.441	1.442	1.441	1.441	1.441	0	0.0%	0.0%
FR_UFR1	4	1.375	1.254	1.496	1.375	1.31	1.441	0.03802	5.53%	4.57%
GH_FR1	4	1.408	1.304	1.513	1.441	1.31	1.441	0.03292	4.68%	2.28%
CM_MC2	4	1.441	1.441	1.442	1.441	1.441	1.441	0	0.0%	0.0%
FR_FRCP1	4	1.375	1.254	1.496	1.375	1.31	1.441	0.03802	5.53%	4.57%

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	11-3772-1241	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Jun-15 10:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Hatched Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1	1	1	1
FR_UFR1	1	0.9333	0.9333	1
GH_FR1	1	1	0.9333	1
CM_MC2	1	1	1	1
FR_FRCP1	1	1	0.9333	0.9333

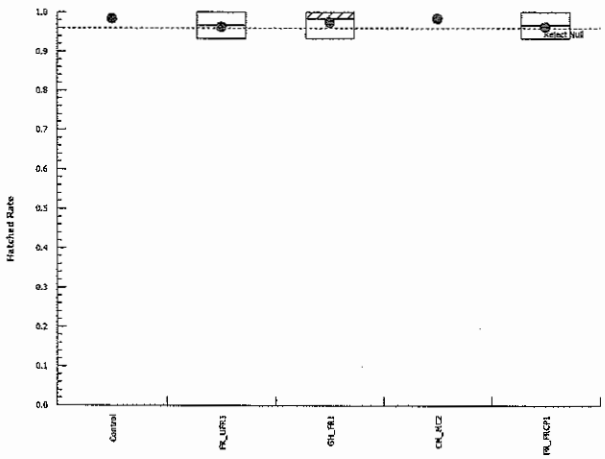
Angular (Corrected) Transformed Detail

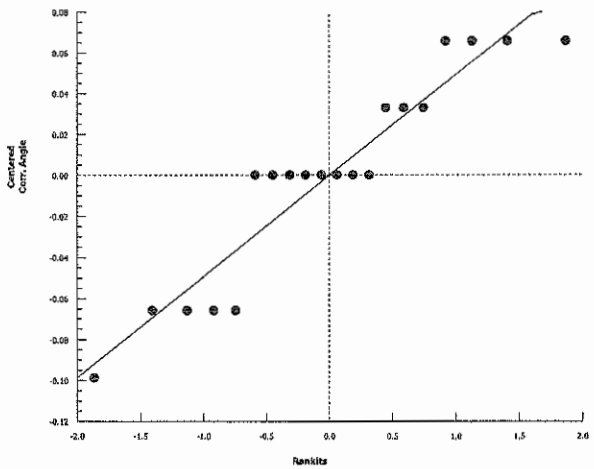
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1.441	1.441	1.441	1.441
FR_UFR1	1.441	1.31	1.31	1.441
GH_FR1	1.441	1.441	1.31	1.441
CM_MC2	1.441	1.441	1.441	1.441
FR_FRCP1	1.441	1.441	1.31	1.31

Hatched Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	15/15	15/15	15/15	15/15
FR_UFR1	15/15	14/15	14/15	15/15
GH_FR1	15/15	15/15	14/15	15/15
CM_MC2	15/15	15/15	15/15	15/15
FR_FRCP1	15/15	15/15	14/15	14/15

Graphics





Fathead Minnow 32-d Survival and Growth Test — Nautilus Environmental

Analysis ID:	18-8862-5685	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Jun-15 10:29	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	17-1868-4686	**Test Type:**	Survival-Development-Growth	**Analyst:**	Karen Lee
Start Date:	12 Mar-15 14:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	13 Apr-15 12:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	28h (8 °C)	Teck Coal	
GH_FR1	21-3664-3662	09 Mar-15 10:05	11 Mar-15 10:10	76h (9.4 °C)		
CM_MC2	17-8817-4739	10 Mar-15 11:30	12 Mar-15 10:00	51h (7.1 °C)		
FR_FRCP1	14-3483-9304	11 Mar-15 11:36	12 Mar-15 12:45	27h (7.1 °C)	Teck Coal	

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1-WS-201503111136		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	5.57%	

Unequal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_FR1	-0.6547	2.015	0.101	5	0.7292	CDF	Non-Significant Effect
		CM_MC2	-1.732	2.353	0.089	3	0.9092	CDF	Non-Significant Effect
		FR_FRCP1	0	1.943	0.105	6	0.5000	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.011924	0.003974668	3	1	0.4262	Non-Significant Effect
Error	0.04769601	0.003974668	12			
Total	0.05962002		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	3.667	5.953	0.0439	Equal Variances
Variances	Levene Equality of Variance	14.33	5.953	0.0003	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8797	0.8408	0.0384	Normal Distribution

Hatched Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	0.9667	0.9054	1	0.9667	0.9333	1	0.01924	3.98%	0.0%
GH_FR1	4	0.9833	0.9303	1	1	0.9333	1	0.01667	3.39%	-1.72%
CM_MC2	4	1	1	1	1	1	1	0	0.0%	-3.45%
FR_FRCP1	4	0.9667	0.9054	1	0.9667	0.9333	1	0.01924	3.98%	0.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	1.375	1.254	1.496	1.375	1.31	1.441	0.03802	5.53%	0.0%
GH_FR1	4	1.408	1.304	1.513	1.441	1.31	1.441	0.03292	4.68%	-2.39%
CM_MC2	4	1.441	1.441	1.442	1.441	1.441	1.441	0	0.0%	-4.79%
FR_FRCP1	4	1.375	1.254	1.496	1.375	1.31	1.441	0.03802	5.53%	0.0%

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	18-8862-5685	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Jun-15 10:29	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Hatched Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	1	0.9333	0.9333	1
GH_FR1	1	1	0.9333	1
CM_MC2	1	1	1	1
FR_FRCP1	1	1	0.9333	0.9333

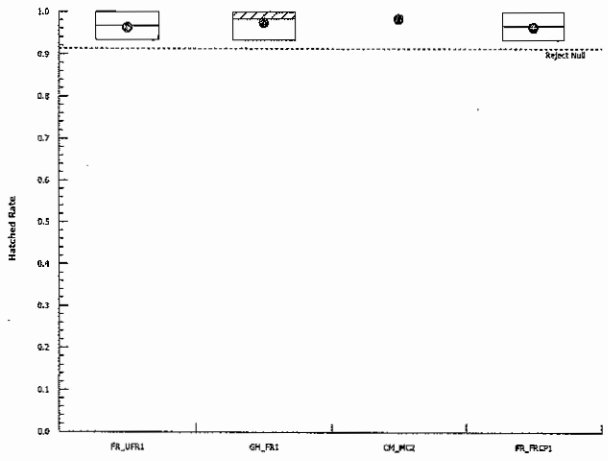
Angular (Corrected) Transformed Detail

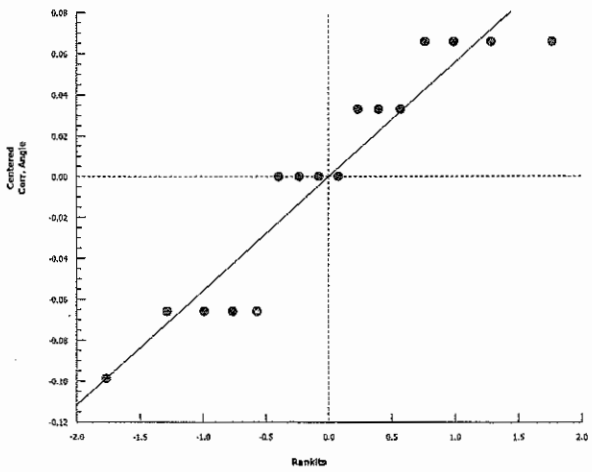
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	1.441	1.31	1.31	1.441
GH_FR1	1.441	1.441	1.31	1.441
CM_MC2	1.441	1.441	1.441	1.441
FR_FRCP1	1.441	1.441	1.31	1.31

Hatched Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	15/15	14/15	14/15	15/15
GH_FR1	15/15	15/15	14/15	15/15
CM_MC2	15/15	15/15	15/15	15/15
FR_FRCP1	15/15	15/15	14/15	14/15

Graphics





Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	03-5502-7176	**Endpoint:**	Post-Hatch Survival	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Jun-15 10:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	17-1868-4686	**Test Type:**	Survival-Development-Growth	**Analyst:**	Karen Lee
Start Date:	12 Mar-15 14:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	13 Apr-15 12:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-3817-2510	12 Mar-15	12 Mar-15	14h	Teck Coal	
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	28h (8 °C)		
GH_FR1	21-3664-3662	09 Mar-15 10:05	11 Mar-15 10:10	76h (9.4 °C)		
CM_MC2	17-8817-4739	10 Mar-15 11:30	12 Mar-15 10:00	51h (7.1 °C)		
FR_FRCP1	14-3483-9304	11 Mar-15 11:36	12 Mar-15 12:45	27h (7.1 °C)	Teck Coal	

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1-WS-201503111136		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	13.0%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		FR_UFR1	2.943	1.943	0.216	6	0.0129	CDF	Significant Effect
		GH_FR1	4.165	1.943	0.240	6	0.0030	CDF	Significant Effect
		CM_MC2	2.965	1.943	0.186	6	0.0126	CDF	Significant Effect
		FR_FRCP1	3.229	1.943	0.227	6	0.0090	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.573702	0.1434255	4	3.791	0.0253	Significant Effect
Error	0.5675039	0.03783359	15			
Total	1.141206		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.842	13.28	0.4278	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9538	0.866	0.4290	Normal Distribution

Post-Hatch Survival Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.9833	0.9303	1	1	0.9333	1	0.01667	3.39%	0.0%
FR_UFR1	4	0.7607	0.4802	1	0.7905	0.5333	0.9286	0.08816	23.18%	22.64%
GH_FR1	4	0.5976	0.2465	0.9488	0.6	0.3333	0.8571	0.1103	36.93%	39.23%
CM_MC2	4	0.8	0.5708	1	0.8333	0.6	0.9333	0.07201	18.0%	18.64%
FR_FRCP1	4	0.7214	0.3961	1	0.7952	0.4286	0.8667	0.1022	28.34%	26.63%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.408	1.304	1.513	1.441	1.31	1.441	0.03292	4.68%	0.0%
FR_UFR1	4	1.081	0.7422	1.419	1.102	0.8188	1.3	0.1064	19.69%	23.27%
GH_FR1	4	0.8932	0.5137	1.273	0.887	0.6155	1.183	0.1192	26.7%	36.58%
CM_MC2	4	1.125	0.8393	1.411	1.152	0.8861	1.31	0.08976	15.96%	20.13%
FR_FRCP1	4	1.031	0.6731	1.388	1.106	0.7137	1.197	0.1123	21.8%	26.83%

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	03-5502-7176	**Endpoint:**	Post-Hatch Survival	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Jun-15 10:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Post-Hatch Survival Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1	0.9333	1	1
FR_UFR1	0.8667	0.9286	0.7143	0.5333
GH_FR1	0.5333	0.6667	0.8571	0.3333
CM_MC2	0.6	0.8	0.9333	0.8667
FR_FRCP1	0.7333	0.8667	0.4286	0.8571

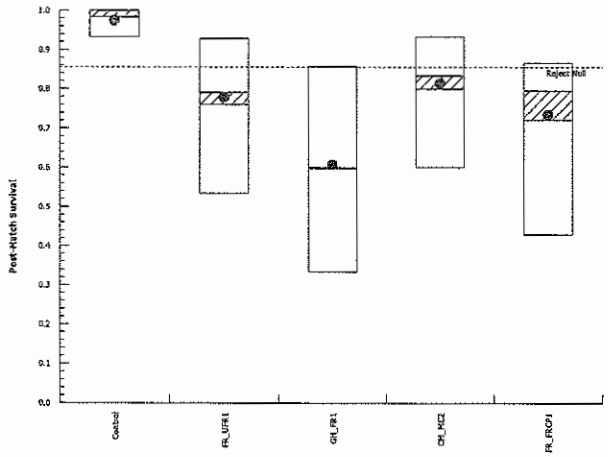
Angular (Corrected) Transformed Detail

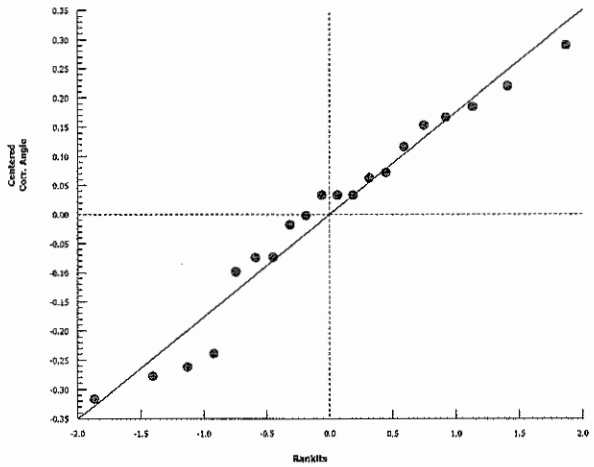
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1.441	1.31	1.441	1.441
FR_UFR1	1.197	1.3	1.007	0.8188
GH_FR1	0.8188	0.9553	1.183	0.6155
CM_MC2	0.8861	1.107	1.31	1.197
FR_FRCP1	1.028	1.197	0.7137	1.183

Post-Hatch Survival Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	15/15	14/15	15/15	15/15
FR_UFR1	13/15	13/14	10/14	8/15
GH_FR1	8/15	10/15	12/14	5/15
CM_MC2	9/15	12/15	14/15	13/15
FR_FRCP1	11/15	13/15	6/14	12/14

Graphics





CETIS Summary Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Batch ID:	17-1868-4686	**Test Type:**	Survival-Development-Growth	**Analyst:**	Karen Lee
Start Date:	12 Mar-15 14:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	13 Apr-15 12:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-3817-2510	12 Mar-15	12 Mar-15	14h	Teck Coal	
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	28h (8 °C)		
GH_FR1	21-3664-3662	09 Mar-15 10:05	11 Mar-15 10:10	76h (9.4 °C)		
CM_MC2	17-8817-4739	10 Mar-15 11:30	12 Mar-15 10:00	51h (7.1 °C)		
FR_FRCP1	14-3483-9304	11 Mar-15 11:36	12 Mar-15 12:45	27h (7.1 °C)	Teck Coal	

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1-WS-201503111136		

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	4	18.36	17.91	18.82	18	18.68	0.1432	0.2864	1.56%	0.0%
FR_UFR1	4	19.63	17.66	21.61	18.27	21	0.6208	1.242	6.32%	-6.92%
GH_FR1	4	20.39	18.74	22.04	19.38	21.8	0.5175	1.035	5.08%	-11.05%
CM_MC2	4	19.15	17.47	20.83	18.23	20.67	0.5277	1.055	5.51%	-4.3%
FR_FRCP1	4	19.22	17.15	21.3	18.38	21.17	0.6513	1.303	6.78%	-4.7%

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	4	10.91	9.895	11.92	10.18	11.69	0.318	0.636	5.83%	0.0%
FR_UFR1	4	10.74	10.06	11.42	10.27	11.19	0.2134	0.4269	3.98%	1.54%
GH_FR1	4	10.23	8.382	12.08	8.767	11.51	0.5805	1.161	11.35%	6.21%
CM_MC2	4	10.7	9.622	11.77	10.07	11.63	0.3376	0.6752	6.31%	1.93%
FR_FRCP1	4	10.68	8.724	12.63	8.897	11.71	0.6143	1.229	11.5%	2.09%

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	4	11.1	9.832	12.38	10.18	11.85	0.3999	0.7998	7.2%	0.0%
FR_UFR1	4	15.25	9.432	21.07	11.85	19.68	1.829	3.658	23.98%	-37.35%
GH_FR1	4	18.85	10.45	27.24	14.38	26.3	2.638	5.276	27.99%	-69.73%
CM_MC2	4	13.73	9.249	18.2	11.61	17.86	1.407	2.813	20.5%	-23.61%
FR_FRCP1	4	16.16	9.632	22.69	13.51	22.24	2.051	4.102	25.39%	-45.52%

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	4	0.9833	0.9303	1	0.9333	1	0.01667	0.03333	3.39%	0.0%
FR_UFR1	4	0.7333	0.4735	0.9932	0.5333	0.8667	0.08165	0.1633	22.27%	25.42%
GH_FR1	4	0.5833	0.2666	0.9001	0.3333	0.8	0.09954	0.1991	34.13%	40.68%
CM_MC2	4	0.8	0.5708	1	0.6	0.9333	0.07201	0.144	18.0%	18.64%
FR_FRCP1	4	0.7	0.3702	1	0.4	0.8667	0.1036	0.2073	29.61%	28.81%

Length-mm Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	18.3	18.68	18	18.47
FR_UFR1	18.96	18.27	20.3	21
GH_FR1	20.44	19.95	19.38	21.8
CM_MC2	20.67	18.96	18.75	18.23
FR_FRCP1	18.64	18.38	21.17	18.71

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	10.18	11.06	10.69	11.69
FR_UFR1	10.99	10.27	11.19	10.5
GH_FR1	9.963	10.68	11.51	8.767
CM_MC2	10.72	10.38	11.63	10.07
FR_FRCP1	10.97	11.71	8.897	11.14

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	10.18	11.85	10.69	11.69
FR_UFR1	12.69	11.85	16.79	19.68
GH_FR1	18.68	16.02	14.38	26.3
CM_MC2	17.86	12.97	12.46	11.61
FR_FRCP1	14.97	13.51	22.24	13.92

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1	0.9333	1	1
FR_UFR1	0.8667	0.8667	0.6667	0.5333
GH_FR1	0.5333	0.6667	0.8	0.3333
CM_MC2	0.6	0.8	0.9333	0.8667
FR_FRCP1	0.7333	0.8667	0.4	0.8

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	15/15	14/15	15/15	15/15
FR_UFR1	13/15	13/15	10/15	8/15
GH_FR1	8/15	10/15	12/15	5/15
CM_MC2	9/15	12/15	14/15	13/15
FR_FRCP1	11/15	13/15	6/15	12/15

CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	03-6125-2189	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Apr-15 16:49	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	16-8137-7912	**Test Type:**	Survival-Development-Growth	**Analyst:**	Karen Lee
Start Date:	12 Mar-15 14:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	13 Apr-15 12:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-3817-2510	12 Mar-15	12 Mar-15	14h	Teck Coal	
GH_FR1	21-3664-3662	09 Mar-15 10:05	11 Mar-15 10:10	76h (9.4 °C)		
CM_MC2	17-8817-4739	10 Mar-15 11:30	12 Mar-15 10:00	51h (7.1 °C)		
FR_FRCP1	14-3483-9304	11 Mar-15 11:36	12 Mar-15 12:45	27h (7.1 °C)	Teck Coal	
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	28h (8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1-WS-201503111136		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	10.6%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		GH_FR1	4.879	1.943	0.213	6	0.0014	CDF	Significant Effect
		CM_MC2	2.965	1.943	0.186	6	0.0126	CDF	Significant Effect
		FR_FRCP1	3.463	1.943	0.227	6	0.0067	CDF	Significant Effect
		FR_UFR1	3.688	1.943	0.193	6	0.0051	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.6353589	0.1588397	4	4.8	0.0108	Significant Effect
Error	0.4963603	0.03309069	15			
Total	1.131719		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.46	13.28	0.4840	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9388	0.866	0.2276	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.9833	0.9303	1	1	0.9333	1	0.01667	3.39%	0.0%
GH_FR1	4	0.5833	0.2666	0.9001	0.6	0.3333	0.8	0.09954	34.13%	40.68%
CM_MC2	4	0.8	0.5708	1	0.8333	0.6	0.9333	0.07201	18.0%	18.64%
FR_FRCP1	4	0.7	0.3702	1	0.7667	0.4	0.8667	0.1036	29.61%	28.81%
FR_UFR1	4	0.7333	0.4735	0.9932	0.7667	0.5333	0.8667	0.08165	22.27%	25.42%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.408	1.304	1.513	1.441	1.31	1.441	0.03292	4.68%	0.0%
GH_FR1	4	0.8742	0.5418	1.207	0.887	0.6155	1.107	0.1044	23.89%	37.93%
CM_MC2	4	1.125	0.8393	1.411	1.152	0.8861	1.31	0.08976	15.96%	20.13%
FR_FRCP1	4	1.004	0.648	1.361	1.068	0.6847	1.197	0.112	22.3%	28.7%
FR_UFR1	4	1.042	0.7438	1.34	1.076	0.8188	1.197	0.09372	17.99%	26.01%

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	03-6125-2189	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Apr-15 16:49	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1	0.9333	1	1
GH_FR1	0.5333	0.6667	0.8	0.3333
CM_MC2	0.6	0.8	0.9333	0.8667
FR_FRCP1	0.7333	0.8667	0.4	0.8
FR_UFR1	0.8667	0.8667	0.6667	0.5333

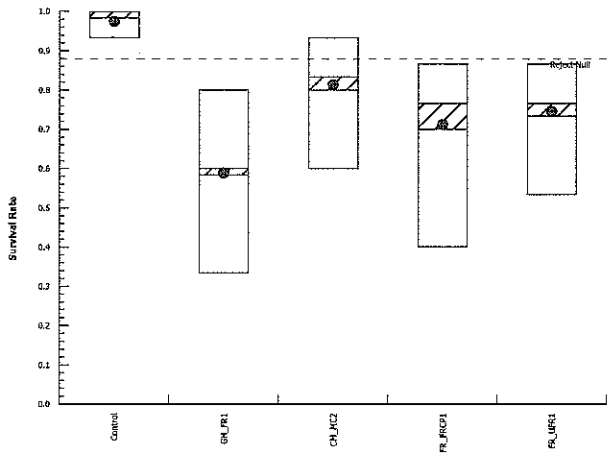
Angular (Corrected) Transformed Detail

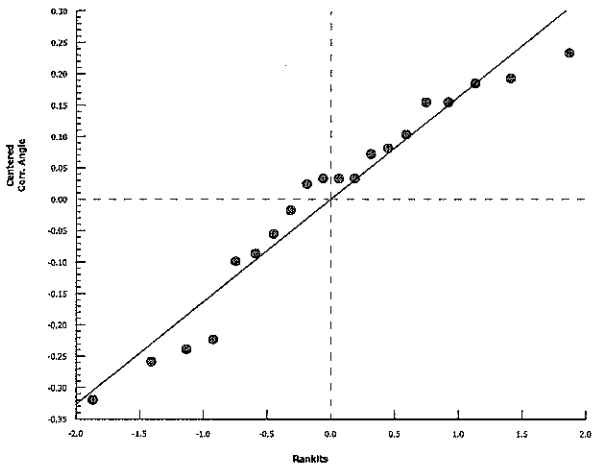
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1.441	1.31	1.441	1.441
GH_FR1	0.8188	0.9553	1.107	0.6155
CM_MC2	0.8861	1.107	1.31	1.197
FR_FRCP1	1.028	1.197	0.6847	1.107
FR_UFR1	1.197	1.197	0.9553	0.8188

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	15/15	14/15	15/15	15/15
GH_FR1	8/15	10/15	12/15	5/15
CM_MC2	9/15	12/15	14/15	13/15
FR_FRCP1	11/15	13/15	6/15	12/15
FR_UFR1	13/15	13/15	10/15	8/15

Graphics





CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	02-9923-8601	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Apr-15 15:32	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	17-1868-4686	**Test Type:**	Survival-Development-Growth	**Analyst:**	Karen Lee
Start Date:	12 Mar-15 14:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	13 Apr-15 12:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	28h (8 °C)	Teck Coal	
GH_FR1	21-3664-3662	09 Mar-15 10:05	11 Mar-15 10:10	76h (9.4 °C)		
CM_MC2	17-8817-4739	10 Mar-15 11:30	12 Mar-15 10:00	51h (7.1 °C)		
FR_FRCP1	14-3483-9304	11 Mar-15 11:36	12 Mar-15 12:45	27h (7.1 °C)	Teck Coal	

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1-WS-201503111136		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	35.5%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_FR1	1.196	1.943	0.273	6	0.1384	CDF	Non-Significant Effect
		CM_MC2	-0.6392	1.943	0.252	6	0.7268	CDF	Non-Significant Effect
		FR_FRCP1	0.2586	1.943	0.284	6	0.4023	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.130867	0.04362232	3	1.083	0.3934	Non-Significant Effect
Error	0.4833523	0.04027936	12			
Total	0.6142192		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	0.161	11.34	0.9836	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9168	0.8408	0.1497	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	0.7333	0.4735	0.9932	0.7667	0.5333	0.8667	0.08165	22.27%	0.0%
GH_FR1	4	0.5833	0.2666	0.9001	0.6	0.3333	0.8	0.09954	34.13%	20.45%
CM_MC2	4	0.8	0.5708	1	0.8333	0.6	0.9333	0.07201	18.0%	-9.09%
FR_FRCP1	4	0.7	0.3702	1	0.7667	0.4	0.8667	0.1036	29.61%	4.55%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	1.042	0.7438	1.34	1.076	0.8188	1.197	0.09372	17.99%	0.0%
GH_FR1	4	0.8742	0.5418	1.207	0.887	0.6155	1.107	0.1044	23.89%	16.11%
CM_MC2	4	1.125	0.8393	1.411	1.152	0.8861	1.31	0.08976	15.96%	-7.96%
FR_FRCP1	4	1.004	0.648	1.361	1.068	0.6847	1.197	0.112	22.3%	3.62%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	0.8667	0.8667	0.6667	0.5333
GH_FR1	0.5333	0.6667	0.8	0.3333
CM_MC2	0.6	0.8	0.9333	0.8667
FR_FRCP1	0.7333	0.8667	0.4	0.8

Analyst:_____ QA: JCL Apr. 30/15

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	02-9923-8601	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Apr-15 15:32	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

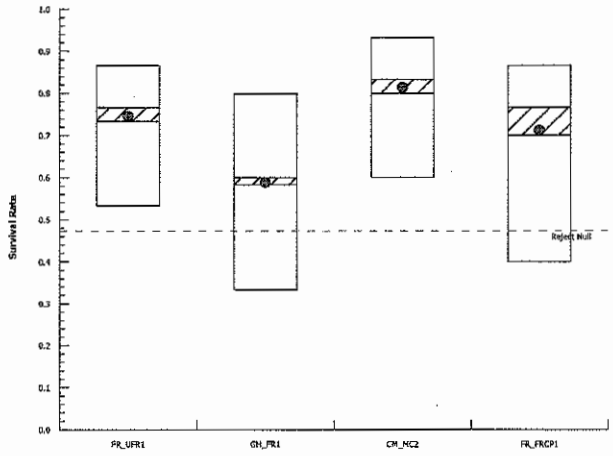
Angular (Corrected) Transformed Detail

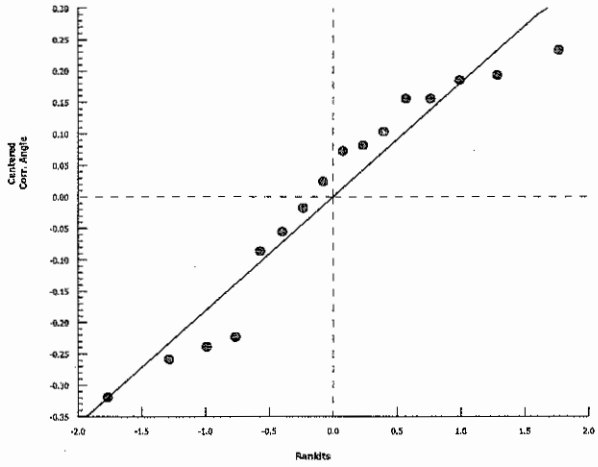
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	1.197	1.197	0.9553	0.8188
GH_FR1	0.8188	0.9553	1.107	0.6155
CM_MC2	0.8861	1.107	1.31	1.197
FR_FRCP1	1.028	1.197	0.6847	1.107

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	13/15	13/15	10/15	8/15
GH_FR1	8/15	10/15	12/15	5/15
CM_MC2	9/15	12/15	14/15	13/15
FR_FRCP1	11/15	13/15	6/15	12/15

Graphics





CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	15-7465-8277	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Apr-15 13:22	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	17-1868-4686	**Test Type:**	Survival-Development-Growth	**Analyst:**	Karen Lee
Start Date:	12 Mar-15 14:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	13 Apr-15 12:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-3817-2510	12 Mar-15	12 Mar-15	14h	Teck Coal	
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	28h (8 °C)		
GH_FR1	21-3664-3662	09 Mar-15 10:05	11 Mar-15 10:10	76h (9.4 °C)		
CM_MC2	17-8817-4739	10 Mar-15 11:30	12 Mar-15 10:00	51h (7.1 °C)		
FR_FRCP1	14-3483-9304	11 Mar-15 11:36	12 Mar-15 12:45	27h (7.1 °C)	Teck Coal	

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1-WS-201503111136		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.3%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		FR_UFR1	0.4386	1.943	0.744	6	0.3381	CDF	Non-Significant Effect
		GH_FR1	1.023	1.943	1.286	6	0.1728	CDF	Non-Significant Effect
		CM_MC2	0.4535	1.943	0.901	6	0.3331	CDF	Non-Significant Effect
		FR_FRCP1	0.3296	1.943	1.344	6	0.3764	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.014666	0.2536664	4	0.3252	0.8567	Non-Significant Effect
Error	11.69931	0.7799542	15			
Total	12.71398		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.812	13.28	0.4320	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9649	0.866	0.6452	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	10.91	9.895	11.92	10.88	10.18	11.69	0.318	5.83%	0.0%
FR_UFR1	4	10.74	10.06	11.42	10.75	10.27	11.19	0.2134	3.98%	1.54%
GH_FR1	4	10.23	8.382	12.08	10.32	8.767	11.51	0.5805	11.35%	6.21%
CM_MC2	4	10.7	9.622	11.77	10.55	10.07	11.63	0.3376	6.31%	1.93%
FR_FRCP1	4	10.68	8.724	12.63	11.06	8.897	11.71	0.6143	11.5%	2.09%

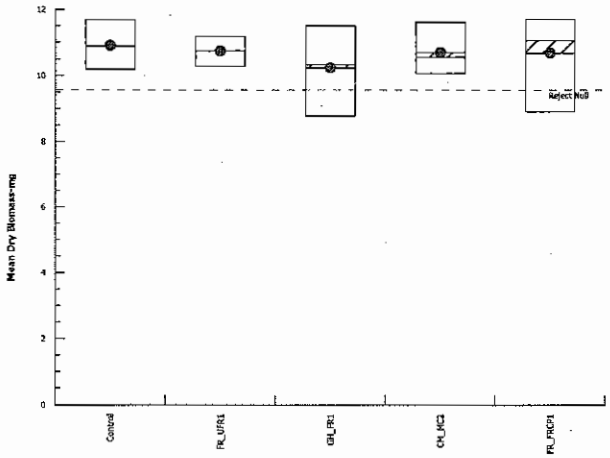
Mean Dry Biomass-mg Detail

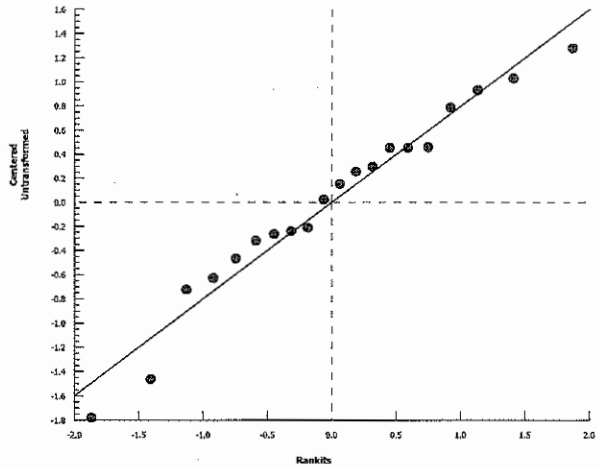
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	10.18	11.06	10.69	11.69
FR_UFR1	10.99	10.27	11.19	10.5
GH_FR1	9.963	10.68	11.51	8.767
CM_MC2	10.72	10.38	11.63	10.07
FR_FRCP1	10.97	11.71	8.897	11.14

Fathead Minnow 32-d Survival and Growth Test | **Nautilus Environmental**

Analysis ID:	15-7465-8277	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Apr-15 13:22	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	07-5694-4478	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Apr-15 15:32	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	17-1868-4686	**Test Type:**	Survival-Development-Growth	**Analyst:**	Karen Lee
Start Date:	12 Mar-15 14:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	13 Apr-15 12:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	28h (8 °C)	Teck Coal	
GH_FR1	21-3664-3662	09 Mar-15 10:05	11 Mar-15 10:10	76h (9.4 °C)		
CM_MC2	17-8817-4739	10 Mar-15 11:30	12 Mar-15 10:00	51h (7.1 °C)		
FR_FRCP1	14-3483-9304	11 Mar-15 11:36	12 Mar-15 12:45	27h (7.1 °C)	Teck Coal	

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1-WS-201503111136		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	11.8%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_FR1	0.8235	1.943	1.202	6	0.2208	CDF	Non-Significant Effect
		CM_MC2	0.106	1.943	0.776	6	0.4595	CDF	Non-Significant Effect
		FR_FRCP1	0.09226	1.943	1.264	6	0.4647	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.6851124	0.2283708	3	0.2614	0.8519	Non-Significant Effect
Error	10.48566	0.8738053	12			
Total	11.17078		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.262	11.34	0.3530	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.952	0.8408	0.5220	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	10.74	10.06	11.42	10.75	10.27	11.19	0.2134	3.98%	0.0%
GH_FR1	4	10.23	8.382	12.08	10.32	8.767	11.51	0.5805	11.35%	4.74%
CM_MC2	4	10.7	9.622	11.77	10.55	10.07	11.63	0.3376	6.31%	0.39%
FR_FRCP1	4	10.68	8.724	12.63	11.06	8.897	11.71	0.6143	11.5%	0.56%

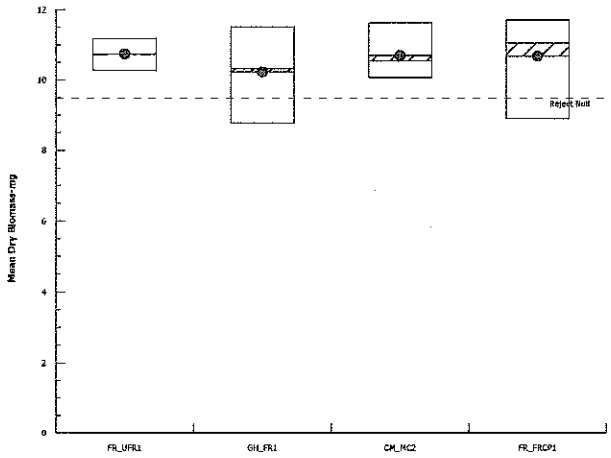
Mean Dry Biomass-mg Detail

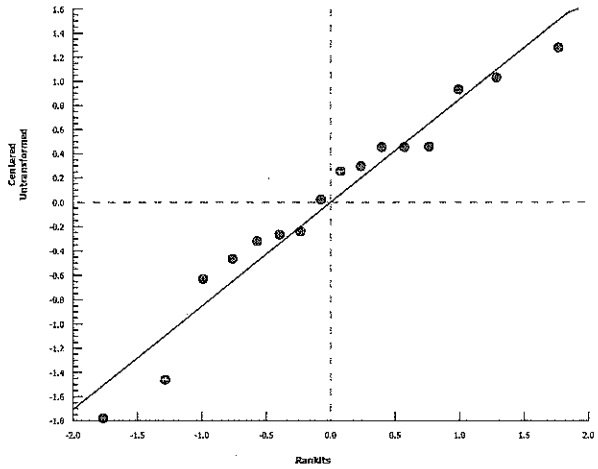
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	10.99	10.27	11.19	10.5
GH_FR1	9.963	10.68	11.51	8.767
CM_MC2	10.72	10.38	11.63	10.07
FR_FRCP1	10.97	11.71	8.897	11.14

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	07-5694-4478	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Apr-15 15:32	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	15-0650-1107	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 May-15 16:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	17-1868-4686	**Test Type:**	Survival-Development-Growth	**Analyst:**	Karen Lee
Start Date:	12 Mar-15 14:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	13 Apr-15 12:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-3817-2510	12 Mar-15	12 Mar-15	14h	Teck Coal	
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	28h (8 °C)		
GH_FR1	21-3664-3662	09 Mar-15 10:05	11 Mar-15 10:10	76h (9.4 °C)		
CM_MC2	17-8817-4739	10 Mar-15 11:30	12 Mar-15 10:00	51h (7.1 °C)		
FR_FRCP1	14-3483-9304	11 Mar-15 11:36	12 Mar-15 12:45	27h (7.1 °C)	Teck Coal	

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1-WS-201503111136		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	36.6%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		FR_UFR1	-2.216	1.943	3.638	6	0.9657	CDF	Non-Significant Effect
		GH_FR1	-2.902	1.943	5.185	6	0.9864	CDF	Non-Significant Effect
		CM_MC2	-1.793	1.943	2.842	6	0.9384	CDF	Non-Significant Effect
		FR_FRCP1	-2.419	1.943	4.061	6	0.9740	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	132.0169	33.00423	4	2.478	0.0887	Non-Significant Effect
Error	199.7946	13.31964	15			
Total	331.8115		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.832	13.28	0.1450	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9042	0.866	0.0494	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	11.1	9.832	12.38	11.19	10.18	11.85	0.3999	7.2%	0.0%
FR_UFR1	4	15.25	9.432	21.07	14.74	11.85	19.68	1.829	23.98%	-37.35%
GH_FR1	4	18.85	10.45	27.24	17.35	14.38	26.3	2.638	27.99%	-69.73%
CM_MC2	4	13.73	9.249	18.2	12.71	11.61	17.86	1.407	20.5%	-23.61%
FR_FRCP1	4	16.16	9.632	22.69	14.44	13.51	22.24	2.051	25.39%	-45.52%

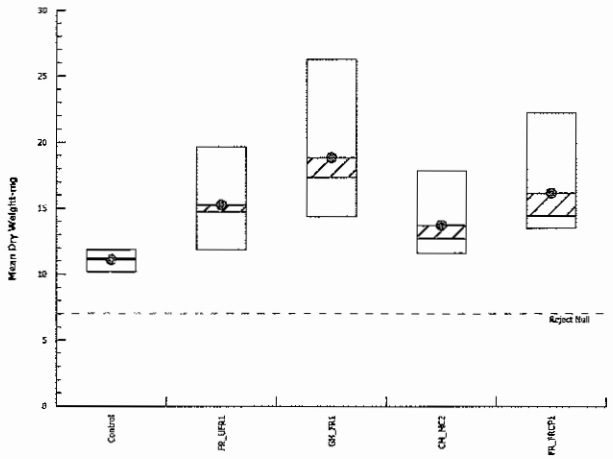
Mean Dry Weight-mg Detail

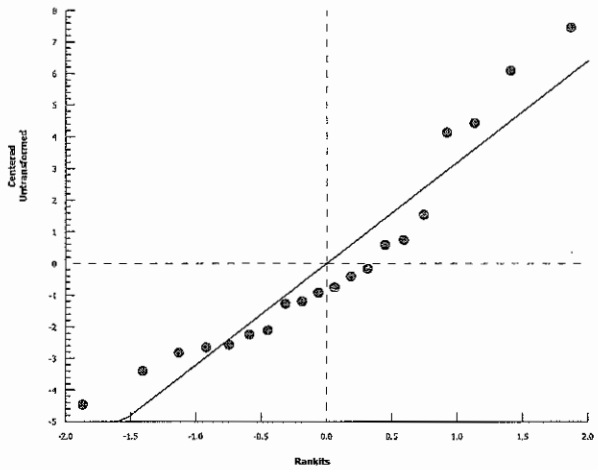
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	10.18	11.85	10.69	11.69
FR_UFR1	12.69	11.85	16.79	19.68
GH_FR1	18.68	16.02	14.38	26.3
CM_MC2	17.86	12.97	12.46	11.61
FR_FRCP1	14.97	13.51	22.24	13.92

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Analysis ID:	15-0650-1107	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 May-15 16:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Test Code: 15180,15184,151 | 13-4667-3290

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	06-1713-5990	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 May-15 16:44	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	17-1868-4686	**Test Type:**	Survival-Development-Growth	**Analyst:**	Karen Lee
Start Date:	12 Mar-15 14:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	13 Apr-15 12:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	28h (8 °C)	Teck Coal	
GH_FR1	21-3664-3662	09 Mar-15 10:05	11 Mar-15 10:10	76h (9.4 °C)		
CM_MC2	17-8817-4739	10 Mar-15 11:30	12 Mar-15 10:00	51h (7.1 °C)		
FR_FRCP1	14-3483-9304	11 Mar-15 11:36	12 Mar-15 12:45	27h (7.1 °C)	Teck Coal	

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1-WS-201503111136		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	35.0%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_FR1	-1.12	1.943	6.238	6	0.8472	CDF	Non-Significant Effect
		CM_MC2	0.6614	1.943	4.483	6	0.2665	CDF	Non-Significant Effect
		FR_FRCP1	-0.3302	1.943	5.34	6	0.6237	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	55.44282	18.48094	3	1.121	0.3793	Non-Significant Effect
Error	197.8753	16.48961	12			
Total	253.3182		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1.051	11.34	0.7889	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8773	0.8408	0.0352	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	15.25	9.432	21.07	14.74	11.85	19.68	1.829	23.98%	0.0%
GH_FR1	4	18.85	10.45	27.24	17.35	14.38	26.3	2.638	27.99%	-23.57%
CM_MC2	4	13.73	9.249	18.2	12.71	11.61	17.86	1.407	20.5%	10.01%
FR_FRCP1	4	16.16	9.632	22.69	14.44	13.51	22.24	2.051	25.39%	-5.95%

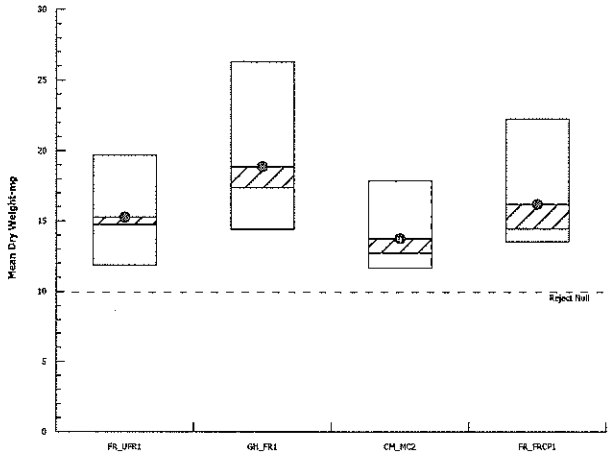
Mean Dry Weight-mg Detail

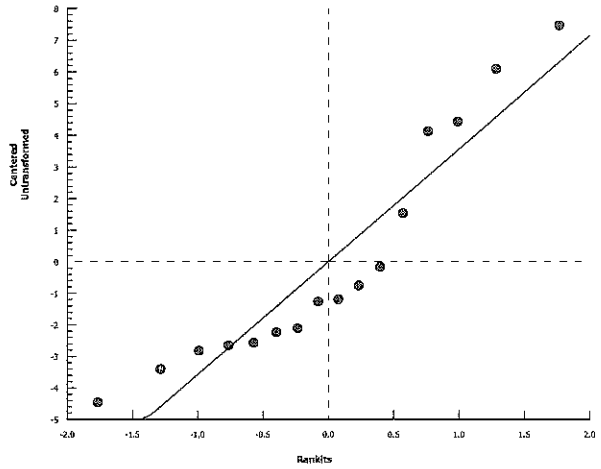
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	12.69	11.85	16.79	19.68
GH_FR1	18.68	16.02	14.38	26.3
CM_MC2	17.86	12.97	12.46	11.61
FR_FRCP1	14.97	13.51	22.24	13.92

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	06-1713-5990	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 May-15 16:44	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Report Date: 11 May-15 11:50 (p 1 of 1)
Test Code: 15180,15184,151 | 13-4667-3290

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	10-3157-6390	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-15 11:50	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	17-1868-4686	**Test Type:**	Survival-Development-Growth	**Analyst:**	Karen Lee
Start Date:	12 Mar-15 14:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	13 Apr-15 12:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-3817-2510	12 Mar-15	12 Mar-15	14h	Teck Coal	
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	28h (8 °C)		
GH_FR1	21-3664-3662	09 Mar-15 10:05	11 Mar-15 10:10	76h (9.4 °C)		
CM_MC2	17-8817-4739	10 Mar-15 11:30	12 Mar-15 10:00	51h (7.1 °C)		
FR_FRCP1	14-3483-9304	11 Mar-15 11:36	12 Mar-15 12:45	27h (7.1 °C)	Teck Coal	

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1-WS-201503111136		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	7.06%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		FR_UFR1	-1.996	1.943	1.238	6	0.9535	CDF	Non-Significant Effect
		GH_FR1	-3.779	1.943	1.043	6	0.9954	CDF	Non-Significant Effect
		CM_MC2	-1.445	1.943	1.063	6	0.9007	CDF	Non-Significant Effect
		FR_FRCP1	-1.294	1.943	1.296	6	0.8783	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.782425	2.195606	4	1.994	0.1472	Non-Significant Effect
Error	16.5163	1.101087	15			
Total	25.29872		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	4.881	13.28	0.2997	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9189	0.866	0.0945	Normal Distribution

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	18.36	17.91	18.82	18.38	18	18.68	0.1432	1.56%	0.0%
FR_UFR1	4	19.63	17.66	21.61	19.63	18.27	21	0.6208	6.32%	-6.92%
GH_FR1	4	20.39	18.74	22.04	20.19	19.38	21.8	0.5175	5.08%	-11.05%
CM_MC2	4	19.15	17.47	20.83	18.85	18.23	20.67	0.5277	5.51%	-4.3%
FR_FRCP1	4	19.22	17.15	21.3	18.67	18.38	21.17	0.6513	6.78%	-4.7%

Length-mm Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	18.3	18.68	18	18.47
FR_UFR1	18.96	18.27	20.3	21
GH_FR1	20.44	19.95	19.38	21.8
CM_MC2	20.67	18.96	18.75	18.23
FR_FRCP1	18.64	18.38	21.17	18.71

CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	14-0607-0746	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 May-15 14:52	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	17-1868-4686	**Test Type:**	Survival-Development-Growth	**Analyst:**	Karen Lee
Start Date:	12 Mar-15 14:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	13 Apr-15 12:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	28h (8 °C)	Teck Coal	
GH_FR1	21-3664-3662	09 Mar-15 10:05	11 Mar-15 10:10	76h (9.4 °C)		
CM_MC2	17-8817-4739	10 Mar-15 11:30	12 Mar-15 10:00	51h (7.1 °C)		
FR_FRCP1	14-3483-9304	11 Mar-15 11:36	12 Mar-15 12:45	27h (7.1 °C)	Teck Coal	

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1-WS-201503111136		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	9.59%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_FR1	-0.9205	2.287	1.883	6	0.9531	CDF	Non-Significant Effect
		CM_MC2	0.5845	2.287	1.883	6	0.5087	CDF	Non-Significant Effect
		FR_FRCP1	0.4964	2.287	1.883	6	0.5474	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.874959	1.291653	3	0.9526	0.4462	Non-Significant Effect
Error	16.27024	1.355853	12			
Total	20.1452		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	0.2094	11.34	0.9761	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.886	0.8408	0.0481	Normal Distribution

Length-mm Summary

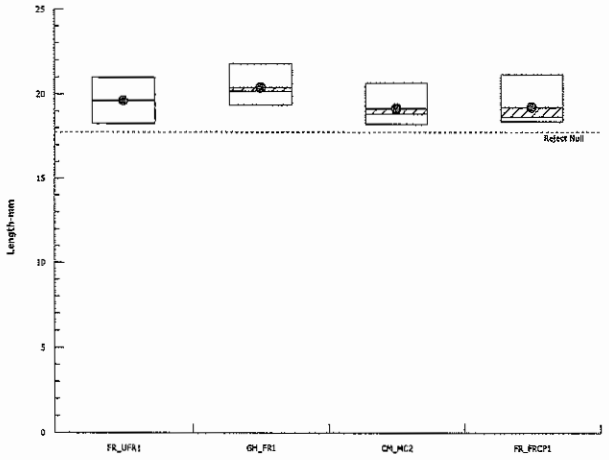
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	19.63	17.66	21.61	19.63	18.27	21	0.6208	6.32%	0.0%
GH_FR1	4	20.39	18.74	22.04	20.19	19.38	21.8	0.5175	5.08%	-3.86%
CM_MC2	4	19.15	17.47	20.83	18.85	18.23	20.67	0.5277	5.51%	2.45%
FR_FRCP1	4	19.22	17.15	21.3	18.67	18.38	21.17	0.6513	6.78%	2.08%

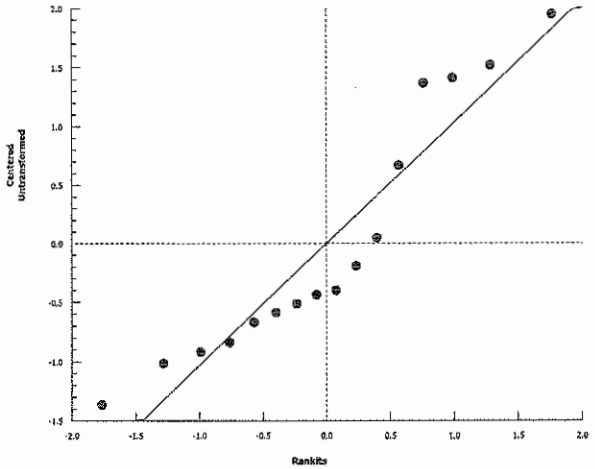
Length-mm Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	18.96	18.27	20.3	21
GH_FR1	20.44	19.95	19.38	21.8
CM_MC2	20.67	18.96	18.75	18.23
FR_FRCP1	18.64	18.38	21.17	18.71

Analysis ID:	14-0607-0746	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	13 May-15 14:52	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





CETIS Summary Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Batch ID:	17-1868-4686	**Test Type:**	Survival-Development-Growth	**Analyst:**	Karen Lee
Start Date:	12 Mar-15 14:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	13 Apr-15 12:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-3817-2510	12 Mar-15	12 Mar-15	14h	Teck Coal	
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	28h (8 °C)		
GH_FR1	21-3664-3662	09 Mar-15 10:05	11 Mar-15 10:10	76h (9.4 °C)		
CM_MC2	17-8817-4739	10 Mar-15 11:30	12 Mar-15 10:00	51h (7.1 °C)		
FR_FRCP1	14-3483-9304	11 Mar-15 11:36	12 Mar-15 12:45	27h (7.1 °C)	Teck Coal	

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1-WS-201503111136		

Proportion Normal Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	4	1	1	1	1	1	0	0	0.0%	0.0%
FR_UFR1	4	1	1	1	1	1	0	0	0.0%	0.0%
GH_FR1	4	1	1	1	1	1	0	0	0.0%	0.0%
CM_MC2	4	1	1	1	1	1	0	0	0.0%	0.0%
FR_FRCP1	4	0.9808	0.9196	1	0.9231	1	0.01923	0.03846	3.92%	1.92%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1	1	1	1
FR_UFR1	1	1	1	1
GH_FR1	1	1	1	1
CM_MC2	1	1	1	1
FR_FRCP1	1	0.9231	1	1

Proportion Normal Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	15/15	14/14	15/15	15/15
FR_UFR1	13/13	13/13	10/10	8/8
GH_FR1	8/8	10/10	12/12	5/5
CM_MC2	9/9	12/12	14/14	13/13
FR_FRCP1	11/11	12/13	6/6	12/12

CETIS Analytical Report

Test Code: 15180,15184,151 | 13-4667-3290

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	18-3920-9637	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 Jun-15 9:42	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes
Batch ID:	17-1868-4686	**Test Type:**	Survival-Development-Growth	**Analyst:**	Karen Lee
Start Date:	12 Mar-15 14:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	13 Apr-15 12:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-3817-2510	12 Mar-15	12 Mar-15	14h	Teck Coal	
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	28h (8 °C)		
GH_FR1	21-3664-3662	09 Mar-15 10:05	11 Mar-15 10:10	76h (9.4 °C)		
CM_MC2	17-8817-4739	10 Mar-15 11:30	12 Mar-15 10:00	51h (7.1 °C)		
FR_FRCP1	14-3483-9304	11 Mar-15 11:36	12 Mar-15 12:45	27h (7.1 °C)	Teck Coal	

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1-WS-201503111136		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact/Bonferroni-Holm Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
Control		FR_UFR1	1	1.0000	Exact	Non-Significant Effect
Control		GH_FR1	1	1.0000	Exact	Non-Significant Effect
Control		CM_MC2	1	1.0000	Exact	Non-Significant Effect
Control		FR_FRCP1	0.4158	1.0000	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
Control	Negative Contr	59	0	59	1	0	0.0%
FR_UFR1		44	0	44	1	0	0.0%
GH_FR1		35	0	35	1	0	0.0%
CM_MC2		48	0	48	1	0	0.0%
FR_FRCP1		41	1	42	0.9762	0.02381	2.38%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1	1	1	1
FR_UFR1	1	1	1	1
GH_FR1	1	1	1	1
CM_MC2	1	1	1	1
FR_FRCP1	1	0.9231	1	1

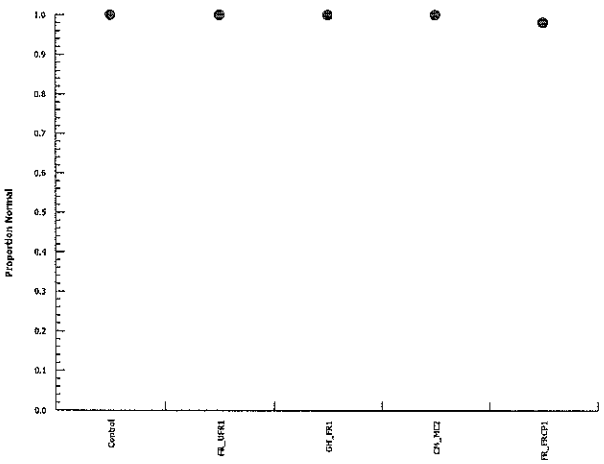
Proportion Normal Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	15/15	14/14	15/15	15/15
FR_UFR1	13/13	13/13	10/10	8/8
GH_FR1	8/8	10/10	12/12	5/5
CM_MC2	9/9	12/12	14/14	13/13
FR_FRCP1	11/11	12/13	6/6	12/12

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Analysis ID:	18-3920-9637	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 Jun-15 9:42	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes

Graphics



Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	13-1373-6457	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 Jun-15 9:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	17-1868-4686	**Test Type:**	Survival-Development-Growth	**Analyst:**	Karen Lee
Start Date:	12 Mar-15 14:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	13 Apr-15 12:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	03-2028-1256	11 Mar-15 10:42	12 Mar-15 12:45	28h (8 °C)	Teck Coal	
GH_FR1	21-3664-3662	09 Mar-15 10:05	11 Mar-15 10:10	76h (9.4 °C)		
CM_MC2	17-8817-4739	10 Mar-15 11:30	12 Mar-15 10:00	51h (7.1 °C)		
FR_FRCP1	14-3483-9304	11 Mar-15 11:36	12 Mar-15 12:45	27h (7.1 °C)	Teck Coal	

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1-WS-201503111042		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-03-02_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_MON_WS_20150303_		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1-WS-201503111136		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	4.66%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_FR1	1.158	1.943	0.039	6	0.1455	CDF	Non-Significant Effect
		CM_MC2	-0.6191	1.943	0.023	6	0.7207	CDF	Non-Significant Effect
		FR_FRCP1	1.278	1.943	0.064	6	0.1242	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.006064055	0.002021352	3	1.399	0.2908	Non-Significant Effect
Error	0.01733265	0.001444387	12			
Total	0.0233967		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.517	11.34	0.0890	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9392	0.8408	0.3398	Normal Distribution

Proportion Normal Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	1	1	1	1	1	1	0	0.0%	0.0%
GH_FR1	4	1	1	1	1	1	1	0	0.0%	0.0%
CM_MC2	4	1	1	1	1	1	1	0	0.0%	0.0%
FR_FRCP1	4	0.9808	0.9196	1	1	0.9231	1	0.01923	3.92%	1.92%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	1.417	1.388	1.447	1.422	1.393	1.432	0.009252	1.31%	0.0%
GH_FR1	4	1.394	1.338	1.45	1.403	1.345	1.426	0.01761	2.53%	1.63%
CM_MC2	4	1.424	1.401	1.448	1.429	1.403	1.437	0.007368	1.04%	-0.52%
FR_FRCP1	4	1.375	1.275	1.475	1.392	1.29	1.426	0.03154	4.59%	2.97%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	1	1	1	1
GH_FR1	1	1	1	1
CM_MC2	1	1	1	1
FR_FRCP1	1	0.9231	1	1

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	13-1373-6457	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 Jun-15 9:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

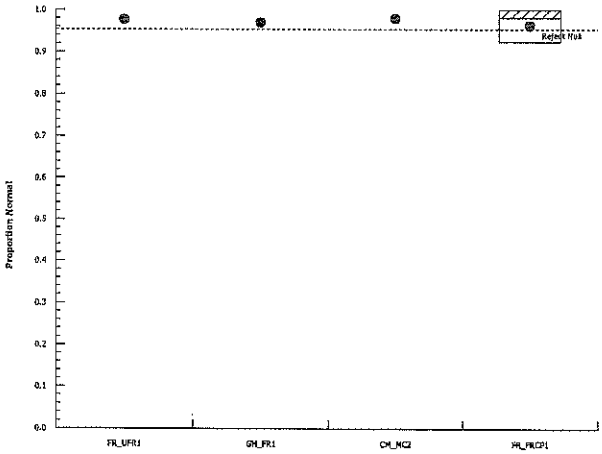
Angular (Corrected) Transformed Detail

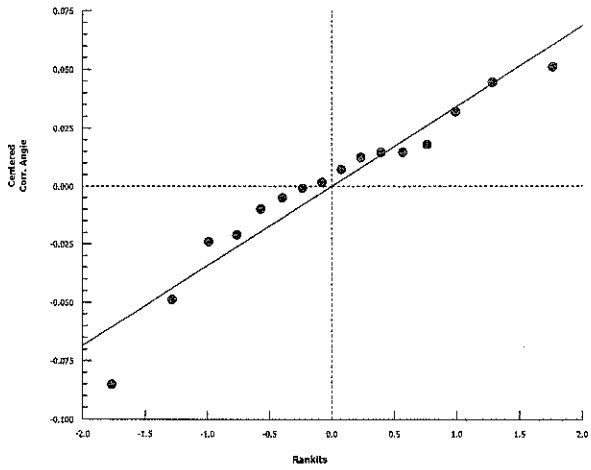
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	1.432	1.432	1.412	1.393
GH_FR1	1.393	1.412	1.426	1.345
CM_MC2	1.403	1.426	1.437	1.432
FR_FRCP1	1.419	1.29	1.365	1.426

Proportion Normal Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	13/13	13/13	10/10	8/8
GH_FR1	8/8	10/10	12/12	5/5
CM_MC2	9/9	12/12	14/14	13/13
FR_FRCP1	11/11	12/13	6/6	12/12

Graphics





Client: Teck

W.O.#: 15180, 15184, 15189

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
FR-UFR1	Mar 12/15	50	7.0	7.2	136		50	9.5	190	MLT
GH-FR1	Mar 12/15	100①	2.1	2.2	200		100①	5.2	520	MLT
CM-MC2	Mar 12/15	100①	2.0	2.1	190		100①	4.4	440	MLT
FR-CP1	Mar 12/15	100①	2.5	2.6	240		100①	MLT 9.5 10.6	MLT 950 1060	MLT
FR-UFR1-031815	Mar 18/15	50	6.9	7.0	136		100①	2.4	240	NY
FR-CP1-031815	Mar 18/15	50	10.3	10.4	204		100①	5.6	560	NY
CM_MC2	Mar 18/15	100①	1.4	1.5	130		100①	3.8	380	MLT
GH-FR1	Mar 18/15	100①	10① ~~2.4~~ 2.3	2.4	220		100①	4.5	450	MLT
FR-UFR1	Apr 2/15	50	7.2	7.3	142		50	8.9	178	KL
CM_MC2	↓	50	8.2	8.4	160		50	14.3	286	↓
FR_CP1		50	9.6	9.8	188		100①	4.9	490	
GH-FR1		50	9.8	10.1	190		100①	4.7	470	
FR-CP1	Apr 9/15	100①	2.2	2.3	210		100①	4.0	400	KS
FR_UFR1	↓	50	7.2	7.5	138		50	8.2	164	KS
CM_MC2	Apr 10/15	50	9.1	9.3	178		100①	3.0	300	EC
GH-FR1	↓	50	9.7	9.9	190		100①	3.6	360	EC

Notes: ① sample diluted to 100mL with DI water MLT

Reviewed by: JGu

Date Reviewed: Apr. 30/15

Client: Teck

W.O.#: 15180, 15184, 15189

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/L CaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L CaCO_3$)	Technician
MHW FHM 030615	Mar 10/15	50	3.3	3.4	64		50	5.0	100	NY
MHW FHM 040215	Apr 9/15	50	3.7	3.8	72		50	5.0	100	KS

Notes:

Reviewed by: JCL

Date Reviewed: Apr. 30/15

APPENDIX E – Analytical Chemistry

FR_UFR1 (Site Water Control)

statistic	sample_date	ALKALINITY, TOTAL (As CaCO3) (N)	ALUMINUM (D)	ALUMINUM (T)	ANTIMONY (D)	ANTIMONY (T)	ARSENIC (D)	ARSENIC (T)
	3/2/2015	149	< 0.0030	0.0032	< 0.10	< 0.10	< 0.10	< 0.10
	3/11/2015	145	< 0.0030	0.0059	< 0.10	< 0.10	< 0.10	< 0.10
	3/18/2015	144	< 0.0030	0.0181	< 0.10	< 0.10	< 0.10	0.12
	3/25/2015	141	0.0038	0.0153	< 0.10	< 0.10	< 0.10	0.12
	4/1/2015	136	0.0036	0.0433	< 0.10	< 0.10	0.1	0.13
	4/8/2015	127	< 0.0030	0.0395	< 0.10	< 0.10	0.1	0.12
Average Sample Result		140.33	0.0032333	0.020883	0.1	0.1	0.1	0.115
Maximum Sample Result		149	0.0038	0.0433	0.1	0.1	0.1	0.13
Minimum Sample Result		127	0.003	0.0032	0.1	0.1	0.1	0.1
Sample Count		6	6	6	6	6	6	6
Sample Range		22	0.0008	0.0401	0	0	0	0.03
Std Deviation		7.8401	0.00036697	0.016883	1.666E-09	1.666E-09	1.666E-09	0.012247
Std Error		3.2007	0.00014981	0.0068925	6.80E-10	6.80E-10	6.80E-10	0.005

statistic	sample_date	ARSENIC (D)	ARSENIC (T)	BARIUM (D)	BARIUM (T)	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)
	3/2/2015	< 0.10	< 0.10	0.0773	0.0771	< 0.10	< 0.10	< 0.00050
	3/11/2015	< 0.10	< 0.10	0.0752	0.0778	< 0.10	< 0.10	< 0.00050
	3/18/2015	< 0.10	0.12	0.0713	0.0719	< 0.10	< 0.10	< 0.00050
	3/25/2015	< 0.10	0.12	0.0751	0.0749	< 0.10	< 0.10	< 0.00050
	4/1/2015	0.1	0.13	0.0613	0.0635	< 0.10	< 0.10	< 0.000050
	4/8/2015	0.1	0.12	0.0686	0.0704	< 0.10	< 0.10	< 0.000050
Average Sample Result		0.1	0.115	0.071467	0.0726	0.1	0.1	0.00035
Maximum Sample Result		0.1	0.13	0.0773	0.0778	0.1	0.1	0.0005
Minimum Sample Result		0.1	0.1	0.0613	0.0635	0.1	0.1	5.00E-05
Sample Count		6	6	6	6	6	6	6
Sample Range		0	0.03	0.016	0.0143	0	0	0.00045
Std Deviation		1.666E-09	0.012247	0.0058783	0.0053051	1.666E-09	1.666E-09	0.00023238
Std Error		6.80E-10	0.005	0.0023998	0.0021658	6.80E-10	6.80E-10	0.000094868

statistic	sample_date	BARIUM (D)	BARIUM (T)	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)	BISMUTH (T)
	3/2/2015	0.0773	0.0771	< 0.10	< 0.10	< 0.00050	< 0.00050
	3/11/2015	0.0752	0.0778	< 0.10	< 0.10	< 0.00050	< 0.00050
	3/18/2015	0.0713	0.0719	< 0.10	< 0.10	< 0.00050	< 0.00050
	3/25/2015	0.0751	0.0749	< 0.10	< 0.10	< 0.00050	< 0.00050
	4/1/2015	0.0613	0.0635	< 0.10	< 0.10	< 0.000050	< 0.000050
	4/8/2015	0.0686	0.0704	< 0.10	< 0.10	< 0.000050	< 0.000050
Average Sample Result		0.071467	0.0726	0.1	0.1	0.00035	0.00035
Maximum Sample Result		0.0773	0.0778	0.1	0.1	0.0005	0.0005
Minimum Sample Result		0.0613	0.0635	0.1	0.1	5.00E-05	5.00E-05
Sample Count		6	6	6	6	6	6
Sample Range		0.016	0.0143	0	0	0.00045	0.00045
Std Deviation		0.0058783	0.0053051	1.666E-09	1.666E-09	0.00023238	0.00023238
Std Error		0.0023998	0.0021658	6.80E-10	6.80E-10	0.000094868	0.000094868

statistic	sample_date	BORON (D)	BORON (T)	BROMIDE (D)	CADMIUM (D)	CADMIUM (T)	CALCIUM (T)
	3/2/2015	< 0.010	< 0.010	< 0.050	< 0.010	0.011	55.6
	3/11/2015	< 0.010	< 0.010	< 0.050	0.011	< 0.010	57
	3/18/2015	< 0.010	< 0.010	< 0.050	< 0.010	0.011	52.3
	3/25/2015	< 0.010	< 0.010	< 0.050	< 0.010	< 0.010	52.6
	4/1/2015	< 0.010	< 0.010	< 0.050	0.011	0.0143	49.6
	4/8/2015	< 0.010	< 0.010	< 0.050	0.0066	0.0093	48.3
Average Sample Result		0.01	0.01	0.05	0.0097667	0.010933	52.567
Maximum Sample Result		0.01	0.01	0.05	0.011	0.0143	57
Minimum Sample Result		0.01	0.01	0.05	0.0066	0.0093	48.3
Sample Count		6	6	6	6	6	6
Sample Range		0	0	0	0.0044	0.005	8.7
Std Deviation		0	0	8.33E-10	0.0016269	0.001775	3.3446
Std Error		0	0	3.40E-10	0.00066416	0.00072465	1.3654

statistic	sample_date	CARBON, DISSOLVED ORGANIC (D)	CHLORIDE (D)	CHROMIUM (D)	CHROMIUM (T)	COBALT (D)	COBALT (T)
	3/2/2015	0.84	< 1.0	0.17	0.17	< 0.10	< 0.10
	3/11/2015	< 0.50	< 1.0	0.13	0.15	< 0.10	< 0.10
	3/18/2015	1.02	< 1.0	0.12	0.21	< 0.10	< 0.10
	3/25/2015	1.05	< 1.0	0.16	0.2	< 0.10	< 0.10
	4/1/2015	1.98	1.2	0.13	0.19	< 0.10	< 0.10
	4/8/2015	1.9	1	0.13	0.21	< 0.10	< 0.10
Average Sample Result		1.215	1.0333	0.14	0.18833	0.1	0.1
Maximum Sample Result		1.98	1.2	0.17	0.21	0.1	0.1
Minimum Sample Result		0.5	1	0.12	0.15	0.1	0.1
Sample Count		6	6	6	6	6	6
Sample Range		1.48	0.2	0.05	0.06	0	0
Std Deviation		0.59524	0.08165	0.02	0.024014	1.666E-09	1.666E-09
Std Error		0.24301	0.033333	0.008165	0.0098036	6.80E-10	6.80E-10

statistic	sample_date	CONDUCTIVITY, FIELD (N)	CONDUCTIVITY, LAB (N)	COPPER (D)	COPPER (T)	DISSOLVED OXYGEN, FIELD (N)	FLUORIDE (D)
	3/2/2015	281.7	367	< 0.50	< 0.50	11.12	0.137
	3/11/2015	280.5	353	< 0.50	< 0.50	14.37	0.137
	3/18/2015	318.2	350	< 0.50	< 0.50	12.53	0.139
	3/25/2015	292.6	331	< 0.50	< 0.50	14.08	0.142
	4/1/2015	284.5	301	< 0.50	< 0.50	12.48	0.137
	4/8/2015	291	306	< 0.50	< 0.50	12.41	0.14
Average Sample Result		291.42	334.67	0.5	0.5	12.832	0.13867
Maximum Sample Result		318.2	367	0.5	0.5	14.37	0.142
Minimum Sample Result		280.5	301	0.5	0.5	11.12	0.137
Sample Count		6	6	6	6	6	6
Sample Range		37.7	66	0	0	3.25	0.005
Std Deviation		14.002	26.778	0	0	1.2039	0.0020656
Std Error		5.7165	10.932	0	0	0.4915	0.00084327

statistic	sample_date	Hardness, Total or Dissolved CaCO3 (N)	IRON (D)	IRON (T)	LEAD (D)	LEAD (T)	LITHIUM (D)
	3/2/2015	197	< 0.010	< 0.010	< 0.050	< 0.050	0.0019
	3/11/2015	197	< 0.010	< 0.010	< 0.050	< 0.050	0.00151
	3/18/2015	179	< 0.010	0.015	< 0.050	< 0.050	0.0019
	3/25/2015	187	< 0.010	0.011	< 0.050	< 0.050	0.00121
	4/1/2015	170	< 0.010	0.03	< 0.050	< 0.050	< 0.0010
	4/8/2015	168	< 0.010	0.021	< 0.050	< 0.050	< 0.0010
Average Sample Result		183	0.01	0.016167	0.05	0.05	0.00142
Maximum Sample Result		197	0.01	0.03	0.05	0.05	0.0019
Minimum Sample Result		168	0.01	0.01	0.05	0.05	0.001
Sample Count		6	6	6	6	6	6
Sample Range		29	0	0.02	0	0	0.0009
Std Deviation		12.791	0	0.0079854	8.33E-10	8.33E-10	0.00041612
Std Error		5.2217	0	0.00326	3.40E-10	3.40E-10	0.00016988

statistic	sample_date	LITHIUM (T)	MAGNESIUM (T)	MANGANESE (D)	MANGANESE (T)	MERCURY (D)	MERCURY (T)
	3/2/2015	0.00164	14.5	0.000054	0.000177	< 0.010	< 0.010
	3/11/2015	0.00173	14.2	0.000168	0.000368	< 0.010	< 0.010
	3/18/2015	0.00114	13.5	0.000283	0.00079	< 0.010	< 0.010
	3/25/2015	0.00134	13	0.000752	0.000929	< 0.010	< 0.010
	4/1/2015	< 0.0010	12.5	0.00093	0.00179	< 0.010	< 0.010
	4/8/2015	0.0012	11.8	0.00099	0.00137	< 0.0050	< 0.0050
Average Sample Result		0.0013417	13.25	0.0005295	0.000904	0.0091667	0.0091667
Maximum Sample Result		0.00173	14.5	0.00099	0.00179	0.01	0.01
Minimum Sample Result		0.001	11.8	5.40E-05	0.000177	0.005	0.005
Sample Count		6	6	6	6	6	6
Sample Range		0.00073	2.7	0.000936	0.001613	0.005	0.005
Std Deviation		0.00028889	1.0252	0.00040976	0.00060524	0.0020412	0.0020412
Std Error		0.00011794	0.41853	0.00016728	0.00024709	0.00083333	0.00083333

statistic	sample_date	MOLYBDENUM (D)	MOLYBDENUM (T)	NICKEL (D)	NICKEL (T)	NITRATE NITROGEN (NO3), AS N (N)	NITRITE NITROGEN (NO2), AS N (N)
	3/2/2015	0.000534	0.00054	< 0.50	< 0.50	0.133	< 0.0010
	3/11/2015	0.000564	0.000552	< 0.50	< 0.50	0.133	< 0.0010
	3/18/2015	0.000586	0.000576	< 0.50	< 0.50	0.137	< 0.0010
	3/25/2015	0.000548	0.000574	< 0.50	< 0.50	0.105	< 0.0010
	4/1/2015	0.000579	0.000565	< 0.50	< 0.50	0.112	< 0.0010
	4/8/2015	0.000557	0.00058	< 0.50	< 0.50	0.0938	< 0.0010
Average Sample Result		0.00056133	0.0005645	0.5	0.5	0.11897	0.001
Maximum Sample Result		0.000586	0.00058	0.5	0.5	0.137	0.001
Minimum Sample Result		0.000534	0.00054	0.5	0.5	0.0938	0.001
Sample Count		6	6	6	6	6	6
Sample Range		0.000052	0.00004	0	0	0.0432	0
Std Deviation		0.000019346	0.000015617	0	0	0.017866	0
Std Error		0.000007898	6.3757E-06	0	0	0.0072939	0

statistic	sample_date	NITROGEN, AMMONIA (AS N) (N)	ORTHO-PHOSPHATE (N)	pH, Field (N)	pH, LAB (N)	PHOSPHORUS (N)	POTASSIUM (T)
	3/2/2015	< 0.0050	0.0032	7.59	8.36	0.0042	0.401
	3/11/2015	< 0.0050	0.0027	7.86	8.34	0.0035	0.419
	3/18/2015	< 0.0050	0.0035	8.22	8.37	0.0054	0.404
	3/25/2015	< 0.0050	0.0022	8.16	8.28	0.004	0.413
	4/1/2015	< 0.0050	0.0037	8.33	8.35	0.0073	0.422
	4/8/2015	< 0.0050	0.0028	8.25	8.37	0.005	0.439
Average Sample Result		0.005	0.0030167	8.0683	8.345	0.0049	0.41633
Maximum Sample Result		0.005	0.0037	8.33	8.37	0.0073	0.439
Minimum Sample Result		0.005	0.0022	7.59	8.28	0.0035	0.401
Sample Count		6	6	6	6	6	6
Sample Range		0	0.0015	0.74	0.09	0.0038	0.038
Std Deviation		0	0.00055648	0.28463	0.033912	0.0013624	0.013794
Std Error		0	0.00022718	0.1162	0.013844	0.00055618	0.0056313

statistic	sample_date	SELENIUM (D)	SELENIUM (T)	SILVER (D)	SILVER (T)	SODIUM (T)	STRONTIUM (D)
	3/2/2015	0.69	0.73	< 0.010	< 0.010	0.773	0.0884
	3/11/2015	0.76	0.73	< 0.010	< 0.010	0.716	0.0885
	3/18/2015	0.7	0.75	< 0.010	< 0.010	0.693	0.0911
	3/25/2015	0.73	0.86	< 0.010	< 0.010	0.703	0.0842
	4/1/2015	0.687	0.712	< 0.010	< 0.010	0.717	0.0785
	4/8/2015	0.712	0.804	< 0.010	< 0.010	0.737	0.0791
Average Sample Result		0.71317	0.76433	0.01	0.01	0.72317	0.084967
Maximum Sample Result		0.76	0.86	0.01	0.01	0.773	0.0911
Minimum Sample Result		0.687	0.712	0.01	0.01	0.693	0.0785
Sample Count		6	6	6	6	6	6
Sample Range		0.073	0.148	0	0	0.08	0.0126
Std Deviation		0.027831	0.056617	0	0	0.028569	0.0052671
Std Error		0.011362	0.023114	0	0	0.011663	0.0021503

statistic	sample_date	STRONTIUM (T)	SULFATE (AS SO4) (D)	TEMPERATURE, FIELD (N)	THALLIUM (D)	THALLIUM (T)	TIN (D)
	3/2/2015	0.0907	46.8	-0.1	< 0.010	< 0.010	< 0.00010
	3/11/2015	0.0923	46.1	0	< 0.010	< 0.010	< 0.00010
	3/18/2015	0.088	41.8	-0.1	< 0.010	< 0.010	< 0.00010
	3/25/2015	0.0829	39.3	0.1	< 0.010	< 0.010	< 0.00010
	4/1/2015	0.0782	30	0.4	< 0.010	< 0.010	< 0.00010
	4/8/2015	0.0812	31.5	-0.1	< 0.010	< 0.010	< 0.00010
Average Sample Result		0.08555	39.25	0.033333	0.01	0.01	0.0001
Maximum Sample Result		0.0923	46.8	0.4	0.01	0.01	0.0001
Minimum Sample Result		0.0782	30	-0.1	0.01	0.01	0.0001
Sample Count		6	6	6	6	6	6
Sample Range		0.0141	16.8	0.5	0	0	0
Std Deviation		0.0056224	7.1562	0.19664	0	0	0
Std Error		0.0022953	2.9215	0.080277	0	0	0

statistic	sample_date	TIN (T)	TITANIUM (D)	TITANIUM (T)	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)	TOTAL KJELDAHL NITROGEN (N)	TOTAL ORGANIC CARBON (T)
	3/2/2015	< 0.00010	< 10	< 10	229	< 0.050	0.69
	3/11/2015	< 0.00010	< 10	< 10	222	< 0.050	< 0.50
	3/18/2015	< 0.00010	< 10	< 10	216	0.061	0.93
	3/25/2015	< 0.00010	< 10	< 10	205	0.091	0.92
	4/1/2015	< 0.00010	< 10	< 10	182	0.095	1.51
	4/8/2015	< 0.00010	< 10	< 10	190	0.08	1.72
Average Sample Result		0.0001	10	10	207.33	0.071167	1.045
Maximum Sample Result		0.0001	10	10	229	0.095	1.72
Minimum Sample Result		0.0001	10	10	182	0.05	0.5
Sample Count		6	6	6	6	6	6
Sample Range		0	0	0	47	0.045	1.22
Std Deviation		0	0	0	18.479	0.020193	0.47408
Std Error		0	0	0	7.5439	0.0082439	0.19354

statistic	sample_date	TOTAL SUSPENDED SOLIDS, LAB (N)	TURBIDITY, LAB (N)	URANIUM (D)	URANIUM (T)	VANADIUM (D)	VANADIUM (T)
	3/2/2015	< 1.0	0.13	0.471	0.467	< 1.0	< 1.0
	3/11/2015	< 1.0	0.33	0.473	0.472	< 1.0	< 1.0
	3/18/2015	< 1.0	0.54	0.471	0.452	< 1.0	< 1.0
	3/25/2015	< 1.0	0.44	0.442	0.434	< 1.0	< 1.0
	4/1/2015	1.4	1.39	0.422	0.414	< 0.50	< 0.50
	4/8/2015	< 1.0	0.76	0.41	0.417	< 0.50	< 0.50
Average Sample Result		1.0667	0.59833	0.44817	0.44267	0.83333	0.83333
Maximum Sample Result		1.4	1.39	0.473	0.472	1	1
Minimum Sample Result		1	0.13	0.41	0.414	0.5	0.5
Sample Count		6	6	6	6	6	6
Sample Range		0.4	1.26	0.063	0.058	0.5	0.5
Std Deviation		0.1633	0.44106	0.027709	0.024881	0.2582	0.2582
Std Error		0.066667	0.18006	0.011312	0.010158	0.10541	0.10541

statistic	sample_date	ZINC (D)	ZINC (T)
	3/2/2015	< 3.0	< 3.0
	3/11/2015	< 3.0	< 3.0
	3/18/2015	< 3.0	< 3.0
	3/25/2015	< 3.0	< 3.0
	4/1/2015	< 3.0	3.9
	4/8/2015	< 3.0	< 3.0
Average Sample Result		3	3.15
Maximum Sample Result		3	3.9
Minimum Sample Result		3	3
Sample Count		6	6
Sample Range		0	0.9
Std Deviation		0	0.36742
Std Error		0	0.15

FR_FRCP1 (Test Location)

Statistic	sample_date	ALKALINITY, TOTAL (As CaCO3) (N)	ALUMINUM (D)	ALUMINUM (T)	ANTIMONY (D)	ANTIMONY (T)	ARSENIC (D)
	3/2/2015	337	< 0.0030	< 0.0060	0.48	0.51	< 0.20
	3/11/2015	266	< 0.0030	0.008	0.36	0.39	< 0.10
	3/18/2015	216	< 0.0030	0.0154	0.37	0.38	< 0.10
	3/25/2015	230	< 0.0030	0.0172	0.39	0.43	0.1
	4/1/2015	192	< 0.0030	0.0502	0.3	0.28	< 0.10
	4/8/2015	228	< 0.0030	0.0199	0.38	0.39	< 0.10
Average Sample Result		244.83	0.003	0.01945	0.38	0.39667	0.11667
Maximum Sample Result		337	0.003	0.0502	0.48	0.51	0.2
Minimum Sample Result		192	0.003	0.006	0.3	0.28	0.1
Sample Count		6	6	6	6	6	6
Sample Range		145	0	0.0442	0.18	0.23	0.1
Std Deviation		51.125	5.21E-11	0.015995	0.05831	0.074744	0.040825
Std Error		20.872	2.13E-11	0.00653	0.023805	0.030514	0.016667

Statistic	sample_date	ARSENIC (T)	BARIUM (D)	BARIUM (T)	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)
	3/2/2015	0.22	0.0355	0.0373	< 0.20	< 0.20	< 0.0010
	3/11/2015	0.12	0.0664	0.0712	< 0.10	< 0.10	< 0.00050
	3/18/2015	0.16	0.0895	0.0923	< 0.10	< 0.10	< 0.00050
	3/25/2015	0.12	0.0983	0.101	< 0.10	< 0.10	< 0.00050
	4/1/2015	0.15	0.0851	0.0854	< 0.10	< 0.10	< 0.000050
	4/8/2015	0.1	0.096	0.0969	< 0.10	< 0.10	< 0.000050
Average Sample Result		0.145	0.078467	0.080683	0.11667	0.11667	0.00043333
Maximum Sample Result		0.22	0.0983	0.101	0.2	0.2	0.001
Minimum Sample Result		0.1	0.0355	0.0373	0.1	0.1	5.00E-05
Sample Count		6	6	6	6	6	6
Sample Range		0.12	0.0628	0.0637	0.1	0.1	0.00095
Std Deviation		0.042778	0.023909	0.023685	0.040825	0.040825	0.00035449
Std Error		0.017464	0.0097609	0.0096695	0.016667	0.016667	0.00014472

Statistic	sample_date	BISMUTH (T)	BORON (D)	BORON (T)	BROMIDE (D)	CADMIUM (D)	CADMIUM (T)
	3/2/2015	< 0.0010	< 0.020	< 0.020	< 1.0	< 0.020	0.053
	3/11/2015	< 0.00050	0.012	0.014	< 0.50	< 0.010	0.073
	3/18/2015	< 0.00050	0.014	0.015	< 0.25	0.016	0.078
	3/25/2015	< 0.00050	0.014	0.013	< 0.25	0.055	0.073
	4/1/2015	< 0.000050	0.012	0.012	< 0.10	0.0514	0.0724
	4/8/2015	< 0.000050	0.013	0.012	< 0.25	0.0509	0.0748
Average Sample Result		0.00043333	0.014167	0.014333	0.39167	0.033883	0.0707
Maximum Sample Result		0.001	0.02	0.02	1	0.055	0.078
Minimum Sample Result		5.00E-05	0.012	0.012	0.1	0.01	0.053
Sample Count		6	6	6	6	6	6
Sample Range		0.00095	0.008	0.008	0.9	0.045	0.025
Std Deviation		0.00035449	0.0029944	0.0030111	0.32468	0.020617	0.0089091
Std Error		0.00014472	0.0012225	0.0012293	0.13255	0.0084168	0.0036371

Statistic	sample_date	CALCIUM (T)	CARBON, DISSOLVED ORGANIC (D)	CHLORIDE (D)	CHROMIUM (D)	CHROMIUM (T)	COBALT (D)
	3/2/2015	337	1.44	2.6	< 0.20	< 0.20	< 0.20
	3/11/2015	210	0.85	3.3	< 0.10	0.17	< 0.10
	3/18/2015	140	1.3	2.1	< 0.10	0.16	0.12
	3/25/2015	147	1.09	2.3	0.12	0.16	0.14
	4/1/2015	108	1.57	1.8	0.12	0.21	< 0.10
	4/8/2015	134	1.42	2.4	< 0.10	0.15	0.12
Average Sample Result		179.33	1.2783	2.4167	0.12333	0.175	0.13
Maximum Sample Result		337	1.57	3.3	0.2	0.21	0.2
Minimum Sample Result		108	0.85	1.8	0.1	0.15	0.1
Sample Count		6	6	6	6	6	6
Sample Range		229	0.72	1.5	0.1	0.06	0.1
Std Deviation		84.303	0.26483	0.51153	0.038816	0.02429	0.037417
Std Error		34.417	0.10812	0.20883	0.015846	0.0099163	0.015275

Statistic	sample_date	COBALT (T)	CONDUCTIVITY, FIELD (N)	CONDUCTIVITY, LAB (N)	COPPER (D)	COPPER (T)	DISSOLVED OXYGEN, FIELD (N)
	3/2/2015	< 0.20	1540	2680	< 0.50	< 1.0	12.93
	3/11/2015	0.11	1291	1600	< 0.50	< 0.50	14.26
	3/18/2015	0.14	1004	1090	< 0.50	< 0.50	13.26
	3/25/2015	0.15	942	1080	< 0.50	< 0.50	12.38
	4/1/2015	0.14	737.2	834	< 0.50	< 0.50	12.28
	4/8/2015	0.15	907.3	960	< 0.50	< 0.50	13.99
Average Sample Result		0.14833	1070.3	1374	0.5	0.58333	13.183
Maximum Sample Result		0.2	1540	2680	0.5	1	14.26
Minimum Sample Result		0.11	737.2	834	0.5	0.5	12.28
Sample Count		6	6	6	6	6	6
Sample Range		0.09	802.8	1846	0	0.5	1.98
Std Deviation		0.029269	292.47	690.91	0	0.20412	0.81748
Std Error		0.011949	119.4	282.06	0	0.083333	0.33373

Statistic	sample_date	FLUORIDE (D)	Hardness, Total or Dissolved CaCO3 (N)	INSTANTANEOUS FLOW (N)	IRON (D)	IRON (T)	LEAD (D)
	3/2/2015	0.45	1880		< 0.020	< 0.020	< 0.10
	3/11/2015	< 0.20	1030		< 0.010	0.014	< 0.050
	3/18/2015	0.17	629	0.5174	< 0.010	0.026	< 0.050
	3/25/2015	0.18	681	0.304	< 0.010	0.03	< 0.050
	4/1/2015	0.162	488	1.4343	< 0.010	0.073	< 0.050
	4/8/2015	0.17	568	0.5696	< 0.010	0.033	< 0.050
Average Sample Result		0.222	879.33	0.70633	0.011667	0.032667	0.058333
Maximum Sample Result		0.45	1880	1.4343	0.02	0.073	0.1
Minimum Sample Result		0.162	488	0.304	0.01	0.014	0.05
Sample Count		6	6	4	6	6	6
Sample Range		0.288	1392	1.1303	0.01	0.059	0.05
Std Deviation		0.11246	524.62	0.49873	0.0040825	0.020916	0.020412
Std Error		0.045913	214.17	0.24937	0.0016667	0.0085388	0.0083333

Statistic	sample_date	LEAD (T)	LITHIUM (D)	LITHIUM (T)	MAGNESIUM (T)	MANGANESE (D)	MANGANESE (T)
	3/2/2015	< 0.10	0.0538	0.0562	261	0.00193	0.00265
	3/11/2015	< 0.050	0.0451	0.0475	131	0.00414	0.00805
	3/18/2015	< 0.050	0.0482	0.0443	73.3	0.00638	0.0101
	3/25/2015	< 0.050	0.0474	0.0487	75.6	0.00805	0.01
	4/1/2015	0.064	0.0312	0.0312	50.6	0.00771	0.0118
	4/8/2015	< 0.050	0.044	0.045	58.3	0.00817	0.0101
Average Sample Result		0.060667	0.04495	0.045483	108.3	0.0060633	0.0087833
Maximum Sample Result		0.1	0.0538	0.0562	261	0.00817	0.0118
Minimum Sample Result		0.05	0.0312	0.0312	50.6	0.00193	0.00265
Sample Count		6	6	6	6	6	6
Sample Range		0.05	0.0226	0.025	210.4	0.00624	0.00915
Std Deviation		0.020067	0.0075482	0.0081842	79.945	0.002529	0.0032312
Std Error		0.0081921	0.0030815	0.0033412	32.637	0.0010325	0.0013191

Statistic	sample_date	MERCURY (D)	MERCURY (T)	MOLYBDENUM (D)	MOLYBDENUM (T)	NICKEL (D)	NICKEL (T)
	3/2/2015	< 0.010	< 0.010	0.00284	0.00288	30.5	32.1
	3/11/2015	< 0.010	< 0.010	0.00214	0.0022	12.8	13.9
	3/18/2015	< 0.010	< 0.010	0.00208	0.00199	6.22	6.65
	3/25/2015	< 0.010	< 0.010	0.00201	0.00198	6.9	7.17
	4/1/2015	< 0.010	< 0.010	0.00174	0.00176	4.51	4.56
	4/8/2015	< 0.0050	< 0.0050	0.00204	0.00202	5.86	6.16
Average Sample Result		0.0091667	0.0091667	0.0021417	0.0021383	11.132	11.757
Maximum Sample Result		0.01	0.01	0.00284	0.00288	30.5	32.1
Minimum Sample Result		0.005	0.005	0.00174	0.00176	4.51	4.56
Sample Count		6	6	6	6	6	6
Sample Range		0.005	0.005	0.0011	0.00112	25.99	27.54
Std Deviation		0.0020412	0.0020412	0.00036891	0.00038938	9.9155	10.475
Std Error		0.00083333	0.00083333	0.00015061	0.00015896	4.048	4.2766

Statistic	sample_date	NITRATE NITROGEN (NO3), AS N (N)	NITRITE NITROGEN (NO2), AS N (N)	NITROGEN, AMMONIA (AS N) (N)	ORTHO-PHOSPHATE (N)	pH, Field (N)	pH, LAB (N)
	3/2/2015	30.1	< 0.020	< 0.0050	< 0.0010	7.65	8.27
	3/11/2015	19.4	< 0.010	< 0.0050	< 0.0010	8.19	8.36
	3/18/2015	14.2	0.0167	0.0349	< 0.0010	8.35	8.41
	3/25/2015	15.2	0.0159	0.0272	< 0.0010	8.22	8.34
	4/1/2015	11.4	0.01	0.0111	< 0.0010	8.47	8.39
	4/8/2015	15	0.0177	0.0166	< 0.0010	8.29	8.4
Average Sample Result		17.55	0.01505	0.016633	0.001	8.195	8.3617
Maximum Sample Result		30.1	0.02	0.0349	0.001	8.47	8.41
Minimum Sample Result		11.4	0.01	0.005	0.001	7.65	8.27
Sample Count		6	6	6	6	6	6
Sample Range		18.7	0.01	0.0299	0	0.82	0.14
Std Deviation		6.6633	0.0041467	0.01222	0	0.28508	0.051929
Std Error		2.7203	0.0016929	0.0049887	0	0.11638	0.0212

Statistic	sample_date	PHOSPHORUS (N)	POTASSIUM (T)	SELENIUM (D)	SELENIUM (T)	SILVER (D)	SILVER (T)
	3/2/2015	0.0021	3.98	490	497	< 0.020	< 0.020
	3/11/2015	0.0029	2.68	214	218	< 0.010	< 0.010
	3/18/2015	0.0032	2.14	94.6	98.3	< 0.010	< 0.010
	3/25/2015	0.0032	2.23	99.5	103	< 0.010	< 0.010
	4/1/2015	0.0067	1.69	64.3	61.4	< 0.010	< 0.010
	4/8/2015	0.0042	2.03	86.6	86.5	< 0.010	< 0.010
Average Sample Result		0.0037167	2.4583	174.83	177.37	0.011667	0.011667
Maximum Sample Result		0.0067	3.98	490	497	0.02	0.02
Minimum Sample Result		0.0021	1.69	64.3	61.4	0.01	0.01
Sample Count		6	6	6	6	6	6
Sample Range		0.0046	2.29	425.7	435.6	0.01	0.01
Std Deviation		0.0016092	0.8114	163.08	165.71	0.0040825	0.0040825
Std Error		0.00065697	0.33125	66.578	67.652	0.0016667	0.0016667

Statistic	sample_date	SODIUM (T)	STRONTIUM (D)	STRONTIUM (T)	SULFATE (AS SO4) (D)	TEMPERATURE, FIELD (N)	THALLIUM (D)
	3/2/2015	2.07	0.223	0.231	1460	-0.2	0.03
	3/11/2015	2.49	0.186	0.192	720	1	0.017
	3/18/2015	2.59	0.181	0.184	365	3.5	0.011
	3/25/2015	2.86	0.176	0.184	378	1.1	0.014
	4/1/2015	1.88	0.138	0.14	253	4	< 0.010
	4/8/2015	2.45	0.171	0.171	319	0.2	0.013
Average Sample Result		2.39	0.17917	0.18367	582.5	1.6	0.015833
Maximum Sample Result		2.86	0.223	0.231	1460	4	0.03
Minimum Sample Result		1.88	0.138	0.14	253	-0.2	0.01
Sample Count		6	6	6	6	6	6
Sample Range		0.98	0.085	0.091	1207	4.2	0.02
Std Deviation		0.35693	0.02736	0.029588	459.57	1.7424	0.0073598
Std Error		0.14572	0.01117	0.012079	187.62	0.71134	0.0030046

Statistic	sample_date	THALLIUM (T)	TIN (D)	TIN (T)	TITANIUM (D)	TITANIUM (T)	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)
	3/2/2015	0.032	< 0.00020	< 0.00020	17	17	2580
	3/11/2015	0.019	< 0.00010	< 0.00010	19	21	1340
	3/18/2015	0.012	< 0.00010	< 0.00010	16	17	813
	3/25/2015	0.014	< 0.00010	< 0.00010	< 10	< 10	851
	4/1/2015	0.01	< 0.00010	< 0.00010	< 10	11	597
	4/8/2015	0.01	< 0.00010	< 0.00010	< 10	< 10	728
Average Sample Result		0.016167	0.00011667	0.00011667	13.667	14.333	1151.5
Maximum Sample Result		0.032	0.0002	0.0002	19	21	2580
Minimum Sample Result		0.01	0.0001	0.0001	10	10	597
Sample Count		6	6	6	6	6	6
Sample Range		0.022	0.0001	0.0001	9	11	1983
Std Deviation		0.0084479	0.000040825	0.000040825	4.1312	4.6332	744.02
Std Error		0.0034488	0.000016667	0.000016667	1.6865	1.8915	303.75

Statistic	sample_date	TOTAL KJELDAHL NITROGEN (N)	TOTAL ORGANIC CARBON (T)	TOTAL SUSPENDED SOLIDS, LAB (N)	TURBIDITY, LAB (N)	URANIUM (D)	URANIUM (T)
	3/2/2015	< 0.050	1.46	< 1.0	0.12	15.2	15.5
	3/11/2015	< 0.050	0.94	< 1.0	0.82	6.97	7.29
	3/18/2015	< 0.050	1.29	1.2	0.91	4.01	4.06
	3/25/2015	< 0.050	1.12	1.9	0.97	3.81	3.91
	4/1/2015	< 0.050	1.82	3.8	2.8	2.55	2.56
	4/8/2015	< 0.050	1.31	1.6	1	3.33	3.32
Average Sample Result		0.05	1.3233	1.75	1.1033	5.9783	6.1067
Maximum Sample Result		0.05	1.82	3.8	2.8	15.2	15.5
Minimum Sample Result		0.05	0.94	1	0.12	2.55	2.56
Sample Count		6	6	6	6	6	6
Sample Range		0	0.88	2.8	2.68	12.65	12.94
Std Deviation		8.33E-10	0.30164	1.0654	0.8935	4.7616	4.8784
Std Error		3.40E-10	0.12314	0.43493	0.36477	1.9439	1.9916

Statistic	sample_date	VANADIUM (D)	VANADIUM (T)	ZINC (D)	ZINC (T)
	3/2/2015	< 2.0	< 2.0	< 3.0	< 6.0
	3/11/2015	< 1.0	< 1.0	< 3.0	< 3.0
	3/18/2015	< 1.0	< 1.0	< 3.0	< 3.0
	3/25/2015	< 1.0	< 1.0	< 3.0	3.2
	4/1/2015	< 0.50	< 0.50	< 3.0	3.5
	4/8/2015	< 0.50	< 0.50	< 3.0	< 3.0
Average Sample Result		1	1	3	3.6167
Maximum Sample Result		2	2	3	6
Minimum Sample Result		0.5	0.5	3	3
Sample Count		6	6	6	6
Sample Range		1.5	1.5	0	3
Std Deviation		0.54772	0.54772	0	1.1839
Std Error		0.22361	0.22361	0	0.48333

GH_FR1 (Test Location)

Statistic	sample_date	ALKALINITY, TOTAL (As CaCO3) (N)	ALUMINUM (D)	ALUMINUM (T)	ANTIMONY (D)	ANTIMONY (T)	ARSENIC (D)
	3/2/2015	202	< 0.0030	0.0048	0.14	0.14	< 0.10
	3/9/2015	210	< 0.0030	0.0047	0.23	0.23	< 0.10
	3/16/2015	202	< 0.0030	0.0935	0.2	0.22	< 0.10
	3/23/2015	214	< 0.0030	0.0452	0.18	0.2	< 0.10
	3/30/2015	197	< 0.0030	0.157	0.21	0.21	0.12
	4/7/2015	199	< 0.0030	0.0456	0.17	0.19	0.1
Average Sample Result		204	0.003	0.058467	0.18833	0.19833	0.10333
Maximum Sample Result		214	0.003	0.157	0.23	0.23	0.12
Minimum Sample Result		197	0.003	0.0047	0.14	0.14	0.1
Sample Count		6	6	6	6	6	6
Sample Range		17	0	0.1523	0.09	0.09	0.02
Std Deviation		6.603	5.21E-11	0.058393	0.031885	0.031885	0.008165
Std Error		2.6957	2.13E-11	0.023839	0.013017	0.013017	0.0033333

Statistic	sample_date	ARSENIC (T)	BARIUM (D)	BARIUM (T)	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)
	3/2/2015	0.14	0.124	0.126	< 0.10	< 0.10	< 0.00050
	3/9/2015	0.12	0.118	0.118	< 0.10	< 0.10	< 0.00050
	3/16/2015	0.15	0.107	0.114	< 0.10	< 0.10	< 0.00050
	3/23/2015	0.16	0.111	0.112	< 0.10	< 0.10	< 0.00050
	3/30/2015	0.18	0.0978	0.0975	< 0.10	< 0.10	< 0.000050
	4/7/2015	0.15	0.106	0.11	< 0.10	< 0.10	< 0.000050
Average Sample Result		0.15	0.11063	0.11292	0.1	0.1	0.00035
Maximum Sample Result		0.18	0.124	0.126	0.1	0.1	0.0005
Minimum Sample Result		0.12	0.0978	0.0975	0.1	0.1	5.00E-05
Sample Count		6	6	6	6	6	6
Sample Range		0.06	0.0262	0.0285	0	0	0.00045
Std Deviation		0.02	0.0092998	0.0094362	1.666E-09	1.666E-09	0.00023238
Std Error		0.008165	0.0037966	0.0038523	6.80E-10	6.80E-10	0.000094868

Statistic	sample_date	BISMUTH (T)	BORON (D)	BORON (T)	BROMIDE (D)	CADMIUM (D)	CADMIUM (T)
	3/2/2015	< 0.00050	0.012	< 0.010	< 0.10	0.021	0.024
	3/9/2015	< 0.00050	< 0.010	< 0.010	< 0.10	0.019	0.02
	3/16/2015	< 0.00050	< 0.010	< 0.010	< 0.10	0.023	0.031
	3/23/2015	< 0.00050	< 0.010	0.011	< 0.10	0.023	0.028
	3/30/2015	< 0.000050	< 0.010	< 0.010	< 0.10	0.0178	0.0299
	4/7/2015	< 0.000050	0.01	0.011	< 0.10	0.0221	0.0259
Average Sample Result		0.00035	0.010333	0.010333	0.1	0.020983	0.026467
Maximum Sample Result		0.0005	0.012	0.011	0.1	0.023	0.031
Minimum Sample Result		5.00E-05	0.01	0.01	0.1	0.0178	0.02
Sample Count		6	6	6	6	6	6
Sample Range		0.00045	0.002	0.001	0	0.0052	0.011
Std Deviation		0.00023238	0.0008165	0.0005164	1.666E-09	0.0021656	0.0040722
Std Error		0.000094868	0.00033333	0.00021082	6.80E-10	0.00088409	0.0016625

Statistic	sample_date	CALCIUM (T)	CARBON, DISSOLVED ORGANIC (D)	CHLORIDE (D)	CHROMIUM (D)	CHROMIUM (T)	COBALT (D)
	3/2/2015	114	1.06	2.6	0.21	0.15	< 0.10
	3/9/2015	125	0.81	2.5	0.1	0.15	0.11
	3/16/2015	122	1.68	3	0.12	0.23	0.13
	3/23/2015	109	1.33	2.6	0.11	0.21	0.1
	3/30/2015	104	2.08	2.9	0.11	0.31	0.13
	4/7/2015	105	1.39	2.5	0.12	0.21	< 0.10
Average Sample Result		113.17	1.3917	2.6833	0.12833	0.21	0.11167
Maximum Sample Result		125	2.08	3	0.21	0.31	0.13
Minimum Sample Result		104	0.81	2.5	0.1	0.15	0.1
Sample Count		6	6	6	6	6	6
Sample Range		21	1.27	0.5	0.11	0.16	0.03
Std Deviation		8.7958	0.44924	0.2137	0.040702	0.05933	0.01472
Std Error		3.5909	0.1834	0.087242	0.016617	0.024221	0.0060093

Statistic	sample_date	COBALT (T)	CONDUCTIVITY, FIELD (N)	CONDUCTIVITY, LAB (N)	COPPER (D)	COPPER (T)	DISSOLVED OXYGEN, FIELD (N)
	3/2/2015	< 0.10	628.9	851	< 0.50	< 0.50	11.58
	3/9/2015	0.13		896	< 0.50	< 0.50	
	3/16/2015	0.19		837	< 0.50	< 0.50	
	3/23/2015	0.14		838	< 0.50	< 0.50	
	3/30/2015	0.21		766	< 0.50	0.53	
	4/7/2015	0.17	594.2	777	< 0.50	< 0.50	12.09
Average Sample Result		0.15667	611.55	827.5	0.5	0.505	11.835
Maximum Sample Result		0.21	628.9	896	0.5	0.53	12.09
Minimum Sample Result		0.1	594.2	766	0.5	0.5	11.58
Sample Count		6	2	6	6	6	2
Sample Range		0.11	34.7	130	0	0.03	0.51
Std Deviation		0.040825	24.537	48.533	0	0.012247	0.36062
Std Error		0.016667	17.35	19.814	0	0.005	0.255

Statistic	sample_date	FLUORIDE (D)	Hardness, Total or Dissolved CaCO3 (N)	INSTANTANEOUS FLOW (N)	IRON (D)	IRON (T)	LEAD (D)
	3/2/2015	0.18	475		< 0.010	< 0.010	< 0.050
	3/9/2015	0.152	526		< 0.010	< 0.010	< 0.050
	3/16/2015	0.138	484		< 0.010	0.077	< 0.050
	3/23/2015	0.154	490		< 0.010	0.061	< 0.050
	3/30/2015	0.142	458		< 0.010	0.141	< 0.050
	4/7/2015	0.146	435		< 0.010	0.038	< 0.050
Average Sample Result		0.152	478	0	0.01	0.056167	0.05
Maximum Sample Result		0.18	526	0	0.01	0.141	0.05
Minimum Sample Result		0.138	435	0	0.01	0.01	0.05
Sample Count		6	6	0	6	6	6
Sample Range		0.042	91	0	0	0.131	0
Std Deviation		0.014967	30.796	0	0	0.049491	8.33E-10
Std Error		0.0061101	12.572	0	0	0.020205	3.40E-10

Statistic	sample_date	LEAD (T)	LITHIUM (D)	LITHIUM (T)	MAGNESIUM (T)	MANGANESE (D)	MANGANESE (T)
	3/2/2015	< 0.050	0.0155	0.0154	49.3	0.00167	0.00208
	3/9/2015	< 0.050	0.0142	0.0144	53.5	0.00171	0.00229
	3/16/2015	0.056	0.0121	0.0134	49.8	0.00203	0.00513
	3/23/2015	0.056	0.0139	0.0131	48	0.00192	0.00439
	3/30/2015	0.102	0.014	0.0135	46.7	0.00303	0.00659
	4/7/2015	< 0.050	0.0151	0.0154	45.4	0.00278	0.00325
Average Sample Result		0.060667	0.014133	0.0142	48.783	0.00219	0.003955
Maximum Sample Result		0.102	0.0155	0.0154	53.5	0.00303	0.00659
Minimum Sample Result		0.05	0.0121	0.0131	45.4	0.00167	0.00208
Sample Count		6	6	6	6	6	6
Sample Range		0.052	0.0034	0.0023	8.1	0.00136	0.00451
Std Deviation		0.020461	0.0011843	0.0010257	2.8266	0.00057498	0.0017492
Std Error		0.0083533	0.00048351	0.00041873	1.154	0.00023473	0.00071409

Statistic	sample_date	MERCURY (D)	MERCURY (T)	MOLYBDENUM (D)	MOLYBDENUM (T)	NICKEL (D)	NICKEL (T)
	3/2/2015	< 0.010	< 0.010	0.000954	0.000984	2.19	2.31
	3/9/2015	< 0.010	< 0.010	0.00128	0.00131	4.66	4.67
	3/16/2015	< 0.010	< 0.010	0.00118	0.00121	3.28	3.67
	3/23/2015	< 0.010	< 0.010	0.00109	0.00111	3.63	3.99
	3/30/2015	< 0.010	< 0.010	0.00143	0.00143	3.94	4.17
	4/7/2015	< 0.0050	< 0.0050	0.00112	0.00114	2.75	2.8
Average Sample Result		0.0091667	0.0091667	0.0011757	0.0011973	3.4083	3.6017
Maximum Sample Result		0.01	0.01	0.00143	0.00143	4.66	4.67
Minimum Sample Result		0.005	0.005	0.000954	0.000984	2.19	2.31
Sample Count		6	6	6	6	6	6
Sample Range		0.005	0.005	0.000476	0.000446	2.47	2.36
Std Deviation		0.0020412	0.0020412	0.00016442	0.00015711	0.87552	0.88667
Std Error		0.00083333	0.00083333	0.000067123	0.000064139	0.35743	0.36198

Statistic	sample_date	NITRATE NITROGEN (NO3), AS N (N)	NITRITE NITROGEN (NO2), AS N (N)	NITROGEN, AMMONIA (AS N) (N)	ORTHO-PHOSPHATE (N)	pH, Field (N)	pH, LAB (N)
	3/2/2015	13	0.0039	< 0.0050	< 0.0010	8.23	8.28
	3/9/2015	11.7	0.004	< 0.0050	< 0.0010		8.35
	3/16/2015	10.8	0.0032	< 0.0050	0.0022		8.3
	3/23/2015	11	0.0026	< 0.0050	0.0011		8.36
	3/30/2015	9.35	0.0045	< 0.0050	0.0019		8.26
	4/7/2015	10.5	0.0045	< 0.0050	< 0.0010	8.29	8.39
Average Sample Result		11.058	0.0037833	0.005	0.0013667	8.26	8.3233
Maximum Sample Result		13	0.0045	0.005	0.0022	8.29	8.39
Minimum Sample Result		9.35	0.0026	0.005	0.001	8.23	8.26
Sample Count		6	6	6	6	2	6
Sample Range		3.65	0.0019	0	0.0012	0.06	0.13
Std Deviation		1.2233	0.00075211	0	0.00053914	0.042426	0.050859
Std Error		0.4994	0.00030705	0	0.0002201	0.03	0.020763

Statistic	sample_date	PHOSPHORUS (N)	POTASSIUM (T)	SELENIUM (D)	SELENIUM (T)	SILVER (D)	SILVER (T)
	3/2/2015	0.0036	1.2	51.3	52.4	< 0.010	< 0.010
	3/9/2015	< 0.0020	1.34	56.1	55.2	< 0.010	< 0.010
	3/16/2015	0.0043	1.34	50.5	52.4	< 0.010	< 0.010
	3/23/2015	0.0081	1.26	51.8	47.4	< 0.010	< 0.010
	3/30/2015	0.012	1.32	47.3	45.2	< 0.010	< 0.010
	4/7/2015	0.0039	1.28	44.4	46.1	< 0.010	< 0.010
Average Sample Result		0.00565	1.29	50.233	49.783	0.01	0.01
Maximum Sample Result		0.012	1.34	56.1	55.2	0.01	0.01
Minimum Sample Result		0.002	1.2	44.4	45.2	0.01	0.01
Sample Count		6	6	6	6	6	6
Sample Range		0.01	0.14	11.7	10	0	0
Std Deviation		0.0037077	0.054772	4.0178	4.0814	0	0
Std Error		0.0015137	0.022361	1.6403	1.6662	0	0

Statistic	sample_date	SODIUM (T)	STRONTIUM (D)	STRONTIUM (T)	SULFATE (AS SO4) (D)	TEMPERATURE, FIELD (N)	THALLIUM (D)
	3/2/2015	2.42	0.164	0.163	233	0	< 0.010
	3/9/2015	2.43	0.169	0.172	264		< 0.010
	3/16/2015	2.52	0.151	0.16	231		< 0.010
	3/23/2015	2.37	0.145	0.149	229		< 0.010
	3/30/2015	2.29	0.143	0.143	223		< 0.010
	4/7/2015	2.34	0.146	0.149	205	2.8	< 0.010
Average Sample Result		2.395	0.153	0.156	230.83	1.4	0.01
Maximum Sample Result		2.52	0.169	0.172	264	2.8	0.01
Minimum Sample Result		2.29	0.143	0.143	205	0	0.01
Sample Count		6	6	6	6	2	6
Sample Range		0.23	0.026	0.029	59	2.8	0
Std Deviation		0.080187	0.0109	0.010844	19.167	1.9799	0
Std Error		0.032736	0.0044497	0.0044272	7.8248	1.4	0

Statistic	sample_date	THALLIUM (T)	TIN (D)	TIN (T)	TITANIUM (D)	TITANIUM (T)	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)
	3/2/2015	< 0.010	< 0.00010	< 0.00010	11	11	621
	3/9/2015	< 0.010	< 0.00010	< 0.00010	14	13	647
	3/16/2015	< 0.010	< 0.00010	< 0.00010	12	17	563
	3/23/2015	< 0.010	< 0.00010	< 0.00010	11	13	598
	3/30/2015	< 0.010	< 0.00010	< 0.00010	11	15	536
	4/7/2015	< 0.010	< 0.00010	< 0.00010	< 10	11	527
Average Sample Result		0.01	0.0001	0.0001	11.5	13.333	582
Maximum Sample Result		0.01	0.0001	0.0001	14	17	647
Minimum Sample Result		0.01	0.0001	0.0001	10	11	527
Sample Count		6	6	6	6	6	6
Sample Range		0	0	0	4	6	120
Std Deviation		0	0	0	1.3784	2.3381	47.967
Std Error		0	0	0	0.56273	0.95452	19.582

Statistic	sample_date	TOTAL KJELDAHL NITROGEN (N)	TOTAL ORGANIC CARBON (T)	TOTAL SUSPENDED SOLIDS, LAB (N)	TURBIDITY, LAB (N)	URANIUM (D)	URANIUM (T)
	3/2/2015	< 0.050	1.08	< 1.0	0.18	2.18	2.17
	3/9/2015	< 0.10	0.96	1.2	0.41	2.49	2.53
	3/16/2015	< 0.050	2.08	< 1.0	2.88	2.31	2.46
	3/23/2015	< 0.050	2.08	3.1	2.71	2.08	2.13
	3/30/2015	0.223	2.87	5.7	10.5	2.23	2.21
	4/7/2015	0.162	1.64	1.3	1.67	2.01	2.04
Average Sample Result		0.10583	1.785	2.2167	3.0583	2.2167	2.2567
Maximum Sample Result		0.223	2.87	5.7	10.5	2.49	2.53
Minimum Sample Result		0.05	0.96	1	0.18	2.01	2.04
Sample Count		6	6	6	6	6	6
Sample Range		0.173	1.91	4.7	10.32	0.48	0.49
Std Deviation		0.072483	0.71414	1.8841	3.8146	0.17108	0.19429
Std Error		0.029591	0.29154	0.76916	1.5573	0.069841	0.079317

Statistic	sample_date	VANADIUM (D)	VANADIUM (T)	ZINC (D)	ZINC (T)
	3/2/2015	< 1.0	< 1.0	< 3.0	< 3.0
	3/9/2015	< 1.0	< 1.0	< 3.0	< 3.0
	3/16/2015	< 1.0	< 1.0	< 3.0	< 3.0
	3/23/2015	< 1.0	< 1.0	< 3.0	< 3.0
	3/30/2015	< 0.50	0.67	< 3.0	< 3.0
	4/7/2015	< 0.50	< 0.50	< 3.0	< 3.0
Average Sample Result		0.83333	0.86167	3	3
Maximum Sample Result		1	1	3	3
Minimum Sample Result		0.5	0.5	3	3
Sample Count		6	6	6	6
Sample Range		0.5	0.5	0	0
Std Deviation		0.2582	0.22094	0	0
Std Error		0.10541	0.0902	0	0

GH_ERC (Test Location)

Statistic	sample_date	ALKALINITY, TOTAL (As CaCO3) (N)	ALUMINUM (D)	ALUMINUM (T)	ANTIMONY (D)	ANTIMONY (T)	ARSENIC (D)
	3/3/2015	155	< 0.0030	0.0281	< 0.10	0.12	< 0.10
	3/17/2015	151	< 0.0030	0.0332	< 0.10	< 0.10	< 0.10
	3/24/2015	170	< 0.0030	0.0162	< 0.10	< 0.10	< 0.10
	3/31/2015	158	< 0.0030	0.156	< 0.10	< 0.10	< 0.10
Average Sample Result		158.5	0.003	0.058375	0.1	0.105	0.1
Maximum Sample Result		170	0.003	0.156	0.1	0.12	0.1
Minimum Sample Result		151	0.003	0.0162	0.1	0.1	0.1
Sample Count		4	4	4	4	4	4
Sample Range		19	0	0.1398	0	0.02	0
Std Deviation		8.1854	0	0.065472	0	0.01	0
Std Error		4.0927	0	0.032736	0	0.005	0

Statistic	sample_date	ARSENIC (T)	BARIUM (D)	BARIUM (T)	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)
	3/3/2015	0.15	0.0551	0.0561	< 0.10	< 0.10	< 0.00050
	3/17/2015	0.1	0.0556	0.0582	< 0.10	< 0.10	< 0.00050
	3/24/2015	0.11	0.0548	0.0555	< 0.10	< 0.10	< 0.00050
	3/31/2015	0.16	0.0538	0.0546	< 0.10	< 0.10	< 0.000050
Average Sample Result		0.13	0.054825	0.0561	0.1	0.1	0.0003875
Maximum Sample Result		0.16	0.0556	0.0582	0.1	0.1	0.0005
Minimum Sample Result		0.1	0.0538	0.0546	0.1	0.1	5.00E-05
Sample Count		4	4	4	4	4	4
Sample Range		0.06	0.0018	0.0036	0	0	0.00045
Std Deviation		0.029439	0.00075884	0.0015297	0	0	0.000225
Std Error		0.01472	0.00037942	0.00076485	0	0	0.0001125

Statistic	sample_date	BISMUTH (T)	BORON (D)	BORON (T)	BROMIDE (D)	CADMIUM (D)	CADMIUM (T)
	3/3/2015	< 0.00050	< 0.010	< 0.010	< 0.050	< 0.010	< 0.010
	3/17/2015	< 0.00050	< 0.010	< 0.010	< 0.050	0.01	< 0.010
	3/24/2015	< 0.00050	< 0.010	< 0.010	< 0.050	< 0.010	< 0.010
	3/31/2015	< 0.000050	< 0.010	< 0.010	< 0.050	0.0068	0.0245
Average Sample Result		0.0003875	0.01	0.01	0.05	0.0092	0.013625
Maximum Sample Result		0.0005	0.01	0.01	0.05	0.01	0.0245
Minimum Sample Result		5.00E-05	0.01	0.01	0.05	0.0068	0.01
Sample Count		4	4	4	4	4	4
Sample Range		0.00045	0	0	0	0.0032	0.0145
Std Deviation		0.000225	0	0	0	0.0016	0.00725
Std Error		0.0001125	0	0	0	0.0008	0.003625

Statistic	sample_date	CALCIUM (T)	CARBON, DISSOLVED ORGANIC (D)	CHLORIDE (D)	CHROMIUM (D)	CHROMIUM (T)	COBALT (D)
	3/3/2015	55.2	0.64	< 1.0	0.29	0.34	< 0.10
	3/17/2015	53.9	0.71	1.2	0.23	0.31	< 0.10
	3/24/2015	54.3	0.62	1.1	0.24	0.28	< 0.10
	3/31/2015	54.8	1.04	< 1.0	0.24	0.6	< 0.10
Average Sample Result		54.55	0.7525	1.075	0.25	0.3825	0.1
Maximum Sample Result		55.2	1.04	1.2	0.29	0.6	0.1
Minimum Sample Result		53.9	0.62	1	0.23	0.28	0.1
Sample Count		4	4	4	4	4	4
Sample Range		1.3	0.42	0.2	0.06	0.32	0
Std Deviation		0.56862	0.19551	0.095743	0.02708	0.14705	0
Std Error		0.28431	0.097756	0.047871	0.01354	0.073527	0

Statistic	sample_date	CALCIUM (T)	CARBON, DISSOLVED ORGANIC (D)	CHLORIDE (D)	CHROMIUM (D)	CHROMIUM (T)	COBALT (D)
	3/3/2015	55.2	0.64	< 1.0	0.29	0.34	< 0.10
	3/17/2015	53.9	0.71	1.2	0.23	0.31	< 0.10
	3/24/2015	54.3	0.62	1.1	0.24	0.28	< 0.10
	3/31/2015	54.8	1.04	< 1.0	0.24	0.6	< 0.10
Average Sample Result		54.55	0.7525	1.075	0.25	0.3825	0.1
Maximum Sample Result		55.2	1.04	1.2	0.29	0.6	0.1
Minimum Sample Result		53.9	0.62	1	0.23	0.28	0.1
Sample Count		4	4	4	4	4	4
Sample Range		1.3	0.42	0.2	0.06	0.32	0
Std Deviation		0.56862	0.19551	0.095743	0.02708	0.14705	0
Std Error		0.28431	0.097756	0.047871	0.01354	0.073527	0

Statistic	sample_date	COBALT (T)	CONDUCTIVITY, FIELD (N)	CONDUCTIVITY, LAB (N)	COPPER (D)	COPPER (T)	DISSOLVED OXYGEN, FIELD (N)
	3/3/2015	< 0.10	278.6	345	< 0.50	< 0.50	9.89
	3/17/2015	< 0.10		338	< 0.50	< 0.50	
	3/24/2015	< 0.10		340	< 0.50	< 0.50	
	3/31/2015	< 0.10		337	< 0.50	< 0.50	
Average Sample Result		0.1	278.6	340	0.5	0.5	9.89
Maximum Sample Result		0.1	278.6	345	0.5	0.5	9.89
Minimum Sample Result		0.1	278.6	337	0.5	0.5	9.89
Sample Count		4	2	4	4	4	2
Sample Range		0	0	8	0	0	0
Std Deviation		0	0	3.559	0	0	0
Std Error		0	0	1.7795	0	0	0

Statistic	sample_date	FLUORIDE (D)	Hardness, Total or Dissolved CaCO3 (N)	INSTANTANEOUS FLOW (N)	IRON (D)	IRON (T)	LEAD (D)
	3/3/2015	0.149	191		< 0.010	0.036	< 0.050
	3/17/2015	0.152	186		< 0.010	0.035	< 0.050
	3/24/2015	0.111	189		< 0.010	0.02	< 0.050
	3/31/2015	0.151	187		< 0.010	0.184	< 0.050
Average Sample Result		0.14075	188.25	0	0.01	0.06875	0.05
Maximum Sample Result		0.152	191	0	0.01	0.184	0.05
Minimum Sample Result		0.111	186	0	0.01	0.02	0.05
Sample Count		4	4	0	4	4	4
Sample Range		0.041	5	0	0	0.164	0
Std Deviation		0.019873	2.2174	0	0	0.077181	0
Std Error		0.0099363	1.1087	0	0	0.038591	0

Statistic	sample_date	LEAD (T)	LITHIUM (D)	LITHIUM (T)	MAGNESIUM (T)	MANGANESE (D)	MANGANESE (T)
	3/3/2015	0.195	0.00193	0.00197	13.3	0.000352	0.00262
	3/17/2015	< 0.050	0.00179	0.00185	13.1	0.000168	0.002
	3/24/2015	< 0.050	0.00187	0.00206	12.6	0.000453	0.00192
	3/31/2015	0.125	0.0017	0.0018	12.8	0.00033	0.00973
Average Sample Result		0.105	0.0018225	0.00192	12.95	0.00032575	0.0040675
Maximum Sample Result		0.195	0.00193	0.00206	13.3	0.000453	0.00973
Minimum Sample Result		0.05	0.0017	0.0018	12.6	0.000168	0.00192
Sample Count		4	4	4	4	4	4
Sample Range		0.145	0.00023	0.00026	0.7	0.000285	0.00781
Std Deviation		0.069642	0.000099791	0.00011747	0.31091	0.00011802	0.0037879
Std Error		0.034821	0.000049896	0.000058737	0.15546	0.000059009	0.001894

Statistic	sample_date	MERCURY (D)	MERCURY (T)	MOLYBDENUM (D)	MOLYBDENUM (T)	NICKEL (D)	NICKEL (T)
	3/3/2015	< 0.010	< 0.010	0.000915	0.000988	< 0.50	< 0.50
	3/17/2015	< 0.010	< 0.010	0.00093	0.000989	< 0.50	< 0.50
	3/24/2015	< 0.010	< 0.010	0.000986	0.00101	< 0.50	< 0.50
	3/31/2015	< 0.010	< 0.010	0.000945	0.000927	< 0.50	< 0.50
Average Sample Result		0.01	0.01	0.000944	0.0009785	0.5	0.5
Maximum Sample Result		0.01	0.01	0.000986	0.00101	0.5	0.5
Minimum Sample Result		0.01	0.01	0.000915	0.000927	0.5	0.5
Sample Count		4	4	4	4	4	4
Sample Range		0	0	0.000071	0.000083	0	0
Std Deviation		0	0	0.000030561	0.0000358	0	0
Std Error		0	0	0.000015281	0.0000179	0	0

Statistic	sample_date	NITRATE NITROGEN (NO3), AS N (N)	NITRITE NITROGEN (NO2), AS N (N)	NITROGEN, AMMONIA (AS N) (N)	ORTHO-PHOSPHATE (N)	pH, Field (N)	pH, LAB (N)
	3/3/2015	0.44	< 0.0010	< 0.0050	< 0.0010	8.04	8.26
	3/17/2015	0.354	< 0.0010	< 0.0050	< 0.0010		8.33
	3/24/2015	0.26	< 0.0010	< 0.0050	< 0.0010		8.3
	3/31/2015	0.328	< 0.0010	< 0.0050	< 0.0010		8.33
Average Sample Result		0.3455	0.001	0.005	0.001	8.04	8.305
Maximum Sample Result		0.44	0.001	0.005	0.001	8.04	8.33
Minimum Sample Result		0.26	0.001	0.005	0.001	8.04	8.26
Sample Count		4	4	4	4	2	4
Sample Range		0.18	0	0	0	0	0.07
Std Deviation		0.074429	0	0	0	0	0.033166
Std Error		0.037214	0	0	0	0	0.016583

Statistic	sample_date	PHOSPHORUS (N)	POTASSIUM (T)	SELENIUM (D)	SELENIUM (T)	SILVER (D)	SILVER (T)
	3/3/2015	0.0043	0.374	1.85	1.86	< 0.010	< 0.010
	3/17/2015	0.0027	0.4	1.66	1.7	< 0.010	< 0.010
	3/24/2015	0.0027	0.361	1.69	1.87	< 0.010	< 0.010
	3/31/2015	0.0181	0.415	1.73	1.67	< 0.010	< 0.010
Average Sample Result		0.00695	0.3875	1.7325	1.775	0.01	0.01
Maximum Sample Result		0.0181	0.415	1.85	1.87	0.01	0.01
Minimum Sample Result		0.0027	0.361	1.66	1.67	0.01	0.01
Sample Count		4	4	4	4	4	4
Sample Range		0.0154	0.054	0.19	0.2	0	0
Std Deviation		0.0074715	0.024474	0.083417	0.10472	0	0
Std Error		0.0037358	0.012237	0.041708	0.052361	0	0

Statistic	sample_date	SODIUM (T)	STRONTIUM (D)	STRONTIUM (T)	SULFATE (AS SO4) (D)	TEMPERATURE, FIELD (N)	THALLIUM (D)
	3/3/2015	0.945	0.2	0.206	30.4	2.9	< 0.010
	3/17/2015	0.976	0.199	0.211	28.5		< 0.010
	3/24/2015	0.978	0.201	0.206	19.4		< 0.010
	3/31/2015	0.93	0.207	0.207	26.9		< 0.010
Average Sample Result		0.95725	0.20175	0.2075	26.3	2.9	0.01
Maximum Sample Result		0.978	0.207	0.211	30.4	2.9	0.01
Minimum Sample Result		0.93	0.199	0.206	19.4	2.9	0.01
Sample Count		4	4	4	4	2	4
Sample Range		0.048	0.008	0.005	11	0	0
Std Deviation		0.023627	0.003594	0.0023805	4.8173	0	0
Std Error		0.011814	0.001797	0.0011902	2.4087	0	0

Statistic	sample_date	THALLIUM (T)	TIN (D)	TIN (T)	TITANIUM (D)	TITANIUM (T)	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)
	3/3/2015	< 0.010	< 0.00010	< 0.00010	< 10	< 10	203
	3/17/2015	< 0.010	< 0.00010	< 0.00010	< 10	< 10	195
	3/24/2015	< 0.010	< 0.00010	< 0.00010	< 10	< 10	204
	3/31/2015	< 0.010	< 0.00010	< 0.00010	< 10	< 10	191
Average Sample Result		0.01	0.0001	0.0001	10	10	198.25
Maximum Sample Result		0.01	0.0001	0.0001	10	10	204
Minimum Sample Result		0.01	0.0001	0.0001	10	10	191
Sample Count		4	4	4	4	4	4
Sample Range		0	0	0	0	0	13
Std Deviation		0	0	0	0	0	6.2915
Std Error		0	0	0	0	0	3.1458

Statistic	sample_date	TOTAL KJELDAHL NITROGEN (N)	TOTAL ORGANIC CARBON (T)	TOTAL SUSPENDED SOLIDS, LAB (N)	TURBIDITY, LAB (N)	URANIUM (D)	URANIUM (T)
	3/3/2015	< 0.050	0.5	2.6	0.41	0.814	0.839
	3/17/2015	0.058	0.6	1.6	0.74	0.806	0.845
	3/24/2015	< 0.050	0.58	1.4	0.91	0.789	0.826
	3/31/2015	0.1	1.14	10.1	5.43	0.791	0.798
Average Sample Result		0.0645	0.705	3.925	1.8725	0.8	0.827
Maximum Sample Result		0.1	1.14	10.1	5.43	0.814	0.845
Minimum Sample Result		0.05	0.5	1.4	0.41	0.789	0.798
Sample Count		4	4	4	4	4	4
Sample Range		0.05	0.64	8.7	5.02	0.025	0.047
Std Deviation		0.023965	0.2932	4.15	2.3807	0.012028	0.020897
Std Error		0.011983	0.1466	2.075	1.1904	0.0060139	0.010448

Statistic	sample_date	VANADIUM (D)	VANADIUM (T)	ZINC (D)	ZINC (T)
	3/3/2015	< 1.0	< 1.0	< 3.0	4.1
	3/17/2015	< 1.0	< 1.0	< 3.0	< 3.0
	3/24/2015	< 1.0	< 1.0	< 3.0	< 3.0
	3/31/2015	< 0.50	0.75	< 3.0	< 3.0
Average Sample Result		0.875	0.9375	3	3.275
Maximum Sample Result		1	1	3	4.1
Minimum Sample Result		0.5	0.75	3	3
Sample Count		4	4	4	4
Sample Range		0.5	0.25	0	1.1
Std Deviation		0.25	0.125	0	0.55
Std Error		0.125	0.0625	0	0.275

LC_LCDSSLCC (Test Location)

Statistic	sample_date	TOTAL (As CaCO3) (N)	ALUMINUM (D)	ALUMINUM (T)	ANTIMONY (D)	ANTIMONY (T)	ARSENIC (D)
	3/2/2015	195	< 0.0030	0.0052	0.22	0.22	0.11
	3/17/2015	186	< 0.0030	0.0138	0.19	0.21	0.11
	3/24/2015	208	< 0.0030	0.01	0.2	0.22	0.11
	3/31/2015	188	< 0.0030	0.0118	0.19	0.2	0.12
	4/6/2015	186	< 0.0030	0.0093	0.2	0.22	0.12
Average Sample Result		192.6	0.003	0.01002	0.2	0.214	0.114
Maximum Sample Result		208	0.003	0.0138	0.22	0.22	0.12
Minimum Sample Result		186	0.003	0.0052	0.19	0.2	0.11
Sample Count		5	5	5	5	5	5
Sample Range		22	0	0.0086	0.03	0.02	0.01
Std Deviation		9.3702	4.12E-11	0.0032097	0.012247	0.0089443	0.0054772
Std Error		4.1905	1.84E-11	0.0014354	0.0054772	0.004	0.0024495

Statistic	sample_date	ARSENIC (T)	BARIUM (D)	BARIUM (T)	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)
	3/2/2015	0.13	0.0956	0.0929	< 0.10	< 0.10	< 0.00050
	3/17/2015	0.15	0.0832	0.0849	< 0.10	< 0.10	< 0.00050
	3/24/2015	0.13	0.0862	0.088	< 0.10	< 0.10	< 0.00050
	3/31/2015	0.16	0.0766	0.0778	< 0.10	< 0.10	< 0.000050
	4/6/2015	0.13	0.0698	0.0703	< 0.10	< 0.10	< 0.000050
Average Sample Result		0.14	0.08228	0.08278	0.1	0.1	0.00032
Maximum Sample Result		0.16	0.0956	0.0929	0.1	0.1	0.0005
Minimum Sample Result		0.13	0.0698	0.0703	0.1	0.1	5.00E-05
Sample Count		5	5	5	5	5	5
Sample Range		0.03	0.0258	0.0226	0	0	0.00045
Std Deviation		0.014142	0.0097679	0.00887	1.3171E-09	1.3171E-09	0.00024648
Std Error		0.0063246	0.0043683	0.0039668	5.89E-10	5.89E-10	0.00011023

Statistic	sample_date	BISMUTH (T)	BORON (D)	BORON (T)	BROMIDE (D)	CADMIUM (D)	CADMIUM (T)
	3/2/2015	< 0.00050	0.013	0.014	< 0.10	0.086	0.109
	3/17/2015	< 0.00050	0.012	0.013	< 0.25	0.099	0.109
	3/24/2015	< 0.00050	0.014	0.014	< 0.10	0.103	0.12
	3/31/2015	< 0.000050	0.014	0.015	< 0.10	0.0654	0.0917
	4/6/2015	< 0.000050	0.013	0.015	< 0.10	0.116	0.134
Average Sample Result		0.00032	0.0132	0.0142	0.13	0.09388	0.11274
Maximum Sample Result		0.0005	0.014	0.015	0.25	0.116	0.134
Minimum Sample Result		5.00E-05	0.012	0.013	0.1	0.0654	0.0917
Sample Count		5	5	5	5	5	5
Sample Range		0.00045	0.002	0.002	0.15	0.0506	0.0423
Std Deviation		0.00024648	0.00083666	0.00083666	0.067082	0.019183	0.015615
Std Error		0.00011023	0.00037417	0.00037417	0.03	0.0085787	0.0069834

Statistic	sample_date	CALCIUM (T)	CARBON, DISSOLVED ORGANIC (D)	CHLORIDE (D)	CHROMIUM (D)	CHROMIUM (T)	COBALT (D)
	3/2/2015	123	1.14	2.7	0.16	0.21	< 0.10
	3/17/2015	113	0.87	2.8	0.15	0.18	< 0.10
	3/24/2015	112	0.84	3	0.21	0.18	< 0.10
	3/31/2015	102	1.18	2.7	0.15	0.21	< 0.10
	4/6/2015	102	1.18	2.5	0.15	0.17	< 0.10
Average Sample Result		110.4	1.042	2.74	0.164	0.19	0.1
Maximum Sample Result		123	1.18	3	0.21	0.21	0.1
Minimum Sample Result		102	0.84	2.5	0.15	0.17	0.1
Sample Count		5	5	5	5	5	5
Sample Range		21	0.34	0.5	0.06	0.04	0
Std Deviation		8.792	0.17181	0.18166	0.026077	0.018708	1.3171E-09
Std Error		3.9319	0.076837	0.08124	0.011662	0.0083666	5.89E-10

Statistic	sample_date	LEAD (T)	LITHIUM (D)	LITHIUM (T)	MAGNESIUM (T)	MANGANESE (D)	MANGANESE (T)
	3/2/2015	< 0.050	0.031	0.0312	52.9	0.000074	0.000211
	3/17/2015	< 0.050	0.0285	0.0289	48.4	0.000112	0.000403
	3/24/2015	< 0.050	0.0309	0.0316	48.3	0.000089	0.000353
	3/31/2015	< 0.050	0.0281	0.0274	41.4	0.00011	0.00046
	4/6/2015	< 0.050	0.0286	0.0298	45.4	< 0.00010	0.00033
Average Sample Result		0.05	0.02942	0.02978	47.28	0.000097	0.0003514
Maximum Sample Result		0.05	0.031	0.0316	52.9	0.000112	0.00046
Minimum Sample Result		0.05	0.0281	0.0274	41.4	7.40E-05	0.000211
Sample Count		5	5	5	5	5	5
Sample Range		0	0.0029	0.0042	11.5	0.000038	0.000249
Std Deviation		6.59E-10	0.0014096	0.0017152	4.2423	0.00001578	0.000093045
Std Error		2.95E-10	0.0006304	0.00076707	1.8972	7.0569E-06	0.000041611

Statistic	sample_date	MERCURY (D)	MERCURY (T)	MOLYBDENUM (D)	MOLYBDENUM (T)	NICKEL (D)	NICKEL (T)
	3/2/2015	< 0.010	< 0.010	0.00173	0.00171	3.59	3.59
	3/17/2015	< 0.010	< 0.010	0.00164	0.00169	3.56	3.72
	3/24/2015	< 0.010	< 0.010	0.00161	0.00169	3.71	3.89
	3/31/2015	< 0.010	< 0.010	0.00157	0.00157	3.46	3.55
	4/6/2015	< 0.0050	< 0.0050	0.00157	0.00164	3.82	3.77
Average Sample Result		0.009	0.009	0.001624	0.00166	3.628	3.704
Maximum Sample Result		0.01	0.01	0.00173	0.00171	3.82	3.89
Minimum Sample Result		0.005	0.005	0.00157	0.00157	3.46	3.55
Sample Count		5	5	5	5	5	5
Sample Range		0.005	0.005	0.00016	0.00014	0.36	0.34
Std Deviation		0.0022361	0.0022361	0.000066182	0.000056569	0.13953	0.13777
Std Error		0.001	0.001	0.000029597	0.000025298	0.062402	0.061612

Statistic	sample_date	NITROGEN (NO3), AS N (N)	NITRITE NITROGEN (NO2), AS N (N)	AMMONIA (AS N) (N)	ORTHO-PHOSPHATE (N)	pH, Field (N)	pH, LAB (N)
	3/2/2015	15.1	0.003	< 0.0050	< 0.0010	8.05	8.33
	3/17/2015	12.4	< 0.0050	< 0.0050	0.0015	8.38	8.4
	3/24/2015	13.1	0.0023	< 0.0050	0.0013	8.47	8.4
	3/31/2015	10.5	0.0032	< 0.0050	< 0.0010	8.52	8.39
	4/6/2015	11.6	0.0023	< 0.0050	< 0.0010	8.85	8.33
Average Sample Result		12.54	0.00316	0.005	0.00116	8.454	8.37
Maximum Sample Result		15.1	0.005	0.005	0.0015	8.85	8.4
Minimum Sample Result		10.5	0.0023	0.005	0.001	8.05	8.33
Sample Count		5	5	5	5	5	5
Sample Range		4.6	0.0027	0	0.0005	0.8	0.07
Std Deviation		1.7271	0.0011059	0	0.00023022	0.28728	0.036742
Std Error		0.7724	0.00049457	0	0.00010296	0.12848	0.016432

Statistic	sample_date	PHOSPHORUS (N)	POTASSIUM (T)	SELENIUM (D)	SELENIUM (T)	SILVER (D)	SILVER (T)
	3/2/2015	0.0029	1.21	72.1	70.6	< 0.010	< 0.010
	3/17/2015	0.0037	1.19	62.2	64.3	< 0.010	< 0.010
	3/24/2015	0.0027	1.22	59.6	60	< 0.010	< 0.010
	3/31/2015	0.0029	1.13	48.6	47.7	< 0.010	< 0.010
	4/6/2015	< 0.0020	1.13	48.8	48.9	< 0.010	< 0.010
Average Sample Result		0.00284	1.176	58.26	58.3	0.01	0.01
Maximum Sample Result		0.0037	1.22	72.1	70.6	0.01	0.01
Minimum Sample Result		0.002	1.13	48.6	47.7	0.01	0.01
Sample Count		5	5	5	5	5	5
Sample Range		0.0017	0.09	23.5	22.9	0	0
Std Deviation		0.00060663	0.043359	9.8954	9.8856	0	0
Std Error		0.00027129	0.019391	4.4253	4.421	0	0

Statistic	sample_date	SODIUM (T)	STRONTIUM (D)	STRONTIUM (T)	SULFATE (AS SO4) (D)	TEMPERATURE, FIELD (N)	THALLIUM (D)
	3/2/2015	5.89	0.234	0.234	283	1.2	< 0.010
	3/17/2015	5.2	0.212	0.219	242	3	< 0.010
	3/24/2015	5.39	0.208	0.216	246	3.4	< 0.010
	3/31/2015	4.66	0.202	0.2	197	3.7	< 0.010
	4/6/2015	4.92	0.193	0.202	211	3	< 0.010
Average Sample Result		5.212	0.2098	0.2142	235.8	2.86	0.01
Maximum Sample Result		5.89	0.234	0.234	283	3.7	0.01
Minimum Sample Result		4.66	0.193	0.2	197	1.2	0.01
Sample Count		5	5	5	5	5	5
Sample Range		1.23	0.041	0.034	86	2.5	0
Std Deviation		0.46944	0.015304	0.013864	33.507	0.97365	0
Std Error		0.20994	0.006844	0.0062	14.985	0.43543	0

Statistic	sample_date	THALLIUM (T)	TIN (D)	TIN (T)	TITANIUM (D)	TITANIUM (T)	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)
	3/2/2015	< 0.010	< 0.00010	< 0.00010	14	13	690
	3/17/2015	< 0.010	< 0.00010	< 0.00010	13	14	601
	3/24/2015	< 0.010	< 0.00010	< 0.00010	11	11	625
	3/31/2015	< 0.010	< 0.00010	< 0.00010	11	11	519
	4/6/2015	< 0.010	< 0.00010	< 0.00010	< 10	< 10	530
Average Sample Result		0.01	0.0001	0.0001	11.8	11.8	593
Maximum Sample Result		0.01	0.0001	0.0001	14	14	690
Minimum Sample Result		0.01	0.0001	0.0001	10	10	519
Sample Count		5	5	5	5	5	5
Sample Range		0	0	0	4	4	171
Std Deviation		0	0	0	1.6432	1.6432	70.608
Std Error		0	0	0	0.73485	0.73485	31.577

Statistic	sample_date	TOTAL KJELDAHL NITROGEN (N)	TOTAL ORGANIC CARBON (T)	SUSPENDED SOLIDS, LAB (N)	TURBIDITY, LAB (N)	URANIUM (D)	URANIUM (T)
	3/2/2015	< 0.050	0.9	< 1.0	0.29	3.92	3.95
	3/17/2015	< 0.050	0.84	< 1.0	0.65	3.55	3.66
	3/24/2015	< 0.050	0.74	< 1.0	0.39	3.4	3.42
	3/31/2015	< 0.050	1.24	< 1.0	0.47	3.11	3.11
	4/6/2015	< 0.050	0.99	< 1.0	0.44	3.26	3.31
Average Sample Result		0.05	0.942	1	0.448	3.448	3.49
Maximum Sample Result		0.05	1.24	1	0.65	3.92	3.95
Minimum Sample Result		0.05	0.74	1	0.29	3.11	3.11
Sample Count		5	5	5	5	5	5
Sample Range		0	0.5	0	0.36	0.81	0.84
Std Deviation		6.59E-10	0.18979	0	0.13198	0.31027	0.32488
Std Error		2.95E-10	0.084876	0	0.059025	0.13876	0.14529

Statistic	sample_date	VANADIUM (D)	VANADIUM (T)	ZINC (D)	ZINC (T)
	3/2/2015	< 1.0	< 1.0	3.8	3.9
	3/17/2015	< 1.0	< 1.0	4.2	4.4
	3/24/2015	< 1.0	< 1.0	5.5	4.8
	3/31/2015	< 0.50	< 0.50	4.8	4.9
	4/6/2015	< 0.50	< 0.50	5	5.4
Average Sample Result		0.8	0.8	4.66	4.68
Maximum Sample Result		1	1	5.5	5.4
Minimum Sample Result		0.5	0.5	3.8	3.9
Sample Count		5	5	5	5
Sample Range		0.5	0.5	1.7	1.5
Std Deviation		0.27386	0.27386	0.66933	0.56303
Std Error		0.12247	0.12247	0.29933	0.25179

EV_HC1 (Test Location)

Statistic	sample_date	ALKALINITY, TOTAL (As CaCO3) (N)	ALUMINUM (D)	ALUMINUM (T)	ANTIMONY (D)	ANTIMONY (T)	ARSENIC (D)
	3/10/2015	203	< 0.0030	0.0134	< 0.10	< 0.10	0.14
	3/17/2015	193	0.0036	0.0842	< 0.10	< 0.10	0.16
	3/24/2015	219	< 0.0030	0.0398	< 0.10	0.13	0.16
	3/31/2015	195	0.0043	0.0842	< 0.10	0.11	0.17
	4/7/2015	187	< 0.0030	0.0206	< 0.10	0.12	0.16
Average Sample Result		199.4	0.00338	0.04844	0.1	0.112	0.158
Maximum Sample Result		219	0.0043	0.0842	0.1	0.13	0.17
Minimum Sample Result		187	0.003	0.0134	0.1	0.1	0.14
Sample Count		5	5	5	5	5	5
Sample Range		32	0.0013	0.0708	0	0.03	0.03
Std Deviation		12.361	0.00057619	0.034041	1.3171E-09	0.013038	0.010954
Std Error		5.5281	0.00025768	0.015223	5.89E-10	0.005831	0.004899

Statistic	sample_date	ARSENIC (T)	BARIUM (D)	BARIUM (T)	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)
	3/10/2015	0.17	0.0628	0.0619	< 0.10	< 0.10	< 0.00050
	3/17/2015	0.22	0.0518	0.0532	< 0.10	< 0.10	< 0.00050
	3/24/2015	0.17	0.0544	0.0542	< 0.10	< 0.10	< 0.00050
	3/31/2015	0.22	0.0482	0.0478	< 0.10	< 0.10	< 0.000050
	4/7/2015	0.17	0.0491	0.05	< 0.10	< 0.10	< 0.000050
Average Sample Result		0.19	0.05326	0.05342	0.1	0.1	0.00032
Maximum Sample Result		0.22	0.0628	0.0619	0.1	0.1	0.0005
Minimum Sample Result		0.17	0.0482	0.0478	0.1	0.1	5.00E-05
Sample Count		5	5	5	5	5	5
Sample Range		0.05	0.0146	0.0141	0	0	0.00045
Std Deviation		0.027386	0.0058599	0.0053816	1.3171E-09	1.3171E-09	0.00024648
Std Error		0.012247	0.0026206	0.0024067	5.89E-10	5.89E-10	0.00011023

Statistic	sample_date	BISMUTH (T)	BORON (D)	BORON (T)	BROMIDE (D)	CADMIUM (D)	CADMIUM (T)
	3/10/2015	< 0.00050	< 0.010	0.01	< 0.050	0.02	0.018
	3/17/2015	< 0.00050	0.011	< 0.010	< 0.050	0.021	0.028
	3/24/2015	< 0.00050	0.01	< 0.010	< 0.10	0.016	0.018
	3/31/2015	< 0.000050	< 0.010	0.012	< 0.050	0.0154	0.031
	4/7/2015	< 0.000050	< 0.010	< 0.010	< 0.050	0.0213	0.0288
Average Sample Result		0.00032	0.0102	0.0104	0.06	0.01874	0.02476
Maximum Sample Result		0.0005	0.011	0.012	0.1	0.0213	0.031
Minimum Sample Result		5.00E-05	0.01	0.01	0.05	0.0154	0.018
Sample Count		5	5	5	5	5	5
Sample Range		0.00045	0.001	0.002	0.05	0.0059	0.013
Std Deviation		0.00024648	0.00044721	0.00089443	0.022361	0.0028245	0.006268
Std Error		0.00011023	0.0002	0.0004	0.01	0.0012632	0.0028031

Statistic	sample_date	CALCIUM (T)	CARBON, DISSOLVED ORGANIC (D)	CHLORIDE (D)	CHROMIUM (D)	CHROMIUM (T)	COBALT (D)
	3/10/2015	89.5	0.79	1.7	0.15	0.2	< 0.10
	3/17/2015	80.8	2.44	1.6	0.18	0.24	< 0.10
	3/24/2015	86.7	1.75	1.8	0.15	0.17	< 0.10
	3/31/2015	79	2.7	1.8	0.16	0.27	< 0.10
	4/7/2015	86.8	1.99	1.8	0.17	0.17	< 0.10
Average Sample Result		84.56	1.934	1.74	0.162	0.21	0.1
Maximum Sample Result		89.5	2.7	1.8	0.18	0.27	0.1
Minimum Sample Result		79	0.79	1.6	0.15	0.17	0.1
Sample Count		5	5	5	5	5	5
Sample Range		10.5	1.91	0.2	0.03	0.1	0
Std Deviation		4.4456	0.73968	0.089443	0.013038	0.044159	1.3171E-09
Std Error		1.9881	0.3308	0.04	0.005831	0.019748	5.89E-10

Statistic	sample_date	COBALT (T)	CONDUCTIVITY, FIELD (N)	CONDUCTIVITY, LAB (N)	COPPER (D)	COPPER (T)	DISSOLVED OXYGEN, FIELD (N)
	3/10/2015	< 0.10	680	650	< 0.50	< 0.50	11.56
	3/17/2015	< 0.10	690	649	< 0.50	< 0.50	11.46
	3/24/2015	< 0.10	708	690	< 0.50	< 0.50	11.13
	3/31/2015	< 0.10	646	628	< 0.50	< 0.50	11.25
	4/7/2015	< 0.10	685	671	< 0.50	< 0.50	11.54
Average Sample Result		0.1	681.8	657.6	0.5	0.5	11.388
Maximum Sample Result		0.1	708	690	0.5	0.5	11.56
Minimum Sample Result		0.1	646	628	0.5	0.5	11.13
Sample Count		5	5	5	5	5	5
Sample Range		0	62	62	0	0	0.43
Std Deviation		1.3171E-09	22.632	23.65	0	0	0.18939
Std Error		5.89E-10	10.121	10.576	0	0	0.084699

Statistic	sample_date	FLUORIDE (D)	Hardness, Total or Dissolved CaCO3 (N)	INSTANTANEOUS FLOW (N)	IRON (D)	IRON (T)	LEAD (D)
	3/10/2015	0.209	411		< 0.010	0.015	< 0.050
	3/17/2015	0.183	373		< 0.010	0.064	< 0.050
	3/24/2015	0.178	398		< 0.010	0.036	< 0.050
	3/31/2015	0.178	366		< 0.010	0.065	< 0.050
	4/7/2015	0.191	392		< 0.010	0.016	< 0.050
Average Sample Result		0.1878	388	0	0.01	0.0392	0.05
Maximum Sample Result		0.209	411	0	0.01	0.065	0.05
Minimum Sample Result		0.178	366	0	0.01	0.015	0.05
Sample Count		5	5	0	5	5	5
Sample Range		0.031	45	0	0	0.05	0
Std Deviation		0.012988	18.398	0	0	0.02457	6.59E-10
Std Error		0.0058086	8.228	0	0	0.010988	2.95E-10

Statistic	sample_date	LEAD (T)	LITHIUM (D)	LITHIUM (T)	MAGNESIUM (T)	MANGANESE (D)	MANGANESE (T)
	3/10/2015	< 0.050	0.00676	0.0068	45.4	0.00153	0.0023
	3/17/2015	< 0.050	0.00652	0.0069	40.5	0.00113	0.0029
	3/24/2015	< 0.050	0.00703	0.00759	44.3	0.00208	0.00304
	3/31/2015	< 0.050	0.0072	0.0071	39.5	0.00087	0.00223
	4/7/2015	< 0.050	0.0066	0.0068	44.8	0.00115	0.00146
Average Sample Result		0.05	0.006822	0.007038	42.9	0.001352	0.002386
Maximum Sample Result		0.05	0.0072	0.00759	45.4	0.00208	0.00304
Minimum Sample Result		0.05	0.00652	0.0068	39.5	0.00087	0.00146
Sample Count		5	5	5	5	5	5
Sample Range		0	0.00068	0.00079	5.9	0.00121	0.00158
Std Deviation		6.59E-10	0.00028744	0.00033199	2.6991	0.00047013	0.00062871
Std Error		2.95E-10	0.00012855	0.00014847	1.2071	0.00021025	0.00028117

Statistic	sample_date	MERCURY (D)	MERCURY (T)	MOLYBDENUM (D)	MOLYBDENUM (T)	NICKEL (D)	NICKEL (T)
	3/10/2015	< 0.010	< 0.010	0.000913	0.000933	0.63	0.68
	3/17/2015	< 0.010	< 0.010	0.000843	0.000857	0.94	0.96
	3/24/2015	< 0.010	< 0.010	0.00092	0.000992	0.86	0.85
	3/31/2015	< 0.010	< 0.010	0.000812	0.000815	0.85	0.98
	4/7/2015	< 0.0050	< 0.0050	0.000868	0.000899	0.94	0.97
Average Sample Result		0.009	0.009	0.0008712	0.0008992	0.844	0.888
Maximum Sample Result		0.01	0.01	0.00092	0.000992	0.94	0.98
Minimum Sample Result		0.005	0.005	0.000812	0.000815	0.63	0.68
Sample Count		5	5	5	5	5	5
Sample Range		0.005	0.005	0.000108	0.000177	0.31	0.3
Std Deviation		0.0022361	0.0022361	0.000045931	0.000068236	0.127	0.12755
Std Error		0.001	0.001	0.000020541	0.000030516	0.056798	0.057044

Statistic	sample_date	NITRATE NITROGEN (NO3), AS N (N)	NITRITE NITROGEN (NO2), AS N (N)	NITROGEN, AMMONIA (AS N) (N)	ORTHO-PHOSPHATE (N)	pH, Field (N)	pH, LAB (N)
	3/10/2015	1.19	< 0.0010	< 0.0050	0.0047	8.15	8.39
	3/17/2015	1.05	< 0.0010	< 0.0050	0.0041	8.13	8.36
	3/24/2015	1.16	< 0.0020	0.0051	0.0054	8.23	8.45
	3/31/2015	0.997	< 0.0010	< 0.0050	0.0057	8.52	8.37
	4/7/2015	1.09	< 0.0010	< 0.0050	0.0036	8.42	8.43
Average Sample Result		1.0974	0.0012	0.00502	0.0047	8.29	8.4
Maximum Sample Result		1.19	0.002	0.0051	0.0057	8.52	8.45
Minimum Sample Result		0.997	0.001	0.005	0.0036	8.13	8.36
Sample Count		5	5	5	5	5	5
Sample Range		0.193	0.001	0.0001	0.0021	0.39	0.09
Std Deviation		0.078859	0.00044721	0.000044721	0.00087464	0.17219	0.03873
Std Error		0.035267	0.0002	0.00002	0.00039115	0.077006	0.017321

Statistic	sample_date	PHOSPHORUS (N)	POTASSIUM (T)	SELENIUM (D)	SELENIUM (T)	SILVER (D)	SILVER (T)
	3/10/2015	0.0055	0.9	33.7	32.9	< 0.010	< 0.010
	3/17/2015	0.0079	0.953	29	29.9	< 0.010	< 0.010
	3/24/2015	0.0108	0.987	32.7	33.4	< 0.010	< 0.010
	3/31/2015	0.0121	0.985	31.7	29.2	< 0.010	< 0.010
	4/7/2015	0.0058	0.968	34	34.9	< 0.010	< 0.010
Average Sample Result		0.00842	0.9586	32.22	32.06	0.01	0.01
Maximum Sample Result		0.0121	0.987	34	34.9	0.01	0.01
Minimum Sample Result		0.0055	0.9	29	29.2	0.01	0.01
Sample Count		5	5	5	5	5	5
Sample Range		0.0066	0.087	5	5.7	0	0
Std Deviation		0.0029525	0.035557	2.0142	2.4193	0	0
Std Error		0.0013204	0.015902	0.90078	1.0819	0	0

Statistic	sample_date	SODIUM (T)	STRONTIUM (D)	STRONTIUM (T)	SULFATE (AS SO4) (D)	TEMPERATURE, FIELD (N)	THALLIUM (D)
	3/10/2015	1.72	0.127	0.128	195	1.24	< 0.010
	3/17/2015	1.79	0.118	0.123	168	1.66	< 0.010
	3/24/2015	1.82	0.122	0.124	187	2.31	0.012
	3/31/2015	1.71	0.116	0.112	153	2.63	< 0.010
	4/7/2015	1.71	0.116	0.118	170	1.91	< 0.010
Average Sample Result		1.75	0.1198	0.121	174.6	1.95	0.0104
Maximum Sample Result		1.82	0.127	0.128	195	2.63	0.012
Minimum Sample Result		1.71	0.116	0.112	153	1.24	0.01
Sample Count		5	5	5	5	5	5
Sample Range		0.11	0.011	0.016	42	1.39	0.002
Std Deviation		0.051478	0.0047117	0.0061644	16.592	0.54355	0.00089443
Std Error		0.023022	0.0021071	0.0027568	7.4202	0.24308	0.0004

Statistic	sample_date	THALLIUM (T)	TIN (D)	TIN (T)	TITANIUM (D)	TITANIUM (T)	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)
	3/10/2015	< 0.010	< 0.00010	< 0.00010	11	11	490
	3/17/2015	0.01	< 0.00010	< 0.00010	12	14	450
	3/24/2015	< 0.010	< 0.00010	< 0.00010	< 10	10	494
	3/31/2015	< 0.010	< 0.00010	< 0.00010	< 10	< 10	411
	4/7/2015	< 0.010	< 0.00010	< 0.00010	< 10	< 10	436
Average Sample Result		0.01	0.0001	0.0001	10.6	11	456.2
Maximum Sample Result		0.01	0.0001	0.0001	12	14	494
Minimum Sample Result		0.01	0.0001	0.0001	10	10	411
Sample Count		5	5	5	5	5	5
Sample Range		0	0	0	2	4	83
Std Deviation		0	0	0	0.89443	1.7321	35.57
Std Error		0	0	0	0.4	0.7746	15.907

Statistic	sample_date	TOTAL KJELDAHL NITROGEN (N)	TOTAL ORGANIC CARBON (T)	TOTAL SUSPENDED SOLIDS, LAB (N)	TURBIDITY, LAB (N)	URANIUM (D)	URANIUM (T)
	3/10/2015	< 0.050	0.95	< 1.0	0.26	2.57	2.55
	3/17/2015	0.086	2.32	11.9	2.28	2.27	2.36
	3/24/2015	0.13	1.87	< 1.0	1.04	2.46	2.51
	3/31/2015	0.127	2.35	1.9	1.9	2.2	2.06
	4/7/2015	0.18	1.76	< 1.0	0.49	2.38	2.45
Average Sample Result		0.1146	1.85	3.36	1.194	2.376	2.386
Maximum Sample Result		0.18	2.35	11.9	2.28	2.57	2.55
Minimum Sample Result		0.05	0.95	1	0.26	2.2	2.06
Sample Count		5	5	5	5	5	5
Sample Range		0.13	1.4	10.9	2.02	0.37	0.49
Std Deviation		0.049141	0.56776	4.7899	0.876	0.14741	0.19578
Std Error		0.021976	0.25391	2.1421	0.39176	0.065924	0.087556

Statistic	sample_date	VANADIUM (D)	VANADIUM (T)	ZINC (D)	ZINC (T)
	3/10/2015	< 1.0	< 1.0	< 3.0	< 3.0
	3/17/2015	< 1.0	< 1.0	< 3.0	< 3.0
	3/24/2015	< 1.0	< 1.0	< 3.0	< 3.0
	3/31/2015	< 0.50	0.53	< 3.0	< 3.0
	4/7/2015	< 0.50	< 0.50	< 3.0	< 3.0
Average Sample Result		0.8	0.806	3	3
Maximum Sample Result		1	1	3	3
Minimum Sample Result		0.5	0.5	3	3
Sample Count		5	5	5	5
Sample Range		0.5	0.5	0	0
Std Deviation		0.27386	0.26586	0	0
Std Error		0.12247	0.11889	0	0

EV_MC2 (Test location)

Statistic	sample_date	ALKALINITY, TOTAL (As CaCO3) (N)	ALUMINUM (D)	ALUMINUM (T)	ANTIMONY (D)	ANTIMONY (T)	ARSENIC (D)	ARSENIC (T)
	3/4/2015	193	0.0037	0.0185	< 0.10	< 0.10	0.15	0.18
	3/7/2015	160	< 0.0030	0.0285	< 0.10	< 0.10	0.16	0.21
	3/8/2015	172	< 0.0030	0.0271	0.11	0.12	0.15	0.2
	3/9/2015	164	< 0.0030	0.0297	0.12	0.12	0.14	0.19
	3/10/2015	166	< 0.0030	0.0715	0.12	0.16	0.16	0.19
	3/11/2015	166	< 0.0030	0.0502	0.13	0.14	0.14	0.18
	3/12/2015	156	< 0.0030	0.0567	0.13	0.17	0.15	0.2
	3/13/2015	160	< 0.0030	0.0988	0.12	0.15	0.14	0.2
	3/14/2015	150	< 0.0030	0.096	0.12	0.14	0.13	0.21
	3/15/2015	97.1	0.0461	3.88	0.11	0.37	0.23	2.02
	3/16/2015	109	0.0232	1.05	0.14	0.18	0.19	0.59
	3/17/2015	115	0.0135	0.341	0.1	0.13	0.17	0.32
	3/18/2015	134	0.0104	0.315	0.12	0.13	0.15	0.28
	3/19/2015	139	0.0071	0.227	0.15	0.19	0.16	0.25
	3/20/2015	134	0.0114	0.293	0.15	0.21	0.17	0.29
	3/25/2015	152	0.0045	0.126	0.16	0.17	0.16	0.23
	4/1/2015	139	0.0075	0.206	0.17	0.21	0.17	0.25
	4/8/2015	152	< 0.0030	0.0553	0.19	0.19	0.15	0.18
Average Sample Result		147.67	0.0085778	0.38724	0.13	0.16556	0.15944	0.34278
Maximum Sample Result		193	0.0461	3.88	0.19	0.37	0.23	2.02
Minimum Sample Result		97.1	0.003	0.0185	0.1	0.1	0.13	0.18
Sample Count		18	18	18	18	18	18	18
Sample Range		95.9	0.0431	3.8615	0.09	0.27	0.1	1.84
Std Deviation		23.82	0.010795	0.90439	0.025437	0.061378	0.022615	0.42936
Std Error		5.6145	0.0025444	0.21317	0.0059956	0.014467	0.0053304	0.1012

Statistic	sample_date	BARIUM (D)	BARIUM (T)	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)	BISMUTH (T)	BORON (D)
	3/4/2015	0.108	0.111	< 0.10	< 0.10	< 0.00050	< 0.00050	0.014
	3/7/2015	0.102	0.103	< 0.10	< 0.10	< 0.00050	< 0.00050	0.011
	3/8/2015	0.106	0.111	< 0.10	< 0.10	< 0.00050	< 0.00050	0.012
	3/9/2015	0.108	0.111	< 0.10	< 0.10	< 0.00050	< 0.00050	0.012
	3/10/2015	0.109	0.108	< 0.10	< 0.10	< 0.00050	< 0.00050	0.013
	3/11/2015	0.108	0.108	< 0.10	< 0.10	< 0.00050	< 0.00050	0.013
	3/12/2015	0.108	0.11	< 0.10	< 0.10	< 0.00050	< 0.00050	0.011
	3/13/2015	0.105	0.111	< 0.10	< 0.10	< 0.00050	< 0.00050	0.011
	3/14/2015	0.103	0.106	< 0.10	< 0.10	< 0.00050	< 0.00050	0.011
	3/15/2015	0.0758	0.166	< 0.10	0.23	< 0.00050	< 0.00050	< 0.010
	3/16/2015	0.0746	0.0944	< 0.10	< 0.10	< 0.00050	< 0.00050	< 0.010
	3/17/2015	0.0774	0.0819	< 0.10	< 0.10	< 0.00050	< 0.00050	< 0.010
	3/18/2015	0.0852	0.0882	< 0.10	< 0.10	< 0.00050	< 0.00050	0.012
	3/19/2015	0.087	0.0937	< 0.10	< 0.10	< 0.00050	< 0.00050	0.01
	3/20/2015	0.0913	0.0955	< 0.10	< 0.10	< 0.00050	< 0.00050	0.011
	3/25/2015	0.0927	0.0942	< 0.10	< 0.10	< 0.00050	< 0.00050	0.013
	4/1/2015	0.0801	0.0817	< 0.10	< 0.10	< 0.000050	< 0.000050	0.01
	4/8/2015	0.0877	0.088	< 0.10	< 0.10	< 0.000050	< 0.000050	0.012
Average Sample Result		0.094933	0.10348	0.1	0.10722	0.00045	0.00045	0.011444
Maximum Sample Result		0.109	0.166	0.1	0.23	0.0005	0.0005	0.014
Minimum Sample Result		0.0746	0.0817	0.1	0.1	5.00E-05	5.00E-05	0.01
Sample Count		18	18	18	18	18	18	18
Sample Range		0.0344	0.0843	0	0.13	0.00045	0.00045	0.004
Std Deviation		0.01273	0.018733	1.2778E-09	0.030641	0.00014552	0.00014552	0.0012472
Std Error		0.0030004	0.0044155	3.01E-10	0.0072222	0.0000343	0.0000343	0.00029397

Statistic	sample_date	BORON (T)	BROMIDE (D)	CADMIUM (D)	CADMIUM (T)	CALCIUM (T)	CARBON, DISSOLVED ORGANIC (D)	CHLORIDE (D)
	3/4/2015	0.016	< 0.050	0.055	0.044	90.7	1.65	11.4
	3/7/2015	0.012	< 0.050	0.012	0.022	60.9	1.13	2.7
	3/8/2015	0.013	< 0.050	0.017	0.031	67.2	1.12	3.2
	3/9/2015	0.013	< 0.050	0.019	0.032	65	1.33	2.8
	3/10/2015	0.012	< 0.050	0.018	0.032	64.6	1.63	2.8
	3/11/2015	0.011	< 0.050	0.017	0.037	69.1	1.06	2.9
	3/12/2015	0.011	< 0.050	0.018	0.033	66.7	1.54	2.8
	3/13/2015	0.011	< 0.050	0.018	0.035	63.9	1.42	2.8
	3/14/2015	0.012	< 0.050	0.018	0.037	62	1.71	3.2
	3/15/2015	0.014	< 0.050	0.029	0.494	46.8	4.69	2.8
	3/16/2015	0.01	< 0.050	0.023	0.133	42.4	4.07	2.1
	3/17/2015	< 0.010	< 0.050	0.021	0.062	47.1	2.81	2.1
	3/18/2015	0.013	< 0.050	0.021	0.058	49.4	2.75	2.6
	3/19/2015	0.011	< 0.050	0.026	0.051	51.7	2.59	2.9
	3/20/2015	< 0.010	< 0.050	0.023	0.052	51.4	2.43	2.8
	3/25/2015	0.011	< 0.050	0.017	0.042	56	2.15	2.8
	4/1/2015	0.012	< 0.050	0.0296	0.0605	54.6	2.61	4.3
	4/8/2015	0.012	< 0.050	0.0193	0.0288	58.4	1.9	2.7
Average Sample Result		0.011889	0.05	0.022272	0.07135	59.328	2.1439	3.3167
Maximum Sample Result		0.016	0.05	0.055	0.494	90.7	4.69	11.4
Minimum Sample Result		0.01	0.05	0.012	0.022	42.4	1.06	2.1
Sample Count		18	18	18	18	18	18	18
Sample Range		0.006	0	0.043	0.472	48.3	3.63	9.3
Std Deviation		0.0015297	6.39E-10	0.0092981	0.10829	11.202	1.0018	2.0692
Std Error		0.00036055	1.51E-10	0.0021916	0.025523	2.6404	0.23612	0.48771

Statistic	sample_date	CHROMIUM (D)	CHROMIUM (T)	COBALT (D)	COBALT (T)	CONDUCTIVITY, FIELD (N)	CONDUCTIVITY, LAB (N)	COPPER (D)
	3/4/2015	0.12	< 0.20	< 0.10	< 0.10	614	665	1.24
	3/7/2015	0.14	0.2	< 0.10	< 0.10	452	450	< 0.50
	3/8/2015	0.15	0.21	< 0.10	< 0.10	509	525	< 0.50
	3/9/2015	0.15	0.2	< 0.10	< 0.10	487	492	< 0.50
	3/10/2015	0.15	0.21	< 0.10	< 0.10	505	497	< 0.50
	3/11/2015	0.13	0.21	< 0.10	< 0.10	498	492	< 0.50
	3/12/2015	0.16	0.24	< 0.10	< 0.10	487	490	< 0.50
	3/13/2015	0.19	0.27	< 0.10	< 0.10	474	488	< 0.50
	3/14/2015	0.13	0.28	< 0.10	< 0.10	456	458	< 0.50
	3/15/2015	0.15	6.06	< 0.10	2.28	270	266	0.75
	3/16/2015	0.16	1.73	< 0.10	0.52	288	283	< 0.50
	3/17/2015	0.11	0.63	< 0.10	0.17	333	317	< 0.50
	3/18/2015	0.15	0.57	< 0.10	0.19	365	365	1.22
	3/19/2015	0.15	0.46	< 0.10	0.14	381	377	< 0.50
	3/20/2015	0.14	0.58	< 0.10	0.17	382	349	< 0.50
	3/25/2015	0.16	0.32	< 0.10	0.12	408	385	< 0.50
	4/1/2015	0.12	0.42	< 0.10	0.16	412	397	< 0.50
	4/8/2015	0.13	0.21	< 0.10	< 0.10	424	418	< 0.50
Average Sample Result		0.14389	0.72222	0.1	0.26389	430.28	428.56	0.595
Maximum Sample Result		0.19	6.06	0.1	2.28	614	665	1.24
Minimum Sample Result		0.11	0.2	0.1	0.1	270	266	0.5
Sample Count		18	18	18	18	18	18	18
Sample Range		0.08	5.86	0	2.18	344	399	0.74
Std Deviation		0.01883	1.3801	1.2778E-09	0.51271	85.71	97.819	0.23838
Std Error		0.0044383	0.3253	3.01E-10	0.12085	20.202	23.056	0.056187

Statistic	sample_date	COPPER (T)	DISSOLVED OXYGEN, FIELD (N)	FLUORIDE (D)	Hardness, Total or Dissolved CaCO3 (N)	INSTANTANEOUS FLOW (N)	IRON (D)	IRON (T)
	3/4/2015	0.76	12.79	0.146	381		< 0.010	0.024
	3/7/2015	< 0.50	12.2	0.14	243		< 0.010	0.029
	3/8/2015	< 0.50	12.76	0.148	272		< 0.010	0.031
	3/9/2015	< 0.50	13.12	0.145	260		< 0.010	0.029
	3/10/2015	< 0.50	13.09	0.144	259		< 0.010	0.04
	3/11/2015	< 0.50	13.1	0.139	268		< 0.010	0.051
	3/12/2015	< 0.50	12.81	0.145	258		< 0.010	0.051
	3/13/2015	< 0.50	12.64	0.138	246		< 0.010	0.082
	3/14/2015	< 0.50	11.98	0.132	241		< 0.010	0.082
	3/15/2015	6.81	12.11	0.101	144		0.04	4.26
	3/16/2015	1.71	12.6	0.11	149		0.021	0.975
	3/17/2015	0.86	11.95	0.119	171		0.012	0.331
	3/18/2015	< 1.0	11.62	0.117	184		< 0.010	0.293
	3/19/2015	1.02	11.65	0.123	200		< 0.010	0.177
	3/20/2015	0.72	11.58	0.124	198		< 0.010	0.246
	3/25/2015	0.6	12.02	0.134	216		< 0.010	0.135
	4/1/2015	0.65	11.67	0.125	209		< 0.010	0.224
	4/8/2015	< 0.50	12.55	0.138	224		< 0.010	0.048
Average Sample Result		1.035	12.347	0.13156	229.06	0	0.012389	0.39489
Maximum Sample Result		6.81	13.12	0.148	381	0	0.04	4.26
Minimum Sample Result		0.5	11.58	0.101	144	0	0.01	0.024
Sample Count		18	18	18	18	0	18	18
Sample Range		6.31	1.54	0.047	237	0	0.03	4.236
Std Deviation		1.4738	0.54378	0.013618	54.888	0	0.0073656	0.99033
Std Error		0.34738	0.12817	0.0032097	12.937	0	0.0017361	0.23342

Statistic	sample_date	LEAD (D)	LEAD (T)	LITHIUM (D)	LITHIUM (T)	MAGNESIUM (T)	MANGANESE (D)	MANGANESE (T)
	3/4/2015	< 0.050	< 0.050	0.0146	0.0145	33.3	0.00239	0.00219
	3/7/2015	< 0.050	< 0.050	0.00622	0.00641	22.1	0.000721	0.00235
	3/8/2015	< 0.050	< 0.050	0.00927	0.00924	25.8	0.000963	0.00259
	3/9/2015	< 0.050	0.101	0.009	0.009	23.6	0.00112	0.00249
	3/10/2015	< 0.050	< 0.050	0.0103	0.00862	24.1	0.00156	0.00258
	3/11/2015	< 0.050	< 0.050	0.00887	0.00894	24.6	0.000573	0.0026
	3/12/2015	< 0.050	< 0.050	0.0079	0.00752	23.6	0.000601	0.00246
	3/13/2015	< 0.050	0.084	0.00784	0.00826	22.6	0.00065	0.00313
	3/14/2015	< 0.050	0.071	0.00727	0.00775	21.9	0.000791	0.0033
	3/15/2015	< 0.050	3.21	0.00312	0.0061	13.2	0.000785	0.104
	3/16/2015	< 0.050	0.739	0.00371	0.00418	12.2	0.000897	0.0226
	3/17/2015	< 0.050	0.235	0.00426	0.0045	13.7	0.000663	0.00826
	3/18/2015	< 0.050	0.195	0.0069	0.00673	15.6	0.000439	0.00712
	3/19/2015	< 0.050	0.131	0.00703	0.00731	17.3	0.00084	0.00521
	3/20/2015	< 0.050	0.167	0.00639	0.0068	16.6	0.000854	0.00587
	3/25/2015	< 0.050	0.108	0.008	0.00813	18.5	0.00168	0.00464
	4/1/2015	< 0.050	0.182	0.0095	0.0094	18.2	0.00102	0.00607
	4/8/2015	< 0.050	< 0.050	0.0087	0.0083	19.5	0.00097	0.00306
Average Sample Result		0.05	0.30961	0.0077156	0.0078717	20.356	0.00097317	0.010584
Maximum Sample Result		0.05	3.21	0.0146	0.0145	33.3	0.00239	0.104
Minimum Sample Result		0.05	0.05	0.00312	0.00418	12.2	0.000439	0.00219
Sample Count		18	18	18	18	18	18	18
Sample Range		0	3.16	0.01148	0.01032	21.1	0.001951	0.10181
Std Deviation		6.39E-10	0.74153	0.0026367	0.0022321	5.3006	0.00047464	0.023791
Std Error		1.51E-10	0.17478	0.00062148	0.0005261	1.2494	0.00011187	0.0056075

Statistic	sample_date	MERCURY (D)	MERCURY (T)	MOLYBDENUM (D)	MOLYBDENUM (T)	NICKEL (D)	NICKEL (T)	NITRATE NITROGEN (NO3), AS N (N)
	3/4/2015	< 0.010	< 0.010	0.000793	0.000782	0.7	0.52	3.17
	3/7/2015	< 0.010	< 0.010	0.000773	0.000807	< 0.50	0.52	0.819
	3/8/2015	< 0.010	< 0.010	0.00099	0.000998	0.99	1.04	2.68
	3/9/2015	< 0.010	< 0.010	0.00103	0.00103	0.9	0.99	1.72
	3/10/2015	< 0.010	< 0.010	0.0011	0.00112	0.95	1.06	1.67
	3/11/2015	< 0.010	< 0.010	0.00106	0.00105	0.95	1.12	1.6
	3/12/2015	< 0.010	< 0.010	0.00107	0.0011	0.97	1.19	1.55
	3/13/2015	< 0.010	< 0.010	0.00101	0.00105	0.96	1.15	1.4
	3/14/2015	< 0.010	< 0.010	0.000993	0.00101	1	1.16	1.32
	3/15/2015	< 0.010	< 0.010	0.00068	0.000963	1.04	9.74	0.54
	3/16/2015	< 0.010	< 0.010	0.000683	0.000727	0.86	2.66	0.508
	3/17/2015	< 0.010	< 0.010	0.0007	0.00076	0.85	1.33	0.59
	3/18/2015	< 0.010	< 0.010	0.000938	0.000899	1.35	1.9	1.23
	3/19/2015	< 0.010	< 0.010	0.00109	0.00114	1.4	1.85	1.27
	3/20/2015	< 0.010	< 0.010	0.00102	0.0011	1.31	1.92	1.17
	3/25/2015	< 0.010	< 0.010	0.0011	0.00109	1.56	1.83	1.25
	4/1/2015	< 0.0050	< 0.0050	0.00106	0.00109	1.98	2.38	1.91
	4/8/2015	< 0.0050	< 0.0050	0.00111	0.00113	2.11	2.26	1.44
Average Sample Result		0.0094444	0.0094444	0.00095556	0.00099144	1.1322	1.9233	1.4354
Maximum Sample Result		0.01	0.01	0.00111	0.00114	2.11	9.74	3.17
Minimum Sample Result		0.005	0.005	0.00068	0.000727	0.5	0.52	0.508
Sample Count		18	18	18	18	18	18	18
Sample Range		0.005	0.005	0.00043	0.000413	1.61	9.22	2.662
Std Deviation		0.0016169	0.0016169	0.00015519	0.00013725	0.41807	2.0441	0.6819
Std Error		0.00038111	0.00038111	0.000036578	0.000032351	0.09854	0.4818	0.16073

Statistic	sample_date	NITRITE NITROGEN (NO2), AS N (N)	NITROGEN, AMMONIA (AS N) (N)	ORTHO-PHOSPHATE (N)	pH, Field (N)	pH, LAB (N)	PHOSPHORUS (N)	POTASSIUM (T)
	3/4/2015	0.0013	< 0.0050	< 0.0010	8.33	8.26	0.0047	1.16
	3/7/2015	0.0014	0.0053	< 0.0010	8.6	8.46	0.0039	0.757
	3/8/2015	0.0063	0.007	< 0.0010	8.81	8.46	0.0047	0.867
	3/9/2015	0.0059	0.0073	< 0.0010	8.71	8.47	0.0037	0.806
	3/10/2015	0.0045	0.0065	< 0.0010	8.46	8.39	0.0033	0.769
	3/11/2015	0.0057	0.0062	< 0.0010	8.45	8.45	0.0042	0.789
	3/12/2015	0.0054	0.0062	< 0.0010	8.42	8.42	0.0041	0.819
	3/13/2015	0.0039	0.0065	< 0.0010	8.23	8.38	0.0055	0.799
	3/14/2015	0.0039	0.0064	< 0.0010	8.27	8.33	0.0067	0.79
	3/15/2015	0.0042	0.0116	0.0061	8.01	8.1	0.319	1.8
	3/16/2015	0.0019	0.0063	0.0072	8.26	8.19	0.069	0.953
	3/17/2015	0.0017	< 0.0050	0.0056	8.25	8.28	0.0255	0.698
	3/18/2015	0.0051	0.0077	0.0065	7.95	8.31	0.0192	0.782
	3/19/2015	0.008	0.0094	0.0049	8.03	8.33	0.0209	0.829
	3/20/2015	0.0067	0.0097	0.0045	8.06	8.29	0.0214	0.843
	3/25/2015	0.0056	0.0083	0.0031	8.4	8.29	0.0163	0.797
	4/1/2015	0.0043	0.0056	0.0057	8.33	8.17	0.024	0.882
	4/8/2015	0.0017	0.0054	< 0.0010	8.13	8.38	0.0069	0.759
Average Sample Result		0.0043056	0.0069667	0.0029778	8.3167	8.3311	0.031278	0.88328
Maximum Sample Result		0.008	0.0116	0.0072	8.81	8.47	0.319	1.8
Minimum Sample Result		0.0013	0.005	0.001	7.95	8.1	0.0033	0.698
Sample Count		18	18	18	18	18	18	18
Sample Range		0.0067	0.0066	0.0062	0.86	0.37	0.3157	1.102
Std Deviation		0.0020084	0.0017905	0.0024182	0.23806	0.10671	0.073528	0.24946
Std Error		0.00047337	0.00042202	0.00056998	0.05611	0.025152	0.017331	0.058799

Statistic	sample_date	SELENIUM (D)	SELENIUM (T)	SILVER (D)	SILVER (T)	SODIUM (T)	STRONTIUM (D)	STRONTIUM (T)
	3/4/2015	23.6	22.2	< 0.010	< 0.010	5.72	0.192	0.195
	3/7/2015	8.8	9	< 0.010	< 0.010	3.17	0.141	0.149
	3/8/2015	14.3	14.6	< 0.010	0.017	3.2	0.159	0.162
	3/9/2015	12.1	12.4	< 0.010	< 0.010	3.09	0.148	0.153
	3/10/2015	11.8	12.2	< 0.010	< 0.010	3.09	0.162	0.153
	3/11/2015	11.1	11.5	< 0.010	< 0.010	3.12	0.152	0.152
	3/12/2015	11.4	11.7	< 0.010	< 0.010	3.15	0.152	0.156
	3/13/2015	10	10.8	< 0.010	< 0.010	3.11	0.148	0.156
	3/14/2015	9.48	9.7	< 0.010	< 0.010	3.32	0.145	0.15
	3/15/2015	2.69	3.03	< 0.010	0.116	2.21	0.095	0.113
	3/16/2015	3.19	3.32	< 0.010	0.03	2.17	0.101	0.104
	3/17/2015	4.19	4.18	< 0.010	0.013	2.22	0.106	0.109
	3/18/2015	5.95	5.99	< 0.010	0.013	2.55	0.119	0.116
	3/19/2015	6.25	6.43	< 0.010	< 0.010	2.67	0.122	0.127
	3/20/2015	6.04	6.28	< 0.010	< 0.010	2.6	0.122	0.125
	3/25/2015	7.29	7.13	< 0.010	< 0.010	2.94	0.137	0.138
	4/1/2015	8.78	8.98	< 0.010	< 0.010	3.05	0.13	0.128
	4/8/2015	7.73	8.38	< 0.010	< 0.010	2.67	0.131	0.137
Average Sample Result		9.1494	9.3233	0.01	0.017722	3.0028	0.13678	0.14017
Maximum Sample Result		23.6	22.2	0.01	0.116	5.72	0.192	0.195
Minimum Sample Result		2.69	3.03	0.01	0.01	2.17	0.095	0.104
Sample Count		18	18	18	18	18	18	18
Sample Range		20.91	19.17	0	0.106	3.55	0.097	0.091
Std Deviation		4.8304	4.6073	1.13E-10	0.025005	0.77241	0.023992	0.022747
Std Error		1.1385	1.086	2.66E-11	0.0058938	0.18206	0.0056549	0.0053616

Statistic	sample_date	SULFATE (AS SO4) (D)	TEMPERATURE, FIELD (N)	THALLIUM (D)	THALLIUM (T)	TIN (D)	TIN (T)	TITANIUM (D)
	3/4/2015	147	0.42	< 0.010	< 0.010	0.00018	< 0.00010	14
	3/7/2015	84.2	3.19	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10
	3/8/2015	111	3.23	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10
	3/9/2015	99.1	3.85	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10
	3/10/2015	99.4	1.02	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10
	3/11/2015	95.6	1.58	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10
	3/12/2015	94.9	3.41	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10
	3/13/2015	87.8	1.93	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10
	3/14/2015	82.7	2.93	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10
	3/15/2015	40.1	1.34	0.01	0.154	< 0.00010	0.00015	< 10
	3/16/2015	39.4	0.65	< 0.010	0.045	< 0.00010	< 0.00010	< 10
	3/17/2015	44.9	2.5	< 0.010	0.017	< 0.00010	< 0.00010	< 10
	3/18/2015	56.7	1.53	< 0.010	0.016	< 0.00010	< 0.00010	< 10
	3/19/2015	60.5	2.33	< 0.010	0.012	< 0.00010	< 0.00010	< 10
	3/20/2015	60.2	2.25	< 0.010	0.018	< 0.00010	< 0.00010	< 10
	3/25/2015	64.6	1.66	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10
	4/1/2015	70.1	2.38	< 0.010	0.015	< 0.00010	< 0.00010	< 10
	4/8/2015	70.6	1.45	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10
Average Sample Result		78.267	2.0917	0.01	0.0215	0.00010444	0.00010278	10.222
Maximum Sample Result		147	3.85	0.01	0.154	0.00018	0.00015	14
Minimum Sample Result		39.4	0.42	0.01	0.01	0.0001	0.0001	10
Sample Count		18	18	18	18	18	18	18
Sample Range		107.6	3.43	0	0.144	0.00008	0.00005	4
Std Deviation		27.546	0.97481	1.13E-10	0.034092	0.000018856	0.000011785	0.94281
Std Error		6.4927	0.22976	2.66E-11	0.0080356	4.4444E-06	2.7778E-06	0.22222

Statistic	sample_date	TITANIUM (T)	TOTAL DISSOLVED SOLIDS (RESIDUE,	TOTAL KJELDAHL NITROGEN (N)	TOTAL ORGANIC CARBON (T)	TOTAL SUSPENDED SOLIDS, LAB (N)	TURBIDITY, LAB (N)	URANIUM (D)
	3/4/2015	13	438	0.134	1.18	1.2	0.31	1.26
	3/7/2015	< 10	293	0.059	1.28	1.4	1.34	0.976
	3/8/2015	< 10	352	< 0.050	1.03	2.5	1.26	1.23
	3/9/2015	< 10	333	0.183	0.96	1.8	1.17	1.18
	3/10/2015	< 10	334	0.16	1.22	2.1	1.6	1.27
	3/11/2015	10	319	0.169	1.09	2.4	1.69	1.24
	3/12/2015	10	312	0.149	1.09	2.2	1.68	1.16
	3/13/2015	< 10	298	0.1	1.15	4	3.02	1.12
	3/14/2015	< 10	289	0.071	1.53	4.8	2.83	1.04
	3/15/2015	136	208	0.729	13.4	255	141	0.547
	3/16/2015	49	207	0.222	5.3	47.7	33.7	0.559
	3/17/2015	13	204	0.16	2.89	15.4	10.2	0.612
	3/18/2015	< 10	232	0.187	3.11	13.4	9.63	0.776
	3/19/2015	< 10	246	0.146	2.8	8.6	4.87	0.849
	3/20/2015	12	247	0.145	2.56	9.7	7.99	0.842
	3/25/2015	< 10	229	0.126	2.44	5.6	5.63	0.922
	4/1/2015	12	258	0.206	4.14	9.3	6.13	0.875
	4/8/2015	< 10	253	0.122	2.38	3.5	1.75	0.955
Average Sample Result		19.722	280.67	0.17322	2.7528	21.7	13.1	0.96739
Maximum Sample Result		136	438	0.729	13.4	255	141	1.27
Minimum Sample Result		10	204	0.05	0.96	1.2	0.31	0.547
Sample Count		18	18	18	18	18	18	18
Sample Range		126	234	0.679	12.44	253.8	140.69	0.723
Std Deviation		30.411	61.182	0.14664	2.9202	59.214	32.823	0.23989
Std Error		7.1678	14.421	0.034563	0.68829	13.957	7.7364	0.056544

Statistic	sample_date	URANIUM (T)	VANADIUM (D)	VANADIUM (T)	ZINC (D)	ZINC (T)
	3/4/2015	1.23	< 1.0	< 1.0	4.1	< 3.0
	3/7/2015	1	< 1.0	< 1.0	< 3.0	< 3.0
	3/8/2015	1.27	< 1.0	< 1.0	< 3.0	< 3.0
	3/9/2015	1.16	< 1.0	< 1.0	< 3.0	< 3.0
	3/10/2015	1.17	< 1.0	< 1.0	< 3.0	< 3.0
	3/11/2015	1.18	< 1.0	< 1.0	< 3.0	< 3.0
	3/12/2015	1.21	< 1.0	< 1.0	< 3.0	< 3.0
	3/13/2015	1.15	< 1.0	< 1.0	< 3.0	< 3.0
	3/14/2015	1.1	< 1.0	< 1.0	< 3.0	< 3.0
	3/15/2015	0.856	< 1.0	15.9	< 3.0	35.9
	3/16/2015	0.655	< 1.0	4.4	< 3.0	8.7
	3/17/2015	0.661	< 1.0	1.6	< 3.0	3.7
	3/18/2015	0.776	< 1.0	1.4	< 3.0	3.9
	3/19/2015	0.883	< 1.0	1.1	< 3.0	3.2
	3/20/2015	0.866	< 1.0	1.3	< 3.0	3.7
	3/25/2015	0.927	< 1.0	< 1.0	< 3.0	3.1
	4/1/2015	0.871	< 0.50	0.95	< 3.0	4
	4/8/2015	1.01	< 0.50	< 0.50	< 3.0	< 3.0
Average Sample Result		0.99861	0.94444	2.0639	3.0611	5.3444
Maximum Sample Result		1.27	1	15.9	4.1	35.9
Minimum Sample Result		0.655	0.5	0.5	3	3
Sample Count		18	18	18	18	18
Sample Range		0.615	0.5	15.4	1.1	32.9
Std Deviation		0.19521	0.16169	3.5486	0.25927	7.7414
Std Error		0.046012	0.038111	0.8364	0.061111	1.8247

CM_MC2 (Test Location)

Statistic	sample_date	ALKALINITY, TOTAL (As CaCO3) (N)	ALUMINUM (D)	ALUMINUM (T)	ANTIMONY (D)	ANTIMONY (T)	ARSENIC (D)	ARSENIC (T)	BARIUM (D)
	3/3/2015	213	0.0097	0.032	0.17	0.19	0.17	0.22	0.072
	3/10/2015	200	< 0.0030	0.0439	0.16	0.18	0.15	0.2	0.0664
	3/16/2015	144	0.0162	0.62	0.12	0.15	0.17	0.5	0.0536
	3/23/2015	184	0.0032	0.0844	0.14	0.15	0.17	0.2	0.0632
	3/30/2015	165	0.0061	0.134	< 0.10	< 0.10	0.15	0.2	0.0548
	4/8/2015	185	< 0.0030	0.0939	0.14	0.15	0.16	0.2	0.0546
Average Sample Result		181.83	0.0068667	0.16803	0.13833	0.15333	0.16167	0.25333	0.060767
Maximum Sample Result		213	0.0162	0.62	0.17	0.19	0.17	0.5	0.072
Minimum Sample Result		144	0.003	0.032	0.1	0.1	0.15	0.2	0.0536
Sample Count		6	6	6	6	6	6	6	6
Sample Range		69	0.0132	0.588	0.07	0.09	0.02	0.3	0.0184
Std Deviation		24.62	0.005274	0.22443	0.025626	0.031411	0.0098319	0.12111	0.0076004
Std Error		10.051	0.0021531	0.091622	0.010462	0.012824	0.0040139	0.049441	0.0031029

Statistic	sample_date	BARIUM (T)	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)	BISMUTH (T)	BORON (D)	BORON (T)	BROMIDE (D)
	3/3/2015	0.0722	< 0.10	< 0.10	< 0.00050	< 0.00050	0.024	0.025	< 0.10
	3/10/2015	0.0681	< 0.10	< 0.10	< 0.00050	< 0.00050	0.023	0.024	< 0.10
	3/16/2015	0.0654	< 0.10	< 0.10	< 0.00050	< 0.00050	0.016	0.018	< 0.050
	3/23/2015	0.0635	< 0.10	< 0.10	< 0.00050	< 0.00050	0.022	0.023	< 0.050
	3/30/2015	0.055	< 0.10	< 0.10	< 0.000050	< 0.000050	0.017	0.018	< 0.050
	4/8/2015	0.0553	< 0.10	< 0.10	< 0.000050	< 0.000050	0.019	0.021	< 0.050
Average Sample Result		0.06325	0.1	0.1	0.00035	0.00035	0.020167	0.0215	0.066667
Maximum Sample Result		0.0722	0.1	0.1	0.0005	0.0005	0.024	0.025	0.1
Minimum Sample Result		0.055	0.1	0.1	5.00E-05	5.00E-05	0.016	0.018	0.05
Sample Count		6	6	6	6	6	6	6	6
Sample Range		0.0172	0	0	0.00045	0.00045	0.008	0.007	0.05
Std Deviation		0.0069221	1.666E-09	1.666E-09	0.00023238	0.00023238	0.0033116	0.0030166	0.02582
Std Error		0.0028259	6.80E-10	6.80E-10	0.000094868	0.000094868	0.001352	0.0012315	0.010541

Statistic	sample_date	CADMIUM (D)	CADMIUM (T)	CALCIUM (T)	CARBON, DISSOLVED ORGANIC	CHLORIDE (D)	CHROMIUM (D)	CHROMIUM (T)	COBALT (D)	COBALT (T)
	3/3/2015	0.022	0.023	106	0.93	3.4	0.19	0.24	0.74	0.79
	3/10/2015	< 0.010	0.024	109	0.93	3.4	0.17	0.25	0.91	1.17
	3/16/2015	0.017	0.058	64.2	2.65	1.9	0.12	0.93	0.14	0.69
	3/23/2015	0.027	0.034	80.7	1.42	2.4	0.15	0.29	0.39	0.57
	3/30/2015	0.0143	0.017	69	1.65	2	0.16	0.49	0.26	0.38
	4/8/2015	0.032	0.037	85	1.25	2.3	0.17	0.34	0.63	0.78
Average Sample Result		0.020383	0.032167	85.65	1.4717	2.5667	0.16	0.42333	0.51167	0.73
Maximum Sample Result		0.032	0.058	109	2.65	3.4	0.19	0.93	0.91	1.17
Minimum Sample Result		0.01	0.017	64.2	0.93	1.9	0.12	0.24	0.14	0.38
Sample Count		6	6	6	6	6	6	6	6	6
Sample Range		0.022	0.041	44.8	1.72	1.5	0.07	0.69	0.77	0.79
Std Deviation		0.0082172	0.014662	18.556	0.6417	0.67132	0.023664	0.2644	0.29701	0.26435
Std Error		0.0033546	0.0059856	7.5754	0.26197	0.27406	0.0096609	0.10794	0.12126	0.10792

Statistic	sample_date	CONDUCTIVITY, FIELD (N)	CONDUCTIVITY, LAB (N)	COPPER (D)	COPPER (T)	DISSOLVED OXYGEN, FIELD (N)	FLUORIDE (D)	Total or Dissolved CaCO3 (N)	INSTANTANEOUS FLOW (N)	IRON (D)
	3/3/2015	621.9	826	< 0.50	< 0.50	14	0.137	445		< 0.010
	3/10/2015		804	< 0.50	< 0.50		0.109	454		< 0.010
	3/16/2015	404.9	422	< 0.50	1.11	11.57	0.1	244	1.44	0.011
	3/23/2015	586.9	605	< 0.50	< 0.50	12.74	0.124	328	1.195	< 0.010
	3/30/2015	522.4	517	< 0.50	< 0.50	100000000	0.113	280		< 0.010
	4/8/2015	624.5	646	< 0.50	< 0.50	11.68	0.121	357	1.1	< 0.010
Average Sample Result		552.12	636.67	0.5	0.60167	20000000	0.11733	351.33	1.245	0.010167
Maximum Sample Result		624.5	826	0.5	1.11	1.00E+08	0.137	454	1.44	0.011
Minimum Sample Result		404.9	422	0.5	0.5	11.57	0.1	244	1.1	0.01
Sample Count		5	6	6	6	5	6	6	3	6
Sample Range		219.6	404	0	0.61	100000000	0.037	210	0.34	0.001
Std Deviation		92.025	158.33	0	0.24903	44721000	0.01291	85.439	0.17543	0.00040825
Std Error		41.155	64.637	0	0.10167	20000000	0.0052705	34.88	0.10128	0.00016667

Statistic	sample_date	IRON (T)	LEAD (D)	LEAD (T)	LITHIUM (D)	LITHIUM (T)	MAGNESIUM (T)	MANGANESE (D)	MANGANESE (T)
	3/3/2015	0.031	< 0.050	< 0.050	0.0109	0.0109	46.2	0.00457	0.0064
	3/10/2015	0.046	< 0.050	< 0.050	0.0108	0.011	47.8	0.00395	0.00769
	3/16/2015	0.699	< 0.050	0.462	0.00517	0.00604	21.3	0.00274	0.0253
	3/23/2015	0.087	< 0.050	0.072	0.00861	0.00848	33	0.00414	0.00866
	3/30/2015	0.109	< 0.050	0.059	0.0069	0.0069	25.4	0.00368	0.00735
	4/8/2015	0.091	< 0.050	0.062	0.0092	0.0096	35.2	0.0044	0.00834
Average Sample Result		0.17717	0.05	0.12583	0.0085967	0.00882	34.817	0.0039133	0.010623
Maximum Sample Result		0.699	0.05	0.462	0.0109	0.011	47.8	0.00457	0.0253
Minimum Sample Result		0.031	0.05	0.05	0.00517	0.00604	21.3	0.00274	0.0064
Sample Count		6	6	6	6	6	6	6	6
Sample Range		0.668	0	0.412	0.00573	0.00496	26.5	0.00183	0.0189
Std Deviation		0.25733	8.33E-10	0.16489	0.0022425	0.00206	10.705	0.00065604	0.0072337
Std Error		0.10505	3.40E-10	0.067317	0.00091551	0.00084098	4.3702	0.00026783	0.0029531

Statistic	sample_date	MERCURY (D)	IRON (T)	LEAD (D)	LEAD (T)	LITHIUM (D)	LITHIUM (T)	MAGNESIUM (T)	MANGANESE (D)
	3/3/2015	< 0.010	0.031	< 0.050	< 0.050	0.0109	0.0109	46.2	0.00457
	3/10/2015	< 0.010	0.046	< 0.050	< 0.050	0.0108	0.011	47.8	0.00395
	3/16/2015	< 0.010	0.699	< 0.050	0.462	0.00517	0.00604	21.3	0.00274
	3/23/2015	< 0.010	0.087	< 0.050	0.072	0.00861	0.00848	33	0.00414
	3/30/2015	< 0.010	0.109	< 0.050	0.059	0.0069	0.0069	25.4	0.00368
	4/8/2015	< 0.0050	0.091	< 0.050	0.062	0.0092	0.0096	35.2	0.0044
Average Sample Result		0.0091667	0.17717	0.05	0.12583	0.0085967	0.00882	34.817	0.0039133
Maximum Sample Result		0.01	0.699	0.05	0.462	0.0109	0.011	47.8	0.00457
Minimum Sample Result		0.005	0.031	0.05	0.05	0.00517	0.00604	21.3	0.00274
Sample Count		6	6	6	6	6	6	6	6
Sample Range		0.005	0.668	0	0.412	0.00573	0.00496	26.5	0.00183
Std Deviation		0.0020412	0.25733	8.33E-10	0.16489	0.0022425	0.00206	10.705	0.00065604
Std Error		0.00083333	0.10505	3.40E-10	0.067317	0.00091551	0.00084098	4.3702	0.00026783

Statistic	sample_date	MANGANESE (T)	MERCURY (D)	MERCURY (T)	MOLYBDENUM (D)	MOLYBDENUM (T)	NICKEL (D)	NICKEL (T)	NITRATE NITROGEN (NO3), AS N	NITRITE NITROGEN (NO2), AS N (N)
	3/3/2015	0.0064	< 0.010	< 0.010	0.00102	0.00106	9.53	9.72	2.36	0.012
	3/10/2015	0.00769	< 0.010	< 0.010	0.00104	0.00106	10.7	11	2.58	0.0155
	3/16/2015	0.0253	< 0.010	< 0.010	0.000835	0.000942	2.56	4.09	0.91	0.009
	3/23/2015	0.00866	< 0.010	< 0.010	0.000977	0.00102	5.56	5.83	1.48	0.0082
	3/30/2015	0.00735	< 0.010	< 0.010	0.000868	0.000865	4.08	4.36	1.18	0.0093
	4/8/2015	0.00834	< 0.0050	< 0.0050	0.000871	0.000911	7.72	8.3	1.77	0.0086
Average Sample Result		0.010623	0.0091667	0.0091667	0.000935	0.0009763	6.6917	7.2167	1.7133	0.010433
Maximum Sample Result		0.0253	0.01	0.01	0.00104	0.00106	10.7	11	2.58	0.0155
Minimum Sample Result		0.0064	0.005	0.005	0.000835	0.000865	2.56	4.09	0.91	0.0082
Sample Count		6	6	6	6	6	6	6	6	6
Sample Range		0.0189	0.005	0.005	0.000205	0.000195	8.14	6.91	1.67	0.0073
Std Deviation		0.0072337	0.0020412	0.0020412	8.79E-05	8.216E-05	3.1734	2.8849	0.65677	0.0028218
Std Error		0.0029531	0.00083333	0.0008333	3.59E-05	3.354E-05	1.2955	1.1778	0.26813	0.001152

Statistic	sample_date	NITROGEN, AMMONIA (AS N) (N)	ORTHO-PHOSPHATE (N)	pH, Field (N)	pH, LAB (N)	PHOSPHORUS (N)	POTASSIUM (T)	SELENIUM (D)	SELENIUM (T)	SILVER (D)
	3/3/2015	0.0055	0.001	8.13	8.38	0.005	1.38	5.87	5.98	< 0.010
	3/10/2015	0.0054	< 0.0010		8.3	0.0042	1.39	5.5	5.67	< 0.010
	3/16/2015	0.0132	0.0032	8.05	8.27	0.0358	1.05	2.52	2.66	< 0.010
	3/23/2015	0.0091	< 0.0010	7.82	8.34	0.0078	1.15	4.2	4.35	< 0.010
	3/30/2015	0.0066	0.0012	7.98	8.3	0.0162	0.98	3.71	3.47	< 0.010
	4/8/2015	< 0.0050	< 0.0010	8.47	8.49	0.0059	1.2	5.61	5.59	< 0.010
Average Sample Result		0.0074667	0.0014	8.09	8.3467	0.012483	1.1917	4.5683	4.62	0.01
Maximum Sample Result		0.0132	0.0032	8.47	8.49	0.0358	1.39	5.87	5.98	0.01
Minimum Sample Result		0.005	0.001	7.82	8.27	0.0042	0.98	2.52	2.66	0.01
Sample Count		6	6	5	6	6	6	6	6	6
Sample Range		0.0082	0.0022	0.65	0.22	0.0316	0.41	3.35	3.32	0
Std Deviation		0.0031785	0.00088544	0.24114	0.079917	0.012226	0.16822	1.3203	1.3513	0
Std Error		0.0012976	0.00036148	0.10784	0.032626	0.0049912	0.068674	0.539	0.55166	0

Statistic	sample_date	SILVER (T)	SODIUM (T)	STRONTIUM (D)	STRONTIUM (T)	SULFATE (AS SO4) (D)	TEMPERATURE, FIELD (N)	THALLIUM (D)	THALLIUM (T)
	3/3/2015	< 0.010	10	0.29	0.299	249	-0.2	0.014	< 0.010
	3/10/2015	< 0.010	10.4	0.296	0.31	255		0.011	0.013
	3/16/2015	< 0.010	4.68	0.171	0.182	94.3	0.6	< 0.010	0.032
	3/23/2015	< 0.010	7.09	0.225	0.231	151	1.7	< 0.010	0.012
	3/30/2015	< 0.010	5.43	0.195	0.194	123	1.9	< 0.010	0.012
	4/8/2015	< 0.010	7.06	0.222	0.222	172	3.8	< 0.010	0.014
Average Sample Result		0.01	7.4433	0.23317	0.23967	174.05	1.56	0.010833	0.0155
Maximum Sample Result		0.01	10.4	0.296	0.31	255	3.8	0.014	0.032
Minimum Sample Result		0.01	4.68	0.171	0.182	94.3	-0.2	0.01	0.01
Sample Count		6	6	6	6	6	5	6	6
Sample Range		0	5.72	0.125	0.128	160.7	4	0.004	0.022
Std Deviation		0	2.3341	0.05038	0.053414	65.836	1.5143	0.0016021	0.0081915
Std Error		0	0.95289	0.020568	0.021806	26.878	0.6772	0.00065405	0.0033441

Statistic	sample_date	TIN (D)	SILVER (T)	SODIUM (T)	STRONTIUM (D)	STRONTIUM (T)	SULFATE (AS SO4) (D)	TEMPERATURE, FIELD (N)	THALLIUM (D)
	3/3/2015	< 0.00010	< 0.010	10	0.29	0.299	249	-0.2	0.014
	3/10/2015	< 0.00010	< 0.010	10.4	0.296	0.31	255		0.011
	3/16/2015	< 0.00010	< 0.010	4.68	0.171	0.182	94.3	0.6	< 0.010
	3/23/2015	< 0.00010	< 0.010	7.09	0.225	0.231	151	1.7	< 0.010
	3/30/2015	< 0.00010	< 0.010	5.43	0.195	0.194	123	1.9	< 0.010
	4/8/2015	< 0.00010	< 0.010	7.06	0.222	0.222	172	3.8	< 0.010
Average Sample Result		0.0001	0.01	7.4433	0.23317	0.23967	174.05	1.56	0.010833
Maximum Sample Result		0.0001	0.01	10.4	0.296	0.31	255	3.8	0.014
Minimum Sample Result		0.0001	0.01	4.68	0.171	0.182	94.3	-0.2	0.01
Sample Count		6	6	6	6	6	6	5	6
Sample Range		0	0	5.72	0.125	0.128	160.7	4	0.004
Std Deviation		0	0	2.3341	0.05038	0.053414	65.836	1.5143	0.0016021
Std Error		0	0	0.95289	0.020568	0.021806	26.878	0.6772	0.00065405

Statistic	sample_date	THALLIUM (T)	TIN (D)	TIN (T)	TITANIUM (D)	TITANIUM (T)	TOTAL DISSOLVED SOLIDS	TOTAL KJELDAHL NITROGEN	TOTAL ORGANIC CARBON
	3/3/2015	< 0.010	< 0.00010	< 0.00010	< 10	< 10	551	< 0.050	0.82
	3/10/2015	0.013	< 0.00010	< 0.00010	12	14	556	< 0.050	0.83
	3/16/2015	0.032	< 0.00010	< 0.00010	< 10	24	278	0.184	3.82
	3/23/2015	0.012	< 0.00010	< 0.00010	< 10	< 10	420	0.127	1.32
	3/30/2015	0.012	< 0.00010	< 0.00010	< 10	12	351	0.192	2.14
	4/8/2015	0.014	< 0.00010	< 0.00010	< 10	10	434	0.07	1.17
Average Sample Result		0.0155	0.0001	0.0001	10.333	13.333	431.67	0.11217	1.6833
Maximum Sample Result		0.032	0.0001	0.0001	12	24	556	0.192	3.82
Minimum Sample Result		0.01	0.0001	0.0001	10	10	278	0.05	0.82
Sample Count		6	6	6	6	6	6	6	6
Sample Range		0.022	0	0	2	14	278	0.142	3
Std Deviation		0.0081915	0	0	0.8165	5.465	109.51	0.065209	1.1526
Std Error		0.0033441	0	0	0.33333	2.2311	44.707	0.026621	0.47056

Statistic	sample_date	SUSPENDED SOLIDS, LAB (N)	TURBIDITY, LAB (N)	URANIUM (D)	URANIUM (T)	VANADIUM (D)	VANADIUM (T)	ZINC (D)	ZINC (T)
	3/3/2015	1.7	0.53	2.19	2.26	< 1.0	< 1.0	< 3.0	3.2
	3/10/2015	2.1	1.09	2.27	2.25	< 1.0	< 1.0	< 3.0	< 3.0
	3/16/2015	29.7	18.9	0.991	1.06	< 1.0	1.6	< 3.0	5.3
	3/23/2015	4.5	2.09	1.5	1.55	< 1.0	< 1.0	< 3.0	< 3.0
	3/30/2015	10.2	6.69	1.19	1.19	< 0.50	< 0.50	< 3.0	< 3.0
	4/8/2015	4.3	1.81	1.57	1.59	< 0.50	< 0.50	< 3.0	3.7
Average Sample Result		8.75	5.185	1.6185	1.65	0.83333	0.93333	3	3.5333
Maximum Sample Result		29.7	18.9	2.27	2.26	1	1.6	3	5.3
Minimum Sample Result		1.7	0.53	0.991	1.06	0.5	0.5	3	3
Sample Count		6	6	6	6	6	6	6	6
Sample Range		28	18.37	1.279	1.2	0.5	1.1	0	2.3
Std Deviation		10.703	7.0679	0.51862	0.51096	0.2582	0.40825	0	0.90701
Std Error		4.3696	2.8854	0.21173	0.2086	0.10541	0.16667	0	0.37029

APPENDIX F – Chain of Custody Forms

Teck Coal

COC ID:	20150302-0750	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Contact Name				Lab Contact	Krysta Pearcy			Invoice Reports	
Address	PO Box 100			Email	krysta@nautilusenvironmental.com			Email Report To	
City	Elkford	State	BC	Address	8664 Commerce Court			Email Reports	
Postal Code	V0B 1H0	Country	Canada		Imperial Square Lake City			Shipping Company	
Phone Number	1-250-865-5289			City	Burnaby	State	BC	Tracking Number	
Email EDD To	lee.wilm@teck.com			Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Email EDD To	neil.macdonald@teck.com			Phone Number				Cooler Description	
Email EDD To	aita.bezzola@teck.com			Quote Number				Sampler 2	
PO Number				PO Number				Sampler 3	

SAMPLE DETAILS									ANALYSIS REQUESTED								
Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	7 d C. dubia P/F	72 h P. subcapitata P/F	30-d fathead minnow P/F	28 d H. azteca P/F					Temp
FR_UFR1_M_02032015_N				WS	3/2/2015	11:55		3	X	X	X	X					10.4
FR_FRCP1_M_02032015_N				WS	3/2/2015	14:30		3	X	X	X	X					9.5
									15155	15156	15157	15158					
											①	①					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
① Test cancelled.	Teck PRO Aita Bezzola	March 3 2015 7:30		

Sampler's Name	Aita Bezzola	Mobile #	
Sampler's Signature		Date/Time	March 3 2015 07:30

Received by NAUTILUS - NY - NAIR YAMAMOTO
6x201

COC ID:	20150311-1400	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Eamil Invoice To	
Contact Name				Lab Contact				Invoice Reports	
Address	PO Box 100			Email				Email Report To	
City	Elkford	State	BC	Address	8664 Commerce Court			Email Reports	
Postal Code	V0B 1H0	Country	Canada		Imperial Square Lake City			Shipping Company	
Phone Number	1-250-865-5289			City	Burnaby	State	BC	Tracking Number	
Email EDD To	lee.wilm@teck.com			Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Email EDD To	neil.macdonald@teck.com			Phone Number				Cooler Description	
Email EDD To	aita.bezzola@teck.com			Quote Number				Sampler 2	
PO Number	VPO00295545			PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	48 hr Single Concentration - Dapnia m.	30 d Fathead minnow	28 d H. Azteca	Rec. Temp (°C)
FR_FRCP1-WS-201503111136				WS	2015/03/11	11:36	G	2		2	X	7.1
FR_SP1-WS-201503111224				WS	2015/03/11	12:24	G	1	1			6.5
FR_UFR1-WS-201503111042				WS	2015/03/11	10:42	G	2		2	X	8.0

ANALYSIS

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	N MacDonald	2015/03/11	[signature] 4HC Mar 12/15 12:45pm →	

Sampler's Name	N MacDonald	Mobile #	250 865-5204
Sampler's Signature	[signature]	Date/Time	2015/03/11

COC ID:	20150318-1417	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Eamil Invoice To	
Contact Name				Lab Contact	Krysta Pearcy			Invoice Reports	
Address	PO Box 100			Email	krysta@nautilusenvironmental.com			Email Report To	
City	Elkford	State	BC	Address	8664 Commerce Court			Email Reports	
Postal Code	V0B 1H0	Country	Canada		Imperial Square Lake City			Shipping Company	
Phone Number	1-250-865-5289			City	Burnaby	State	BC	Tracking Number	
Email EDD To	lee.wilm@teck.com			Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Email EDD To	neil.macdonald@teck.com			Phone Number				Cooler Description	
Email EDD To	aita.bezzola@teck.com			Quote Number				Sampler 2	
PO Number				PO Number				Sampler 3	

SAMPLE DETAILS									ANALYSIS REQUESTED											
Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30-d fathead minnow	28 d H. azteca									Temp
FR_UFRI_W_16032015_N				WS	3/18/2015	8:54		2		X	X									8.6
FR_FRCP1_W_16032015_N				WS	3/18/2015	14:30		2		X	X									8.6
								30 #		151891	151900									

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
= refresh samples = NY	A. Bezzola Teck RPO	March 18 2015	NAUTILUS	Mar 19/15
			NY - NAIR YAMAMOTO	@ 09:21
				2 x 20L each sample

Sampler's Name	A. Bezzola	Mobile #	
Sampler's Signature		Date/Time	March 18 2015

COC ID:	20150325-1243	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Eamil Invoice To	
Contact Name				Lab Contact	Krysta Pearcy			Invoice Reports	
Address	PO Box 100			Email	krysta@nautilusenvironmental.com			Email Report To	
City	Elkford	State	BC	Address	8664 Commerce Court			Email Reports	
Postal Code	V0B 1H0	Country	Canada		Imperial Square Lake City			Shipping Company	
Phone Number	1-250-865-5289			City	Burnaby	State	BC	Tracking Number	
Email EDD To	lee.wilm@teck.com			Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Email EDD To	neil.macdonald@teck.com			Phone Number				Cooler Description	
Email EDD To	aita.bezzola@teck.com			Quote Number				Sampler 2	
PO Number				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30-d fathead minnow	28 d H. azteca	Temp
FR_FRCP1_W_23032015_N				WS	2015/03/25	09:52		2	X	X	6.1
FR_UFR1_W_23032015_N				WS	2015/03/25	09:56		2	X	X	6.1
									WO # 15189	15190	

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
= refresh sample =	Teck FRO Aita Bezzola	M.24 2015 13:00		

Sampler's Name	Aita Bezzola	Mobile #	
Sampler's Signature	[signature]	Date/Time	March 24 2015 13:00

Received by NAUTILUS - NY - NAIR YAMAMOTO

COC ID:	20150401-1446	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Eamil Invoice To	
Contact Name				Lab Contact	Krysta Pearcy			Invoice Reports	
Address	PO Box 100			Email	krysta@nautilusenvironmental.com			Email Report To	
City	Elkford	State	BC	Address	8664 Commerce Court			Email Reports	
Postal Code	V0B 1H0	Country	Canada		Imperial Square Lake City			Shipping Company	
Phone Number	1-250-865-5289			City	Burnaby	State	BC	Tracking Number	
Email EDD To	lee.wilm@teck.com			Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Email EDD To	neil.macdonald@teck.com			Phone Number				Cooler Description	
Email EDD To	aita.bezzola@teck.com			Quote Number				Sampler 2	
PO Number				PO Number				Sampler 3	

SAMPLE DETAILS									ANALYSIS REQUESTED											
Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30-d fathead minnow	28 d H. azteca									
FR_FRCP1_W_30032015_N				WS	4/1/2015	09:45	20L	2		X	X									5.5
FR_UFR1_W_30032015_N				WS	4/1/2015	11:47	20L	2		X	X									5.2
										15189	15190									
										WOF										

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Refresh Samples	Teck FRO	April 1 2015 14:56		

Sampler's Name	A. Le Bezzola	Mobile #	
Sampler's Signature		Date/Time	April 1 2015 14:56

Received by Nautilus KL Krista Lyne

COC ID:	20150408-0958	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Eamil Invoice To	
Contact Name				Lab Contact	Krysta Pearcy			Invoice Reports	
Address	PO Box 100			Email	krysta@nautilusenvironmental.com			Email Report To	
City	Elkford	State	BC	Address	8664 Commerce Court			Email Reports	
Postal Code	V0B 1H0	Country	Canada		Imperial Square Lake City			Shipping Company	
Phone Number	1-250-865-5289			City	Burnaby	State	BC	Tracking Number	
Email EDD To	lee.wilm@teck.com			Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Email EDD To	neil.macdonald@teck.com			Phone Number				Cooler Description	
Email EDD To	aita.bezzola@teck.com			Quote Number				Sampler 2	
PO Number				PO Number				Sampler 3	

SAMPLE DETAILS									ANALYSIS REQUESTED											
Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30-d fathead minnow	28 d H. azteca										Chron.
FR_FRCP1_M_06042015_N				WS	4/8/2015	09:19		2	X	X										6.2
FR_UFRI_M_06042015_N				WS	4/8/2015	09:02		2	X	X										7.0

COC ID: 20150408-0958

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
= refresh sample =	Tetra Tech Aita Bezzola	4/8/2015 10:15		

Sampler's Name	Aita Bezzola	Mobile #	
Sampler's Signature		Date/Time	Apr 8 2015 10:15

Received by NAUTILUS – NY – NAIR YAMAMOTO

Chain Of Custody Record

COC ID: 20140902-1509 | Page: 1 of 2

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Coal Mountain Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Contact Name	Don Sacino			Contact Name				Address			
Address	2261 Corbin Rd.			Address	8664 commerce Court						
City	Sparwood	Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada	City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425 7377			Postal Code	V5A 4N7	Country	Canada	Task Code			
Email EDD To	Rick.Magliocco@teck.com			Phone Number				Shipping Company			
	Don.Sacino@teck.com			Email Address				Tracking Number			
	Carla.Romero@teck.com			PO Number				CC Hardcopy To			
								CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
					W07 #	PRESERV.	15157	15160	15161	15162	15163	15164				
						ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia P/F	72 h P. subcapitata P/F	30 d fathead minnow ① P/F	28 d H. Azteca ① P/F				Temp	
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.												
CM_SPD_MON_WS_20150303_N	WS	03-03-15	12:15	G	2		x	x								8.0	
CM_CCPD_MON_WS_20150303_N	WS	03-03-15	14:15	G	2		x	x								8.1	
CM_MC2_MON_WS_20150303_N	WS	03-03-15	08:50	G	3				X	X	X	X				6.3	

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	T. Phillips/Nupqu							Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Tyler Phillips		Mobile #	250-919-0965		Temp in °C	Samples on ice?
Sampler's Signature				Date/Time		Sample intact?	Trip Blank?

Received by NAUTILUS - NY - NAIR YAMAMOTO

① Test cancelled

Chain Of Custody Record

COC ID: 20140902-1509 | Page: 1 of 2

Turnaround Time:

PROJECT/CLIENT INFO					LABORATORY					OTHER INFO				
Facility Name	Coal Mountain Operation				Lab Name	Nautilus Environmental				Send Invoice To				
Contact Name	Don Sacino				Contact Name					Address				
Address	2261 Corbin Rd.				Address	8664 commerce Court								
City	Sparwood	Prov.	BC							City		State		
Postal Code	V0B 2G0	Country	Canada		City	Burnaby	State	BC		Postal Code		Country		
Phone Number	250 425 7377				Postal Code	V5A 4N7	Country	Canada		Task Code				
Email EDD To	Rick.Magliocco@teck.com				Phone Number					Shipping Company				
	Don.Sacino@teck.com				Email Address					Tracking Number				
	Carla.Romero@teck.com				PO Number					CC Hardcopy To				
										CC Hardcopy To				

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia	72 h P. subcapitata	30 d fathead minnow	28 d H. Azteca				
																7(C) 7.1
CM_MC2_MON_WS_20150303_N	WS	March 10/15	11:30	G	2 x 20L						x	x				
											15184	15185				rcvd by Amo March 12/15 @ 1000h
											Lot# 1504	Lot# 1504				
											Exp 2015 04	Exp 2015 04				

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
2x20L cubitainers	Carla Romero							Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Carla Romero	Mobile #	2504257350		
Sampler's Signature		Date/Time	March 10 2015/13:07		

Temp in °C | Samples on ice? | Sample intact? | Trip Blank?

Chain Of Custody Record

COC ID:

Page: 1 of 2

Turnaround Time:

PROJECT/CLIENT INFO					LABORATORY				OTHER INFO			
Facility Name	Coal Mountain Operation				Lab Name	Nautilus Environmental			Send Invoice To			
Contact Name	Don Sacino				Contact Name				Address			
Address	2261 Corbin Rd.				Address	8664 commerce Court						
City	Sparwood	Prov.	BC						City		State	
Postal Code	V0B 2G0	Country	Canada		City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425 7377				Postal Code	V5A 4N7	Country	Canada	Task Code			
Email EDD To	Rick.Magliocco@teck.com				Phone Number				Shipping Company			
	Don.Sacino@teck.com				Email Address				Tracking Number			
	Carla.Romero@teck.com				PO Number				CC Hardcopy To			
									CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV. NO.#	15211	15212			15184	15185				
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia	72 h P. subcapitata	30 d fathead minnow	28 d H. Azteca				Temp °C	
																	temp (°C) - 8.3-1x2
CM_PC2_MON_WS_20150316_N	WS	3/16/2015	13:30	G	3 (1)		x	x								→	9.8 — 2x1L
CM_MC2_MON_WS_20150303_N	WS	3/16/2015	10:00	G	2 (2)						X	X				6.5	

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
(1) 2x1L + 1x20L	T. Phillips/Nupqu			NAUTILUS	Mar 18/15	10:20		Y / N	Y / N	Y / N
(2) refresh sample				NY - NAIR YAMAMOTO				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
NY								Y / N	Y / N	Y / N

Sampler's Name	Tyler Phillips	Mobile #	250-919-0965
Sampler's Signature		Date/Time	

Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
	Y / N	Y / N	Y / N

Chain Of Custody Record

COC ID: 20140902-1509 | Page: 1 of 2

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Coal Mountain Operation			Lab Name	Nautilus Environmental			Send Invoice To	
Contact Name	Don Sacino			Contact Name				Address	
Address	2261 Corbin Rd.			Address	8664 commerce Court				
City	Sparwood	Prov.	BC					City	State
Postal Code	V0B 2G0	Country	Canada	City	Burnaby	State	BC	Postal Code	Country
Phone Number	250 425 7377			Postal Code	V5A 4N7	Country	Canada	Task Code	
Email EDD To	Rick.Magliocco@teck.com			Phone Number				Shipping Company	
	Don.Sacino@teck.com			Email Address				Tracking Number	
	Carla.Romero@teck.com			PO Number				CC Hardcopy To	
								CC Hardcopy To	

SAMPLE DETAILS						ANALYSIS REQUESTED									ADDITIONAL INFORMATION
						PRESERV.									
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia	72 h P. subcapitata	30 d fathead minnow	28 d H. Azteca			
CM_MC2_MON_WS_20150323_N	WS	Mar. 23. 2015	08:31	G	2						x	x			8.9
										WO #	15184	15185			

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
-refresh sample -	Tyler Phillips/ Nupqu							Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Tyler Phillips	Mobile #	(250) 919-0965	Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature			Date/Time				

Received by NAUTILUS - NY - NAIR YAMAMOTO

Chain Of Custody Record

COC ID: 20140902-1509 | Page: 1 of 2

Turnaround Time:

PROJECT/CLIENT INFO					LABORATORY					OTHER INFO				
Facility Name	Coal Mountain Operation				Lab Name	Nautilus Environmental				Send Invoice To				
Contact Name	Don Sacino				Contact Name					Address				
Address	2261 Corbin Rd.				Address	8664 commerce Court								
City	Sparwood		Prov.	BC						City			State	
Postal Code	V0B 2G0	Country	Canada		City	Burnaby		State	BC	Postal Code		Country		
Phone Number	250 425 7377				Postal Code	V5A 4N7	Country	Canada		Task Code				
Email EDD To	Rick.Magliocco@teck.com				Phone Number					Shipping Company				
	Don.Sacino@teck.com				Email Address					Tracking Number				
	Carla.Romero@teck.com				PO Number					CC Hardcopy To				
										CC Hardcopy To				

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia	72 h P. subcapitata	30 d fathead minnow	28 d H. Azteca				
CM_MC2_MON_WS_20150330_N	WS	30-Mar-15		G	2						x	x			8.8	
										WO #	15184	15185				

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
Refresh Sample	Tyler Phillips- Nupqu							Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Tyler Phillips	Mobile #	(250) 919-0965	Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature		Date/Time					

Received by Nautilus - NY / KL - Kania Lyne

Chain Of Custody Record

COC ID: 20140902-1509 | Page: 1 of 2

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Coal Mountain Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Contact Name	Don Sacino			Contact Name				Address			
Address	2261 Corbin Rd.			Address	8664 commerce Conrt						
City	Sparwood	Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada	City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425 7377			Postal Code	V5A 4N7	Country	Canada	Task Code			
Email EDD To	Rick.Magliocco@teck.com			Phone Number				Shipping Company			
	Don.Sacino@teck.com			Email Address				Tracking Number			
	Carla.Romero@teck.com			PO Number				CC Hardcopy To			
								CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV.	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia	72 h P. subcapitata	30 d fathead minnow	28 d H. Azteca				Temp °C
										30 d #	15184	15185				
CM_MC2_MON_WS_20150408_N	WS	April-8-2015	15:30	G	2						X	X				9.2

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	T. Phillips/Nupqu							Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Tyler Phillips	Mobile #	250-919-0965	Temp in °C	Samples on ice?
Sampler's Signature		Date/Time			Sample intact?
					Trip Blank?

Received Apr 10/15 @ 10:40

Chain Of Custody Record

COC ID: March Quarterly_Nautilus | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Project Number				Contact Name				Address			
Contact Name	Zahir Jina			Address	8664 Commence Court						
Address	P.O. BOX 5000				Imperial Square Lake City			City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number				Shipping Company			
Phone Number	250-865-3301			Email Address				Tracking Number			
Email EDD To	Zahir.Jina@teck.com			Quote Number				CC Hardcopy To			
Email Report To	Zahir.Jina@teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
					WO #	PRESERV.	15146	15147	15148	15149	15150	15151				
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow P/F	28 d Hyallella P/F	72 h P. subcapitata P/F	7 d C. dubia P/F	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail					Temp.
GH_FR1_WS_2015-03-02_N	WS	2015/03/02	14:22	G	4	✓	X	X	X	X							6.0
GH_ERC_WS_2015-03-02_N	WS			G					X	X							
GH_GH1_WS_2015-03-02_N	WS	2015/03/02	8:18	G	2	✓					X	X					5.5
GH_CC1_WS_2015-03-02_N	WS	2015/03/02	11:40	G	2	✓					X	X					5.3
GH_SC1_WS_2015-03-02_N	WS			G							X	X					
GH_PC1_WS_2015-03-02_N	WS	2015/03/02	10:40	G	2	✓					X	X					4.8
GH_MC1_WS_2015-03-02_N	WS			G							X	X					
GH_TC1_WS_2015-03-02_N	WS			G							X	X					
GH_TC2_WS_2015-03-02_N	WS			G							X	X					
GH_COUGAR_WS_2015-03-02_N	WS			G							X	X					
GH_WADE_WS_2015-03-02_N	WS			G							X	X					

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	M Calabrese	March 3/15	16:40					Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

				Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Name	Zahir Jina	Mobile #	6047447245				
Sampler's Signature		Date/Time	March 3/15 15:40				

Received by NAUTILUS - NY - NAIR YAMAMOTO

Chain Of Custody Record

COC ID: March Quarterly_Nautilus | Page: 1 of 1

Turnaround Time: | **Rush:**

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Project Number				Contact Name				Address			
Contact Name	Zahir Jina			Address	8664 Commence Court						
Address	P.O. BOX 5000				Imperial Square Lake City			City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number				Shipping Company			
Phone Number	250-865-3301			Email Address				Tracking Number			
Email EDD To	Zahir.Jina@teck.com			Quote Number				CC Hardcopy To			
Email Report To	Zahir.Jina@teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	WO#	15146	15147	15148	15149	15150	15151				
						PRESERV.										
						ANALYSIS	30 d early life stage, fathead minnow P/F	28 d Hyallella P/F	72 h P. subcapitata P/F	7 d C. dubia P/F	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail				Temp
Mar 4 GH_FR1_WS_2015-03-02_N	WS			G			X	X	X	X						1
GH_ERC_WS_2015-03-02_N	WS	15:16 Mar 3		G	1 x 20L 1 x 1L				X	X						4.4 6.4
Mar 4 GH_GH1_WS_2015-03-02_N	WS			G							X	X				1
Mar 4 GH_CC1_WS_2015-03-02_N	WS			G							X	X				1
TO COME GH_SC1_WS_2015-03-02_N	WS			G							X	X				1
Mar 4 GH_PC1_WS_2015-03-02_N	WS			G							X	X				1
GH_MC1_WS_2015-03-02_N	WS	Mar 3	12:20	G	2x20L						X	X				6.5
GH_TC1_WS_2015-03-02_N	WS	Mar 3	14:31	G	2x20L						X	X				5.5
GH_TC2_WS_2015-03-02_N	WS	13:45 Mar 3		G	2x20L						X	X				6.4
TO COME GH_COUGAR_WS_2015-03-02_N	WS			G							X	X				1
GH_WADE_WS_2015-03-02_N	WS	March 3	11:06	G	2x20L						X	X				5.4

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Zahir Jina	Mobile #		Temp in °C	Samples on ice?
Sampler's Signature		Date/Time			Sample intact?
					Trip Blank?

Received by NAUTILUS - NY - NAIR YAMAMOTO

Chain Of Custody Record

COC ID: [redacted] | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Project Number				Contact Name				Address			
Contact Name	Zahir Jina			Address	8664 Commence Court						
Address	P.O. BOX 5000				Imperial Square Lake City			City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number				Shipping Company			
Phone Number	250-865-3301			Email Address				Tracking Number			
Email EDD To	Zahir.Jina@teck.com			Quote Number				CC Hardcopy To			
Email Report To	Zahir.Jina@teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail				
GH_FR1_WS_2015-03-02_N	WS	9/3/2015	[illegible]	G			X	X								T(C): 9.4
																received by AO Mar 11/15 @ 1010

WO# 15180 15181 15188 ppy

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Zahir Jina		Mobile #		Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature			Date/Time					

Chain Of Custody Record

COC ID: March Re-Fresh_Wk_2_Nautilus | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Project Number				Contact Name				Address			
Contact Name	Zahir Jina			Address	8664 Commence Court						
Address	P.O. BOX 5000				Imperial Square Lake City			City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number				Shipping Company			
Phone Number	250-865-3301			Email Address				Tracking Number			
Email EDD To	Zahir.Jina@teck.com			Quote Number				CC Hardcopy To			
Email Report To	Zahir.Jina@teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESRV.	15189	15181								Re-Fresher, Wk #2
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail				Temp.
GH_FR1_WS_2015-03-02_N	WS	16/3/2015	10 16	G	2x20L		X	X								6,0

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
refresh sample				NAUTILUS	Mar 18/15	10:20		Y / N	Y / N	Y / N
N4				N4 - NAIR YAMAMOTO				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Zahir Jina	Mobile #		Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature		Date/Time					

Chain Of Custody Record

COC ID: March Re-Fresh_Wk_3_Nautilus | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Greenhills Operation	Lab Name	Nautilus Environmental	Send Invoice To	
Project Number		Contact Name		Address	
Contact Name	Zahir Jina	Address	8664 Commence Court		
Address	P.O. BOX 5000		Imperial Square Lake City	City / State	
		City / State	Burnaby / BC	Postal Code / Country	
City / State	Elkford / BC	Postal Code / Country	V5A 4N7 / Canada	Task Code	
Postal Code / Country	V0B1H0 / Canada	Phone Number		Shipping Company	
Phone Number	250-865-3301	Email Address		Tracking Number	
Email EDD To	Zahir.Jina@teck.com	Quote Number		CC Hardcopy To	
Email Report To	Zahir.Jina@teck.com			CC Hardcopy To	

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Re-Fresher, Wk #2
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail				
GH_FR1_WS_2015-03-23_N	WS	23/3/2015	10:45	G	2		X	X							6-7	
							15180	15181								
							WO#									

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
=refresh sample=								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

				Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Name	Zahir Jina	Mobile #					
Sampler's Signature		Date/Time					

Received by NAUTILUS - NW-NAIR YAMS

Chain Of Custody Record

COC ID: March Re-Fresh_Wk_3_Nautilus

Page: 1 of 1

Turnaround Time: Rush:

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Greenhills Operation	Lab Name	Nautilus Environmental	Send Invoice To	
Project Number		Contact Name		Address	
Contact Name	Zahir Jina	Address	8664 Commence Court		
Address	P.O. BOX 5000		Imperial Square Lake City	City	State
		City	Burnaby State BC	Postal Code	Country
City	Elkford State BC	Postal Code	V5A 4N7 Country Canada	Task Code	
Postal Code	V0B1H0 Country Canada	Phone Number		Shipping Company	
Phone Number	250-865-3301	Email Address		Tracking Number	
Email EDD To	Zahir.Jina@teck.com	Quote Number		CC Hardcopy To	
Email Report To	Zahir.Jina@teck.com			CC Hardcopy To	

SAMPLE DETAILS / ANALYSIS REQUESTED / ADDITIONAL INFORMATION

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. / ANALYSIS	30 d early life stage, fathead minnow	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail					ADDITIONAL INFORMATION
																	Re-Fresher, Wk #2
GH_FR1_WS_2015-03-30_N	WS	30/3/2015		G			X	X								8.2	
						WO #	15180	15181									

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
= refresh sample =								Y / N	Y / N	Y / N
	Sampler's Name	Zahir Jina		Mobile #			Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
	Sampler's Signature			Date/Time						

Received by NAUTILUS NY - NAIR YAMAMOTO

Chain Of Custody Record

COC ID: April Re-Fresh_Final_Nautilus | Page: 1 of 1

Turnaround Time: | **Rush:**

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Project Number				Contact Name				Address			
Contact Name	Zahir Jina			Address	8664 Commence Court						
Address	P.O. BOX 5000				Imperial Square Lake City			City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number				Shipping Company			
Phone Number	250-865-3301			Email Address				Tracking Number			
Email EDD To	Zahir.Jina@teck.com			Quote Number				CC Hardcopy To			
Email Report To	Zahir.Jina@teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
					PRESERV.											
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30 d early life stage, fathead minnow	28 d Hyalella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail				Temp °	
GH_FR1_WS_2015-04-08_N	WS	08/4/2015		G		X	X								9.2	
					#NAME?											
					#NAME?											
					#NAME?											
					#NAME?	151180	151181									
					#NAME?											
					#NAME?											
					#NAME?											
					#NAME?	WO#										
					#NAME?											
					#NAME?											

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Zahir Jina		Mobile #		Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature			Date/Time					

Received Apr 10/15 @ 11:40 - NAUTILUS
2 x 20L
NY - NAIR YAMAMOTO

Nautilus Environmental
8664 Commerce Court
Imperial Square Lake City
Burnaby BC, V5A 4N7

COC # 4032015

Page 1 of 1

Report to:	
Company:	TECK COAL LTD (ELKVIEW)
Contact:	Michael Moore
Address:	RR1 HWY 3
	Sparwood, BC, V0B 2G1, Canada
Phone:	250-425-8868 Fax:
Invoice To:	Same as Report ? (●) Yes ( ) No
Company:	Send all invoices to: dlteckcoalaccountspayable@teck.com
Contact:	Attn: Accounting
Address:	Same as above
Phone:	Fax:
Lab Work Order # (lab use only)	

Report Format / Distribution	
☑ Standard ☐ Other	
☑ PDF ☑ Excel ☑ Digital ☐ Fax	
Email 1:	michael.moore@teck.com
Email 2:	
Email 3:	casandra.knoolhuizen@teck.com
Email 4:	james.boldt@teck.com
Client / Project Information:	
Job #:	Regular Elkview Monthly Sampling - Tox Testing
PO / AFE:	359182
Legal Site Description:	
Quote #:	
Nautilus Contact: Krysta Pearcy	**Sampler:**

Service Requested: (rush - subject to availability)
- (●) Regular (Default)
- ( ) Priority (2-3 Business Days) - 50% Surcharge
- ( ) Emergency (1 Business Day) - 100% Surcharge
- ( ) For Emergency < 1 Day, ASAP or Weekend - Contact ALS

Analysis Request
Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample	Sample Identification	Date (mmm-dd-yy)	Time (hh:mm)	Matrix	TECKCOAL-MONTHLY-VA	Toxcitity 7day/72 hr (1)	T-Se (CCMS)	T-Metal(TECKCOAL-MET-T-VA)	D-Metal(TECKCOAL-MET-D-VA)	EPH	TSS	TURBIDITY	PAH - low level detection	True Color	Toxicity 96hr/48hr (2)	BOD	Number of Containers	Temp
	EV_MC2_WS_2015-03-04_N	4-Mar-15	13:15	WS		X											1	6.0
	~~EV_BC1_WS_2015-03-04_N~~	~~4-Mar-15~~		~~WS~~											~~X~~		~~2~~	
	~~EV_GT1_WS_2015-03-04_N~~	~~4-Mar-15~~		~~WS~~											~~X~~		~~2~~	
	~~EV_AQ1_WS_2015-03-04_N~~	~~4-Mar-15~~		~~WS~~											~~X~~		~~2~~	
	EV_MG1_WS_2015-03-04_N	4-Mar-15	9:15	WS											X		2	7.1

(3)

Special Instructions / Regulations / Hazardous Details

Toxcitity 7day/72 hr = 7 d C. dubia and 72 h P. subcapitata
Toxcitity 96hr/48hr = 96 hr Rainbow Trout Pass/fail and 48 hr Daphnia pass/fail

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)		
Released by: [signature]	Date & Time: 4/3/2015 16:00	Received by: NAUTILUS NY-NAIR YAMAMOTO	Date: Mar 6/15	Time: 09:50	Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF

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(1) EV-MC2 - 7d cerio P/F — 15170
72H P. subcapitata P/F - 15171
(2) [illegible] — 15172

Nautilus Environmental
8664 Commerce Court
Imperial Square Lake City
Burnaby BC, V5A 4N7

COC # 10032015

Page 1 of 1

Report to:		**Report Format / Distribution**				**Service Requested:** (rush - subject to availability)
Company:	TECK COAL LTD (ELKVIEW)	☑ Standard	☐ Other			◉ Regular (Default)
Contact:	Michael Moore	☑ PDF	☑ Excel	☑ Digital	☐ Fax	○ Priority (2-3 Business Days) - 50% Surcharge
Address:	RR1 HWY 3	Email 1:	michael.moore@teck.com			○ Emergency (1 Business Day) - 100% Surcharge
Sparwood, BC, V0B 2G1, Canada		Email 2:				○ For Emergency < 1 Day, ASAP or Weekend - Contact ALS
Phone:	250-425-8868 Fax:	Email 3:	casandra.knooihuizen@teck.com			**Analysis Request**
Invoice To:	Same as Report ? ◉ Yes ○ No	Email 4:	james.boldt@teck.com			Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:	Send all invoices to: dlteckcoalaccountspayable@teck.com	**Client / Project Information:**				
Contact:	Attn: Accounting	Job #:	Regular Elkview Monthly Sampling - Tox Testing			
Address:	Same as above	PO / AFE:	359182			
		Legal Site Description:				
Phone:	Fax:	Quote #:				
Lab Work Order # (lab use only)		**Nautilus Contact:** Krysta Pearcy	**Sampler:** JB/CK			

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Matrix	TECKCOAL-MONTHLY-VA		T-Se (CCMS)	T-Metal(TECKCOAL-MET-T-VA)	D-Metal(TECKCOAL-MET-D-VA)	EPH	TSS	TURBIDITY	PAH - low level detection	True Color	Toxicity 7 day/72 hr	BOD	Number of Containers
1	EV_HC1_WS_2015-03-10_N	10-Mar-15	8:15	WS											X		1
			1 cooler 1/2 filled														
																	1

Special Instructions / Regulations / Hazardous Details

Toxcitity 7day/72 hr = 7 d C. dubia and 72 h P. subcapitata
Toxcitity 96hr/48hr = 96 hr Rainbow Trout Pass/fail and 48 hr Daphnia pass/fail

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Released by: JB	Date & Time: 10/3/2015 16:00	Received by:	Date: Mar 11/15	Time: 1000		Temperature: 7.1	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF

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GENF 18.00 Front

wo# 15186 - 7 d. Cerio
15187 - 72 h P. subcapita

COC ID: 20150106-1519 **TURNAROUND TIME:** **RUSH:**

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Line Creek Operation			Lab Name	Nautilus			Eamil Invoice To	
Project Number	ALS Water [redacted]			Lab Contact	Krysta			Invoice Reports	
Department				Email				Email Report To	
Address	Box 2003			Address				Email Reports	
	15km North Hwy 43							Shipping Company	
City	Sparwood	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	250-425-6111			Phone Number				Cooler Description	
Project Manager	Jay Jones			Quote Number				Sampler 2	
Email Address	jay.jones@teck.com			PO Number				Sampler 3	

SAMPLE DETAILS									ANALYSIS REQUESTED										
Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	7 d C. dubia P/F	72 h P. subcapitata P/F									
LC_LCDSSLCC_WS_2015-03-02_N				WS	3/2/2015	10:36	G	2	1	1									

30 #'s
15144 15145

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Tyler Phillips	Mobile #	
	Sampler's Signature	[signature]	Date/Time	

Received by NAUTILUS - Mar 04/15 @09:30 - Temp. 7.2°C

Section B-2: 2nd Quarter 2015 Results

Nautilus Environmental

Toxicity testing on Elk Valley samples with *Ceriodaphnia dubia, Pseudokirchneriella subcapitata, Hyalella azteca, Pimephales promelas* and *Oncorhynchus mykiss*

2nd Quarter 2015 Results

Final Report

Report date:
November 13, 2015

Submitted to:

Teck Coal Ltd.
Sparwood, BC

8664 Commerce Court
Burnaby, BC
V5A 4N7

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APPENDIX F – Analytical Chemistry
APPENDIX G – Chain-of-Custody Forms

SIGNATURE PAGE

Krystal Pearcy, B.Sc.
Laboratory Biologist

James Elphick, R.P.Bio.
Senior Reviewer

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

1.0 INTRODUCTION

Nautilus Environmental conducted toxicity tests for Teck Coal Ltd. on samples collected from various locations in the Elk Valley as part of a quarterly chronic toxicity testing program required under BC Ministry of Environment permit number 107517. Test species included a cladoceran (*Ceriodaphnia dubia*), a unicellular green alga (*Pseudokirchneriella subcapitata*), an amphipod (*Hyalella azteca*), the fathead minnow (*Pimephales promelas*) and early life stages of rainbow trout (*Oncorhynchus mykiss*).

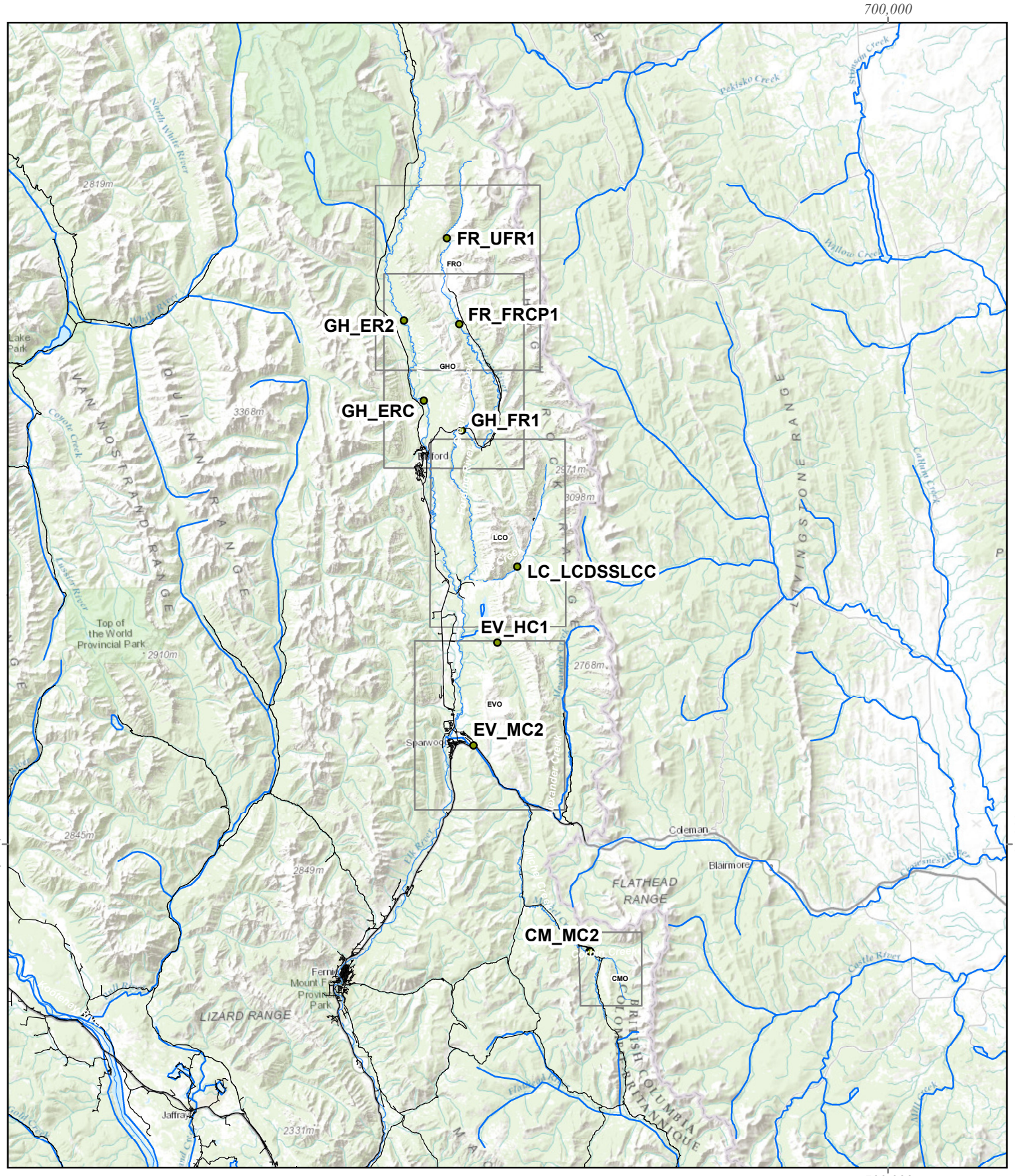
Samples were transported in 20-L plastic containers in coolers containing ice packs. Samples were received at temperatures ranging from 5.0 to 11.8°C and were stored in the dark at 4 ± 2°C prior to testing. Table 1 outlines the toxicity tests that were conducted on each sample as well as sample collection dates. The *O. mykiss* tests were initiated on April 29, 2015 using samples collected April 28, 2015. The *C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas* tests were initiated on May 6 and 7, 2015 using samples collected May 5, 2015. Refresh samples were collected weekly on the dates shown in Table 1 for the duration of the *H. azteca* and *P. promelas* and *O. mykiss* tests. The *P. promelas* test was conducted at the Nautilus Environmental laboratory in Calgary, AB (HydroQual); the other toxicity tests were conducted at the Burnaby, BC location.

This report describes the results of the toxicity tests. Copies of laboratory data sheets and printouts of statistical analyses are provided in Appendices A to E. Results of analytical chemistry that was performed on the samples tested in this program are provided in Appendix F. These samples were collected by Teck personnel at the same time the samples were collected for toxicity testing. The chain-of-custody forms are provided in Appendix G.

Table 1. Summary of toxicity testing program.

Sample ID	EMS Location ID	Species Tested	Sample Collection Dates
FR_UFR1 *	E216777	*C. dubia*, *P. subcapitata*, *H. azteca*, *P. promelas* and *O. mykiss*	April 28, May 5, May 12, May 19, May 26 and June 2, 2015
GH_ER2 *	0200389	*C. dubia*, *P. subcapitata* and *O. mykiss*	April 28, May 5, May 12, May 19 and May 26, 2015
FR_FRCP1	E300071	*C. dubia*, *P. subcapitata*, *H. azteca*, *P. promelas* and *O. mykiss*	April 28, May 5, May 12, May 19, May 26 and June 2, 2015
GH_FR1	0200378	*C. dubia*, *P. subcapitata*, *H. azteca*, *P. promelas* and *O. mykiss*	April 28, May 5, May 12, May 19, May 26 and June 2, 2015
GH_ERC	E300090	*C. dubia*, *P. subcapitata* and *O. mykiss*	April 28, May 5, May 12, May 19 and May 26, 2015
EV_MC2	E300091	*C. dubia*, *P. subcapitata* and *O. mykiss*	April 28, May 5, May 12, May 19 and May 26, 2015
EV_HC1	E102682	*C. dubia*, *P. subcapitata* and *O. mykiss*	April 28, May 5, May 12, May 19 and May 26, 2015
CM_MC2	E258937	*C. dubia*, *P. subcapitata*, *H. azteca*, *P. promelas* and *O. mykiss*	April 28, May 5, May 12, May 19, May 26 and June 2, 2015
LC_LCDSSLCC	E297110	*O. mykiss*	April 28, May 5, May 12, May 19 and May 26, 2015

* Site water control



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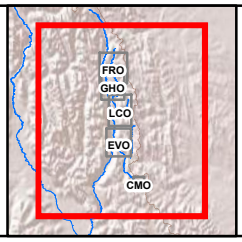

Chronic Toxicity Monitoring Locations

- Roads
- Rivers
- Monitoring Locations

N

0 4,000 8,000 16,000 Meters

DATE:	MINE OPERATION:
11/10/2015	Elk Valley
SCALE:	COORDINATE SYSTEM:
1:550,000	NAD 1983 UTM Zone 11N

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2.0 METHODS

Methods for the toxicity tests using *C. dubia*, *P. subcapitata*, *H. azteca, P. promelas* and *O. mykiss* are summarized in Tables 2 through 6. Laboratory control water was 20% Perrier water prepared with deionized water for *C. dubia*; moderately hard water prepared by addition of reagent grade salts to dechlorinated municipal tap water for *P. promelas* according to a recipe provided by ASTM (1980); moderately hard water prepared by addition of reagent grade salts to dechlorinated municipal tap water for *H. azteca* according to a recipe provided in Environment Canada (2013); and dechlorinated municipal tap water for *O. mykiss*.

For the *H. azteca* tests, all of the site waters were supplemented with 25 mg/L chloride and 0.02 mg/L bromide using NaCl and NaBr, respectively, according to recommendations of the *Hyalella* Advisory Group (chaired by Chris Ingersoll, USGS) (Norberg-King et al., 2014), since low concentrations of these halides are known to impair growth of this species. The laboratory control water contained approximately 75 mg/L chloride and 0.8 mg/L bromide, respectively.

Statistical analyses were performed using CETIS (Tidepool Scientific Software, 2013), and involved comparison of results to both the laboratory and site water controls.

Table 2. Summary of test conditions: *Ceriodaphnia dubia* survival and reproduction test.

Test organism	*Ceriodaphnia dubia*
Test organism source	In-house culture
Test organism age	<24 h old neonates produced within 12 h
Test type	Static-renewal
Test duration	7 ± 1 day
Test vessel	20 mL test tube
Test volume	15 mL
Test replicates	10 test replicates per treatment
Number of organisms	1 per replicate
Control water	20% Perrier water
Test solution renewal	Daily
Test temperature	25 ± 1°C
Feeding	*Pseudokirchneriella subcapitata* and YCT
Light intensity	100 to 600 lux at water surface
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test protocol	Environment Canada (2007a)
Statistical software	CETIS
Test endpoint	Survival and reproduction
Test acceptability criteria for controls	≥80% survival; ≥15 young per surviving control producing three broods; ≥60% of controls producing three or more broods
Reference toxicant	Sodium chloride

Table 3. Summary of test conditions: *Pseudokirchneriella subcapitata* growth inhibition test.

Test organism	*Pseudokirchneriella subcapitata*, strain CPCC #37
Test organism source	In-house axenic culture, obtained from Canadian Phycological Culture Centre, and originally isolated from Nitelva River, Norway.
Test organism age	3-to 7-day old culture in logarithmic growth phase
Test type	Static
Test duration	72 hours
Test vessel	Microplate
Test volume	220 µL
Test replicates	4 replicates per treatment; 8 replicates for control
Number of organisms	10, 000 cells/mL
Control water	Deionized water with nutrients added
Test solution renewal	None
Test temperature	24 ± 2°C
Feeding	None
Light intensity	3600 to 4400 lux
Photoperiod	24 hours light
Sample filtration	Through a preconditioned membrane filter of 0.45 µm using a vacuum pump
Aeration	None
pH adjustment	None
Test protocol	Environment Canada (2007b)
Statistical software	CETIS
Test endpoint	Algal cell growth inhibition
Test acceptability criteria for controls	>16-fold increase in number of algal cells; CV ≤20%; no trend when analyzed using Mann-Kendall test
Reference toxicant	Zinc

Table 4. Summary of test conditions: *Hyalella azteca* survival and growth test.

Test organism	*Hyalella azteca*
Test organism source	Aquatic Research Organisms, NH
Test organism age	7-8 days old
Test type	Static-renewal
Test duration	28 days
Test vessel	375 mL glass container
Test volume	300 mL of water
Test replicates	5 test replicates per treatment
Number of organisms	10 per replicate
Control water	Moderately-hard water (hardness 80-100 mg/L $CaCO_3$) containing ~75 mg/L Cl and supplemented with 0.02 mg/L Br. Samples also supplemented with 25 mg/L Cl and 0.02 mg/L Br.
Test solution renewal	Twice daily
Test temperature	23 ± 1°C
Feeding	1 mL of YCT daily to each container. Tetramin daily, with amounts increasing weekly: Week 1: 0.5 mg, Week 2: 0.75 mg, Week 3: 1 mg, Week 4: 1.5 mg in each test container.
Light intensity	500 to 1000 lux at water surface
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test protocol	Modified from US EPA (2000), as described in Norberg-King et al. (2014)
Statistical software	CETIS
Test endpoint	Survival and dry weight
Test acceptability criteria for controls	Mean control survival of ≥80% survival
Reference toxicant	Sodium chloride

Table 5. Summary of test conditions: *Pimephales promelas* survival and growth test.

Test organism	*Pimephales promelas*
Test organism source	Aquatox, Hot Springs, AR
Test organism age	<24 hours
Test type	Static renewal
Test duration	28 days post hatch
Test vessel	1-L plastic container
Test volume	1-L
Test replicates	4 test replicates per treatment
Number of organisms	10 per replicate
Control water	Moderately-hard water (hardness 80-100 mg/L $CaCO_3$)
Test solution renewal	Daily
Test temperature	25 ± 1°C
Feeding	Twice a day, after hatch, with newly hatched brine shrimp *(Artemia nauplii)*
Light intensity	100 – 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	Provided post hatch (<100 bubbles/min)
Test protocol	US EPA (1996) and ASTM (2013)
Statistical software	CETIS
Test endpoint	Hatch, survival, length, biomass, normal development (which assesses incidence of deformities)
Test acceptability criteria for controls	>66% hatch; ≥70% post-hatch survival
Reference toxicant	Sodium chloride

Table 6. Summary of test conditions: *Oncorhynchus mykiss* embryo-alevin test.

Test organism	*Oncorhynchus mykiss*
Test organism source	Vancouver Island Trout Hatchery, Duncan, BC
Gamete quality	Small amount of water added to milt on a dry glass slide; verification of vigorous sperm motility using a compound microscope (100 X magnification)
Test organism age	<30 minutes post fertilization, <24 hour old gametes
Test type	Static renewal
Test duration	30 days
Test vessel	2-L plastic containers
Test volume	2 L
Test solution depth	17 cm
Test concentrations	100% (v/v), plus laboratory control
Test replicates	4 test replicates per treatment
No. of organisms	30 eggs per replicate
Control water	City of Burnaby dechlorinated municipal tap water (hardness 12 mg/L $CaCO_3$)
Test solution renewal	Daily (80% renewal)
Test temperature	14 ± 1°C
Feeding	None
Light intensity	Dark
Photoperiod	24 hours dark; low intensity light used during solution renewals
Aeration	6.5 ± 1 mL/min/L
Test protocol	Environment Canada (1998)
Statistical software	CETIS
Test endpoint	Survival, viability (which assesses incidence of deformities), length, wet weight
Test acceptability criteria for controls	≥65% normal hatched fish
Reference toxicant	Sodium dodecyl sulphate

3.0 RESULTS

Results of the toxicity tests using *C. dubia* are provided in Table 7. The site water and laboratory water controls performed similarly for this species, indicating that there was no adverse or stimulatory effect associated with the upstream Fording River and Elk River stations. No adverse effect was observed on survival of *C. dubia*; survival was 100% in the samples. An adverse effect on *C. dubia* reproduction was observed in one of the seven samples (CM_MC2). Reproduction in CM_MC2 was statistically significantly reduced relative to both the laboratory water and site water controls; percent reduction in reproduction was approximately 40 to 45% when compared to the site water and laboratory controls.

Results of the toxicity tests using *P. subcapitata* are provided in Table 8. In these tests, the site water controls produced 2.9-to 3.5-fold greater growth than the laboratory water control. This finding is not unusual, since the higher ionic strength associated with the site water control would be expected to stimulate cell growth of this species relative to the very low ionic strength associated with the laboratory control water. Similarly, the samples exhibited a stimulation of cell growth relative to the laboratory water control; none of the samples exhibited a statistically significant reduction in cell growth relative to the laboratory water control. A statistically significant reduction in cell yield was observed for two samples (EV_MC2 and CM_MC2) when compared to the FR_UFR1 site water control; percent reduction compared to FR_UFR1 was 16 and 12% for EV_MC2 and CM_MC2, respectively. No statistically significant reduction in cell yield was observed compared to the GH_ER2 site control.

Results of the toxicity tests using *H. azteca* are provided in Table 9. Survival and dry weight in the site water and laboratory water controls were similar for this species, indicating that there was no adverse or stimulatory effects associated with the upstream Fording River station. No adverse effect was observed on *H. azteca* survival; survival was 96% in the samples. An adverse effect on dry weight was observed in one sample (FR_FRCP1) compared to the site and laboratory water control; percent reduction in FR_FRCP1 compared to the site and laboratory water control was 21 and 28%, respectively.

Results of the toxicity tests using *P. promelas* are provided in Table 10. Hatch, survival, biomass, length and normal development were similar in the site water and laboratory water control for this species, indicating that there was no adverse or stimulatory effects associated with the upstream Fording River station. Survival and biomass of *P. promelas* was statistically

significantly reduced in two of the three samples (FR_FRCP1 and GH_FR1) compared to the site water and laboratory controls. Survival was reduced by more than 50% compared to the site water and laboratory water controls for FR_FRCP1 and GH_FR1. Biomass was reduced by 39 and 34% in FR_FRCP1 compared to the site water and laboratory water controls, respectively. Biomass in GH_FR1 was reduced by 52 and 49% compared to the site water and laboratory control, respectively. There were no adverse effects on hatch, length, or normal development (i.e., incidence of deformities) in the samples compared to the site water and laboratory water controls.

Results of the toxicity tests using *O. mykiss* are provided in Table 11. Survival, viability, length and wet weight of *O. mykiss* in the Fording River site water control and laboratory water control were similar, indicating that there were no adverse or stimulatory effects associated with the upstream Fording River station. Survival and viability in the Elk River site water control were statistically significantly reduced (~40% reduction) compared to the laboratory water control. Survival in four samples (FR_FRCP1, CM_MC2, GH_ERC and EV_HC1) was statistically significantly reduced compared to the laboratory water control; percent reduction ranged from 17 to 31%. Viability was statistically significantly reduced in three samples (CM_MC2, GH_ERC and EV_HC1) compared to the laboratory water control; percent reduction ranged from 18 to 31%. There were no adverse effects on length or wet weight in the samples compared to the laboratory control. Wet weight in sample EV_HC1 was statistically significantly reduced compared to the FR_UFR1 site water control (~10% reduction); no other adverse effects were observed in the samples compared to the two site water controls. There were no observations of unusual behaviour in any of the test solutions, and the survival and viability endpoints were very similar, indicating a very low rate of deformities in all samples. A hatch rate was not calculated in these tests; however, the survival endpoint provides an appropriate measure of successful hatch, since the test is terminated shortly following hatch.

Table 7. Results: *Ceriodaphnia dubia* survival and reproduction test.

Sample ID	Survival (%) (Mean)	Reproduction (Mean ± SD)
Laboratory Control	100	22.2 ± 1.5
FR_UFR1 (Site Control)	100	20.5 ± 4.1
GH_ER2 (Site Control)	100	20.7 ± 2.3
FR_FRCP1	100	20.8 ± 2.3
GH_FR1	100	22.9 ± 1.7
GH_ERC	100	20.1 ± 4.7
EV_MC2	100	20.0 ± 3.3
EV_HC1	100	21.6 ± 1.3
CM_MC2	100	12.2 ± 3.0 *, α, β

SD = Standard Deviation
* Result was significantly lower than the laboratory control
α Result was significantly lower than the site control FR_UFR1
β Result was significantly lower than the site control GH_ER2

Table 8. Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Sample ID	Cell Yield (x 10^4 cells/mL) (Mean ± SD)	Stimulation relative to laboratory control (%)
Laboratory Control	35.0 ± 1.3	-
FR_UFR1 (Site Control)	121.8 ± 5.9	247.9
GH_ER2 (Site Control)	102.4 ± 5.7 α	192.5
FR_FRCP1	140.3 ± 8.4	300.7
GH_FR1	125.0 ± 7.4	257.1
GH_ERC	131.0 ± 6.7	274.3
EV_MC2	102.0 ± 5.2 α	191.4
EV_HC1	139.8 ± 13.6	299.3
CM_MC2	107.5 ± 8.8 α	207.1

SD = Standard Deviation
α Result was significantly lower than the site control FR_UFR1

Table 9. Results: *Hyalella azteca* survival and growth test.

Sample ID	Survival (%) (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Laboratory Control	96.0 ± 5.5	1.06 ± 0.11
Site Control (FR_UFR1)	100.0 ± 0.0	0.97 ± 0.07
FR_FRCP1	96.0 ± 5.5	0.76 ± 0.11 *, α
GH_FR1	96.0 ± 5.5	0.83 ± 0.26 *
CM_MC2	96.0 ± 5.5	0.92 ± 0.09

SD = Standard Deviation
* Result was significantly lower than the laboratory control
α Result was significantly lower than the site control FR_UFR1

Table 10. Results: *Pimephales promelas* survival and growth test.

Sample ID	Hatch (%) (Mean ± SD)	Survival (%) (Mean ± SD)	Biomass (mg) (Mean ± SD)	Length (mm) (Mean ± SD)	Normal development (%) (Mean ± SD)
Laboratory Control	98.3 ± 3.3	83.3 ± 20.7	3.7 ± 0.2	12.6 ± 1.0	100.0 ± 0.0
Site Control (FR_UFR1)	93.3 ± 5.4	73.3 ± 12.2	4.0 ± 0.4	12.7 ± 1.2	100.0 ± 0.0
FR_FRCP1	98.3 ± 3.3	31.7 ± 8.4 *, α	2.4 ± 0.3 *, α	14.2 ± 1.1	100.0 ± 0.0
GH_FR1	96.7 ± 3.8	25.0 ± 22.0 *, α	1.9 ± 1.3 *, α	15.0 ± 1.8	100.0 ± 0.0
CM_MC2	100.0 ± 0.0	65.0 ± 8.4	4.7 ± 0.2	13.4 ± 0.7	100.0 ± 0.0

SD = Standard Deviation
* Result was significantly lower than the laboratory control
α Result was significantly lower than the site control FR_UFR1

Table 11. Results: *Oncorhynchus mykiss* embryo-alevin test.

Sample ID	Survival (%) (Mean ± SD)	Viability (%) (Mean ± SD)	Length (mm) (Mean ± SD)	Wet Weight (mg) (Mean ± SD)
Laboratory Control	85.7 ± 3.4	81.5 ± 6.5	19.0 ± 0.6	97.6 ± 7.4
Site Control (FR_UFR1)	77.6 ± 7.6	72.6 ± 11.6	18.7 ± 1.4	97.7 ± 4.3
Laboratory Control	87.5 ± 3.0	86.7 ± 4.6	17.6 ± 0.4	86.4 ± 1.4
Site Control (GH_ER2)	53.6 ± 19.5 * α	53.6 ± 19.5 *	18.0 ± 0.7	91.3 ± 5.0
Laboratory Control	89.2 ± 4.2	86.7 ± 6.1	19.0 ± 0.5	96.7 ± 2.9
FR_FRCP1	73.9 ± 14.9 *	72.3 ± 16.2	20.0 ± 0.1	106.2 ± 3.8
Laboratory Control	85.0 ± 5.8	81.8 ± 9.3	18.4 ± 0.3	96.2 ± 2.3
GH_FR1	75.5 ± 10.5	75.5 ± 10.5	18.8 ± 0.7	94.7 ± 3.4
Laboratory Control	83.8 ± 8.7	82.2 ± 7.2	17.3 ± 0.6	85.9 ± 3.2
GH_ERC	58.0 ± 11.7 *	56.3 ± 13.0 *	17.5 ± 0.4	91.0 ± 4.0
Laboratory Control	83.6 ± 3.0	82.8 ± 3.1	19.5 ± 0.4	96.3 ± 2.6
EV_MC2	86.5 ± 6.1	84.8 ± 8.0	20.3 ± 0.4	100.6 ± 4.4
Laboratory Control	92.6 ± 3.8	90.9 ± 4.7	18.0 ± 0.4	90.2 ± 2.6
EV_HC1	69.4 ± 17.5 *	68.6 ± 16.0 *	18.0 ± 0.5	88.2 ± 0.7 α
Laboratory Control	85.6 ± 5.3	83.9 ± 7.0	19.8 ± 0.8	98.1 ± 1.7
CM_MC2	68.8 ± 6.4 *	68.8 ± 6.4 *	20.4 ± 1.1	99.0 ± 7.9
Laboratory Control	76.7 ± 7.2	74.2 ± 9.6	19.6 ± 0.9	98.4 ± 1.5
LC_LCDSSLCC	78.3 ± 2.0	75.0 ± 4.1	19.8 ± 0.8	99.7 ± 5.4

SD = Standard Deviation
* Result was significantly lower than the laboratory control
α Result was significantly lower than the site control FR_UFR1

4.0 QA/QC

The health histories of the test organisms used in the exposures were acceptable and met the requirements of the Environment Canada protocols. The tests met all control acceptability criteria and water quality parameters remained within ranges specified in the protocols throughout the tests. There were no deviations from the test methodologies. Uncertainty associated with these tests is best described by the standard deviations around the means.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 12. Results for these tests fell within the acceptable range for organism performance of mean and two standard deviations, based on historical results obtained by the laboratory with these tests. Thus, the sensitivity of the organisms used in these tests was appropriate.

Table 12. Reference toxicant test results.

Test Species	Endpoint	Historical Mean (2 SD Range)	CV (%)	Test Date
C. dubia	Survival (LC50): 2.0 g/L NaCl	2.0 (1.7–2.3)	7	May 20, 2015
	Reproduction (IC50): 1.5 g/L NaCl	1.5 (1.2–1.9)	14	
P. subcapitata	Growth (IC50): 38.6 µg/L Zn	26.4 (13.6–51.1)	39	May 5, 2015
H. azteca	Survival (LC50): 5.7 g/L NaCl	5.1 (4.2–6.1)	10	May 6, 2015
P. promelas	Survival (LC50): 0.8 g/L NaCl	1.0 (0.7–1.6)	14	May 10, 2015
O. mykiss	Viability (EC50): 6.7 mg/L SDS	4.1 (2.2 - 7.6)	36	April 29, 2015

SD = Standard Deviation, CV = Coefficient of Variation, LC = Lethal Concentration, IC = Inhibition Concentration, EC = Effect Concentration.

5.0 REFERENCES

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6.0 END OF REPORT

APPENDIX A – *Ceriodaphnia dubia* Toxicity Test Data

Ceriodaphnia dubia Summary Sheet

Client: Teck
Work Order No.: 15370, 15371, 15379, 15380

Start Date/Time: May 7/15 @ 1130h
Set up by: Emm

Sample Information:

Sample ID: Various, see results table for ID's
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: Various (4 to 6 x 2L per sample)

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 042815A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 17
Mortality (%) in previous 7 d: 10
Individual female # used ≥8 young on test day: 1,2,3,4,6,7,9,10

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd129
Stock Solution ID: 15NaO2
Date Initiated: May 20/15

7-d LC50 (95% CL): 2.0 (1.7 - 2.3) g/L NaCL
7-d IC50 (95% CL): 1.5 (1.1 - 1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.7-2.3) g/L NaCL CV (%): 7
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-1.9) g/L NaCL CV (%): 14

Test Results:

	Survival (%) (mean ± SD) %	Reproduction (Mean ± SD)
Negative Control	100 ± 0.0	22.2 ± 1.5
FR_UFR1	100 ± 0.0	20.5 ± 4.1
GH_ER2	100 ± 0.0	20.7 ± 2.3
FR_FRCP1	100 ± 0.0	20.8 ± 2.3
GH_ERC	100 ± 0.0	20.1 ± ~~4.6~~ 4.7
GH_FR1	100 ± 0.0	22.9 ± 1.7
EV_MC2	100 ± 0.0	20.0 ± 3.3
EV_HC1	100 ± 0.0	21.6 ± 1.3
CM_MC2	100 ± 0.0	12.2 [a,b] ± 3.0

FR_UFR1 & GH_ER2 are site controls

*Reproduction was significantly less than the laboratory control. a=reproduction was significantly less than the site control FR_UFR1 b=reproduction was significantly less than the site control GH_ER2

Reviewed by: JCh
Date reviewed: June 25/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: QA55/Fall (various)
Work Order #: ~~15376~~ 15370, 15371, 15374, 15380 MLT
Start Date & Time: May 7/15 @ 1130h
Stop Date & Time: May 13/15 @ 1130h
Test Species: *Ceriodaphnia dubia*

20% Demer (Tr)	Days														
Concentration	0	1		2		3		4		5		Final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	25.5	24.5	24.0	24.0	24.0	25.0			
DO (mg/L)	8.0	7.9	8.2	7.9	8.2	7.5	8.1	7.5	8.2	7.6	8.2	7.4			
pH	7.9	7.7	8.0	7.7	8.1	7.8	8.0	7.6	8.0	7.7	8.0	7.7			
Cond. (µS/cm)	209	213		218		223		220		219		218			
Initials	EMM	EMM		EMM		MLT		EMM		MLT		EMM			

100% (v/v)	Days														
Concentration FR UAFR1 (Site GH)	0	1		2		3		4		5		Final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.5	24.5	24.0	24.0	24.0	25.0			
DO (mg/L)	7.9	7.9	8.2	7.8	8.1	7.5	8.1	7.6	8.2	7.6	8.1	7.5			
pH	8.0	7.7	8.1	8.1	8.2	8.2	8.0	7.8	8.1	7.7	7.9	7.8			
Cond. (µS/cm)	241	245		242		243		246		242		239			
Initials	EMM	EMM		EMM		MLT		EMM		MLT		EMM			

100% (v/v)	Days														
Concentration GH ER2 (Site GH)	0	1		2		3		4		5		Final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.5	24.5	24.0	24.0	24.0	25.0			
DO (mg/L)	7.9	7.9	8.2	7.8	8.3	7.6	8.1	7.6	8.3	7.6	8.1	7.5			
pH	7.9	7.9	8.1	8.2	8.2	8.3	8.0	7.9	8.1	7.9	7.9	7.9			
Cond. (µS/cm)	309	310		312		314		313		305		310			
Initials	EMM	EMM		EMM		MLT		EMM		MLT		EMM			

100% (v/v)	Days														
Concentration FR FRCP1	0	1		2		3		4		5		Final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.5	24.5	24.0	24.0	24.0	25.0			
DO (mg/L)	8.1	8.0	8.2	7.9	8.3	7.6	8.2	7.8	8.1	7.7	8.1	7.6			
pH	8.0	7.9	8.2	8.2	8.2	8.2	8.1	7.9	8.2	7.9	7.9	7.9			
Cond. (µS/cm)	568	572		570		575		572		560		565			
Initials	EMM	EMM		EMM		MLT		EMM		MLT		EMM			

	Control	FR UFR1	GH ER2	FR FRCP1
Hardness*	100	130	156	304
Alkalinity*	92	124	164	164

Analysts: EMM, MLT, AWD, JW
Reviewed by: JW
Date reviewed: June 23/15

* mg/L as $CaCO_3$

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L); pH = 6 to 8.5

Sample Description: clear (all samples)

Comments: **Broodboard Used:** 042815A (1, 2, 3, 4, 6, 7, 9, 10)

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: ~~Pass~~/Fail (Various)
Work Order #: ~~15376~~ 15370, 15371, 15374, 15380 MLT
Start Date & Time: May 7/15 @ 1130h
Stop Date & Time: May 13/15 @ 1130h
Test Species: *Ceriodaphnia dubia*

100% (v/v) Concentration: GHERC

	Days														
	0	1		2		3		4		24.05		final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	~~old~~	new	final	
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.8	24.5	24.0	~~24.0~~	24.0	25.0			
DO (mg/L)	7.8	7.8	8.2	7.8	8.2	7.6	8.2	8.1	8.2	7.6	8.1	7.5			
pH	8.0	7.9	8.1	8.3	8.3	8.3	8.1	7.9	8.1	7.9	7.9	7.9			
Cond. (µS/cm)	337	338		334		335		335		327		329			
Initials	EMM	EMM		EMM		MLT		EMM		MLT		EMM			

100% (v/v) Concentration: GHFRI

	Days														
	0	1		2		3		4		5		final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	~~old~~	new	final	
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.9	24.5	24.0	24.0	24.0	25.0			
DO (mg/L)	8.1	8.0	8.2	7.9	8.2	7.5	8.1	7.9	8.2	7.6	8.9	7.5			
pH	8.1	7.9	8.2	8.3	8.2	8.3	8.1	8.0	8.1	7.9	~~7.90~~	7.9			
Cond. (µS/cm)	608	617		610		610		610		~~5~~ 594		606			
Initials	EMM	EMM		EMM		MLT		EMM		MLT		EMM			

@ 8.0

100% (v/v) Concentration: EV MC2

	Days														
	0	1		2		3		4		5		final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	~~old~~	new	final	
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.5	24.5	24.0	24.0	24.0	25.0			
DO (mg/L)	8.2	7.9	8.1	7.9	8.3	7.4	8.1	7.7	8.2	7.6	8.1	7.6			
pH	7.9	8.0	8.0	8.1	8.2	8.3	8.0	7.8	8.0	7.8	7.9	7.9			
Cond. (µS/cm)	299	298		298		297		299		291		290			
Initials	EMM	EMM		EMM		MLT		EMM		MLT		EMM			

100% (v/v) Concentration: EV HCl

	Days														
	0	1		2		3		4		5		final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	~~old~~	new	final	
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.5	24.5	24.0	24.0	24.0	25.0			
DO (mg/L)	8.1	7.9	8.1	7.8	8.3	7.5	8.1	7.8	8.1	7.6	8.0	7.6			
pH	8.1	7.9	8.2	8.3	8.2	8.2	8.2	8.1	8.2	8.0	8.0	8.0			
Cond. (µS/cm)	540	530		539		546		542		529		540			
Initials	EMM	EMM		EMM		MLT		EMM		MLT		EMM			

	~~Control~~ GH ERC	GH FRI	EV MC2	EV HCl
Hardness*	MLT ~~160~~ 180	306	144	272
Alkalinity*	MLT ~~92~~ 172	172	118	186

Analysts: EMM, MLT, AWD, JW
Reviewed by: JGW
Date reviewed: June 23/15

* mg/L as CaCO3
WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L) ; pH = 6 to 8.5
Sample Description: clear (all samples)

Comments: **Broodboard Used:** 042815A (1,2,3,4,6,7,9,10)

2 of 3

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: Pass/Fail (various)
Work Order #: ~~15370~~ MLT 15370, 15371, 15374, 15380
Start Date & Time: May 7/15 @ 1130h
Stop Date & Time: May 13/15 @ 1130h
Test Species: *Ceriodaphnia dubia*

100%(v/v) CMMC2	Days													
Concentration	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	MLT old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.5	24.5	24.0	24.0	24.0	25.0		
DO (mg/L)	8.1	8.0	8.2	7.8	8.3	7.5	8.1	7.7	8.3	7.5	8.1	7.4		
pH	8.2	8.1	8.1	8.3	8.3	8.3	8.2	8.0	8.3	8.0	MLT 8.0	8.1		
Cond. (µS/cm)	480	480		483		482		483		471		470		
Initials	EMM	EMM		EMM		MLT		EMM		MLT		EMM		

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

	MLT ~~Control~~	CMMC2		
Hardness*	MLT ~~100~~	250		
Alkalinity*	MLT 92	154		

* mg/L as CaCO3

Analysts: EMM, MLT, AWD, JW
Reviewed by: JOH
Date reviewed: June 23/15

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L) ; pH = 6 to 8.5
Sample Description: clear (all samples)

Comments: **Broodboard Used:** 042815A (1,2,3,4,6,7,9,10)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck
Sample ID: pass/tail (Cranas)
Work Order: ~~15376~~ mg 15370, 15371, 15374, 15380 (100% CM)

Start Date & Time: May 7/15 @ 1130h
Stop Date & Time: May 13/15 @ 1130h
Set up by: EMM)

Days	Concentration: 20% Permeer (lab ctrl)										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	4	4	4	4	4	4	4	4	4	4	JW
5	8	8	7	7	6	7	6	7	8	9	MG
6	10	11	10	10	11	13	11	10	11	12	MG
7											
8											
Total	22	23	21	21	21	24	21	21	23	25	MG

Days	Concentration: FR UFR1										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	4	4	2	3	4	4	4	4	3	4	JW
5	6	7	✓	6	6	8	7	7	7	7	MG
6	10	12	8	10	9	12	13	12	12	10	MG
7											
8											
Total	20	23	10	19	19	24	24	23	22	21	MG

Days	Concentration: ~~GH ERC~~ w GH ER2										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	4	3	4	4	3	3	2	3	4	3	JW
5	7	6	6	7	7	8	6	7	7	7	MG
6	11	10	9	12	8	10	9	13	12	12	MG
7											
8											
Total	22	19	19	23	18	21	17	23	23	22	MG

Days	Concentration: FR FRCP1										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	4	4	5	4	4	4	3	4	3	3	JW
5	8	7	8	7	6	6	6	8	8	7	MG
6	10	7	11	10	11	10	7	9	12	12	MG
7											
8											
Total	22	18	24	21	21	20	16	21	23	22	MG

Days	Concentration: GH ERC										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	4	3	4	4	4	4	4	1	4	4	JW
5	6	7	7	6	7	8	7	2	6	3	MG
6	12	12	13	11	9	11	11	5	12	10	MG
7											
8											
Total	22	22	24	21	20	23	22	8	22	17	MG

Days	Concentration: GH FR1										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	3	4	4	4	4	4	3	4	3	4	JW
5	7	8	7	9	6	8	6	7	7	8	MG
6	11	12	13	12	11	11	11	13	14	11	MG
7											
8											
Total	21	24	24	25	21	23	20	24	24	23	MG

Days	Concentration: EV MC2										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	4	4	3	4	4	4	3	4	✓	4	JW
5	6	6	7	7	7	8	7	8	4	8	MG
6	9	12	9	10	7	11	9	13	9	9	MG
7											
8											
Total	19	22	19	21	18	23	19	25	13	21	MG

Days	Concentration: EV MC1										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	4	4	4	4	2	4	4	4	4	3	JW
5	8	6	7	7	8	6	7	6	8	6	MG
6	13	11	10	10	12	11	11	11	9	12	MG
7											
8											
Total	25	21	21	21	22	21	22	21	21	21	MG

Days	Concentration: CM MC2										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	4	3	4	3	4	4	4	2	2	2	JW
5	5	6	✓	6	6	4	4	4	5	✓	MG
6	8	6	6	2	4	5	3	7	5	4	MG
7											
8											
Total	17	15	10	11	14	13	11	13	12	6	MG

Notes: X = mortality.

Sample Description: clear (all samples)
Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JW

Date reviewed: June 23/15

CETIS Summary Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Batch ID:	21-3838-5712	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Krysta Pearcy
Start Date:	07 May-15 11:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	13 May-15 11:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	03-8125-0620	07 May-15	07 May-15	11h	Teck Coal	
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	50h (8.6 °C)		
GH_ER2	07-2285-3489	05 May-15	06 May-15 08:34	59h (7 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	48h (9.5 °C)		
GH_ERC	11-9592-1363	05 May-15 08:00	06 May-15 08:34	51h (6.4 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	50h (7.5 °C)		
EV_MC2	17-6401-9240	05 May-15 07:30	06 May-15 08:34	52h (5.6 °C)		
EV_HC1	21-3261-2174	05 May-15 10:00	06 May-15 08:34	50h (5.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	45h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
① Lab Control	control	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015-05-05_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015-05-05_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-05-05_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-05-05_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

6d Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	10	1	1	1	1	1	0	0	0.0%	0.0%
FR_UFR1	10	1	1	1	1	1	0	0	0.0%	0.0%
GH_ER2	10	1	1	1	1	1	0	0	0.0%	0.0%
FR_FRCP1	10	1	1	1	1	1	0	0	0.0%	0.0%
GH_ERC	10	1	1	1	1	1	0	0	0.0%	0.0%
GH_FR1	10	1	1	1	1	1	0	0	0.0%	0.0%
EV_MC2	10	1	1	1	1	1	0	0	0.0%	0.0%
EV_HC1	10	1	1	1	1	1	0	0	0.0%	0.0%
CM_MC2	10	1	1	1	1	1	0	0	0.0%	0.0%

6d Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1	1	1	1	1	1	1	1	1	1
FR_UFR1	1	1	1	1	1	1	1	1	1	1
GH_ER2	1	1	1	1	1	1	1	1	1	1
FR_FRCP1	1	1	1	1	1	1	1	1	1	1
GH_ERC	1	1	1	1	1	1	1	1	1	1
GH_FR1	1	1	1	1	1	1	1	1	1	1
EV_MC2	1	1	1	1	1	1	1	1	1	1
EV_HC1	1	1	1	1	1	1	1	1	1	1
CM_MC2	1	1	1	1	1	1	1	1	1	1

① Lab control = 20% Perrier lab water control
FR_UFR1_M_04052015_N = site control
GH_ER2_WS_2015-05-05_N = site control

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

6d Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFR1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_MC2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	13-6489-6908	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Jun-15 10:52	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes
Batch ID:	21-3838-5712	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Krysta Pearcy
Start Date:	07 May-15 11:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	13 May-15 11:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	03-8125-0620	07 May-15	07 May-15	11h	Teck Coal	
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	50h (8.6 °C)		
GH_ER2	07-2285-3489	05 May-15	06 May-15 08:34	59h (7 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	control	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015-05-05_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact/Bonferroni-Holm Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFR1	1	1.0000	Exact	Non-Significant Effect
Lab Control		GH_ER2	1	1.0000	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
Lab Control	Negative Contr	10	0	10	1	0	0.0%
FR_UFR1	Upstream Contr	10	0	10	1	0	0.0%
GH_ER2	Receiving Wate	10	0	10	1	0	0.0%

6d Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1	1	1	1	1	1	1	1	1	1
FR_UFR1	1	1	1	1	1	1	1	1	1	1
GH_ER2	1	1	1	1	1	1	1	1	1	1

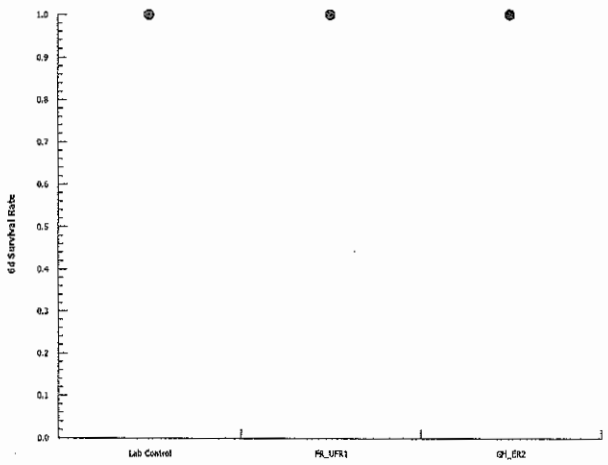
6d Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFR1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID:	13-6489-6908	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Jun-15 10:52	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	11-8453-2945	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Jun-15 10:50	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes
Batch ID:	21-3838-5712	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Krysta Pearcy
Start Date:	07 May-15 11:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	13 May-15 11:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	03-8125-0620	07 May-15	07 May-15	11h	Teck Coal	
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	48h (9.5 °C)		
GH_ERC	11-9592-1363	05 May-15 08:00	06 May-15 08:34	51h (6.4 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	50h (7.5 °C)		
EV_MC2	17-6401-9240	05 May-15 07:30	06 May-15 08:34	52h (5.6 °C)		
EV_HC1	21-3261-2174	05 May-15 10:00	06 May-15 08:34	50h (5.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	45h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	control	Teck Coal	Lab Control		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015-05-05_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-05-05_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-05-05_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact/Bonferroni-Holm Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_FRCP1	1	1.0000	Exact	Non-Significant Effect
Lab Control		GH_ERC	1	1.0000	Exact	Non-Significant Effect
Lab Control		GH_FR1	1	1.0000	Exact	Non-Significant Effect
Lab Control		EV_MC2	1	1.0000	Exact	Non-Significant Effect
Lab Control		EV_HC1	1	1.0000	Exact	Non-Significant Effect
Lab Control		CM_MC2	1	1.0000	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
Lab Control	Negative Contr	10	0	10	1	0	0.0%
FR_FRCP1		10	0	10	1	0	0.0%
GH_ERC		10	0	10	1	0	0.0%
GH_FR1		10	0	10	1	0	0.0%
EV_MC2		10	0	10	1	0	0.0%
EV_HC1		10	0	10	1	0	0.0%
CM_MC2		10	0	10	1	0	0.0%

6d Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1	1	1	1	1	1	1	1	1	1
FR_FRCP1	1	1	1	1	1	1	1	1	1	1
GH_ERC	1	1	1	1	1	1	1	1	1	1
GH_FR1	1	1	1	1	1	1	1	1	1	1
EV_MC2	1	1	1	1	1	1	1	1	1	1
EV_HC1	1	1	1	1	1	1	1	1	1	1
CM_MC2	1	1	1	1	1	1	1	1	1	1

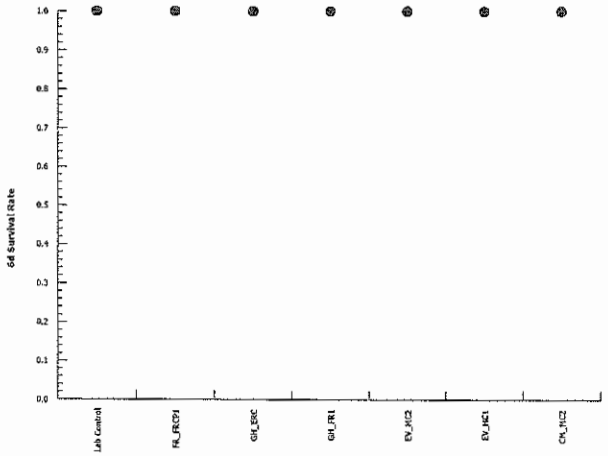
Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID:	11-8453-2945	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Jun-15 10:50	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes

6d Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_MC2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	13-5998-3162	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Jun-15 10:51	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes
Batch ID:	21-3838-5712	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Krysta Pearcy
Start Date:	07 May-15 11:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	13 May-15 11:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	50h (8.6 °C)	Teck Coal	
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	48h (9.5 °C)		
GH_ERC	11-9592-1363	05 May-15 08:00	06 May-15 08:34	51h (6.4 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	50h (7.5 °C)		
EV_MC2	17-6401-9240	05 May-15 07:30	06 May-15 08:34	52h (5.6 °C)		
EV_HC1	21-3261-2174	05 May-15 10:00	06 May-15 08:34	50h (5.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	45h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015-05-05_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-05-05_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-05-05_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact/Bonferroni-Holm Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
FR_UFR1		FR_FRCP1	1	1.0000	Exact	Non-Significant Effect
FR_UFR1		GH_ERC	1	1.0000	Exact	Non-Significant Effect
FR_UFR1		GH_FR1	1	1.0000	Exact	Non-Significant Effect
FR_UFR1		EV_MC2	1	1.0000	Exact	Non-Significant Effect
FR_UFR1		EV_HC1	1	1.0000	Exact	Non-Significant Effect
FR_UFR1		CM_MC2	1	1.0000	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1	Upstream Contr	10	0	10	1	0	0.0%
FR_FRCP1		10	0	10	1	0	0.0%
GH_ERC		10	0	10	1	0	0.0%
GH_FR1		10	0	10	1	0	0.0%
EV_MC2		10	0	10	1	0	0.0%
EV_HC1		10	0	10	1	0	0.0%
CM_MC2		10	0	10	1	0	0.0%

6d Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1	1	1	1	1	1	1	1	1	1	1
FR_FRCP1	1	1	1	1	1	1	1	1	1	1
GH_ERC	1	1	1	1	1	1	1	1	1	1
GH_FR1	1	1	1	1	1	1	1	1	1	1
EV_MC2	1	1	1	1	1	1	1	1	1	1
EV_HC1	1	1	1	1	1	1	1	1	1	1
CM_MC2	1	1	1	1	1	1	1	1	1	1

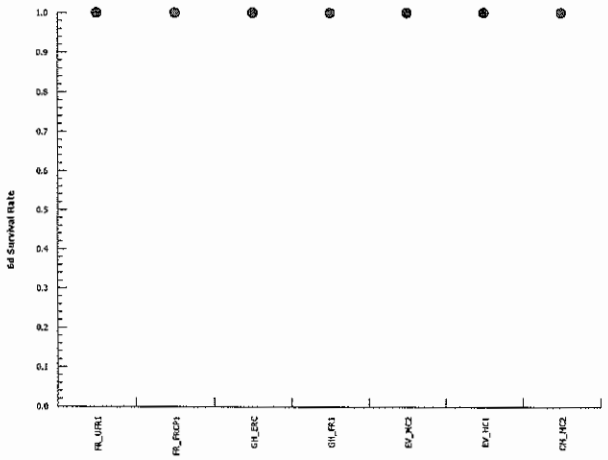
Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 13-5998-3162 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 19 Jun-15 10:51 **Analysis:** STP 2x2 Contingency Tables **Official Results:** Yes

6d Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_MC2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	14-0427-0948	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Jun-15 10:51	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes
Batch ID:	21-3838-5712	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Krysta Pearcy
Start Date:	07 May-15 11:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	13 May-15 11:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
GH_ER2	07-2285-3489	05 May-15	06 May-15 08:34	59h (7 °C)	Teck Coal	
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	48h (9.5 °C)		
GH_ERC	11-9592-1363	05 May-15 08:00	06 May-15 08:34	51h (6.4 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	50h (7.5 °C)		
EV_MC2	17-6401-9240	05 May-15 07:30	06 May-15 08:34	52h (5.6 °C)		
EV_HC1	21-3261-2174	05 May-15 10:00	06 May-15 08:34	50h (5.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	45h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015-05-05_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015-05-05_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-05-05_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-05-05_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact/Bonferroni-Holm Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
GH_ER2		FR_FRCP1	1	1.0000	Exact	Non-Significant Effect
GH_ER2		GH_ERC	1	1.0000	Exact	Non-Significant Effect
GH_ER2		GH_FR1	1	1.0000	Exact	Non-Significant Effect
GH_ER2		EV_MC2	1	1.0000	Exact	Non-Significant Effect
GH_ER2		EV_HC1	1	1.0000	Exact	Non-Significant Effect
GH_ER2		CM_MC2	1	1.0000	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
GH_ER2	Receiving Wate	10	0	10	1	0	0.0%
FR_FRCP1		10	0	10	1	0	0.0%
GH_ERC		10	0	10	1	0	0.0%
GH_FR1		10	0	10	1	0	0.0%
EV_MC2		10	0	10	1	0	0.0%
EV_HC1		10	0	10	1	0	0.0%
CM_MC2		10	0	10	1	0	0.0%

6d Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
GH_ER2	1	1	1	1	1	1	1	1	1	1
FR_FRCP1	1	1	1	1	1	1	1	1	1	1
GH_ERC	1	1	1	1	1	1	1	1	1	1
GH_FR1	1	1	1	1	1	1	1	1	1	1
EV_MC2	1	1	1	1	1	1	1	1	1	1
EV_HC1	1	1	1	1	1	1	1	1	1	1
CM_MC2	1	1	1	1	1	1	1	1	1	1

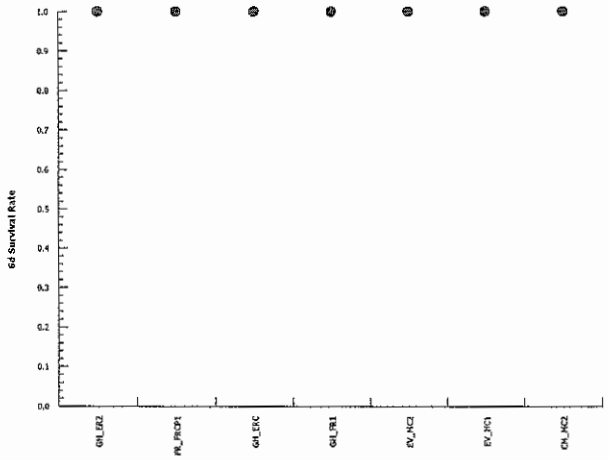
Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 14-0427-0948 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 19 Jun-15 10:51 **Analysis:** STP 2x2 Contingency Tables **Official Results:** Yes

6d Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
GH_ER2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_MC2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Summary Report

Test Code: 15370,15371,153 | 20-5435-8442

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Batch ID:	21-3838-5712	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Krysta Pearcy
Start Date:	07 May-15 11:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	13 May-15 11:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	03-8125-0620	07 May-15	07 May-15	11h	Teck Coal	
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	50h (8.6 °C)		
GH_ER2	07-2285-3489	05 May-15	06 May-15 08:34	59h (7 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	48h (9.5 °C)		
GH_ERC	11-9592-1363	05 May-15 08:00	06 May-15 08:34	51h (6.4 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	50h (7.5 °C)		
EV_MC2	17-6401-9240	05 May-15 07:30	06 May-15 08:34	52h (5.6 °C)		
EV_HC1	21-3261-2174	05 May-15 10:00	06 May-15 08:34	50h (5.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	45h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	control	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015-05-05_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015-05-05_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-05-05_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-05-05_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Reproduction Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	10	22.2	21.14	23.26	21	25	0.4667	1.476	6.65%	0.0%
FR_UFR1	10	20.5	17.54	23.46	10	24	1.31	4.143	20.21%	7.66%
GH_ER2	10	20.7	19.08	22.32	17	23	0.7157	2.263	10.93%	6.76%
FR_FRCP1	10	20.8	19.12	22.48	16	24	0.7424	2.348	11.29%	6.31%
GH_ERC	10	20.1	16.77	23.43	8	24	1.472	4.654	23.15%	9.46%
GH_FR1	10	22.9	21.71	24.09	20	25	0.526	1.663	7.26%	-3.15%
EV_MC2	10	20	17.66	22.34	13	25	1.033	3.266	16.33%	9.91%
EV_HC1	10	21.6	20.7	22.5	21	25	0.4	1.265	5.86%	2.7%
CM_MC2	10	12.2	10.05	14.35	6	17	0.9522	3.011	24.68%	45.05%

Reproduction Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	22	23	21	21	21	24	21	21	23	25
FR_UFR1	20	23	10	19	19	24	24	23	22	21
GH_ER2	22	19	19	23	18	21	17	23	23	22
FR_FRCP1	22	18	24	21	21	20	16	21	23	22
GH_ERC	22	22	24	21	20	23	22	8	22	17
GH_FR1	21	24	24	25	21	23	20	24	24	23
EV_MC2	19	22	19	21	18	23	19	25	13	21
EV_HC1	25	21	21	21	22	21	22	21	21	21
CM_MC2	17	15	10	11	14	13	11	13	12	6

FR_UFR1 = site ctrl
GH_ER2 = site ctrl.

Analyst:_____ QA: June 23/15

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	21-3168-2074	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Jun-15 10:46	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	21-3838-5712	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Krysta Pearcy
Start Date:	07 May-15 11:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	13 May-15 11:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	50h (8.6 °C)	Teck Coal	
GH_ER2	07-2285-3489	05 May-15	06 May-15 08:34	59h (7 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015-05-05_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.5%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
GH_ER2		FR_UFR1	112.5	NA	4	18	0.7156	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.2	0.2	1	0.01795	0.8949	Non-Significant Effect
Error	200.6	11.14444	18			
Total	200.8		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.351	6.541	0.0861	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8311	0.866	0.0026	Non-normal Distribution

Reproduction Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	10	20.5	17.54	23.46	21.5	10	24	1.31	20.21%	0.0%
GH_ER2	10	20.7	19.08	22.32	21.5	17	23	0.7157	10.93%	-0.98%

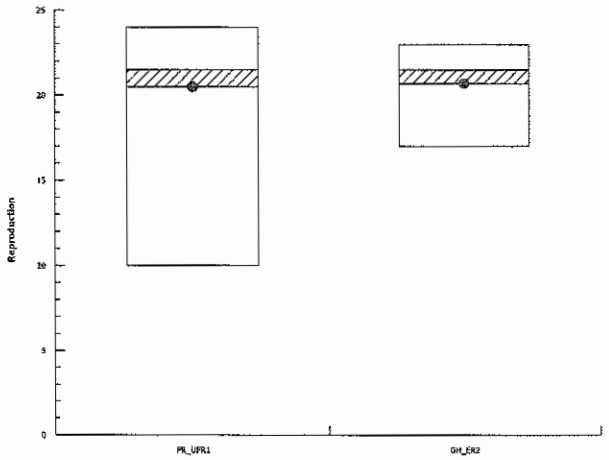
Reproduction Detail

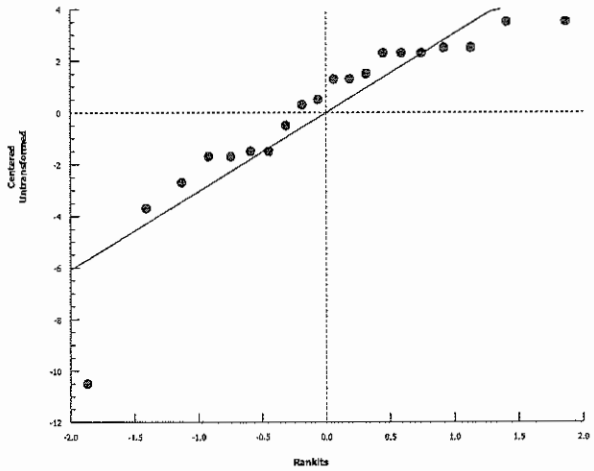
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1	20	23	10	19	19	24	24	23	22	21
GH_ER2	22	19	19	23	18	21	17	23	23	22

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID:	21-3168-2074	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Jun-15 10:46	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	06-8905-8795	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Jun-15 10:39	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	21-3838-5712	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Krysta Pearcy
Start Date:	07 May-15 11:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	13 May-15 11:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	03-8125-0620	07 May-15	07 May-15	11h	Teck Coal	
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	50h (8.6 °C)		
GH_ER2	07-2285-3489	05 May-15	06 May-15 08:34	59h (7 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	control	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015-05-05_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	11.5%	

Steel Many-One Rank Sum Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFR1	94	79	4	18	0.3167	Asymp	Non-Significant Effect
		GH_ER2	89.5	79	3	18	0.1990	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	17.26667	8.633333	2	1.059	0.3609	Non-Significant Effect
Error	220.2	8.155556	27			
Total	237.4667		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	8.93	9.21	0.0115	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8408	0.9031	0.0004	Non-normal Distribution

Reproduction Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	10	22.2	21.14	23.26	21.5	21	25	0.4667	6.65%	0.0%
FR_UFR1	10	20.5	17.54	23.46	21.5	10	24	1.31	20.21%	7.66%
GH_ER2	10	20.7	19.08	22.32	21.5	17	23	0.7157	10.93%	6.76%

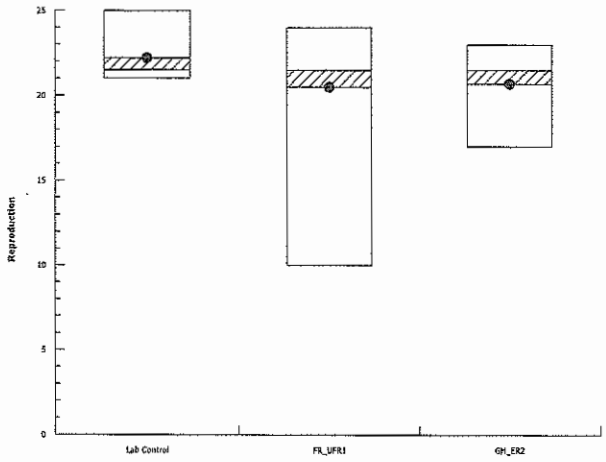
Reproduction Detail

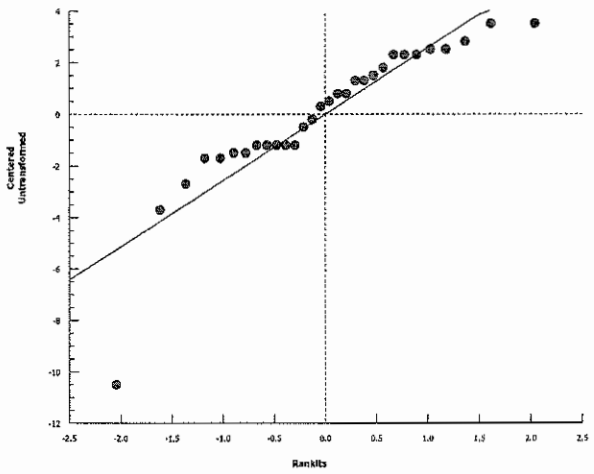
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	22	23	21	21	21	24	21	21	23	25
FR_UFR1	20	23	10	19	19	24	24	23	22	21
GH_ER2	22	19	19	23	18	21	17	23	23	22

Ceriodaphnia 7-d Survival and Reproduction Test | **Nautilus Environmental**

Analysis ID:	06-8905-8795	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Jun-15 10:39	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	00-9234-0286	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Jun-15 10:40	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	21-3838-5712	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Krysta Pearcy
Start Date:	07 May-15 11:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	13 May-15 11:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	03-8125-0620	07 May-15	07 May-15	11h	Teck Coal	
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	48h (9.5 °C)		
GH_ERC	11-9592-1363	05 May-15 08:00	06 May-15 08:34	51h (6.4 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	50h (7.5 °C)		
EV_MC2	17-6401-9240	05 May-15 07:30	06 May-15 08:34	52h (5.6 °C)		
EV_HC1	21-3261-2174	05 May-15 10:00	06 May-15 08:34	50h (5.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	45h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	control	Teck Coal	Lab Control		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015-05-05_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-05-05_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-05-05_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed	NA	C > T	NA	NA	

Nemenyi-Damico-Wolfe Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_FRCP1	93.5	208.6	11		0.4345	Asymp	Non-Significant Effect
		GH_ERC	75.5	208.6	11		0.5281	Asymp	Non-Significant Effect
		GH_FR1	-65	208.6	11		0.9736	Asymp	Non-Significant Effect
		EV_MC2	139	208.6	11		0.2250	Asymp	Non-Significant Effect
		EV_HC1	62.5	208.6	11		0.5953	Asymp	Non-Significant Effect
		CM_MC2	384	208.6	11		<0.0001	Asymp	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Treatment Effect	Fligner-Wolfe	1.677	1.645	0.0468	Significant Overall Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	772.9429	128.8238	6	16.87	<0.0001	Significant Effect
Error	481	7.634921	63			
Total	1253.943		69			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	22.53	16.81	0.0010	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8843	0.9526	<0.0001	Non-normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	00-9234-0286	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Jun-15 10:40	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

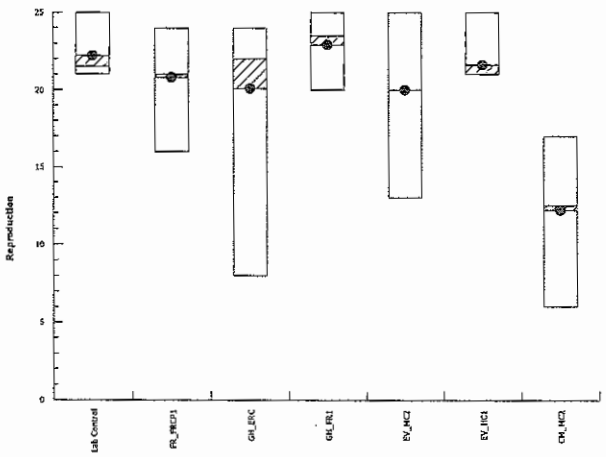
Reproduction Summary

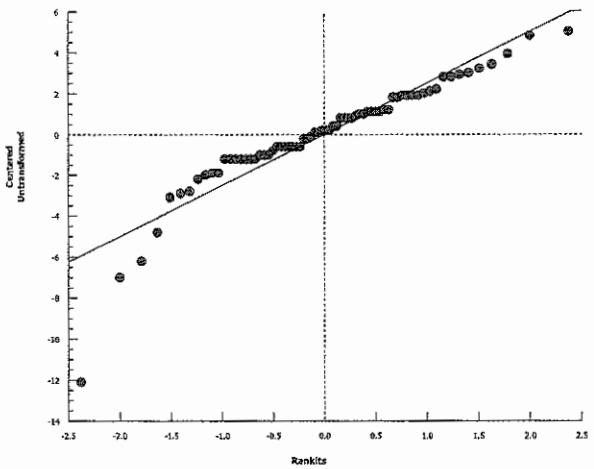
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	10	22.2	21.14	23.26	21.5	21	25	0.4667	6.65%	0.0%
FR_FRCP1	10	20.8	19.12	22.48	21	16	24	0.7424	11.29%	6.31%
GH_ERC	10	20.1	16.77	23.43	22	8	24	1.472	23.15%	9.46%
GH_FR1	10	22.9	21.71	24.09	23.5	20	25	0.526	7.26%	-3.15%
EV_MC2	10	20	17.66	22.34	20	13	25	1.033	16.33%	9.91%
EV_HC1	10	21.6	20.7	22.5	21	21	25	0.4	5.86%	2.7%
CM_MC2	10	12.2	10.05	14.35	12.5	6	17	0.9522	24.68%	45.05%

Reproduction Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	22	23	21	21	21	24	21	21	23	25
FR_FRCP1	22	18	24	21	21	20	16	21	23	22
GH_ERC	22	22	24	21	20	23	22	8	22	17
GH_FR1	21	24	24	25	21	23	20	24	24	23
EV_MC2	19	22	19	21	18	23	19	25	13	21
EV_HC1	25	21	21	21	22	21	22	21	21	21
CM_MC2	17	15	10	11	14	13	11	13	12	6

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	06-6578-5464	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Jun-15 10:40	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	21-3838-5712	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Krysta Pearcy
Start Date:	07 May-15 11:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	13 May-15 11:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	50h (8.6 °C)	Teck Coal	
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	48h (9.5 °C)		
GH_ERC	11-9592-1363	05 May-15 08:00	06 May-15 08:34	51h (6.4 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	50h (7.5 °C)		
EV_MC2	17-6401-9240	05 May-15 07:30	06 May-15 08:34	52h (5.6 °C)		
EV_HC1	21-3261-2174	05 May-15 10:00	06 May-15 08:34	50h (5.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	45h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015-05-05_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-05-05_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-05-05_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed	NA	C > T	NA	NA	

Nemenyi-Damico-Wolfe Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		FR_FRCP1	17	208.6	12		0.8000	Asymp	Non-Significant Effect
		GH_ERC	4	208.6	12		0.8448	Asymp	Non-Significant Effect
		GH_FR1	-139.5	208.6	12		0.9984	Asymp	Non-Significant Effect
		EV_MC2	62	208.6	12		0.5978	Asymp	Non-Significant Effect
		EV_HC1	-16.5	208.6	12		0.9010	Asymp	Non-Significant Effect
		CM_MC2	311	208.6	12		0.0018	Asymp	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Treatment Effect	Fligner-Wolfe	0.5759	1.645	0.2823	Non-significant Overall Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	721.9429	120.3238	6	12.31	<0.0001	Significant Effect
Error	615.9	9.776191	63			
Total	1337.843		69			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	19.65	16.81	0.0032	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.867	0.9526	<0.0001	Non-normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID:	06-6578-5464	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Jun-15 10:40	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

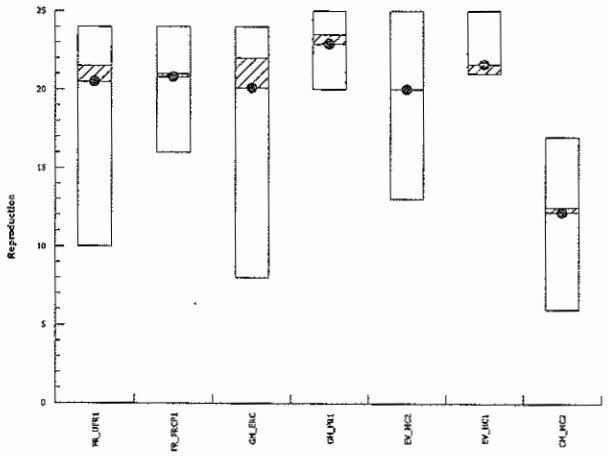
Reproduction Summary

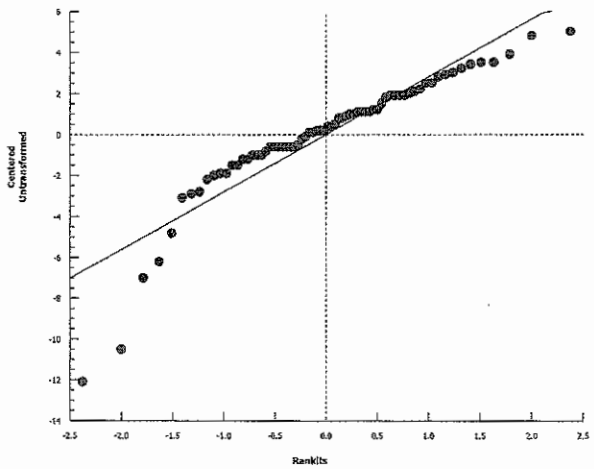
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	10	20.5	17.54	23.46	21.5	10	24	1.31	20.21%	0.0%
FR_FRCP1	10	20.8	19.12	22.48	21	16	24	0.7424	11.29%	-1.46%
GH_ERC	10	20.1	16.77	23.43	22	8	24	1.472	23.15%	1.95%
GH_FR1	10	22.9	21.71	24.09	23.5	20	25	0.526	7.26%	-11.71%
EV_MC2	10	20	17.66	22.34	20	13	25	1.033	16.33%	2.44%
EV_HC1	10	21.6	20.7	22.5	21	21	25	0.4	5.86%	-5.37%
CM_MC2	10	12.2	10.05	14.35	12.5	6	17	0.9522	24.68%	40.49%

Reproduction Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1	20	23	10	19	19	24	24	23	22	21
FR_FRCP1	22	18	24	21	21	20	16	21	23	22
GH_ERC	22	22	24	21	20	23	22	8	22	17
GH_FR1	21	24	24	25	21	23	20	24	24	23
EV_MC2	19	22	19	21	18	23	19	25	13	21
EV_HC1	25	21	21	21	22	21	22	21	21	21
CM_MC2	17	15	10	11	14	13	11	13	12	6

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-3632-0801	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Jun-15 10:40	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	21-3838-5712	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Krysta Pearcy
Start Date:	07 May-15 11:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	13 May-15 11:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
GH_ER2	07-2285-3489	05 May-15	06 May-15 08:34	59h (7 °C)	Teck Coal	
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	48h (9.5 °C)		
GH_ERC	11-9592-1363	05 May-15 08:00	06 May-15 08:34	51h (6.4 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	50h (7.5 °C)		
EV_MC2	17-6401-9240	05 May-15 07:30	06 May-15 08:34	52h (5.6 °C)		
EV_HC1	21-3261-2174	05 May-15 10:00	06 May-15 08:34	50h (5.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	45h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015-05-05_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015-05-05_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-05-05_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-05-05_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed	NA	C > T	NA	NA	

Nemenyi-Damico-Wolfe Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
GH_ER2		FR_FRCP1	0.5	208.6	11		0.8556	Asymp	Non-Significant Effect
		GH_ERC	-13.5	208.6	11		0.8939	Asymp	Non-Significant Effect
		GH_FR1	-160	208.6	11		0.9994	Asymp	Non-Significant Effect
		EV_MC2	44.5	208.6	11		0.6837	Asymp	Non-Significant Effect
		EV_HC1	-30.5	208.6	11		0.9298	Asymp	Non-Significant Effect
		CM_MC2	306	208.6	11		0.0021	Asymp	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Treatment Effect	Fligner-Wolfe	0.3556	1.645	0.3611	Non-significant Overall Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	725.3714	120.8952	6	15.01	<0.0001	Significant Effect
Error	507.5	8.055555	63			
Total	1232.871		69			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	18.39	16.81	0.0053	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8998	0.9526	<0.0001	Non-normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-3632-0801	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Jun-15 10:40	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

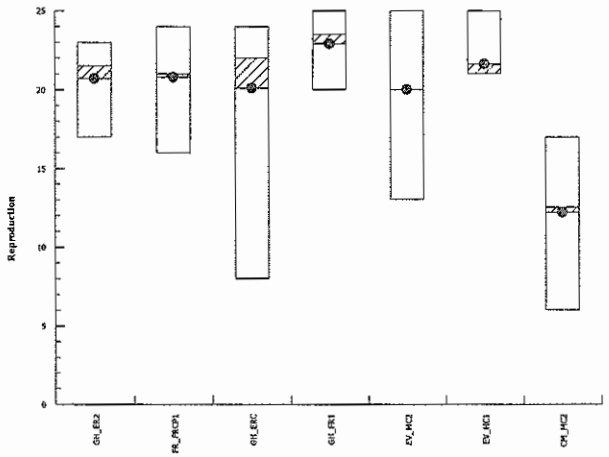
Reproduction Summary

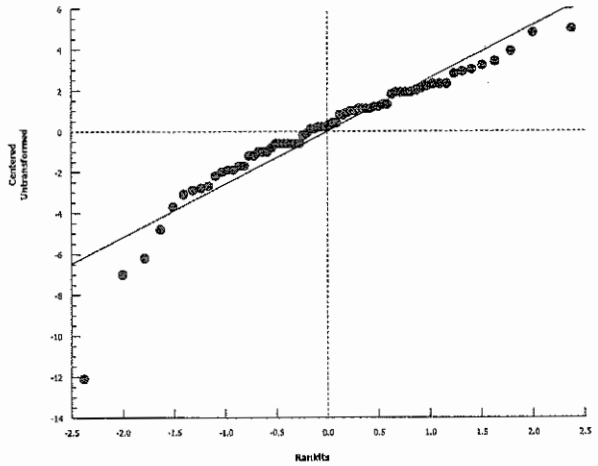
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
GH_ER2	10	20.7	19.08	22.32	21.5	17	23	0.7157	10.93%	0.0%
FR_FRCP1	10	20.8	19.12	22.48	21	16	24	0.7424	11.29%	-0.48%
GH_ERC	10	20.1	16.77	23.43	22	8	24	1.472	23.15%	2.9%
GH_FR1	10	22.9	21.71	24.09	23.5	20	25	0.526	7.26%	-10.63%
EV_MC2	10	20	17.66	22.34	20	13	25	1.033	16.33%	3.38%
EV_HC1	10	21.6	20.7	22.5	21	21	25	0.4	5.86%	-4.35%
CM_MC2	10	12.2	10.05	14.35	12.5	6	17	0.9522	24.68%	41.06%

Reproduction Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
GH_ER2	22	19	19	23	18	21	17	23	23	22
FR_FRCP1	22	18	24	21	21	20	16	21	23	22
GH_ERC	22	22	24	21	20	23	22	8	22	17
GH_FR1	21	24	24	25	21	23	20	24	24	23
EV_MC2	19	22	19	21	18	23	19	25	13	21
EV_HC1	25	21	21	21	22	21	22	21	21	21
CM_MC2	17	15	10	11	14	13	11	13	12	6

Graphics





Client: Teck Coal

W.O.#: 15370, 15371, 15374, 15380

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
FR-FRCP1	May 7/15	50.0	8.4	8.6	164		50.0	15.2	304	KS
FR-UFR1	May 7/15	50.0	6.3	6.4	124		50.0	6.5	130	KS
EV-MC2	May 7/15	50.0	6.1	6.3	118		50.0	7.2	144	KS
GH-FR1	May 7/15	50.0	8.7	8.8	172		50.0	15.3	306	KS
GH-ERC	May 7/15	50.0	8.7	8.8	172		50.0	9.0	180	KS
EV-HC1	May 7/15	50.0	9.4	9.5	186		50.0	13.6	272	KS
CM-MC2	May 7/15	50.0	7.9	8.1	154		50.0	12.5	250	KS
GH-ER2	May 7/15	50.0	8.3	8.4	164		50.0	7.8	156	KS
20% Perrier Control	May 7/15	50	4.7	4.8	92		50	5.0	100	MH

Notes:

Reviewed by: JGb

Date Reviewed: June 23/15

APPENDIX B – *Pseudokirchneriella subcapitata* Toxicity Test Data

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15369, 15372, 15375, 15381

Start Date: May 7/15
Set up by: MLT

Sample Information:

Sample ID: Various, see results table for IDs
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: Various

Test Organism Information:

Culture Date: May 1/15
Age of culture (Day 0): 6d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC129
Stock Solution ID: 15Zn01
Date Initiated: May 5/15

72-h IC50 (95% CL): 38.6 (35.0 - 42.4) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 26.4 (13.6 - 51.1) ug/L Zn CV (%): 39

Test Results:

	Negative Control	Cell Yield (Mean± SD)		
		35.0	±	1.3
①	FR_UFR1_M_04052015_N	121.8	±	5.9 *b
②	GH_ER2_WS_2015-05-05_N	102.4 a	±	5.7 ~~5.6~~ * emm
	FR_FRCP1_M_04052015_N	140.3	±	8.4 *bc
	GH_ERC_WS_2015-05-05_N	131.0	±	6.7 *b
	GH_FR1_WS_2015-05-04_N	125.0	±	7.4 *b
	EV_MC2_WS_2015-05-05_N	102.0 a	±	5.2 *
	EV_HC1_WS_2015-05-05_N	139.8	±	13.6 *bc
	CM_MC2_WKLY_WS_20150505_N	107.5 a	±	8.8 *

b indicates cell yield that were significantly greater than site GH_ER2_WS.
c indicates cell yield that were significantly greater than site FR_UFR1_M.

① site control ② site control

* indicates cell yield that were significantly greater than the lab control. a indicates cell yield was significantly less than the site control FRUFR1

Reviewed by: JOh

Date reviewed: June 25/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck | Setup by: MLT

Sample ID: Pass / Fail (various) | Test Date/Time: May 7/15 @ 1300h

Work Order No.: 15369, 15372, 15375, 15381 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: May 1/15 | Age of Culture: 6d | Culture Health: Good

Culture Count: 1 435 2 450 | Average: 442.5 | Culture Cell Density (c1): 442.5 x104 cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 442.5 x104 cells/ml = 5mL

Time Zero Counts: 1 20 2 22 | Average: 21

No. of Cells/mL: 21 x104 | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality pH 0 h	Water Quality Temp (°C) 0 h	Incubator Temperature (°C) 0 h	24 h	48 h	72 h	Microplates rotated 2X per day? 0 h	24 h	48 h	72 h
Control	6.8	24.0	25.0	25.0	24.5	25.0	✓	✓	✓	✓
FR_UFR1	8.1	24.0					✓	✓	✓	✓
GH_ER2	8.2	24.0					✓	✓	✓	✓
FR_FRCP1	8.2	24.0					✓	✓	✓	✓
GH_ERC	8.2	24.0					✓	✓	✓	✓
GH_FR1	8.2	24.0					✓	✓	✓	✓
EV_MC2	8.1	24.0					✓	✓	✓	✓
EV_HC1	8.3	24.0					✓	✓	✓	✓
CM_MC2	8.2	24.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.8 Well 2: 6.8

Final control pH: Well 1: 6.6 Well 2: 6.6

Light intensity (lux): 4060 Date measured: May 7/15

Instruments: Thermometer 4 pH meter 2 Light meter 1

Sample Description: clear (all samples)

Comments:

Reviewed: JGH Date reviewed: June 23/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal — Start Date/Time: May 7/15 @ 1300h

Work Order #: 15369, 15372, 15375, 15381 — Termination Date: May 10/15 @ 1300h

Sample ID: Pass/Fail (various) — Test set up by: MLT

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	MLT ~~35~~ 36					MLT
Lab Ctrl (D.I. w/ nutrients)	B	37					
	C	35					
	D	38					
	E	36					
	F	34					
	G	35					
	H	37					
100% (v/v) FR_UFR1 (site control)	A	131					
	B	127					
	C	114					
	D	115					
↓	MLT ~~A~~ E	123					
	MLT ~~B~~ F	121					
	MLT ~~C~~ G	126					
	MLT ~~D~~ H	125					
100% (v/v) GH_ER2 (site control)	A	100					
	B	111					
	C	103					
	D	96					
↓	MLT ~~A~~ E	101					
	MLT ~~B~~ F	110					
	MLT ~~C~~ G	108					
	MLT ~~D~~ H	98					
100% (v/v) FR_FRCP1	A	140					
	B	149					
	C	130					
	D	146					
100% (v/v) GH_ERC	A	134					
	B	140					
	C	130					
	D	124					
100% (v/v) GH_FR1	A	127					
	B	135					
	C	117					
	D	125					↓

Comments:

Reviewed by: JGL — Date Reviewed: June 23/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal — Start Date/Time: May 7/15 @ 1300h

Work Order #: ~~Pass/Fail~~ MLT 15369, 15372, 15375, 15378 — Termination Date: May 10/15 @ 1300h

Sample ID: Pass/Fail (various) — Test set up by: MLT

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A						~~MLT~~ MLT
MLT	B						
	C						
	D						
	E						
	F						
	G						
	H						
100% (v/v) EV_MC2	A	107					MLT
	B	98					↓
	C	99					
	D	108					
100% (v/v) EV_HCl	A	154					
	B	141					
	C	146					
	D	122					
100% (v/v) CM_MC2	A	98					
	B	118					
	C	105					
	D	113					↓
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						

Comments:

Reviewed by: JGL — Date Reviewed: June 23/15

Pseudokirchneriella subcapitata Algal Counts

Client: Teck Coal
WO#: 15369, 15372, 15375, 15381
Sample ID: Teck Coal samples pass/fail

Start Date/Time: 07-May-15 @ 1300h
Termination Date: 10-May-15 @ 1300h

Initial Cell Density: 9545 cell/mL

210000
0.22
0.01
9545.455

Concentration	Rep	Count 1 ($x 10^4$)	Count 2 ($x 10^4$)	Count 3 ($x 10^4$)	Count 4 ($x 10^4$)	Mean ($x 10^4$)	Cell Yield ($x 10^4$) cell/mL		
Control	A	36				36	35.0	mean	35.0
Lab Water	B	37				37	36.0	SD	1.309307
	C	35				35	34.0	CV	3.736026
	D	38				38	37.0		
	E	36				36	35.0		
	F	34				34	33.0		
	G	35				35	34.0		
	H	37				37	36.0		
Control	A	131				131	130.0	mean	121.8
Site Water	B	127				127	126.0	SD	5.87367
(FR_UFRI)	C	114				114	113.0	CV	4.822569
100% (v/v)	D	115				115	114.0		
	E	123				123	122.0		
	F	121				121	120.0		
	G	126				126	125.0		
	H	125				125	124.0		
Control	A	100				100	99.0	mean	102.4
Site Water	B	111				111	110.0	SD	5.655276
(GH_ER2)	C	103				103	102.0	CV	5.521627
100% (v/v)	D	96				96	95.0		
	E	101				101	100.0		
	F	110				110	109.0		
	G	108				108	107.0		
	H	98				98	97.0		
FR_FRCPI	A	140				140	139.0		
100% (v/v)	B	149				149	148.0		
	C	130				130	129.0		
	D	146				146	145.0		
GH_ERC	A	134				134	133.0		
100% (v/v)	B	140				140	139.0		
	C	130				130	129.0		
	D	124				124	123.0		
GH_FRI	A	127				127	126.0		
100% (v/v)	B	135				135	134.0		
	C	117				117	116.0		
	D	125				125	124.0		
EV_MC2	A	107				107	106.0		
100% (v/v)	B	98				98	97.0		
	C	99				99	98.0		
	D	108				108	107.0		
EV_HC1	A	154				154	153.0		
100% (v/v)	B	141				141	140.0		
	C	146				146	145.0		
	D	122				122	121.0		
CM_MC2	A	98				98	97.0		
100% (v/v)	B	118				118	117.0		
	C	105				105	104.0		
	D	113				113	112.0		

JCA
June 23/15

CETIS Summary Report

Report Date: 29 May-15 08:20 (p 1 of 1)
Test Code: 15369,15372,153 | 15-4928-0230

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Batch ID:	03-3947-1127	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	07 May-15 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	10 May-15 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	6d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	03-8125-0620	07 May-15	07 May-15	13h	Teck Coal	
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	52h (8.6 °C)		
GH_ER2	07-2285-3489	05 May-15	06 May-15 08:34	61h (7 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	50h (9.5 °C)		
GH_ERC	11-9592-1363	05 May-15 08:00	06 May-15 08:34	53h (6.4 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	52h (7.5 °C)		
EV_MC2	17-6401-9240	05 May-15 07:30	06 May-15 08:34	53h (5.6 °C)		
EV_HC1	21-3261-2174	05 May-15 10:00	06 May-15 08:34	51h (5.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	46h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
(1) Lab Control	control	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015-05-05_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015-05-05_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-05-05_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-05-05_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Cell Yield Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	8	35	33.91	36.09	33	37	0.4629	1.309	3.74%	0.0%
FR_UFR1	8	121.8	116.8	126.7	113	130	2.077	5.874	4.82%	-247.9%
GH_ER2	8	102.4	97.65	107.1	95	110	1.999	5.655	5.52%	-192.5%
FR_FRCP1	4	140.3	126.9	153.6	129	148	4.191	8.382	5.98%	-300.7%
GH_ERC	4	131	120.3	141.7	123	139	3.367	6.733	5.14%	-274.3%
GH_FR1	4	125	113.2	136.8	116	134	3.697	7.394	5.92%	-257.1%
EV_MC2	4	102	93.68	110.3	97	107	2.614	5.228	5.13%	-191.4%
EV_HC1	4	139.8	118.1	161.4	121	153	6.799	13.6	9.73%	-299.3%
CM_MC2	4	107.5	93.48	121.5	97	117	4.406	8.813	8.2%	-207.1%

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	35	36	34	37	35	33	34	36
FR_UFR1	130	126	113	114	122	120	125	124
GH_ER2	99	110	102	95	100	109	107	97
FR_FRCP1	139	148	129	145				
GH_ERC	133	139	129	123				
GH_FR1	126	134	116	124				
EV_MC2	106	97	98	107				
EV_HC1	153	140	145	121				
CM_MC2	97	117	104	112				

(1) lab control = deionized water + nutrients
FR_UFR1_M_04052015_N = site control
GH_ER2_WS_2015-05-05_N = site control

CETIS Analytical Report

Test Code: 15369,15372,153 | 15-4928-0230

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	21-3514-4976	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 May-15 12:35	**Analysis:**	Nonparametric-Multiple Comparison	**Official Results:**	Yes
Batch ID:	03-3947-1127	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	07 May-15 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	10 May-15 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	6d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	03-8125-0620	07 May-15	07 May-15	13h	Teck Coal	
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	52h (8.6 °C)		
GH_ER2	07-2285-3489	05 May-15	06 May-15 08:34	61h (7 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	50h (9.5 °C)		
GH_ERC	11-9592-1363	05 May-15 08:00	06 May-15 08:34	53h (6.4 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	52h (7.5 °C)		
EV_MC2	17-6401-9240	05 May-15 07:30	06 May-15 08:34	53h (5.6 °C)		
EV_HC1	21-3261-2174	05 May-15 10:00	06 May-15 08:34	51h (5.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	46h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	control	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015-05-05_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015-05-05_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-05-05_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-05-05_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

(5) lab control = deionized water + nutrients
FR_UFR1_M_04052015_N = site control
GH_ER2_WS_2015-05-05_N = site control

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C < T	NA	NA	31.6%	

Wilcoxon/Bonferroni Adj Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFR1	36	NA	0	14	0.0006	Exact	Significant Effect
		GH_ER2	36	NA	0	14	0.0006	Exact	Significant Effect
		FR_FRCP1	10	NA	0	10	0.0162	Exact	Significant Effect
		GH_ERC	10	NA	0	10	0.0162	Exact	Significant Effect
		GH_FR1	10	NA	0	10	0.0162	Exact	Significant Effect
		EV_MC2	10	NA	0	10	0.0162	Exact	Significant Effect
		EV_HC1	10	NA	0	10	0.0162	Exact	Significant Effect
		CM_MC2	10	NA	0	10	0.0162	Exact	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.5651	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	55660.44	6957.555	8	146.1	<0.0001	Significant Effect
Error	1857.875	47.63782	39			
Total	57518.31		47			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	20.93	20.09	0.0073	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9803	0.9345	0.5904	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 21-3514-4976 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 28 May-15 12:35 **Analysis:** Nonparametric-Multiple Comparison **Official Results:** Yes

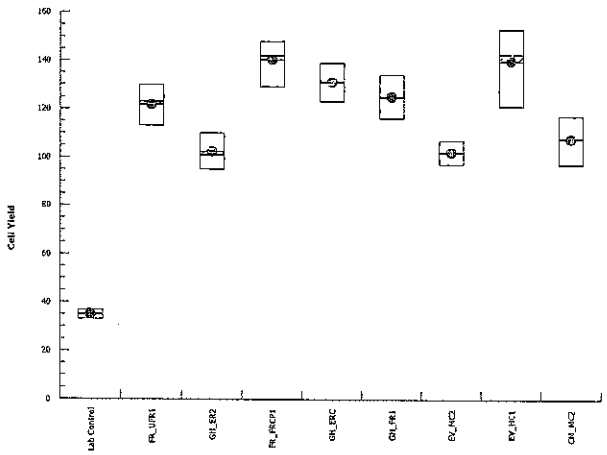
Cell Yield Summary

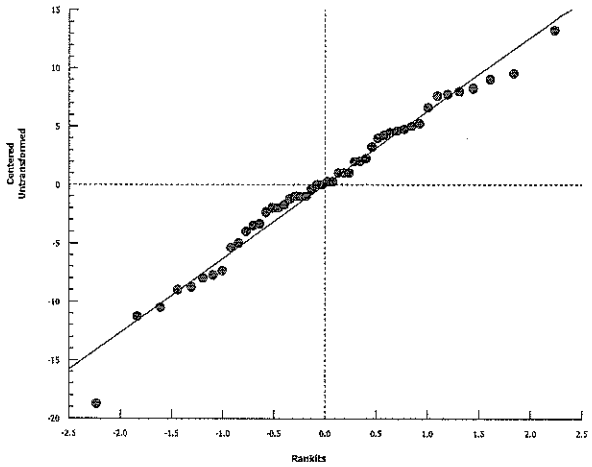
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	8	35	33.91	36.09	35	33	37	0.4629	3.74%	0.0%
FR_UFR1	8	121.8	116.8	126.7	123	113	130	2.077	4.82%	-247.9%
GH_ER2	8	102.4	97.65	107.1	101	95	110	1.999	5.52%	-192.5%
FR_FRCP1	4	140.3	126.9	153.6	142	129	148	4.191	5.98%	-300.7%
GH_ERC	4	131	120.3	141.7	131	123	139	3.367	5.14%	-274.3%
GH_FR1	4	125	113.2	136.8	125	116	134	3.697	5.92%	-257.1%
EV_MC2	4	102	93.68	110.3	102	97	107	2.614	5.13%	-191.4%
EV_HC1	4	139.8	118.1	161.4	142.5	121	153	6.799	9.73%	-299.3%
CM_MC2	4	107.5	93.48	121.5	108	97	117	4.406	8.2%	-207.1%

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	35	36	34	37	35	33	34	36
FR_UFR1	130	126	113	114	122	120	125	124
GH_ER2	99	110	102	95	100	109	107	97
FR_FRCP1	139	148	129	145				
GH_ERC	133	139	129	123				
GH_FR1	126	134	116	124				
EV_MC2	106	97	98	107				
EV_HC1	153	140	145	121				
CM_MC2	97	117	104	112				

Graphics





CETIS Analytical Report

Test Code: 15369,15372,153 | 15-4928-0230

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-6677-3300	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 May-15 12:40	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	03-3947-1127	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	07 May-15 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	10 May-15 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	6d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	52h (8.6 °C)	Teck Coal	
GH_ER2	07-2285-3489	05 May-15	06 May-15 08:34	61h (7 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	50h (9.5 °C)		
GH_ERC	11-9592-1363	05 May-15 08:00	06 May-15 08:34	53h (6.4 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	52h (7.5 °C)		
EV_MC2	17-6401-9240	05 May-15 07:30	06 May-15 08:34	53h (5.6 °C)		
EV_HC1	21-3261-2174	05 May-15 10:00	06 May-15 08:34	51h (5.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	46h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015-05-05_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015-05-05_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-05-05_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-05-05_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

① FR_UFR1_M_04052015_N = site control

GH_ER2_WS_2015-05-05_N = site control

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	9.56%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_ER2	5.102	2.502	9.5	14	<0.0001	CDF	Significant Effect
		FR_FRCP1	-3.978	2.502	11.64	10	1.0000	CDF	Non-Significant Effect
		GH_ERC	-1.989	2.502	11.64	10	1.0000	CDF	Non-Significant Effect
		GH_FR1	-0.6988	2.502	11.64	10	0.9902	CDF	Non-Significant Effect
		EV_MC2	4.246	2.502	11.64	10	0.0006	CDF	Significant Effect
		EV_HC1	-3.87	2.502	11.64	10	1.0000	CDF	Non-Significant Effect
		CM_MC2	3.064	2.502	11.64	10	0.0136	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9049	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8199.5	1171.357	7	20.31	<0.0001	Significant Effect
Error	1845.875	57.68359	32			
Total	10045.38		39			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	5.303	18.48	0.6230	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9775	0.9236	0.5991	Normal Distribution

EC Alga Growth Inhibition Test — Nautilus Environmental

Analysis ID:	00-6677-3300	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 May-15 12:40	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

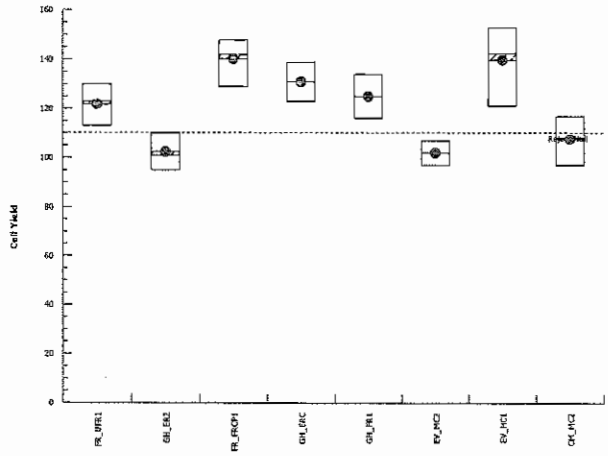
Cell Yield Summary

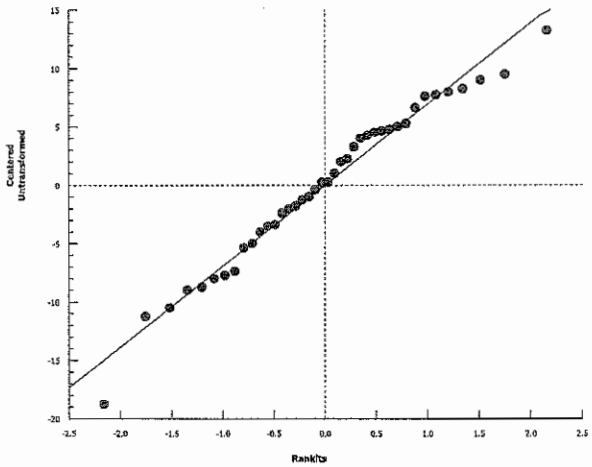
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	8	121.8	116.8	126.7	123	113	130	2.077	4.82%	0.0%
GH_ER2	8	102.4	97.65	107.1	101	95	110	1.999	5.52%	15.91%
FR_FRCP1	4	140.3	126.9	153.6	142	129	148	4.191	5.98%	-15.2%
GH_ERC	4	131	120.3	141.7	131	123	139	3.367	5.14%	-7.6%
GH_FR1	4	125	113.2	136.8	125	116	134	3.697	5.92%	-2.67%
EV_MC2	4	102	93.68	110.3	102	97	107	2.614	5.13%	16.22%
EV_HC1	4	139.8	118.1	161.4	142.5	121	153	6.799	9.73%	-14.78%
CM_MC2	4	107.5	93.48	121.5	108	97	117	4.406	8.2%	11.7%

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1	130	126	113	114	122	120	125	124
GH_ER2	99	110	102	95	100	109	107	97
FR_FRCP1	139	148	129	145				
GH_ERC	133	139	129	123				
GH_FR1	126	134	116	124				
EV_MC2	106	97	98	107				
EV_HC1	153	140	145	121				
CM_MC2	97	117	104	112				

Graphics





CETIS Analytical Report

Test Code: 15369,15372,153 | 15-4928-0230

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	05-7000-0828	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 May-15 12:40	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	03-3947-1127	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	07 May-15 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	10 May-15 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	6d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	52h (8.6 °C)	Teck Coal	
GH_ER2	07-2285-3489	05 May-15	06 May-15 08:34	61h (7 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	50h (9.5 °C)		
GH_ERC	11-9592-1363	05 May-15 08:00	06 May-15 08:34	53h (6.4 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	52h (7.5 °C)		
EV_MC2	17-6401-9240	05 May-15 07:30	06 May-15 08:34	53h (5.6 °C)		
EV_HC1	21-3261-2174	05 May-15 10:00	06 May-15 08:34	51h (5.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	46h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015-05-05_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015-05-05_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-05-05_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-05-05_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

① FR_UFR1_M_04052015_N = site control

GH_ER2_WS_2015-05-05_N = site control

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C < T	NA	NA	9.56%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_ER2	-5.102	2.502	9.5	14	1.0000	CDF	Non-Significant Effect
		FR_FRCP1	3.978	2.502	11.64	10	0.0012	CDF	Significant Effect
		GH_ERC	1.989	2.502	11.64	10	0.1388	CDF	Non-Significant Effect
		GH_FR1	0.6988	2.502	11.64	10	0.6885	CDF	Non-Significant Effect
		EV_MC2	-4.246	2.502	11.64	10	1.0000	CDF	Non-Significant Effect
		EV_HC1	3.87	2.502	11.64	10	0.0016	CDF	Significant Effect
		CM_MC2	-3.064	2.502	11.64	10	1.0000	CDF	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9049	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8199.5	1171.357	7	20.31	<0.0001	Significant Effect
Error	1845.875	57.68359	32			
Total	10045.38		39			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	5.303	18.48	0.6230	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9775	0.9236	0.5991	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	05-7000-0828	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 May-15 12:40	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

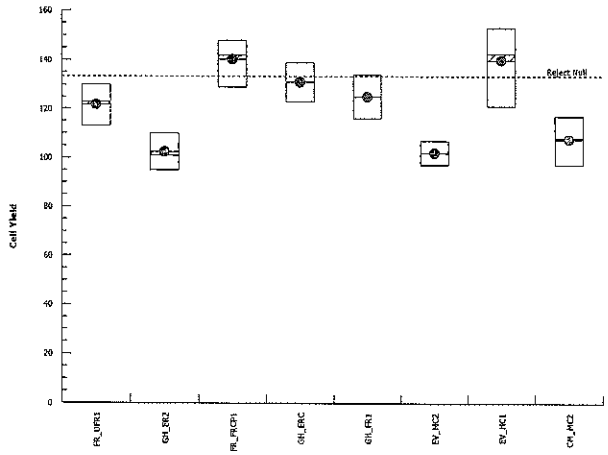
Cell Yield Summary

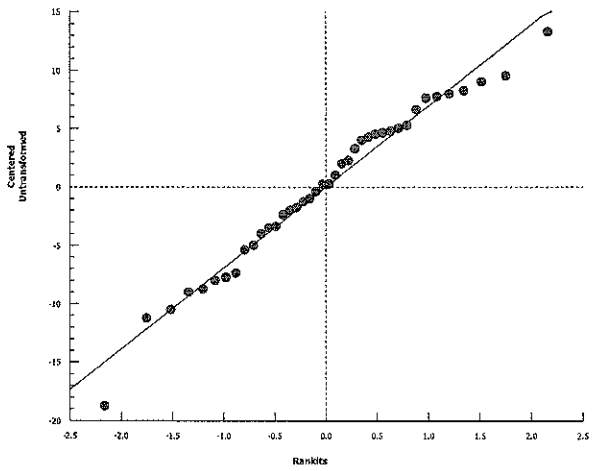
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	8	121.8	116.8	126.7	123	113	130	2.077	4.82%	0.0%
GH_ER2	8	102.4	97.65	107.1	101	95	110	1.999	5.52%	15.91%
FR_FRCP1	4	140.3	126.9	153.6	142	129	148	4.191	5.98%	-15.2%
GH_ERC	4	131	120.3	141.7	131	123	139	3.367	5.14%	-7.6%
GH_FR1	4	125	113.2	136.8	125	116	134	3.697	5.92%	-2.67%
EV_MC2	4	102	93.68	110.3	102	97	107	2.614	5.13%	16.22%
EV_HC1	4	139.8	118.1	161.4	142.5	121	153	6.799	9.73%	-14.78%
CM_MC2	4	107.5	93.48	121.5	108	97	117	4.406	8.2%	11.7%

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1	130	126	113	114	122	120	125	124
GH_ER2	99	110	102	95	100	109	107	97
FR_FRCP1	139	148	129	145				
GH_ERC	133	139	129	123				
GH_FR1	126	134	116	124				
EV_MC2	106	97	98	107				
EV_HC1	153	140	145	121				
CM_MC2	97	117	104	112				

Graphics





Analyst:_____ QA: Jole - June 23/15

CETIS Analytical Report

Test Code: 15369,15372,153 | 15-4928-0230

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	18-3387-8513	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 May-15 12:44	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	03-3947-1127	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	07 May-15 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	10 May-15 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	6d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	52h (8.6 °C)	Teck Coal	
GH_ER2	07-2285-3489	05 May-15	06 May-15 08:34	61h (7 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	50h (9.5 °C)		
GH_ERC	11-9592-1363	05 May-15 08:00	06 May-15 08:34	53h (6.4 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	52h (7.5 °C)		
EV_MC2	17-6401-9240	05 May-15 07:30	06 May-15 08:34	53h (5.6 °C)		
EV_HC1	21-3261-2174	05 May-15 10:00	06 May-15 08:34	51h (5.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	46h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015-05-05_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015-05-05_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-05-05_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-05-05_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

① FR_UFR1_M_04052015_N = site control

GH_ER2_WS_2015-05-05_N = site control

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	11.4%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
GH_ER2		FR_UFR1	-5.102	2.502	9.5	14	1.0000	CDF	Non-Significant Effect
		FR_FRCP1	-8.143	2.502	11.64	10	1.0000	CDF	Non-Significant Effect
		GH_ERC	-6.155	2.502	11.64	10	1.0000	CDF	Non-Significant Effect
		GH_FR1	-4.865	2.502	11.64	10	1.0000	CDF	Non-Significant Effect
		EV_MC2	0.08063	2.502	11.64	10	0.9043	CDF	Non-Significant Effect
		EV_HC1	-8.036	2.502	11.64	10	1.0000	CDF	Non-Significant Effect
		CM_MC2	-1.102	2.502	11.64	10	0.9978	CDF	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9049	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8199.5	1171.357	7	20.31	<0.0001	Significant Effect
Error	1845.875	57.68359	32			
Total	10045.38		39			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	5.303	18.48	0.6230	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9775	0.9236	0.5991	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 18-3387-8513 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 28 May-15 12:44 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

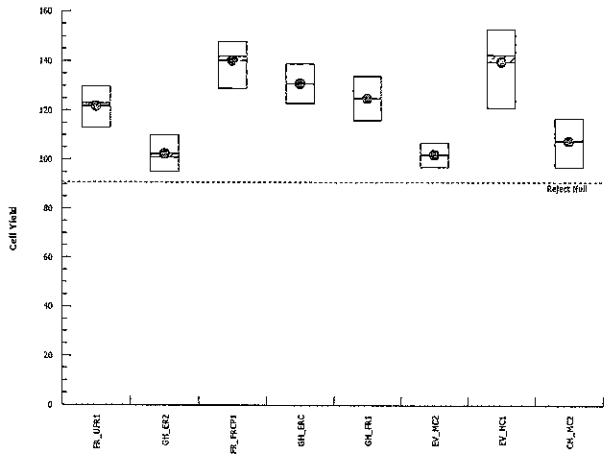
Cell Yield Summary

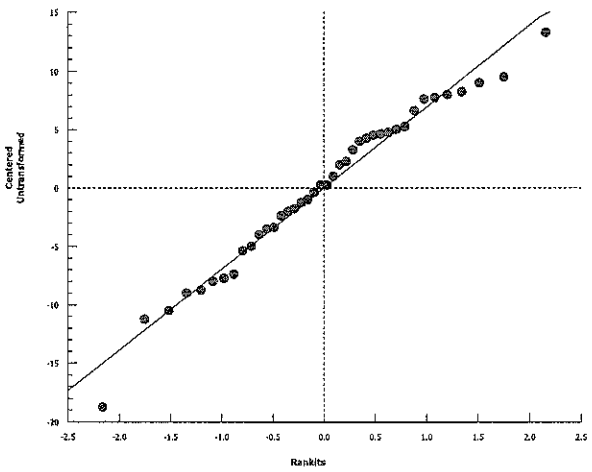
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	8	121.8	116.8	126.7	123	113	130	2.077	4.82%	0.0%
GH_ER2	8	102.4	97.65	107.1	101	95	110	1.999	5.52%	15.91%
FR_FRCP1	4	140.3	126.9	153.6	142	129	148	4.191	5.98%	-15.2%
GH_ERC	4	131	120.3	141.7	131	123	139	3.367	5.14%	-7.6%
GH_FR1	4	125	113.2	136.8	125	116	134	3.697	5.92%	-2.67%
EV_MC2	4	102	93.68	110.3	102	97	107	2.614	5.13%	16.22%
EV_HC1	4	139.8	118.1	161.4	142.5	121	153	6.799	9.73%	-14.78%
CM_MC2	4	107.5	93.48	121.5	108	97	117	4.406	8.2%	11.7%

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1	130	126	113	114	122	120	125	124
GH_ER2	99	110	102	95	100	109	107	97
FR_FRCP1	139	148	129	145				
GH_ERC	133	139	129	123				
GH_FR1	126	134	116	124				
EV_MC2	106	97	98	107				
EV_HC1	153	140	145	121				
CM_MC2	97	117	104	112				

Graphics





CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	01-0298-5703	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 May-15 12:44	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	03-3947-1127	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	07 May-15 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	10 May-15 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	6d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	52h (8.6 °C)	Teck Coal	
GH_ER2	07-2285-3489	05 May-15	06 May-15 08:34	61h (7 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	50h (9.5 °C)		
GH_ERC	11-9592-1363	05 May-15 08:00	06 May-15 08:34	53h (6.4 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	52h (7.5 °C)		
EV_MC2	17-6401-9240	05 May-15 07:30	06 May-15 08:34	53h (5.6 °C)		
EV_HC1	21-3261-2174	05 May-15 10:00	06 May-15 08:34	51h (5.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	46h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015-05-05_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015-05-05_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-05-05_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-05-05_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

① FR_UFR1_M_04052015_N = site control

GH_ER2_WS_2015-05-05_N = site control

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C < T	NA	NA	11.4%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
GH_ER2		FR_UFR1	5.102	2.502	9.5	14	<0.0001	CDF	Significant Effect
		FR_FRCP1	8.143	2.502	11.64	10	<0.0001	CDF	Significant Effect
		GH_ERC	6.155	2.502	11.64	10	<0.0001	CDF	Significant Effect
		GH_FR1	4.865	2.502	11.64	10	0.0001	CDF	Significant Effect
		EV_MC2	-0.08063	2.502	11.64	10	0.9358	CDF	Non-Significant Effect
		EV_HC1	8.036	2.502	11.64	10	<0.0001	CDF	Significant Effect
		CM_MC2	1.102	2.502	11.64	10	0.4904	CDF	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9049	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8199.5	1171.357	7	20.31	<0.0001	Significant Effect
Error	1845.875	57.68359	32			
Total	10045.38		39			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	5.303	18.48	0.6230	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9775	0.9236	0.5991	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	01-0298-5703	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 May-15 12:44	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

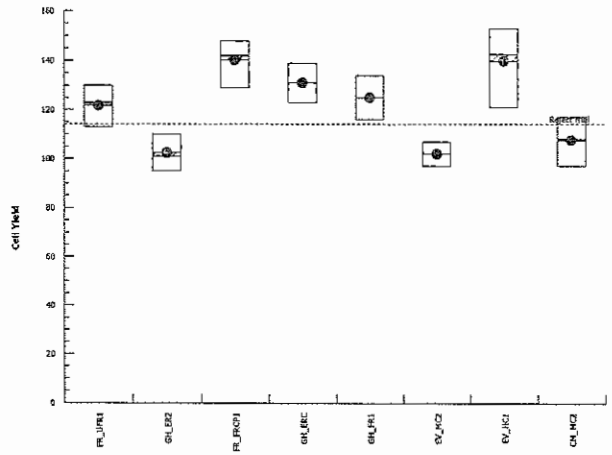
Cell Yield Summary

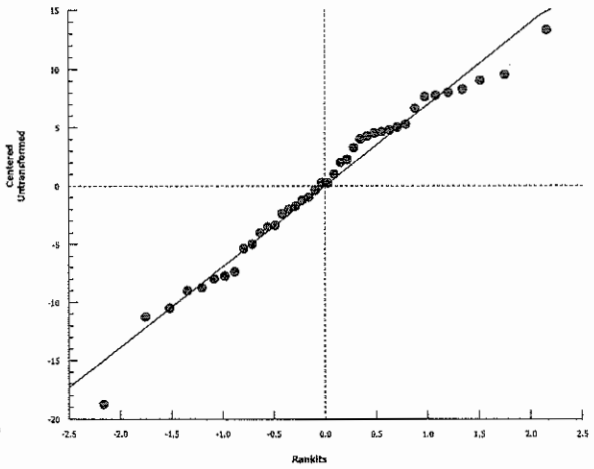
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	8	121.8	116.8	126.7	123	113	130	2.077	4.82%	0.0%
GH_ER2	8	102.4	97.65	107.1	101	95	110	1.999	5.52%	15.91%
FR_FRCP1	4	140.3	126.9	153.6	142	129	148	4.191	5.98%	-15.2%
GH_ERC	4	131	120.3	141.7	131	123	139	3.367	5.14%	-7.6%
GH_FR1	4	125	113.2	136.8	125	116	134	3.697	5.92%	-2.67%
EV_MC2	4	102	93.68	110.3	102	97	107	2.614	5.13%	16.22%
EV_HC1	4	139.8	118.1	161.4	142.5	121	153	6.799	9.73%	-14.78%
CM_MC2	4	107.5	93.48	121.5	108	97	117	4.406	8.2%	11.7%

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1	130	126	113	114	122	120	125	124
GH_ER2	99	110	102	95	100	109	107	97
FR_FRCP1	139	148	129	145				
GH_ERC	133	139	129	123				
GH_FR1	126	134	116	124				
EV_MC2	106	97	98	107				
EV_HC1	153	140	145	121				
CM_MC2	97	117	104	112				

Graphics





APPENDIX C – *Hyalella azteca* Toxicity Test Data

Hyalella azteca 28-d Toxicity Test Summary Sheet

Client: Teck
Work Order No.: 15373, 15379, 15382

Start Date: 06-May-15
Set up by: JW/KLP

Sample Information:

Sample ID: Various - See below
Sample Date: May 5, 12, 19, 26, 2015
Date Received: May 6, 13, 20, 27, 2015
Sample Volume: 2-6x 20L per refresh

Test Organism Information:

Species: *Hyalella azteca*
Supplier: Aquatic Research Organisms, NH
Date received: 06-May-15
Age or size (Day 0): 8-days

NaCl Reference Toxicant Results:

Reference Toxicant ID: HA95
Stock Solution ID: n/a
Date Initiated: 06-May-15

96-h LC50 (95% CL): 5.7 (4.4 - 7.3) g/L NaCl

96-h LC50 Reference Toxicant Mean and Range: 5.1 (4.2 - 6.1) g/L NaCl. CV (%): 10

Test Results:

Sample ID	Survival ± SD (%)	Average Dry Wt. ± SD (mg)
Control	96.0 ± 5.5	1.06 ± 0.11
FR_UFR1	100 ± 0.0	0.97 ± ~~0.69~~ 0.07
FR_FRCP1	96.0 ± 5.5	0.11*, 1
GH_FR1	96.0 ± 5.5	0.83 ± 0.26*
CM_MC2	96.0 ± 5.5	0.92 ± 0.09

* Samples that are significantly different from Control.

[1] Samples that are significantly different from site control FR_UFR1.

Reviewed by: JW

Date reviewed: June 25/15

Chronic *H. azteca* ~~Sediment~~ Toxicity Test Data Sheet

Freshwater ~~Sediment~~ Water Quality

Client: Teck

Work Order #: 15373, 15379, 15382

Start Date: May 6, 2015

Termination Date: June 3, 2015

Test Organism: *H. azteca*

Temperature (°C)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control	22.0	23.0	22.5	23.0	23.0	23.0	23.0	23.0	23.5	24.0	24.0	24.0	24.0	23.5	24.0
FR-UFR1	22.0	23.0	22.5	23.0	23.0	23.0	23.0	23.0	23.5	24.0	24.0	24.0	24.0	23.5	24.0
FR-FRCP1	22.0	22.5	22.5	23.0	23.0	23.0	23.0	23.0	23.5	24.0	24.0	24.0	24.0	23.5	24.0
GH-FR1	22.0	23.0	22.5	23.0	23.0	23.0	23.0	23.0	23.5	24.0	24.0	24.0	24.0	23.5	24.0
CM-MC2	22.0	23.0	22.5	23.0	23.0	23.0	23.0	23.0	23.5	24.0	24.0	24.0	24.0	23.5	24.0
Technician Initials	JW	KL	JW	A	KJL	KS	KS	KS	KS	KS	A	A	A	KS	KS

Conductivity (µS)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control	397	385	401	398	416	405	400	398	394	397	397	404	405	409	402
FR-UFR1	329	334	344	347	378	393	404	409	354	348	302	337	350	372	388
FR-FRCP1 663	589	659	678	681	707	698	724	726	726	731	697	730	737	755	761
GH-FR1	729	689	722	715	746	763	769	772	730	725	685	716	736	754	755
CM-MC2 574	488 JW	565 KL	596 JW	589 A	599 KJL	645 KS	649 KS	648 KS	615 KS	620 KS	569 A	601 A	620 A	643 KS	653 KS
Technician Initials	JW	KL	JW	A	KJL	KS	KS	KS	KS	KS	A	A	A	KS	KS

Dissolved oxygen (mg/L)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control	8.4	6.8	5.9	6.3	6.5	6.1	5.6	5.9	5.2	JW 6.0	5.9	6.5	6.4	6.3	6.1
FR-UFR1	8.7	6.8	5.8	6.4	6.4	6.1	5.2	6.0	5.8	6.5	5.8	6.6	6.4	6.4	6.5
FR-FRCP1	8.7	7.0	5.9	6.4	6.5	6.1	5.2	5.7	6.9	6.7	5.9	6.5	6.3	6.2	6.4
GH-FR1	8.7	6.7	5.8	6.3	6.5	6.2	5.5	6.0	6.8	6.7	6.0	6.5	6.4	6.4	6.6
CM-MC2	8.7	6.9	6.0	6.3	6.6	5.9	5.3	5.7	6.9	6.7	6.1	6.6	6.5	6.5	6.0
Technician Initials	JW	KL	JW	A	KJL	KS	KS	KS	KS	KS	A	A	A	KS	KS

pH

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control	7.6	7.4	7.1	7.7	7.3	7.2	7.1	7.3	7.2	7.1	7.6	7.7	7.8	7.3	7.2
FR-UFR1	7.8	7.8	7.4	7.8	7.7	7.7	7.5	7.6	7.5	7.6	7.7	7.9	7.9	7.7	7.6
FR-FRCP1	7.9	8.0	7.7	7.9	7.9	8.0	7.8	7.9	7.9	7.9	7.9	8.0	8.0	8.0	7.9
GH-FR1	7.9	8.0	7.8	7.9	7.9	8.1	7.9	7.9	7.9	8.0	8.0	8.0	8.0	8.0	7.9
CM-MC2	8.0	8.0	7.7	7.9	7.9	8.1	7.8	7.8	7.8	7.9	7.9	7.9	8.0	8.0	7.8
Technician Initials	JW	KL	JW	A	KJL	KS	KS	KS	KS	KS	A	A	A	KS	KS

Comments:

Reviewed by: JW

Date Reviewed: June 24/15

Nautilus Environmental

Chronic *H. azteca* ~~Sediment~~ Toxicity Test Data Sheet

Freshwater ~~Sediment~~ Water Quality

Client: Teck
Work Order #: 15373, 15379, 15382

Start Date: May 6, 2015
Termination Date: June 3, 2015
Test Organism: *H. azteca*

Temperature (°C)

Sample ID	Day 15	16	17	18	19	20	21	22	23	24	25	26	27	28
Control	24.0 ~~403~~	23.0	23.0	23.0	23.0	22.5	23.0	23.0	23.5	23.0	23.0	24.0	23.0	23.0
FR-UFR1	24.0	23.0	23.0	23.0	23.0	22.5	23.0	23.0	23.5	23.0	23.0	24.0	23.0	23.0
FR- FRCP1	24.0	23.0	23.0	23.0	23.0	22.5	23.0	23.0	23.5	23.0	23.0	24.0	23.0	23.0
GH- FR1	24.0	23.0	23.0	23.0	23.0	22.5	23.0	23.0	23.5	23.0	23.0	24.0	23.0	23.0
CM-MC2	24.0	23.0	23.0	23.0	23.0	22.5	23.0	23.0	23.5	23.0	23.0	24.0	23.0	23.0
Technician Initials	KS	KS	A	A	KS	KS	KS	JW	KS	A	A	KS	KS	KS

Conductivity (µS)

Sample ID	Day 15	16	17	18	19	20	21	22	23	24	25	26	27	28
Control	403	399	398	404	399	400	391	394	400	408	412	418	398	399
FR-UFR1	314	306	298	325	335	339	347	319	324	329	330	338	317	320
FR-FRCP1	648	632	622	651	655	661	668	569	560	577	565	558	554	555
GH- FR1	685	676	671	690	731	711	715	613	612	618	620	610	610	641
CM-MC2	563	550	544	550	575	570	586	447	441	444	446	435	437	440
Technician Initials	KS	KS	A	A	KS	KS	KS	JW	KS	A	A	KS	KS	KS

Dissolved oxygen (mg/L)

Sample ID	Day 15	16	17	18	19	20	~~21~~ 21	22	23	24	25	26	27	28
Control	5.9	5.3	6.0	5.8	5.6	5.7	~~4.46~~ 6.2	5.8	4.5	5.9	5.6	5.5	5.3	4.9
FR-UFR1	6.1	5.3	5.9	5.7	5.4	5.84	6.0	5.1	5.4	5.8	5.4	5.9	5.5	5.1
FR-FRCP1	6.4	6.2	6.1	5.6	6.5	5.8	5.9	5.6	5.34	5.8	5.5	5.2	5.0	4.9
GH- FR1	6.3	5.2	6.2	5.7	5.4	5.4	5.5	5.8	4.9 KS	5.9	5.4	5.2	5.0	5.0
CM-MC2	6.4	6.0	6.1	5.7	5.6	5.8	6.1	5.6	5.82	5.8	5.5	5.5	5.1	4.9
Technician Initials	KS	KS	A	A	KS	KS	KS	JW	KS	A	A	KS	KS	KS

pH

Sample ID	Day 15	16	17	18	19	20	21	22	23	24	25	26	27	28
Control	7.1	7.0	7.5	7.6	7.2	7.0	7.0	6.8	6.8	6.9	7.0	6.9	6.8	6.7
FR- UFR1	7.5	7.5	7.6	7.7	7.4	7.4	7.5	7.0	7.3	7.4	7.5	7.3	7.2	7.1
FR- FRCP1	7.9	7.7	7.8	7.9	7.9	7.8	7.7	7.3	7.5	7.5	7.5	7.4	7.4	7.2
GH- FR1	7.8	7.8	7.9	7.8	7.7	7.7	7.7	7.5	7.5	7.6	7.5	7.5	7.5	7.4
CM- MC2	7.8	7.7	7.9	7.9	7.7	7.6	7.7	7.4	7.4	7.5	7.6	7.4	7.4	7.3
Technician Initials	KS	KS	A	A	KS	KS	KS	JW	KS	A	A	KS	KS	KS

Comments:

Reviewed by: JW

Date Reviewed: June 24/15

Nautilus Environmental

H. azteca Sediment Toxicity Test Data Sheet

Freshwater Sediment 28-d Survival and Weight

Client: Teck
Work Order No: 15373, 15379, 15382
Sample ID: See below

Start Date: May 6/15
Termination Date: June 3/15
Test Organism: *Hyalella azteca*

Sample ID	THA Pan No. green	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
Control	1	A	11 ①	0	0	KJL	987.61	997.77	11	KS/JW
	2	B	9 ①	0	1		981.75	990.86	9	
	3	C	9	0	1		989.38	1000.39	9	
	4	D	10 ①	0	0		972.06	982.35	10	
	5	E	10 ①	0	0		1020.77	1032.01	10	
FR_UFR1	6	A	10 ①	0	0	KS	1019.22	1028.92	10	
	7	B	10 ①	0	0		952.65	962.62	10	
	8	C	10 ①	0	0		954.47	964.13	10	
	9	D	11 ~~8~~ ①	0	0		973.73	983.13	11	
	10	E	10 ①	0	0		979.69	990.08	10	
FR_FRCP1	11	A	9 ~~8~~ ① KS Rep	0	1	KJL	974.14	979.96	9	
	12	B	10	0	0		970.59	977.49	10	
	13	C	10 ①	0	0		962.74	971.86	10	
	14	D	9 ①	0	1		981.57	989.07	9	
	15	E	10	0	0		952.56	959.81	10	
GH_FR1	16	A	10	0	0	KJL	1007.44	1017.17	10	
	17	B	9	0	1		961.77	970.04	9	
	18	C	9	0	1		1023.01	1026.23	9	
	19	D	10 ①	0	0		1008.59	1017.90	10	
	20	E	10 ①	0	0		980.44	990.00	10	

Comments: ① Young present 10% Reweigh: # 6. 1028.84 # 21. 989.22
15. 959.66

Reviewed by: JGL

Date Reviewed: June 24/15

H. azteca Sediment Toxicity Test Data Sheet

Freshwater Sediment 28-d Survival and Weight

Client: Teck

Work Order No: 15373, 15379, 15382

Sample ID: See below

Start Date: May 6/15

Termination Date: June 3/15

Test Organism: *Hyalella azteca*

Sample ID	THA Pan No. green	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
CM_MC2	21	A	9①	0	1 ⊘KS	KS	980.45	989.46	9	KS/JW
	22	B	10①	0	0	↓	986.54	995.36	10	↓
	23	C	10①	0	0		974.36	983.17	10	
	24	D	9	0	1		981.58	990.72	9	
	25	E	11	0	0		983.08	991.93	11	
		A								
		B								
		C								
		D								
		E								
		A								
		B								
		C								
		D								
		E								
		A								
		B								
		C								
		D								
		E								

Comments: ① Young Present

Reviewed by: JW

Date Reviewed: June 24/15

CETIS Summary Report

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Batch ID:	16-6000-6699	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	06 May-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	03 Jun-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	09-0012-4342	06 May-15	06 May-15	NA	Teck Coal	
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	15h (8.6 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	13h (9.5 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	15h (7.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	9h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	5	0.96	0.892	1	0.9	1	0.02449	0.05477	5.71%	0.0%
FR_UFR1	5	1	1	1	1	1	0	0	0.0%	-4.17%
FR_FRCP1	5	0.96	0.892	1	0.9	1	0.02449	0.05477	5.71%	0.0%
GH_FR1	5	0.96	0.892	1	0.9	1	0.02449	0.05477	5.71%	0.0%
CM_MC2	5	0.96	0.892	1	0.9	1	0.02449	0.05477	5.71%	0.0%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	1	0.9	0.9	1	1
FR_UFR1	1	1	1	1	1
FR_FRCP1	0.9	1	1	0.9	1
GH_FR1	1	0.9	0.9	1	1
CM_MC2	0.9	1	1	0.9	1

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	11/11	9/10	9/10	10/10	10/10
FR_UFR1	10/10	10/10	10/10	11/11	10/10
FR_FRCP1	9/10	10/10	10/10	9/10	10/10
GH_FR1	10/10	9/10	9/10	10/10	10/10
CM_MC2	9/10	10/10	10/10	9/10	11/11

Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	14-5231-5867	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jun-15 12:18	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	16-6000-6699	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	06 May-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	03 Jun-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	09-0012-4342	06 May-15	06 May-15	NA	Teck Coal	
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	15h (8.6 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	13h (9.5 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	15h (7.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	9h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Angular (Corrected)	NA	C > T	NA	NA	

Kolmogorov-Smirnov Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		FR_UFR1	0	NA		8	0.5000	CDF	Non-Significant Effect
		FR_FRCP1	0	NA		8	0.5000	CDF	Non-Significant Effect
		GH_FR1	0	NA		8	0.5000	CDF	Non-Significant Effect
		CM_MC2	0	NA		8	0.5000	CDF	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.96	0.8 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01739968	0.00434992	4	0.6715	0.6194	Non-Significant Effect
Error	0.1295599	0.006477994	20			
Total	0.1469596		24			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	19.92	13.28	0.0005	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.7499	0.8877	<0.0001	Non-normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	5	0.96	0.892	1	1	0.9	1	0.02449	5.71%	0.0%
FR_UFR1	5	1	1	1	1	1	1	0	0.0%	-4.17%
FR_FRCP1	5	0.96	0.892	1	1	0.9	1	0.02449	5.71%	0.0%
GH_FR1	5	0.96	0.892	1	1	0.9	1	0.02449	5.71%	0.0%
CM_MC2	5	0.96	0.892	1	1	0.9	1	0.02449	5.71%	0.0%

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 14-5231-5867 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 08 Jun-15 12:18 **Analysis:** Nonparametric-Two Sample **Official Results:** Yes

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	5	1.348	1.236	1.461	1.412	1.249	1.419	0.04055	6.73%	0.0%
FR_UFR1	5	1.414	1.409	1.418	1.412	1.412	1.419	0.001494	0.24%	-4.84%
FR_FRCP1	5	1.347	1.236	1.458	1.412	1.249	1.412	0.03992	6.63%	0.11%
GH_FR1	5	1.347	1.236	1.458	1.412	1.249	1.412	0.03992	6.63%	0.11%
CM_MC2	5	1.348	1.236	1.461	1.412	1.249	1.419	0.04055	6.73%	0.0%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	1	0.9	0.9	1	1
FR_UFR1	1	1	1	1	1
FR_FRCP1	0.9	1	1	0.9	1
GH_FR1	1	0.9	0.9	1	1
CM_MC2	0.9	1	1	0.9	1

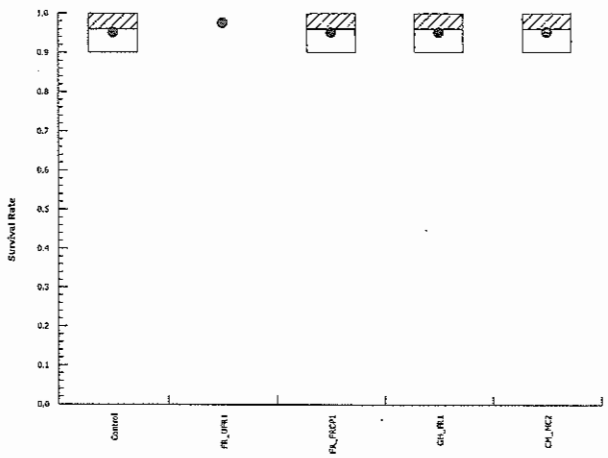
Angular (Corrected) Transformed Detail

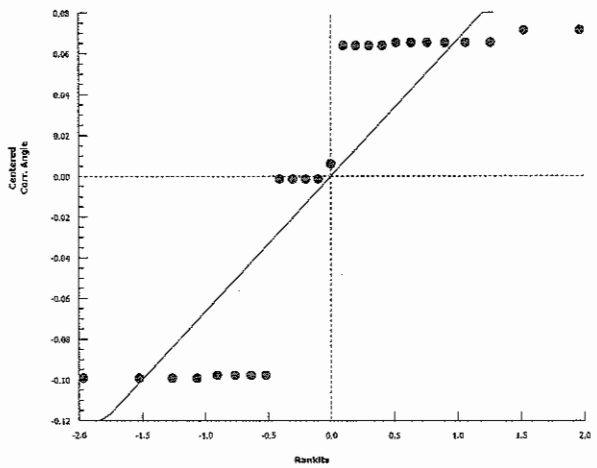
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	1.419	1.249	1.249	1.412	1.412
FR_UFR1	1.412	1.412	1.412	1.419	1.412
FR_FRCP1	1.249	1.412	1.412	1.249	1.412
GH_FR1	1.412	1.249	1.249	1.412	1.412
CM_MC2	1.249	1.412	1.412	1.249	1.419

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	11/11	9/10	9/10	10/10	10/10
FR_UFR1	10/10	10/10	10/10	11/11	10/10
FR_FRCP1	9/10	10/10	10/10	9/10	10/10
GH_FR1	10/10	9/10	9/10	10/10	10/10
CM_MC2	9/10	10/10	10/10	9/10	11/11

Graphics





Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	19-6626-5677	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Jun-15 9:16	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	16-6000-6699	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	06 May-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	03 Jun-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	15h (8.6 °C)	Teck Coal	
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	13h (9.5 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	15h (7.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	9h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Angular (Corrected)	NA	C > T	NA	NA	

Kolmogorov-Smirnov Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		FR_FRCP1	0.4	NA		8	0.4365	CDF	Non-Significant Effect
		GH_FR1	0.4	NA		8	0.4365	CDF	Non-Significant Effect
		CM_MC2	0.4	NA		8	0.4365	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01643219	0.005477395	3	0.9065	0.4597	Non-Significant Effect
Error	0.09667332	0.006042083	16			
Total	0.1131055		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	19.7	11.34	0.0002	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.7694	0.866	0.0003	Non-normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	5	1	1	1	1	1	1	0	0.0%	0.0%
FR_FRCP1	5	0.96	0.892	1	1	0.9	1	0.02449	5.71%	4.0%
GH_FR1	5	0.96	0.892	1	1	0.9	1	0.02449	5.71%	4.0%
CM_MC2	5	0.96	0.892	1	1	0.9	1	0.02449	5.71%	4.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	5	1.414	1.409	1.418	1.412	1.412	1.419	0.001494	0.24%	0.0%
FR_FRCP1	5	1.347	1.236	1.458	1.412	1.249	1.412	0.03992	6.63%	4.72%
GH_FR1	5	1.347	1.236	1.458	1.412	1.249	1.412	0.03992	6.63%	4.72%
CM_MC2	5	1.348	1.236	1.461	1.412	1.249	1.419	0.04055	6.73%	4.61%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1	1	1	1	1	1
FR_FRCP1	0.9	1	1	0.9	1
GH_FR1	1	0.9	0.9	1	1
CM_MC2	0.9	1	1	0.9	1

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	19-6626-5677	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Jun-15 9:16	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

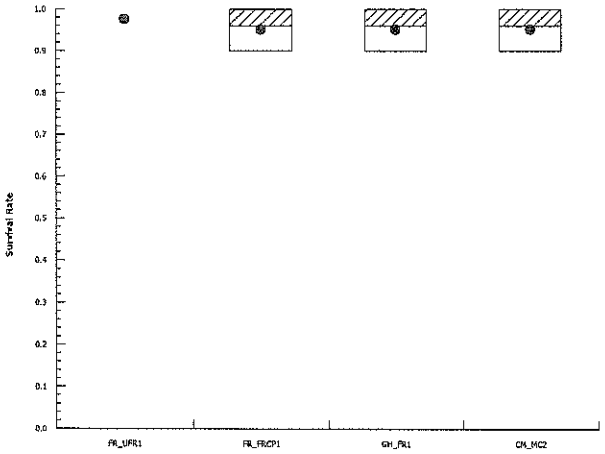
Angular (Corrected) Transformed Detail

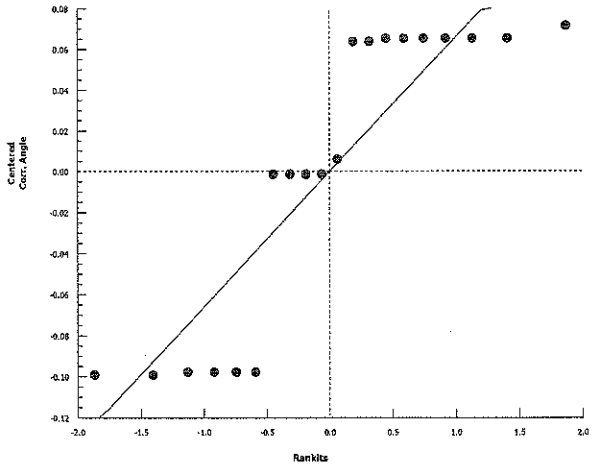
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1	1.412	1.412	1.412	1.419	1.412
FR_FRCP1	1.249	1.412	1.412	1.249	1.412
GH_FR1	1.412	1.249	1.249	1.412	1.412
CM_MC2	1.249	1.412	1.412	1.249	1.419

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1	10/10	10/10	10/10	11/11	10/10
FR_FRCP1	9/10	10/10	10/10	9/10	10/10
GH_FR1	10/10	9/10	9/10	10/10	10/10
CM_MC2	9/10	10/10	10/10	9/10	11/11

Graphics





CETIS Summary Report

Test Code: 15373,15379,153 | 05-0788-6776

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Batch ID:	16-6000-6699	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	06 May-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	03 Jun-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	09-0012-4342	06 May-15	06 May-15	NA	Teck Coal	
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	15h (8.6 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	13h (9.5 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	15h (7.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	9h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	5	1.062	0.9201	1.205	0.9236	1.223	0.05127	0.1147	10.79%	0.0%
FR_UFR1	5	0.9653	0.8804	1.05	0.8545	1.039	0.0306	0.06842	7.09%	9.14%
FR_FRCP1	5	0.7614	0.6262	0.8966	0.6467	0.912	0.0487	0.1089	14.3%	28.33%
GH_FR1	5	0.8273	0.5004	1.154	0.3578	0.973	0.1178	0.2633	31.83%	22.13%
CM_MC2	5	0.9168	0.8059	1.028	0.8045	1.016	0.03997	0.08938	9.75%	13.7%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	0.9236	1.012	1.223	1.029	1.124
FR_UFR1	0.97	0.997	0.966	0.8545	1.039
FR_FRCP1	0.6467	0.69	0.912	0.8333	0.725
GH_FR1	0.973	0.9189	0.3578	0.931	0.956
CM_MC2	1.001	0.882	0.881	1.016	0.8045

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	15-9321-2082	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jun-15 12:21	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	16-6000-6699	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	06 May-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	03 Jun-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	09-0012-4342	06 May-15	06 May-15	NA	Teck Coal	
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	15h (8.6 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	13h (9.5 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	15h (7.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	9h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed	NA	C > T	NA	NA	

Kolmogorov-Smirnov Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		FR_UFR1	0.6	NA		8	0.1786	CDF	Non-Significant Effect
		FR_FRCP1	1	NA		8	0.0040	CDF	Significant Effect
		GH_FR1	0.8	NA		8	0.0397	CDF	Significant Effect
		CM_MC2	0.6	NA		8	0.1786	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.2760211	0.06900527	4	3.224	0.0340	Significant Effect
Error	0.4280908	0.02140454	20			
Total	0.7041119		24			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	8.756	13.28	0.0675	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8489	0.8877	0.0017	Non-normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	5	1.062	0.9201	1.205	1.029	0.9236	1.223	0.05127	10.79%	0.0%
FR_UFR1	5	0.9653	0.8804	1.05	0.97	0.8545	1.039	0.0306	7.09%	9.14%
FR_FRCP1	5	0.7614	0.6262	0.8966	0.725	0.6467	0.912	0.0487	14.3%	28.33%
GH_FR1	5	0.8273	0.5004	1.154	0.931	0.3578	0.973	0.1178	31.83%	22.13%
CM_MC2	5	0.9168	0.8059	1.028	0.882	0.8045	1.016	0.03997	9.75%	13.7%

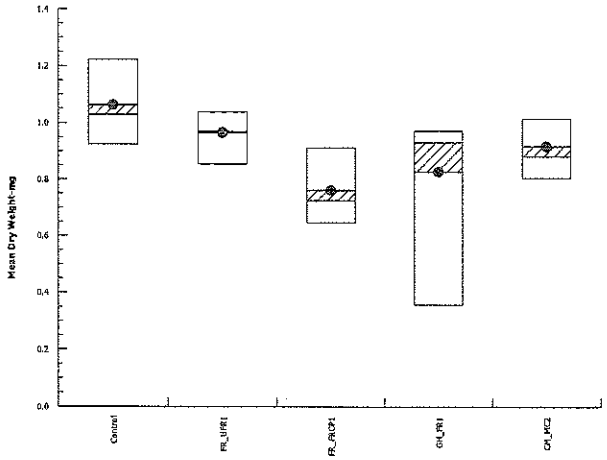
Mean Dry Weight-mg Detail

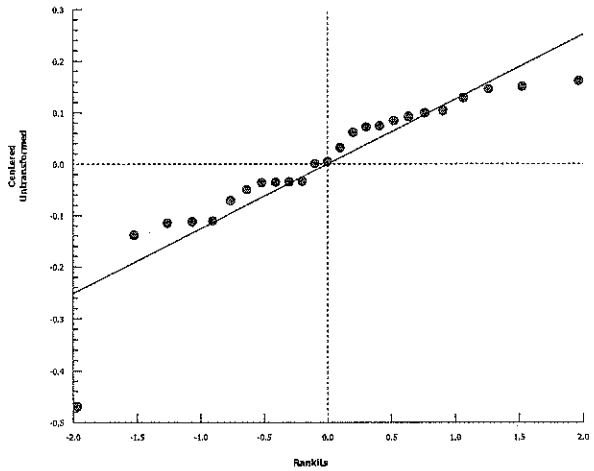
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	0.9236	1.012	1.223	1.029	1.124
FR_UFR1	0.97	0.997	0.966	0.8545	1.039
FR_FRCP1	0.6467	0.69	0.912	0.8333	0.725
GH_FR1	0.973	0.9189	0.3578	0.931	0.956
CM_MC2	1.001	0.882	0.881	1.016	0.8045

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	15-9321-2082	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jun-15 12:21	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Graphics





Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	00-6950-8439	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Jun-15 9:17	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	16-6000-6699	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	06 May-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	03 Jun-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	15h (8.6 °C)	Teck Coal	
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	13h (9.5 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	15h (7.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	9h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed	NA	C > T	NA	NA	

Kolmogorov-Smirnov Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		FR_FRCP1	0.8	NA		8	0.0397	CDF	Significant Effect
		GH_FR1	0.6	NA		8	0.1786	CDF	Non-Significant Effect
		CM_MC2	0.4	NA		8	0.4365	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1243616	0.04145385	3	1.766	0.1941	Non-Significant Effect
Error	0.3755084	0.02346927	16			
Total	0.4998699		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	8.292	11.34	0.0404	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8136	0.866	0.0014	Non-normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	5	0.9653	0.8804	1.05	0.97	0.8545	1.039	0.0306	7.09%	0.0%
FR_FRCP1	5	0.7614	0.6262	0.8966	0.725	0.6467	0.912	0.0487	14.3%	21.12%
GH_FR1	5	0.8273	0.5004	1.154	0.931	0.3578	0.973	0.1178	31.83%	14.29%
CM_MC2	5	0.9168	0.8059	1.028	0.882	0.8045	1.016	0.03997	9.75%	5.02%

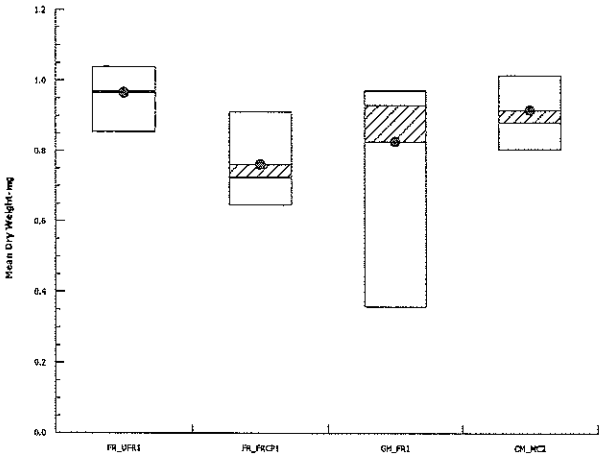
Mean Dry Weight-mg Detail

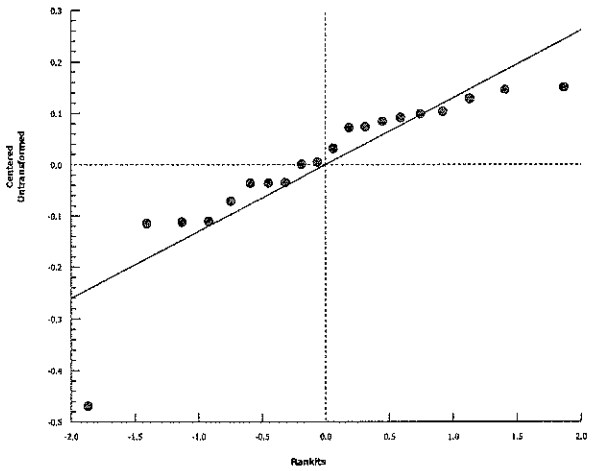
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1	0.97	0.997	0.966	0.8545	1.039
FR_FRCP1	0.6467	0.69	0.912	0.8333	0.725
GH_FR1	0.973	0.9189	0.3578	0.931	0.956
CM_MC2	1.001	0.882	0.881	1.016	0.8045

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	00-6950-8439	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Jun-15 9:17	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Graphics





Client: Teck

W.O.#: 15373, 15379, 15382

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
MHW 050515	May 6/15	50	2.7	2.9	50		50	5.6	112	JW / KL
FR - UFR 1	↓	↓	5.9	6.0	116		↓	5.9	118	↓
FR - FRCP 1	↓	↓	8.1	8.3	158		↓	15.1	302	↓
GH - FR 1	↓	↓	8.9	9.1	174		↓	15.9	318	↓
CM - MC2	↓	↓	7.7	7.8	152		↓	11.6	232	↓
FR - UFR 1	May 13/15	50	6.0	6.1	118		50	6.6	132	KL
FR - FRCP 1	↓	↓	8.6	8.8	168		↓	16.5	330	↓
GH - FR 1	↓	↓	8.7	9.0	168		↓	16.9	338	↓
CM - MC 2	↓	↓	7.7	7.9	150		↓	15.8 ①	316	↓
FR - UFR 1	May 20/15	50	6.0	6.2	116		50	5.7	114	KL
FR - FRCP 1	↓	↓	8.2	8.3	162		↓	14.9	298	↓
GH - FR 1	↓	↓	8.7	8.8	172		↓	16.2	324	↓
CM - MC 2	↓	↓	7.5	KL 7.6	148		↓	13.6	272	↓

Notes: ① Did twice, still get the same value

Reviewed by: JCH

Date Reviewed: June 24/15

Client: Teck

W.O.#: 15373, 15379, 15382

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
MHW	May27/15	50	2-7	2-8	52		50	5-5	110	KL
FR_~~E~~[KL]4FR1	↓	↓	5-8	5-9	114		↓	6-5	130	↓
FR_FRCP1			7-3	7-4	144			① ~~12-5~~[KL]13-6	272	
GH_FR1			7-8	7-9	154			① ~~13-8~~[KL]14-3	286	
CM_MC2			6-0	6-1	118			① ~~9-4~~[KL]10-9	218	

Notes: ① Did twice and still get values lower than previous refresh samples.

Reviewed by: JCL

Date Reviewed: June 24/15

APPENDIX D – *Pimephales promelas* Toxicity Test Data

HydroQual
Laboratories Ltd.

ATTN: Krysta Pearcy
Nautilus Environmental Company Inc.
8664 Commerce Court
Burnaby, BC
Canada

Received: various dates
Report Date: 2015/06/26
Version: FINAL

HydroQual Test Report

Client:	NAU104
Reference:	15-0484, 15-0485, 15-0486, 15-0487
Client Reference:	GH_FR1_WS CM_MC2_WKLY_WS FR_FRCP1_M FR_UFR1_M
Billing:	not given

Senior Verifier

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.

HydroQual Laboratories Ltd.

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU 104 Reference: CONTROL SP15-003 Initial EC: NA

Test Log

Date	Day	Time	Technicians	Chem. Cart Used	Fed		Feeding Rate	Bench Sheet Review	
					AM	PM		First	Second
2015/05/06	0	1530	NM/JP/KL	1	-	-	-	JP	CQ
2015/05/07	1	1030	NM/JP/KL	1	-	-	-	JP	CQ
2015/05/08	2	1040	KL/NM/JP	1	-	-	-	*	*
2015/05/09	3	1405	NM	1	-	✓	1 mL	NM	JP
2015/05/10	4	1245	CQ	1	✓	✓	1 mL	CQ	*
2015/05/11	5	1410	NM	1	✓	✓	1 mL	*	*
2015/05/12	6	1500	JP	1	✓	✓	1 mL	CQ	JP
2015/05/13	7	1155	NM	1	✓	✓	1 mL	*	*
2015/05/14	8	1130	NM/DS	1	✓	✓	1 mL	NM	DS
2015/05/15	9	1130	DS	1	✓	✓	1 mL	JP	DS
2015/05/16	10	1000	DS	1	✓	✓	2 mL	DS	*
2015/05/17	11	1130	NM	1	✓	✓	2 mL	NM	*
2015/05/18	12	1000	NM	1	✓	✓	2 mL	NM	*
2015/05/19	13	1345	CQ/NM	1	✓	✓	2 mL	NM	CQ
2015/05/20	14	1205	NM/ML	1	✓	✓	2 mL	NM	*
2015/05/21	15	1150	CQ/ML	1	✓	✓	2 mL	ML	CQ
2015/05/22	16	1130	DS	1	✓	✓	2 mL	DS	ML
2015/05/23	17	1030	CQ	1	✓	✓	2 mL	CQ	DS
2015/05/24	18	1120	NM	1	✓	✓	2 mL	*	*
2015/05/25	19	1030	ML	1	✓	✓	2 mL	ML	NM
2015/05/26	20	1200	NM	1	✓	✓	2 mL	NM	*
2015/05/27	21	1415	CQ	1	✓	✓	3 mL	CQ	*
2015/05/28	22	1145	ML	1	✓	✓	3 mL	CQ	NM
2015/05/29	23	1145	CQ/ML	1	✓	✓	3 mL	CQ	ML
2015/05/30	24	1110	CQ	1	✓	✓	3 mL	CQ	HKS
2015/05/31	25	1345	ML	1	✓	✓	3 mL	NM	JK
2015/06/01	26	1040	NM	1	✓	✓	3 mL	ML	JK
2015/06/02	27	1130	CQ	1	✓	✓	3 mL	CQ	NM
2015/06/03	28	1145	NM	1	✓	✓	3 mL	NM	CQ
2015/06/04	29	1350	ML	1	✓	✓	3 mL	ML	JP
2015/06/05	30	1100	CQ	1	✓	✓	3 mL	CQ	JP
2015/06/06	31	1130	CQ	1	✓	✓	3 mL	CQ	HKS
2015/06/07	32	1300	NM	1	-	-	-	*	*

*bench sheet review was not completed on all days, this is not a requirement of the method and all results were reviewed at test completion

HydroQual Laboratories Ltd.

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU 104 Reference: CONTROL
SP15-003

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

	Day 1		Day 2			Day 3		Day 4		Day 5	Day 6	Day 7	Day 8
replicate	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	29	0	15	0	15	8	7	1	14	14	14	14	14
b	14	1	15	0	15	10	5	-	15	15 (1)	15 (1)	15 (1)	14
c	28	2	15	0	15	5	10	-	15	15	15	15	14 (1)
d	15	0	15	0	15	9	6	-	15	15	15	15	15
e	15	0	26	3									
f	16	0	22	6									

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2

Number of Alive Organisms

replicate	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16
a	13	9	9	8	8	8	8	8
b	14	14	14	14	14	14	14	14
c	14	14	14	14	14	14	14	14
d	15 (1)	15	15	15	15	15	15	15

replicate	Day 17	Day 18	Day 19	Day 20	Day 21	Day 22	Day 23	Day 24
a	8	8	8	8	8	8	8	8
b	14	14	14	14	14	13	13	13
c	14	14	14	14	14	14	14	14
d	15	15	15	15	15	15	15	15

replicate	Day 25	Day 26	Day 27	Day 28	Day 29	Day 30	Day 31	Day 32
a	8	8	8	8	8	8	8	8
b	13	13	13	13	13	13	13	13
c	14	14	14	14	14	14	14	14
d	15	15	15	15	15	15	15	15

Comments/Observations: Day 5 replicate b - one fathead minnow stressed, Day 6 replicate b - one fathead minnow stressed (not swimming normally)

Biology Summary Table

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	93%	57%	53%	14	7.57	0%
b	100%	87%	87%	12	4.36	0%
c	100%	93%	93%	12	3.90	0%
d	100%	100%	100%	12	3.99	0%
Average	98%	84%	83%	13	4.95	0%

HydroQual Laboratories Ltd.

Fathead Minnow Bench Sheet

Method: FMD 32 Day ELS Client: NAU 104 Reference: CONTROL
SP15-003

Chemistries

	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	7.8	-	7.8	7.6	7.6	7.6	7.9	7.9	7.9	8.0	7.9	7.8	8.0	7.9	7.9	7.8
EC (µS/cm)	265	-	306	277	291	284	296	288	291	294	296	293	285	305	283	278
DO (mg/L)	8.1	-	7.2	7.2	7.4	7.4	7.2	7.1	7.6	7.4	7.6	7.2	7.3	7.3	7.4	7.5
Temp. (°C)	24	-	25	25	25	24	25	24	24	24	24	24	25	24	25	24

	Day 8		Day 9		Day 10		Day 11		Day 12		Day 13		Day 14		Day 15	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	7.8	7.9	7.8	7.9	7.9	7.8	7.9	7.8	8.0	7.8	8.0	7.8	7.9	7.8	8.2	7.9
EC (µS/cm)	302	297	315	342	293	313	290	307	297	294	302	292	333	328	319	335
DO (mg/L)	7.8	7.5	7.5	7.2	7.5	7.0	7.4	7.1	7.5	6.8	7.6	6.9	7.6	7.7	7.7	6.3
Temp. (°C)	24	24	24	24	25	24	25	24	25	24	24	24	25	24	25	24

	Day 16		Day 17		Day 18		Day 19		Day 20		Day 21		Day 22		Day 23	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.0	7.9	8.0	7.8	7.8	7.7	8.1	8.0	8.0	8.0	7.8	7.6	7.8	7.8	7.7	7.6
EC (µS/cm)	319	337	318	331	327	310	327	331	225	333	307	319	305	375	313	320
DO (mg/L)	7.6	7.2	7.5	6.6	7.3	5.6	7.5	7.3	7.2	7.0	7.5	7.0	7.4	7.3	7.4	6.8
Temp. (°C)	25	24	25	24	25	24	25	24	25	25	24	25	25	24	25	24

	Day 24		Day 25		Day 26		Day 27		Day 28		Day 29		Day 30		Day 31	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	7.9	7.8	7.8	7.7	7.9	7.8	7.9	7.7	8.1	8.1	8.1	7.9	7.6	8.0	7.8	7.8
EC (µS/cm)	311	324	302	322	318	311	311	326	288	310	286	304	290	294	294	302
DO (mg/L)	7.5	6.7	7.5	6.8	7.5	5.3	7.6	6.9	7.5	7.3	7.4	6.9	7.5	7.2	7.5	7.2
Temp. (°C)	24	24	25	25	24	24	24	25	24	24	25	24	25	24	25	24

	Day 32	
	New	Old
pH	-	8.0
EC (µS/cm)	-	284
DO (mg/L)	-	7.1
Temp. (°C)	-	24

	New Solutions		
	AVERAGE	SD	CV
pH	7.9	0.14	1.7
EC (µS/cm)	300	20	6.8
DO	7.5	0.16	2.2
Temp. (°C)	25	0.48	6.4

	Old Solutions		
	AVERAGE	SD	CV
pH	7.8	0.14	1.7
EC (µS/cm)	311	22	7.0
DO	7.0	0.50	7.1
Temp. (°C)	24	0.37	1.5

HydroQual Laboratories Ltd.

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU 104 Reference: CONTROL
SP15-003

Test Termination

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Replicate A

Fish	Length (mm)	Normal/ Abnormal
1	14	Normal
2	14	Normal
3	13	Normal
4	15	Normal
5	16	Normal
6	13	Normal
7	13	Normal
8	15	Normal
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	7.57
Avg. length (mm)	14

Replicate B

Fish	Length (mm)	Normal/ Abnormal
1	11	Normal
2	13	Normal
3	12	Normal
4	11	Normal
5	12	Normal
6	12	Normal
7	13	Normal
8	11	Normal
9	12	Normal
10	14	Normal
11	13	Normal
12	13	Normal
13	13	Normal
14	-	-
15	-	-

Dry Weight(mg)	4.36
Avg. length (mm)	12

Replicate C

Fish	Length (mm)	Normal/ Abnormal
1	12	Normal
2	12	Normal
3	12	Normal
4	12	Normal
5	12	Normal
6	8	Normal
7	13	Normal
8	13	Normal
9	11	Normal
10	13	Normal
11	13	Normal
12	11	Normal
13	12	Normal
14	12	Normal
15	-	-

Dry Weight(mg) per fish	3.90
Avg. length (mm)	12

Replicate D

Fish	Length (mm)	Normal/ Abnormal
1	12	Normal
2	13	Normal
3	13	Normal
4	12	Normal
5	12	Normal
6	12	Normal
7	13	Normal
8	11	Normal
9	14	Normal
10	11	Normal
11	11	Normal
12	12	Normal
13	11	Normal
14	*	Normal
15	*	Normal

Dry Weight(mg) per fish	3.99
Avg. length (mm)	12

***Measurements were not taken for fish 14 and 15 as they were lost during takedown**

HydroQual Laboratories Ltd.

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU 104 Reference: FR_UFR1_M (15-0487) SP15-003 Initial EC: 458

Test Log

Date	Day	Time	Technicians	Chem. Cart Used	Fed AM	Fed PM	Feeding Rate	Bench Sheet Review First	Bench Sheet Review Second
2015/05/06	0	1530	JP/NM	1	-	-	-	JP	CQ
2015/05/07	1	1015	JP/NM	1	-	-	-	JP	CQ
2015/05/08	2	1100	KL/NM/JP	1	-	-	-	*	*
2015/05/09	3	1400	NM	1	-	✓	1 mL	NM	JP
2015/05/10	4	1255	CQ	1	✓	✓	1 mL	CQ	*
2015/05/11	5	1345	NM	1	✓	✓	1 mL	NM	*
2015/05/12	6	1520	CQ/NM	1	✓	✓	1 mL	NM	CQ
2015/05/13	7	1200	NM	1	✓	✓	1 mL	*	*
2015/05/14	8	1100	DS/NM	1	✓	✓	1 mL	DS	NM
2015/05/15	9	1030	DS	1	✓	✓	1 mL	DS	JP
2015/05/16	10	1030	DS	1	✓	✓	2 mL	DS	*
2015/05/17	11	1100	NM	1	✓	✓	2 mL	NM	*
2015/05/18	12	1015	NM	1	✓	✓	2 mL	NM	*
2015/05/19	13	1330	CQ/NM	1	✓	✓	2 mL	NM	CQ
2015/05/20	14	1200	NM/ML	1	✓	✓	2 mL	NM	*
2015/05/21	15	1150	CQ/ML	1	✓	✓	2 mL	ML	CQ
2015/05/22	16	1200	DS	1	✓	✓	2 mL	DS	ML
2015/05/23	17	1030	CQ	1	✓	✓	2 mL	CQ	DS
2015/05/24	18	1105	NM	1	✓	✓	2 mL	*	*
2015/05/25	19	1040	ML	1	✓	✓	2 mL	ML	NM
2015/05/26	20	1150	NM	1	✓	✓	2 mL	NM	*
2015/05/27	21	1420	CQ	1	✓	✓	3 mL	CQ	*
2015/05/28	22	1200	ML	1	✓	✓	3 mL	CQ	NM
2015/05/29	23	1145	CQ/ML	1	✓	✓	3 mL	ML	CQ
2015/05/30	24	1110	CQ	1	✓	✓	3 mL	CQ	HKS
2015/05/31	25	1335	ML	1	✓	✓	3 mL	ML	JK
2015/06/01	26	1030	NM	1	✓	✓	3 mL	NM	JK
2015/06/02	27	1130	CQ	1	✓	✓	3 mL	CQ	NM
2015/06/03	28	1130	NM	1	✓	✓	3 mL	NM	CQ
2015/06/04	29	1350	ML	1	✓	✓	3 mL	ML	JP
2015/06/05	30	1100	CQ	1	✓	✓	3 mL	CQ	JP
2015/06/06	31	1130	CQ	1	✓	✓	3 mL	CQ	HKS
2015/06/07	32	1445	NM	1	-	-	-	*	*

*bench sheet review was not completed on all days, this is not a requirement of the method and all results were reviewed at test completion

HydroQual Laboratories Ltd.

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU 104 Reference: FR_UFR1_M (15-0487)
SP15-003

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

	Day 1		Day 2			Day 3		Day 4		Day 5	Day 6	Day 7	Day 8
replicate	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	15	0	15	0	15	3	11	-	13	13	13	13	13
b	15	0	13	2	15	3	12	-	15	14	14	14	14
c	15	0	15	0	15	6	8	-	14	14	13	13	13
d	15	0	14	1	15	3	12	-	14	14	14	14	14
e	29	0	26	3									
f	30	0	30	0									

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2

Number of Alive Organisms

replicate	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16
a	13	13	13 (1)	13	13	13	13	13
b	12	12	12	12	12	12	12	12
c	13	11	11	11	11	11	11	11
d	13 (1)	11	11	11	10	10	10	10

replicate	Day 17	Day 18	Day 19	Day 20	Day 21	Day 22	Day 23	Day 24
a	13	13	13	13	13	13	13	13
b	12	12	12	12	12	12	12	12
c	11	11	10	10	10	10	10	10
d	10	10	9	9	9	9	9	9

replicate	Day 25	Day 26	Day 27	Day 28	Day 29	Day 30	Day 31	Day 32
a	13	13	13	13	13	13	13	13
b	12	12	12	12	12	12	12	12
c	10	10	10	10	10	10	10	10
d	9	9	9	9	9	9	9	9

Comments/Observations: None

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	87%	33%	33%	11	4.17	0%
b	100%	20%	20%	12	4.74	0%
c	100%	40%	40%	13	6.16	0%
d	93%	36%	33%	14	7.53	0%
Average	**95%**	**32%**	**32%**	**13**	**5.65**	**0%**

HydroQual Laboratories Ltd.

Fathead Minnow Bench Sheet

Method: FMD 32 Day ELS Client: NAU 104 Reference: FR_UFR1_M (15-0487) SP15-003

Chemistries

	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	7.9	-	7.7	8.0	8.1	7.9	8.0	8.1	8.1	8.1	8.0	8.1	8.0	8.1	8.1	8.2
EC (µS/cm)	226	-	244	232	236	242	230	229	237	239	239	239	232	241	256	228
DO (mg/L)	8.2	-	8.2	7.4	7.5	7.5	7.5	7.2	7.6	7.4	7.7	7.1	7.5	7.2	7.8	7.3
Temp. (°C)	25	-	24	24	24	24	25	25	24	24	25	24	24	24	24	24

	Day 8		Day 9		Day 10		Day 11		Day 12		Day 13		Day 14		Day 15	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.0	8.1	8.2	8.3	8.2	8.0	8.1	8.0	8.2	8.1	8.1	8.0	8.0	8.0	8.3	8.1
EC (µS/cm)	244	243	248	246	260	249	245	260	243	253	246	254	260	271	265	264
DO (mg/L)	8.2	7.5	7.5	6.9	7.7	7.3	7.6	7.0	7.8	7.0	7.8	7.1	8.1	7.0	7.8	7.1
Temp. (°C)	25	24	25	24	24	24	25	24	25	24	25	25	25	24	25	24

	Day 16		Day 17		Day 18		Day 19		Day 20		Day 21		Day 22		Day 23	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	8.1	8.2	8.0	8.0	8.0	8.2	8.3	8.0	8.2	7.9	7.9	8.0	8.0	8.0	7.8
EC (µS/cm)	274	273	264	277	264	274	282	280	264	275	245	261	234	251	233	250
DO (mg/L)	8.0	7.2	7.6	6.6	7.9	6.9	7.9	7.3	7.8	7.0	7.7	6.9	7.4	7.2	7.7	6.9
Temp. (°C)	25	25	25	24	25	24	25	24	26	25	25	25	25	24	25	25

	Day 24		Day 25		Day 26		Day 27		Day 28		Day 29		Day 30		Day 31	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.1	8.0	8.1	8.0	8.2	8.1	8.0	7.9	8.3	8.2	8.3	8.3	8.2	8.1	8.2	8.0
EC (µS/cm)	236	244	229	256	228	241	234	246	221	250	219	233	238	235	220	231
DO (mg/L)	7.7	6.6	8.0	7.0	7.8	7.0	7.7	7.1	7.7	7.1	7.7	7.1	7.5	7.0	7.7	7.1
Temp. (°C)	25	25	25	25	25	24	25	24	25	24	25	24	25	25	25	25

	Day 32	
	New	Old
pH	-	8.1
EC (µS/cm)	-	232
DO (mg/L)	-	7.0
Temp. (°C)	-	24

	New Solutions		
	AVERAGE	SD	CV
pH	8.1	0.13	1.6
EC (µS/cm)	244	16	6.6
DO	7.8	0.21	2.7
Temp. (°C)	25	0.45	5.8

	Old Solutions		
	AVERAGE	SD	CV
pH	8.1	0.12	1.5
EC (µS/cm)	250	15	6.1
DO	7.1	0.21	3.0
Temp. (°C)	24	0.47	1.9

HydroQual Laboratories Ltd.

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU 104 Reference: FR_UFR1_M (15-0467)
SP15-003

Test Termination

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Replicate A

Fish	Length (mm)	Normal/ Abnormal
1	10	Normal
2	11	Normal
3	13	Normal
4	11	Normal
5	13	Normal
6	13	Normal
7	11	Normal
8	11	Normal
9	11	Normal
10	12	Normal
11	10	Normal
12	13	Normal
13	10	Normal
14	-	-
15	-	-

Dry Weight(mg) per fish	4.17
Avg. length (mm)	11

Replicate B

Fish	Length (mm)	Normal/ Abnormal
1	10	Normal
2	12	Normal
3	11	Normal
4	12	Normal
5	11	Normal
6	12	Normal
7	12	Normal
8	13	Normal
9	14	Normal
10	13	Normal
11	12	Normal
12	11	Normal
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	4.74
Avg. length (mm)	12

Replicate C

Fish	Length (mm)	Normal/ Abnormal
1	14	Normal
2	13	Normal
3	13	Normal
4	13	Normal
5	14	Normal
6	14	Normal
7	13	Normal
8	14	Normal
9	13	Normal
10	13	Normal
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	6.16
Avg. length (mm)	13

Replicate D

Fish	Length (mm)	Normal/ Abnormal
1	15	Normal
2	15	Normal
3	13	Normal
4	11	Normal
5	14	Normal
6	14	Normal
7	15	Normal
8	14	Normal
9	14	Normal
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	7.53
Avg. length (mm)	14

HydroQual Laboratories Ltd.

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU 104 Reference: FR_FRCP1_M (15-0486) SP15-003 Initial EC: 458

Test Log

Date	Day	Time	Technicians	Chem. Cart Used	Fed		Feeding Rate	Bench Sheet Review	
					AM	PM		First	Second
2015/05/06	0	1530	NM/JP/KL	1	-	-	-	JP	CQ
2015/05/07	1	1025	NM/JP/KL	1	-	-	-	JP	CQ
2015/05/08	2	1110	KL/NM/JP	1	-	-	-	*	*
2015/05/09	3	1355	NM	1	-	✓	1 mL	NM	JP
2015/05/10	4	1255	CQ	1	✓	✓	1 mL	*	*
2015/05/11	5	1350	NM	1	✓	✓	1 mL	*	*
2015/05/12	6	1510	CQ/JP	1	✓	✓	1 mL	NM	CQ
2015/05/13	7	1200	NM	1	✓	✓	1 mL	*	*
2015/05/14	8	1100	DS/NM	1	✓	✓	1 mL	DS	NM
2015/05/15	9	1145	DS	1	✓	✓	1 mL	DS	JP
2015/05/16	10	1030	DS	1	✓	✓	2 mL	DS	*
2015/05/17	11	1050	NM	1	✓	✓	2 mL	NM	*
2015/05/18	12	1010	NM	1	✓	✓	2 mL	NM	*
2015/05/19	13	1330	CQ/NM	1	✓	✓	2 mL	NM	CQ
2015/05/20	14	1200	NM/ML	1	✓	✓	2 mL	NM	*
2015/05/21	15	1200	CQ/ML	1	✓	✓	2 mL	ML	CQ
2015/05/22	16	1130	DS	1	✓	✓	2 mL	DS	ML
2015/05/23	17	1030	CQ	1	✓	✓	2 mL	CQ	DS
2015/05/24	18	1100	NM	1	✓	✓	1 mL	NM	*
2015/05/25	19	1050	ML	1	✓	✓	1 mL	ML	NM
2015/05/26	20	1150	NM	1	✓	✓	1 mL	NM	*
2015/05/27	21	1415	CQ	1	✓	✓	1.5 mL	CQ	*
2015/05/28	22	1200	ML	1	✓	✓	1.5 mL	CQ	NM
2015/05/29	23	1145	CQ/ML	1	✓	✓	1.5 mL	ML	CQ
2015/05/30	24	1110	CQ	1	✓	✓	1.5 mL	CQ	HKS
2015/05/31	25	1340	ML	1	✓	✓	1.5 mL	ML	JK
2015/06/01	26	1040	NM	1	✓	✓	1.5 mL	NM	JK
2015/06/02	27	1130	CQ	1	✓	✓	1.5 mL	CQ	NM
2015/06/03	28	1130	NM	1	✓	✓	1.5 mL	NM	CQ
2015/06/04	29	1355	ML	1	✓	✓	1.5 mL	ML	JP
2015/06/05	30	1100	CQ	1	✓	✓	1.5 mL	CQ	JP
2015/06/06	31	1130	CQ	1	✓	✓	1.5 mL	CQ	HKS
2015/06/07	32	1430	NM	1	-	-	-	*	*

*bench sheet review was not completed on all days, this is not a requirement of the method and all results were reviewed at test completion

HydroQual Laboratories Ltd.

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU 104 Reference: FR_FRCP1_M (15-0486)
SP15-003

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

	Day 1		Day 2			Day 3		Day 4		Day 5	Day 6	Day 7	Day 8
replicate	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14	1	15	0	15	3	12	-	15	13	7	7	7
b	15	0	13	2	15	1	14	-	15	11	6	4	4
c	15	0	10	4	15	3	12	-	15	12	6	6	6
d	14	1	15	0	15	7	8	-	14	10	5	5	5
e	28	2	27	1									
f	25	3	24	1									

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2

Number of Alive Organisms

replicate	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16
a	7 (1)	6	6	6	6	6	6	6
b	3	3	3	3	3	3	3	3
c	6	6	6	6	6	6	6	6
d	5	5	5	5	5	5	5	5

replicate	Day 17	Day 18	Day 19	Day 20	Day 21	Day 22	Day 23	Day 24
a	6	6	6	6	6	6	6	6
b	3	3	3	3	3	3	3	3
c	6	6	6	6	6	6	6	6
d	5	5	5	5	5	5	5	5

replicate	Day 25	Day 26	Day 27	Day 28	Day 29	Day 30	Day 31	Day 32
a	6	6	6	6	6	6	6	5
b	3	3	3	3	3	3	3	3
c	6	6	6	6	6	6	6	6
d	5	5	5	5	5	5	5	5

Comments/Observations: None

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	100%	33%	33%	14	6.28	0%
b	100%	20%	20%	16	12.20	0%
c	100%	40%	40%	13	6.35	0%
d	93%	36%	33%	14	8.11	0%
Average	**98%**	**32%**	**32%**	**14**	**8.23**	**0%**

HydroQual Laboratories Ltd.

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU 104 Reference: FR_FRCP1_M (15-0486)
SP15-003

Chemistries

	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.0	-	7.9	8.1	8.1	8.0	8.1	8.2	8.3	8.2	8.2	8.2	8.3	8.2	8.1	8.3
EC (µS/cm)	557	-	579	550	540	548	552	547	546	566	545	560	563	555	530	545
DO (mg/L)	8.3	-	8.2	7.4	7.5	7.7	7.5	7.2	7.7	7.4	7.6	7.2	7.5	7.2	7.7	7.3
Temp. (°C)	25	-	25	24	24	24	25	24	24	24	25	24	24	24	24	24

	Day 8		Day 9		Day 10		Day 11		Day 12		Day 13		Day 14		Day 15	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.1	8.3	8.3	8.3	8.2	8.2	8.2	8.1	8.2	8.4	8.3	8.3	8.1	8.2	8.4	8.3
EC (µS/cm)	595	560	616	601	622	605	607	637	614	624	607	627	670	671	625	680
DO (mg/L)	7.9	7.5	7.4	6.6	7.8	7.2	7.6	7.0	7.6	7.3	7.6	7.2	7.8	7.2	7.8	7.1
Temp. (°C)	25	24	25	24	24	24	24	24	25	24	25	24	25	24	25	24

	Day 16		Day 17		Day 18		Day 19		Day 20		Day 21		Day 22		Day 23	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	8.2	8.2	8.2	8.1	8.1	8.3	8.4	8.2	8.3	8.1	8.1	8.0	8.1	8.0	8.0
EC (µS/cm)	614	646	594	620	597	611	606	604	605	608	561	573	465	467	473	502
DO (mg/L)	7.8	7.2	7.5	6.9	7.5	7.0	7.6	7.2	7.5	6.8	7.5	7.1	7.4	7.3	7.6	6.9
Temp. (°C)	25	25	24	24	25	24	25	24	25	25	25	25	25	24	25	24

	Day 24		Day 25		Day 26		Day 27		Day 28		Day 29		Day 30		Day 31	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	7.9	8.1	7.9	8.2	8.2	8.0	8.0	8.4	8.4	8.4	8.4	7.6	7.6	8.2	8.1
EC (µS/cm)	465	488	452	491	468	472	467	479	399	443	435	451	441	452	438	451
DO (mg/L)	7.4	5.6	7.6	6.9	7.5	7.0	7.6	7.3	7.5	7.1	7.6	7.1	7.6	7.0	7.6	7.1
Temp. (°C)	25	25	25	25	25	24	25	24	25	24	25	25	25	25	25	25

	Day 32	
	New	Old
pH	-	8.2
EC (µS/cm)	-	422
DO (mg/L)	-	6.3
Temp. (°C)	-	24

	New Solutions		
	AVERAGE	SD	CV
pH	8.2	0.16	2.0
EC (µS/cm)	546	72	13.1
DO	7.6	0.18	2.4
Temp. (°C)	25	0.42	5.5

	Old Solutions		
	AVERAGE	SD	CV
pH	8.2	0.17	2.1
EC (µS/cm)	552	73	13.3
DO	7.1	0.37	5.3
Temp. (°C)	24	0.44	1.8

HydroQual Laboratories Ltd.

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU 104 Reference: FR_FRCP1_M (15-0486)
SP15-003

Test Termination

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Replicate A		
Fish	Length (mm)	Normal/ Abnormal
1	14	Normal
2	13	Normal
3	14	Normal
4	14	Normal
5	14	Normal
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**6.28**
Avg. length (mm)	**14**

Replicate B		
Fish	Length (mm)	Normal/ Abnormal
1	16	Normal
2	16	Normal
3	15	Normal
4	-	-
5	-	-
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**12.20**
Avg. length (mm)	**16**

Replicate C		
Fish	Length (mm)	Normal/ Abnormal
1	13	Normal
2	12	Normal
3	13	Normal
4	13	Normal
5	14	Normal
6	14	Normal
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**6.35**
Avg. length (mm)	**13**

Replicate D		
Fish	Length (mm)	Normal/ Abnormal
1	14	Normal
2	14	Normal
3	15	Normal
4	14	Normal
5	14	Normal
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**8.11**
Avg. length (mm)	**14**

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Fathead Minnow Bench Sheet

Method: FMD 32 Day ELS | Client: NAU 104 | Reference: GH_FR_WS (15-0484) SP15-003 | Initial EC: 586

Test Log

Date	Day	Time	Technicians	Chem. Cart Used	Fed		Feeding Rate	Bench Sheet Review	
					AM	PM		First	Second
2015/05/06	0	1530	NM/JP/KL	1	-	-	-	JP	CQ
2015/05/07	1	1030	NM/JP/KL	1	-	-	-	JP	CQ
2015/05/08	2	1050	KL/NM/JP	1	-	-	-	*	*
2015/05/09	3	1415	NM	1	-	✓	1 mL	NM	JP
2015/05/10	4	1245	CQ	1	✓	✓	1 mL	CQ	*
2015/05/11	5	1430	NM	1	✓	✓	1 mL	*	*
2015/05/12	6	1500	JP	1	✓	✓	1 mL	NM	CQ
2015/05/13	7	1150	NM	1	✓	✓	1 mL	*	*
2015/05/14	8	1140	NM	1	✓	✓	1 mL	DS	NM
2015/05/15	9	1130	DS	1	✓	✓	1 mL	NM	DS
2015/05/16	10	1000	DS	1	✓	✓	2 mL	DS	*
2015/05/17	11	1120	NM	1	✓	✓	2 mL	NM	*
2015/05/18	12	1010	NM	1	✓	✓	2 mL	NM	*
2015/05/19	13	1340	CQ/NM	1	✓	✓	2 mL	NM	CQ
2015/05/20	14	1200	NM/ML	1	✓	✓	2 mL	NM	*
2015/05/21	15	1150	CQ/ML	1	✓	✓	2 mL	ML	CQ
2015/05/22	16	1150	DS	1	✓	✓	2 mL	DS	ML
2015/05/23	17	1030	CQ	1	✓	✓	2 mL	CQ	DS
2015/05/24	18	1110	NM	1	✓	✓	1 mL	NM	*
2015/05/25	19	1035	ML	1	✓	✓	1 mL	ML	NM
2015/05/26	20	1200	NM	1	✓	✓	1 mL	NM	*
2015/05/27	21	1415	CQ	1	✓	✓	1.5 mL	CQ	*
2015/05/28	22	1155	ML	1	✓	✓	1.5 mL	CQ	NM
2015/05/29	23	1150	CQ/ML	1	✓	✓	1.5 mL	ML	CQ
2015/05/30	24	1110	CQ	1	✓	✓	1.5 mL	CQ	HKS
2015/05/31	25	1340	ML	1	✓	✓	1.5 mL	ML	JK
2015/06/01	26	1045	NM	1	✓	✓	1.5 mL	NM	JK
2015/06/02	27	1130	CQ	1	✓	✓	1.5 mL	CQ	NM
2015/06/03	28	1140	NM	1	✓	✓	1.5 mL	NM	CQ
2015/06/04	29	1345	ML	1	✓	✓	1.5 mL	MI	JP
2015/06/05	30	1100	CQ	1	✓	✓	1.5 mL	CQ	JP
2015/06/06	31	1130	CQ	1	✓	✓	1.5 mL	CQ	HKS
2015/06/07	32	1400	NM	1	-	-	-	*	*

*bench sheet review was not completed on all days, this is not a raquirement of the method and all results were reviewed at test completion

HydroQual Laboratories Ltd.

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU 104 Reference: GH_FR_WS (15-0484)
SP15-003

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

	Day 1		Day 2			Day 3		Day 4		Day 5	Day 6	Day 7	Day 8
replicate	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14	1	15	0	15	4	11	-	14	11	5	5(1)	4
b	15	0	15	0	15	3	12	-	15	12	2	2	2
c	14	1	15	0	15	4	11	-	15	14	8	8	8
d	15	0	15	0	15	7	8	1	14	13	7	7	6
e	30	0	23	7									
f	29	1	28	1									

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2

Number of Alive Organisms

replicate	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16
a	2	2	2	0	0	0	0	0
b	2	2	2	2	2	2	2	2
c	8	7	7	7	7	7	7	7
d	6	6	6	6	6	6	6	6

replicate	Day 17	Day 18	Day 19	Day 20	Day 21	Day 22	Day 23	Day 24
a	0	0	0	0	0	0	0	0
b	2	2	2	2	2	2	2	2
c	7	7	7	7	7	7	7	7
d	6	6	6	6	6	6	6	6

replicate	Day 25	Day 26	Day 27	Day 28	Day 29	Day 30	Day 31	Day 32
a	0	0	0	0	0	0	0	0
b	2	2	2	2	2	2	2	2
c	7	7	7	7	7	7	7	7
d	6	6	6	6	6	6	6	6

Comments/Observations: None

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	93%	0%	0%	0	0.00	0%
b	100%	13%	13%	17	14.99	0%
c	100%	47%	47%	13	5.72	0%
d	93%	43%	40%	15	7.44	0%
Average	**97%**	**26%**	**25%**	**11**	**7.04**	**0%**

HydroQual Laboratories Ltd.

Fathead Minnow Bench Sheet

Method: FMD 32 Day ELS | Client: NAU 104 | Reference: GH_FR_WS (15-0484) SP15-003

Chemistries

	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	7.9	-	7.9	8.0	8.0	8.1	8.1	8.2	8.3	8.3	8.2	8.3	8.2	8.3	8.1	8.3
EC (µS/cm)	584	-	624	596	629	590	606	579	558	598	592	608	594	598	563	577
DO (mg/L)	8.2	-	8.0	7.4	7.5	7.5	7.5	7.2	7.5	7.4	7.5	7.2	7.5	7.3	7.7	7.4
Temp. (°C)	24	-	24	24	25	24	24	24	24	24	25	24	25	24	24	24

	Day 8		Day 9		Day 10		Day 11		Day 12		Day 13		Day 14		Day 15	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.1	8.3	8.3	8.4	8.2	8.4	8.3	8.3	8.3	8.3	8.2	8.3	8.0	8.0	8.4	8.3
EC (µS/cm)	620	599	613	606	615	610	600	620	632	626	598	625	658	673	655	678
DO (mg/L)	7.9	7.6	7.4	7.1	7.8	7.3	7.6	7.2	7.8	6.8	7.7	7.3	7.8	7.0	7.7	6.5
Temp. (°C)	25	24	25	24	24	24	24	24	24	24	25	25	25	24	25	25

	Day 16		Day 17		Day 18		Day 19		Day 20		Day 21		Day 22		Day 23	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.3	8.2	8.3	8.2	8.1	8.1	8.3	8.4	8.2	8.4	8.2	8.1	8.1	7.9	8.0	8.1
EC (µS/cm)	642	661	644	657	647	656	649	650	649	646	616	614	555	600	529	568
DO (mg/L)	7.7	7.0	7.6	7.0	7.6	7.0	7.6	7.1	7.5	7.1	7.6	7.1	7.5	7.1	7.5	7.1
Temp. (°C)	25	24	24	24	25	25	25	24	25	25	25	25	25	24	25	24

	Day 24		Day 25		Day 26		Day 27		Day 28		Day 29		Day 30		Day 31	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	8.3	8.1	8.2	8.2	8.2	8.2	8.3	8.4	8.3	8.4	8.4	8.2	8.1	8.2	8.3
EC (µS/cm)	523	541	519	510	523	527	517	520	498	505	473	500	470	487	473	482
DO (mg/L)	7.5	7.2	7.7	7.9	7.6	7.1	7.5	7.4	7.5	7.4	7.7	7.4	7.4	7.7	7.5	8.6
Temp. (°C)	25	25	25	24	25	24	25	24	25	24	25	24	25	25	25	25

	Day 32	
	New	Old
pH	-	8.4
EC (µS/cm)	-	462
DO (mg/L)	-	8.4
Temp. (°C)	-	24

	New Solutions		
	AVERAGE	SD	CV
pH	8.2	0.13	1.6
EC (µS/cm)	583	59	10.1
DO	7.6	0.16	2.1
Temp. (°C)	25	0.46	6.0

	Old Solutions		
	AVERAGE	SD	CV
pH	8.2	0.13	1.6
EC (µS/cm)	587	60	10.3
DO	7.3	0.41	5.6
Temp. (°C)	24	0.44	1.8

HydroQual Laboratories Ltd.

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU 104 Reference: GH_FR_WS (15-0484)
SP15-003

Test Termination

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Replicate A		
Fish	Length (mm)	Normal/ Abnormal
1	-	-
2	-	-
3	-	-
4	-	-
5	-	-
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	0
Avg. length (mm)	0

Replicate B		
Fish	Length (mm)	Normal/ Abnormal
1	18	Normal
2	16	Normal
3	-	-
4	-	-
5	-	-
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	14.99
Avg. length (mm)	17

Replicate C		
Fish	Length (mm)	Normal/ Abnormal
1	13	Normal
2	12	Normal
3	14	Normal
4	13	Normal
5	14	Normal
6	13	Normal
7	15	Normal
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	5.72
Avg. length (mm)	13

Replicate D		
Fish	Length (mm)	Normal/ Abnormal
1	15	Normal
2	14	Normal
3	15	Normal
4	15	Normal
5	14	Normal
6	14	Normal
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	7.44
Avg. length (mm)	15

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Fathead Minnow Bench Sheet

Method: FMD 32 Day ELS | Client: NAU 104 | Reference: CM_MC2_WKLY_WS-2 (15-0485) SP15-003 | Initial EC: 458

Test Log

Date	Day	Time	Technicians	Chem. Cart Used	Fed		Feeding Rate	Bench Sheet Review	
					AM	PM		First	Second
2015/05/06	0	1530	NM/JP/KL	1	-	-	-	JP	CQ
2015/05/07	1	1030	NM/JP/KL	1	-	-	-	JP	CQ
2015/05/08	2	1100	KL/NM/JP	1	-	-	-	*	*
2015/05/09	3	1415	NM	1	-	✓	1 mL	NM	JP
2015/05/10	4	1245	CQ	1	✓	✓	1 mL	*	*
2015/05/11	5	1430	NM	1	✓	✓	1 mL	*	*
2015/05/12	6	1520	NM	1	✓	✓	1 mL	NM	CQ
2015/05/13	7	1145	NM/DS	1	✓	✓	1 mL	*	*
2015/05/14	8	1130	NM/DS	1	✓	✓	1 mL	DS	NM
2015/05/15	9	1130	DS	1	✓	✓	1 mL	DS	JP
2015/05/16	10	1010	DS	1	✓	✓	2 mL	DS	*
2015/05/17	11	1110	NM	1	✓	✓	2 mL	NM	*
2015/05/18	12	1000	NM	1	✓	✓	2 mL	NM	*
2015/05/19	13	1335	CQ/NM	1	✓	✓	2 mL	NM	CQ
2015/05/20	14	1210	NM/ML	1	✓	✓	2 mL	NM	*
2015/05/21	15	1155	CQ/ML	1	✓	✓	2 mL	ML	CQ
2015/05/22	16	1145	DS	1	✓	✓	2 mL	DS	ML
2015/05/23	17	1030	CQ	1	✓	✓	2 mL	CQ	DS
2015/05/24	18	1115	NM	1	✓	✓	2 mL	NM	*
2015/05/25	19	1040	ML	1	✓	✓	2 mL	ML	NM
2015/05/26	20	1155	NM	1	✓	✓	2 mL	NM	*
2015/05/27	21	1420	CQ	1	✓	✓	3 mL	CQ	*
2015/05/28	22	1155	ML	1	✓	✓	3 mL	CQ	NM
2015/05/29	23	1150	CQ/ML	1	✓	✓	3 mL	ML	CQ
2015/05/30	24	1110	CQ	1	✓	✓	3 mL	CQ	HKS
2015/05/31	25	1345	ML	1	✓	✓	3 mL	ML	JK
2015/06/01	26	1045	NM	1	✓	✓	3 mL	NM	JK
2015/06/02	27	1135	CQ	1	✓	✓	3 mL	CQ	NM
2015/06/03	28	1130	NM	1	✓	✓	3 mL	NM	CQ
2015/06/04	29	1340	ML	1	✓	✓	3 mL	ML	JP
2015/06/05	30	1100	CQ	1	✓	✓	3 mL	CQ	JP
2015/06/06	31	1130	CQ	1	✓	✓	3 mL	CQ	HKS
2015/06/07	32	1410	NM	1	-	-	-	*	*

*bench sheet review was not completed on all days, this is not a requirement of the method and all results were reviewed at test completion

HydroQual Laboratories Ltd.

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU 104 Reference: CM_MC2_WKLY_WS-2 (15-0485)
SP15-003

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

	Day 1		Day 2			Day 3		Day 4		Day 5	Day 6	Day 7	Day 8
replicate	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	15	0	15	0	15	1	14	-	15	15 (1)	13	12	10
b	15	0	15	0	15	3	12	-	15	15	13	12	11
c	15	0	15	0	15	1	14	-	15	14	13	11	11
d	15	0	15	0	15	5	10	-	15	15	9	8	8
e	27	2	25	2									
f	30	0	21	0									

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2

Number of Alive Organisms

replicate	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16
a	10	10	10	10	10	10	10	10
b	11	10	10	10	10	10	10	10
c	11	11	11	11	11	11	11	11
d	8	8	8	8	8	8	8	8

replicate	Day 17	Day 18	Day 19	Day 20	Day 21	Day 22	Day 23	Day 24
a	10	10	10	10	10	10	10	10
b	10	10	10	10	10	10	10	10
c	11	11	11	11	11	11	11	11
d	8	8	8	8	8	8	8	8

replicate	Day 25	Day 26	Day 27	Day 28	Day 29	Day 30	Day 31	Day 32
a	10	10	10	10	10	10	10	10
b	10	10	10	10	10	10	10	10
c	11	11	11	11	11	11	11	11
d	8	8	8	8	8	8	8	8

Comments/Observations: None

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	100%	67%	67%	13	6.74	0%
b	100%	67%	67%	14	7.43	0%
c	100%	73%	73%	13	6.43	0%
d	100%	57%	53%	14	9.00	0%
Average	**100%**	**66%**	**65%**	**13**	**7.40**	**0%**

HydroQual Laboratories Ltd.

Fathead Minnow Bench Sheet

Method: FMD 32 Day ELS | Client: NAU 104 | Reference: CM_MC2_WKLY_WS-2 (15-0485) SP15-003

Chemistries

	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.0	-	8.0	8.2	8.1	8.0	8.2	8.2	8.2	8.3	8.2	8.3	8.2	8.3	8.2	8.4
EC (µS/cm)	487	-	480	449	457	450	469	478	450	475	468	478	474	469	443	459
DO (mg/L)	8.1	-	8.2	7.3	7.5	7.6	7.4	7.2	7.7	7.4	7.5	7.2	7.5	7.3	7.8	7.4
Temp. (°C)	24	-	24	24	25	24	25	24	24	24	25	24	25	24	24	24

	Day 8		Day 9		Day 10		Day 11		Day 12		Day 13		Day 14		Day 15	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.1	8.3	8.4	8.4	8.3	8.2	8.3	8.1	8.3	8.4	8.2	8.2	8.1	8.0	8.3	8.3
EC (µS/cm)	477	480	493	492	496	492	523	519	486	503	498	512	522	552	516	547
DO (mg/L)	8.2	7.4	7.3	7.0	7.7	7.1	7.6	7.0	7.6	7.3	7.6	7.2	7.7	6.4	7.7	7.2
Temp. (°C)	25	24	25	24	25	24	25	24	25	24	25	25	25	24	25	24

	Day 16		Day 17		Day 18		Day 19		Day 20		Day 21		Day 22		Day 23	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	8.1	8.2	8.0	8.1	7.9	8.3	8.3	8.1	8.3	8.1	8.0	8.1	7.9	7.9	7.8
EC (µS/cm)	518	539	549	539	519	527	519	521	516	523	485	495	372	494	355	414
DO (mg/L)	7.8	6.6	7.8	6.1	7.6	6.0	7.6	7.2	7.6	6.9	7.5	7.0	7.4	7.3	7.6	6.5
Temp. (°C)	25	24	24	24	\25	25	25	24	26	25	25	25	25	24	25	24

	Day 24		Day 25		Day 26		Day 27		Day 28		Day 29		Day 30		Day 31	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.1	8.0	8.1	8.0	8.2	8.1	8.0	8.0	8.3	8.4	8.3	8.3	7.8	7.8	8.1	8.1
EC (µS/cm)	348	380	346	365	342	360	347	359	330	341	350	342	364	360	354	370
DO (mg/L)	7.5	6.8	7.7	7.1	7.6	7.0	7.6	7.3	7.5	7.1	7.6	7.3	7.4	7.4	7.6	7.4
Temp. (°C)	25	25	25	25	24	24	25	25	25	24	25	24	25	24	25	25

	Day 32	
	New	Old
pH	-	8.1
EC (µS/cm)	-	365
DO (mg/L)	-	7.3
Temp. (°C)	-	24

	New Solutions		
	AVERAGE	SD	CV
pH	8.2	0.13	1.6
EC (µS/cm)	449	71	15.8
DO	7.6	0.20	2.6
Temp. (°C)	25	0.45	5.9

	Old Solutions		
	AVERAGE	SD	CV
pH	8.1	0.18	2.2
EC (µS/cm)	458	69	15.1
DO	7.1	0.38	5.4
Temp. (°C)	24	0.44	1.8

HydroQual Laboratories Ltd.

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU 104 Reference: CM_MC2_WKLY_WS-2 (15-0485)
SP15-003

Test Termination

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Replicate A		
Fish	Length (mm)	Normal/ Abnormal
1	14	Normal
2	11	Normal
3	14	Normal
4	12	Normal
5	15	Normal
6	15	Normal
7	14	Normal
8	13	Normal
9	10	Normal
10	14	Normal
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	6.74
Avg. length (mm)	13

Replicate B		
Fish	Length (mm)	Normal/ Abnormal
1	14	Normal
2	14	Normal
3	13	Normal
4	13	Normal
5	13	Normal
6	14	Normal
7	13	Normal
8	14	Normal
9	14	Normal
10	14	Normal
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	7.43
Avg. length (mm)	14

Replicate C		
Fish	Length (mm)	Normal/ Abnormal
1	14	Normal
2	14	Normal
3	14	Normal
4	13	Normal
5	13	Normal
6	11	Normal
7	12	Normal
8	11	Normal
9	14	Normal
10	12	Normal
11	11	Normal
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	6.43
Avg. length (mm)	13

Replicate D		
Fish	Length (mm)	Normal/ Abnormal
1	13	Normal
2	15	Normal
3	14	Normal
4	16	Normal
5	15	Normal
6	14	Normal
7	13	Normal
8	14	Normal
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	9.00
Avg. length (mm)	14

CETIS Summary Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Batch ID:	17-3865-4657	**Test Type:**	Survival-Development-Growth	**Analyst:**	Cat Curran
Start Date:	06 May-15 15:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	07 Jun-15 14:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-0125-1748	06 May-15	06 May-15	16h	Teck Coal	
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	30h (8.6 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	30h (7.5 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	28h (9.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	25h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Hatched Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	4	0.9833	0.9303	1	0.9333	1	0.01667	0.03333	3.39%	0.0%
FR_UFR1	4	0.9333	0.8467	1	0.8667	1	0.02722	0.05443	5.83%	5.09%
GH_FR1	4	0.9667	0.9054	1	0.9333	1	0.01925	0.03849	3.98%	1.7%
FR_FRCP1	4	0.9833	0.9303	1	0.9333	1	0.01667	0.03333	3.39%	0.0%
CM_MC2	4	1	1	1	1	1	0	0	0.0%	-1.7%

Hatched Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.9333	1	1	1
FR_UFR1	0.8667	1	0.9333	0.9333
GH_FR1	0.9333	1	1	0.9333
FR_FRCP1	1	1	1	0.9333
CM_MC2	1	1	1	1

Hatched Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	14/15	15/15	15/15	15/15
FR_UFR1	13/15	15/15	14/15	14/15
GH_FR1	14/15	15/15	15/15	14/15
FR_FRCP1	15/15	15/15	15/15	14/15
CM_MC2	15/15	15/15	15/15	15/15

July 17/15

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	08-3644-1598	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Jun-15 16:46	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	17-3865-4657	**Test Type:**	Survival-Development-Growth	**Analyst:**	Cat Curran
Start Date:	06 May-15 15:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	07 Jun-15 14:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-0125-1748	06 May-15	06 May-15	16h	Teck Coal	
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	30h (8.6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	6.0%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		FR_UFR1	1.571	1.943	0.116	6	0.0836	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01767464	0.01767464	1	2.469	0.1672	Non-Significant Effect
Error	0.04294776	0.00715796	6			
Total	0.0606224		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.302	47.47	0.5114	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9149	0.6451	0.3896	Normal Distribution

Hatched Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.9833	0.9303	1	1	0.9333	1	0.01667	3.39%	0.0%
FR_UFR1	4	0.9333	0.8467	1	0.9333	0.8667	1	0.02722	5.83%	5.09%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.408	1.304	1.513	1.441	1.31	1.441	0.03292	4.68%	0.0%
FR_UFR1	4	1.314	1.155	1.473	1.31	1.197	1.441	0.04995	7.6%	6.68%

Hatched Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.9333	1	1	1
FR_UFR1	0.8667	1	0.9333	0.9333

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1.31	1.441	1.441	1.441
FR_UFR1	1.197	1.441	1.31	1.31

Hatched Rate Binomials

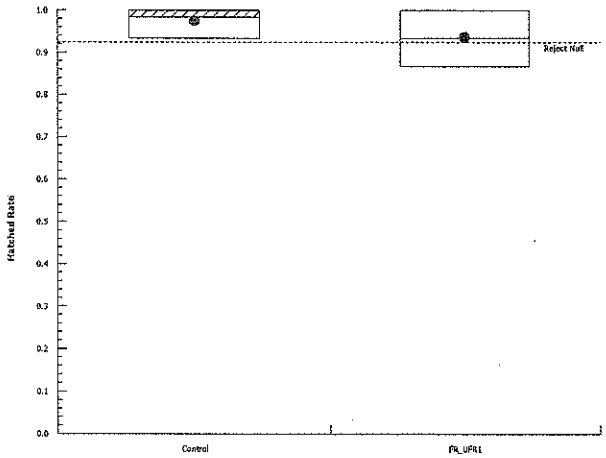
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	14/15	15/15	15/15	15/15
FR_UFR1	13/15	15/15	14/15	14/15

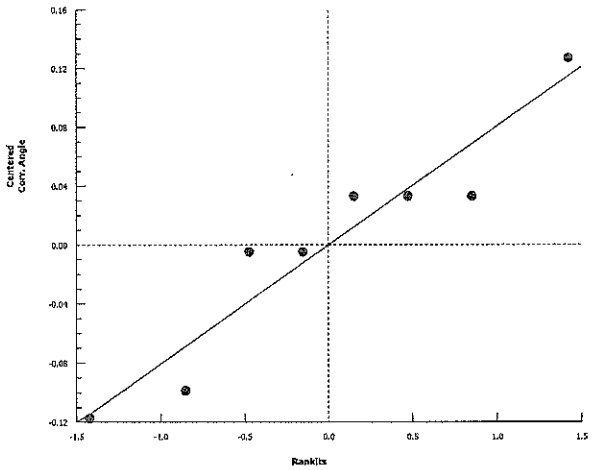
July 17/15

Fathead Minnow 32-d Survival and Growth Test | **Nautilus Environmental**

Analysis ID:	08-3644-1598	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Jun-15 16:46	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





July 17/15

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	11-4436-8856	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Jun-15 16:45	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	17-3865-4657	**Test Type:**	Survival-Development-Growth	**Analyst:**	Cat Curran
Start Date:	06 May-15 15:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	07 Jun-15 14:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-0125-1748	06 May-15	06 May-15	16h	Teck Coal	
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	30h (7.5 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	28h (9.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	25h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	5.01%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		GH_FR1	0.7746	2.287	0.097	6	0.4263	CDF	Non-Significant Effect
		FR_FRCP1	0	2.287	0.097	6	0.7500	CDF	Non-Significant Effect
		CM_MC2	-0.7746	2.287	0.097	6	0.9362	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.008672003	0.002890667	3	0.8	0.5174	Non-Significant Effect
Error	0.04336001	0.003613334	12			
Total	0.05203202		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	1.333	5.953	0.3096	Equal Variances
Variances	Levene Equality of Variance	6	5.953	0.0097	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8514	0.8408	0.0143	Normal Distribution

Hatched Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.9833	0.9303	1	1	0.9333	1	0.01667	3.39%	0.0%
GH_FR1	4	0.9667	0.9054	1	0.9667	0.9333	1	0.01924	3.98%	1.7%
FR_FRCP1	4	0.9833	0.9303	1	1	0.9333	1	0.01667	3.39%	0.0%
CM_MC2	4	1	1	1	1	1	1	0	0.0%	-1.7%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.408	1.304	1.513	1.441	1.31	1.441	0.03292	4.68%	0.0%
GH_FR1	4	1.375	1.254	1.496	1.375	1.31	1.441	0.03802	5.53%	2.34%
FR_FRCP1	4	1.408	1.304	1.513	1.441	1.31	1.441	0.03292	4.68%	0.0%
CM_MC2	4	1.441	1.441	1.442	1.441	1.441	1.441	0	0.0%	-2.34%

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	11-4436-8856	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Jun-15 16:45	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Hatched Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.9333	1	1	1
GH_FR1	0.9333	1	1	0.9333
FR_FRCP1	1	1	1	0.9333
CM_MC2	1	1	1	1

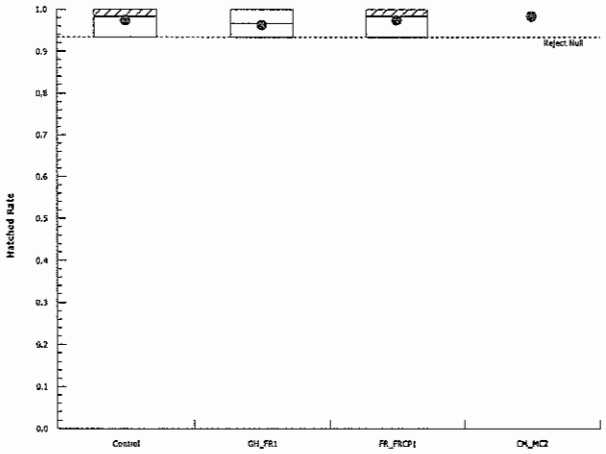
Angular (Corrected) Transformed Detail

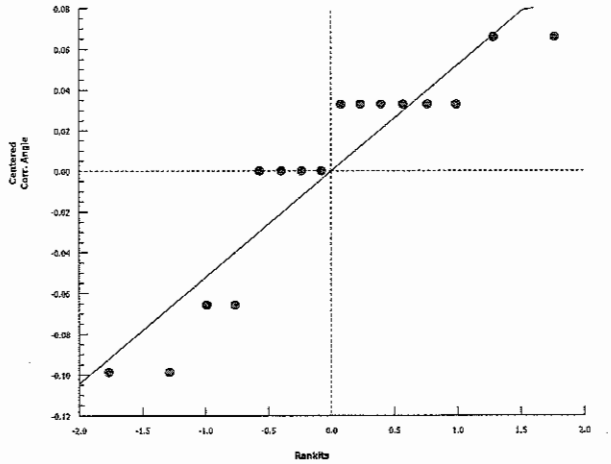
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1.31	1.441	1.441	1.441
GH_FR1	1.31	1.441	1.441	1.31
FR_FRCP1	1.441	1.441	1.441	1.31
CM_MC2	1.441	1.441	1.441	1.441

Hatched Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	14/15	15/15	15/15	15/15
GH_FR1	14/15	15/15	15/15	14/15
FR_FRCP1	15/15	15/15	15/15	14/15
CM_MC2	15/15	15/15	15/15	15/15

Graphics





July 17/15

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	14-8339-4895	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	18 Jun-15 13:10	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	17-3865-4657	**Test Type:**	Survival-Development-Growth	**Analyst:**	Cat Curran
Start Date:	06 May-15 15:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	07 Jun-15 14:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	30h (8.6 °C)	Teck Coal	
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	30h (7.5 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	28h (9.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	25h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	6.94%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_FR1	-1.219	2.287	0.115	6	0.9759	CDF	Non-Significant Effect
		FR_FRCP1	-1.876	2.287	0.115	6	0.9950	CDF	Non-Significant Effect
		CM_MC2	-2.532	2.287	0.115	6	0.9990	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.03518395	0.01172799	3	2.334	0.1255	Non-Significant Effect
Error	0.06029176	0.005024314	12			
Total	0.09547572		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Mod Levene Equality of Variance	1.572	5.953	0.2474	Equal Variances
Variances	Levene Equality of Variance	2.641	5.953	0.0971	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9497	0.8408	0.4842	Normal Distribution

Hatched Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	0.9333	0.8467	1	0.9333	0.8667	1	0.02722	5.83%	0.0%
GH_FR1	4	0.9667	0.9054	1	0.9667	0.9333	1	0.01924	3.98%	-3.57%
FR_FRCP1	4	0.9833	0.9303	1	1	0.9333	1	0.01667	3.39%	-5.36%
CM_MC2	4	1	1	1	1	1	1	0	0.0%	-7.14%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	1.314	1.155	1.473	1.31	1.197	1.441	0.04995	7.6%	0.0%
GH_FR1	4	1.375	1.254	1.496	1.375	1.31	1.441	0.03802	5.53%	-4.65%
FR_FRCP1	4	1.408	1.304	1.513	1.441	1.31	1.441	0.03292	4.68%	-7.15%
CM_MC2	4	1.441	1.441	1.442	1.441	1.441	1.441	0	0.0%	-9.66%

July 17/15

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	14-8339-4895	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	18 Jun-15 13:10	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Hatched Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	0.8667	1	0.9333	0.9333
GH_FR1	0.9333	1	1	0.9333
FR_FRCP1	1	1	1	0.9333
CM_MC2	1	1	1	1

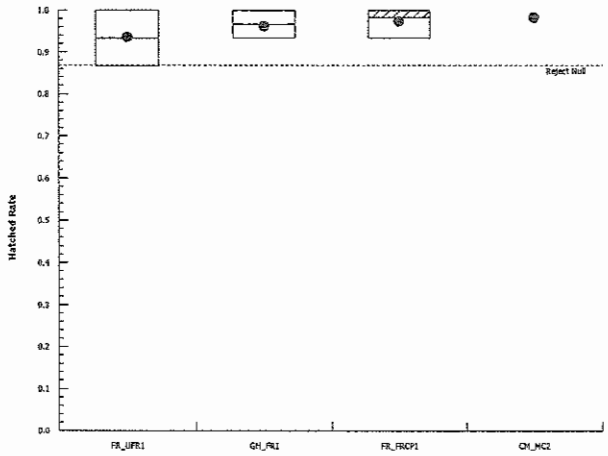
Angular (Corrected) Transformed Detail

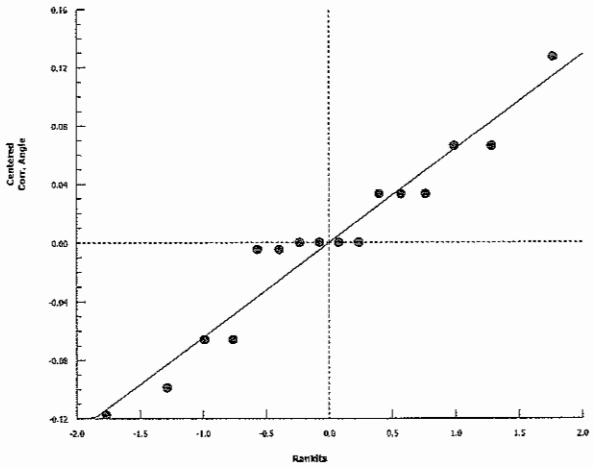
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	1.197	1.441	1.31	1.31
GH_FR1	1.31	1.441	1.441	1.31
FR_FRCP1	1.441	1.441	1.441	1.31
CM_MC2	1.441	1.441	1.441	1.441

Hatched Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	13/15	15/15	14/15	14/15
GH_FR1	14/15	15/15	15/15	14/15
FR_FRCP1	15/15	15/15	15/15	14/15
CM_MC2	15/15	15/15	15/15	15/15

Graphics





CETIS Summary Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Batch ID:	17-3865-4657	**Test Type:**	Survival-Development-Growth	**Analyst:**	Cat Curran
Start Date:	06 May-15 15:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	07 Jun-15 14:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-0125-1748	06 May-15	06 May-15	16h	Teck Coal	
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	30h (8.6 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	30h (7.5 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	28h (9.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	25h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	4	0.8333	0.5035	1	0.5333	1	0.1036	0.2073	24.87%	0.0%
FR_UFR1	4	0.7333	0.5397	0.927	0.6	0.8667	0.06086	0.1217	16.6%	12.0%
GH_FR1	4	0.25	0	0.6005	0	0.4667	0.1101	0.2203	88.11%	70.0%
FR_FRCP1	4	0.3167	0.1832	0.4501	0.2	0.4	0.04194	0.08389	26.49%	62.0%
CM_MC2	4	0.65	0.5165	0.7835	0.5333	0.7333	0.04194	0.08389	12.91%	22.0%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.5333	0.8667	0.9333	1
FR_UFR1	0.8667	0.8	0.6667	0.6
GH_FR1	0	0.1333	0.4667	0.4
FR_FRCP1	0.3333	0.2	0.4	0.3333
CM_MC2	0.6667	0.6667	0.7333	0.5333

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	8/15	13/15	14/15	15/15
FR_UFR1	13/15	12/15	10/15	9/15
GH_FR1	0/15	2/15	7/15	6/15
FR_FRCP1	5/15	3/15	6/15	5/15
CM_MC2	10/15	10/15	11/15	8/15

Fathead Minnow 32-d Survival and Growth Test

Nautilus Environmental

Analysis ID:	01-1215-5397	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Jun-15 16:29	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	17-3865-4657	**Test Type:**	Survival-Development-Growth	**Analyst:**	Cat Curran
Start Date:	06 May-15 15:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	07 Jun-15 14:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-0125-1748	06 May-15	06 May-15	16h	Teck Coal	
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	30h (8.6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	26.7%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		FR_UFR1	1.025	1.943	0.294	6	0.1724	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.04823435	0.04823435	1	1.051	0.3448	Non-Significant Effect
Error	0.2753132	0.04588554	6			
Total	0.3235476		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.591	47.47	0.3217	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9581	0.6451	0.7918	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.8333	0.5035	1	0.9	0.5333	1	0.1036	24.87%	0.0%
FR_UFR1	4	0.7333	0.5397	0.927	0.7333	0.6	0.8667	0.06086	16.6%	12.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.192	0.7654	1.618	1.253	0.8188	1.441	0.134	22.48%	0.0%
FR_UFR1	4	1.036	0.8114	1.261	1.031	0.8861	1.197	0.07069	13.64%	13.03%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.5333	0.8667	0.9333	1
FR_UFR1	0.8667	0.8	0.6667	0.6

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.8188	1.197	1.31	1.441
FR_UFR1	1.197	1.107	0.9553	0.8861

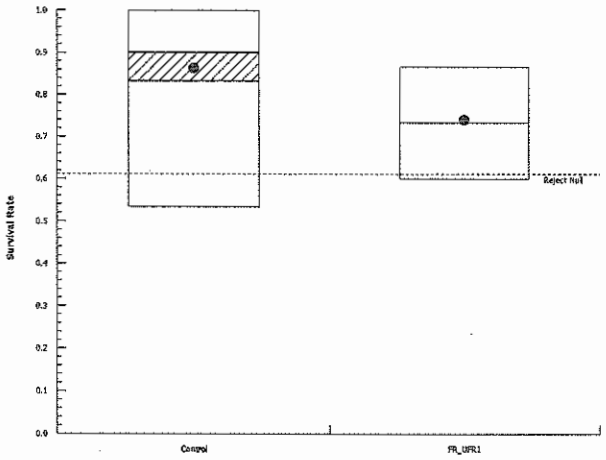
Survival Rate Binomials

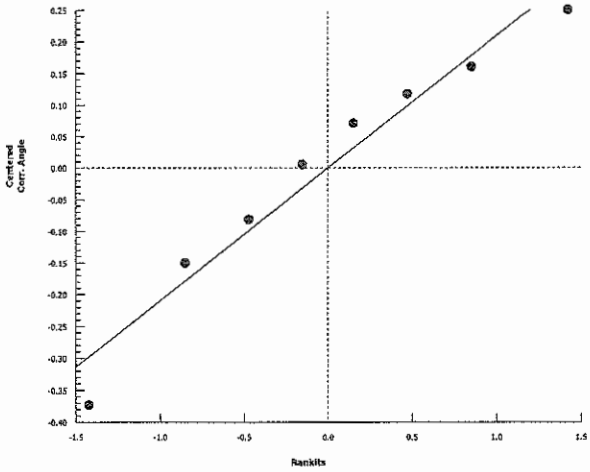
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	8/15	13/15	14/15	15/15
FR_UFR1	13/15	12/15	10/15	9/15

Fathead Minnow 32-d Survival and Growth Test | **Nautilus Environmental**

Analysis ID:	01-1215-5397	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Jun-15 16:29	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	14-7660-3599	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Jun-15 16:28	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	17-3865-4657	**Test Type:**	Survival-Development-Growth	**Analyst:**	Cat Curran
Start Date:	06 May-15 15:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	07 Jun-15 14:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-0125-1748	06 May-15	06 May-15	16h	Teck Coal	
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	30h (7.5 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	28h (9.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	25h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	31.5%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		GH_FR1	4.827	2.287	0.335	6	0.0006	CDF	Significant Effect
		FR_FRCP1	4.077	2.287	0.335	6	0.0021	CDF	Significant Effect
		CM_MC2	1.723	2.287	0.335	6	0.1256	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.256529	0.4188429	3	9.771	0.0015	Significant Effect
Error	0.5143973	0.04286644	12			
Total	1.770926		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	5.629	11.34	0.1311	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9264	0.8408	0.2133	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.8333	0.5035	1	0.9	0.5333	1	0.1036	24.87%	0.0%
GH_FR1	4	0.25	0	0.6005	0.2667	0	0.4667	0.1101	88.11%	70.0%
FR_FRCP1	4	0.3167	0.1832	0.4501	0.3333	0.2	0.4	0.04194	26.49%	62.0%
CM_MC2	4	0.65	0.5165	0.7835	0.6667	0.5333	0.7333	0.04194	12.91%	22.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.192	0.7654	1.618	1.253	0.8188	1.441	0.134	22.48%	0.0%
GH_FR1	4	0.485	0.02568	0.9443	0.5293	0.1295	0.752	0.1443	59.52%	59.3%
FR_FRCP1	4	0.5948	0.4463	0.7434	0.6155	0.4636	0.6847	0.04667	15.69%	50.08%
CM_MC2	4	0.9394	0.8002	1.079	0.9553	0.8188	1.028	0.04372	9.31%	21.17%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.5333	0.8667	0.9333	1
GH_FR1	0	0.1333	0.4667	0.4
FR_FRCP1	0.3333	0.2	0.4	0.3333
CM_MC2	0.6667	0.6667	0.7333	0.5333

Fathead Minnow 32-d Survival and Growth Test | **Nautilus Environmental**

Analysis ID:	14-7660-3599	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Jun-15 16:28	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

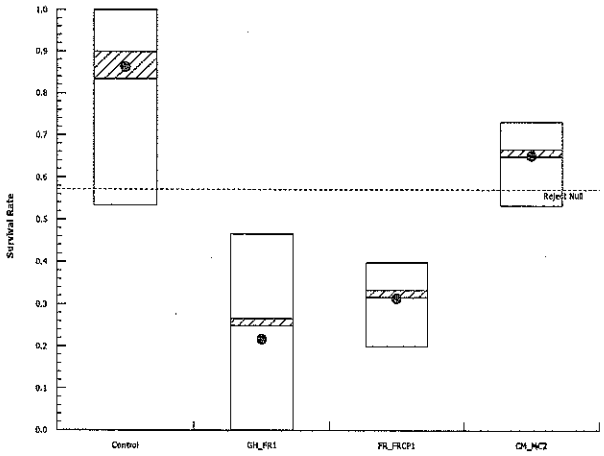
Angular (Corrected) Transformed Detail

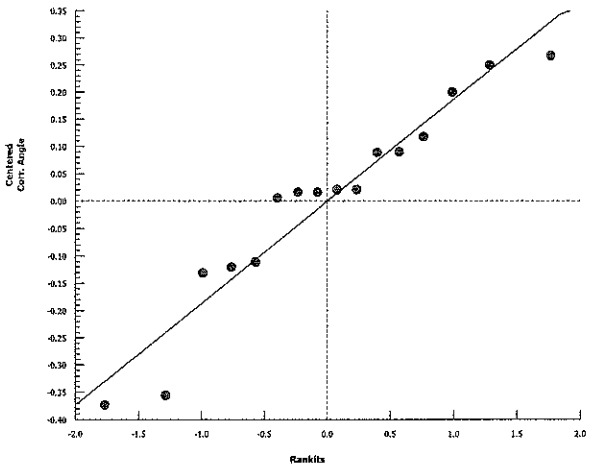
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.8188	1.197	1.31	1.441
GH_FR1	0.1295	0.3738	0.752	0.6847
FR_FRCP1	0.6155	0.4636	0.6847	0.6155
CM_MC2	0.9553	0.9553	1.028	0.8188

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	8/15	13/15	14/15	15/15
GH_FR1	0/15	2/15	7/15	6/15
FR_FRCP1	5/15	3/15	6/15	5/15
CM_MC2	10/15	10/15	11/15	8/15

Graphics





Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	08-8404-4634	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	18 Jun-15 13:20	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	17-3865-4657	**Test Type:**	Survival-Development-Growth	**Analyst:**	Cat Curran
Start Date:	06 May-15 15:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	07 Jun-15 14:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	30h (8.6 °C)	Teck Coal	
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	30h (7.5 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	28h (9.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	25h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	35.7%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_FR1	4.508	2.287	0.28	6	0.0010	CDF	Significant Effect
		FR_FRCP1	3.61	2.287	0.28	6	0.0047	CDF	Significant Effect
		CM_MC2	0.7931	2.287	0.28	6	0.4185	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.8456488	0.2818829	3	9.422	0.0018	Significant Effect
Error	0.3590252	0.02991877	12			
Total	1.204674		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	5.207	11.34	0.1572	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9659	0.8408	0.7694	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	0.7333	0.5397	0.927	0.7333	0.6	0.8667	0.06086	16.6%	0.0%
GH_FR1	4	0.25	0	0.6005	0.2667	0	0.4667	0.1101	88.11%	65.91%
FR_FRCP1	4	0.3167	0.1832	0.4501	0.3333	0.2	0.4	0.04194	26.49%	56.82%
CM_MC2	4	0.65	0.5165	0.7835	0.6667	0.5333	0.7333	0.04194	12.91%	11.36%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	1.036	0.8114	1.261	1.031	0.8861	1.197	0.07069	13.64%	0.0%
GH_FR1	4	0.485	0.02568	0.9443	0.5293	0.1295	0.752	0.1443	59.52%	53.2%
FR_FRCP1	4	0.5948	0.4463	0.7434	0.6155	0.4636	0.6847	0.04667	15.69%	42.61%
CM_MC2	4	0.9394	0.8002	1.079	0.9553	0.8188	1.028	0.04372	9.31%	9.36%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	0.8667	0.8	0.6667	0.6
GH_FR1	0	0.1333	0.4667	0.4
FR_FRCP1	0.3333	0.2	0.4	0.3333
CM_MC2	0.6667	0.6667	0.7333	0.5333

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 08-8404-4634 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 18 Jun-15 13:20 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

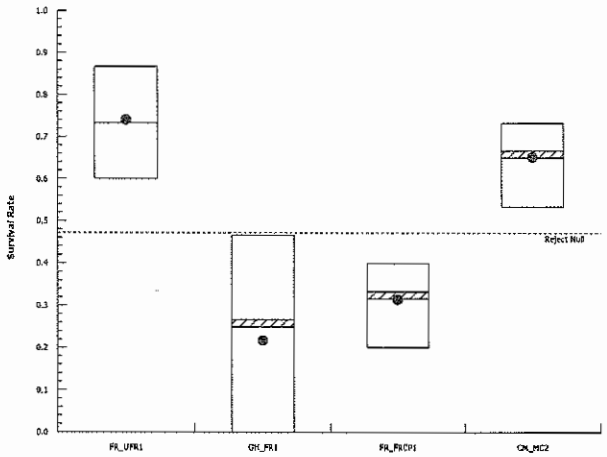
Angular (Corrected) Transformed Detail

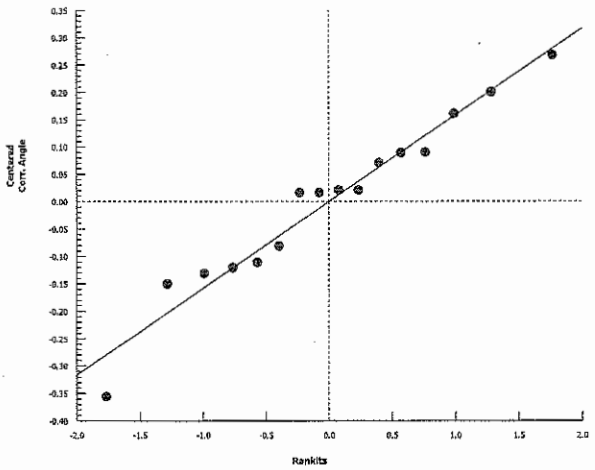
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	1.197	1.107	0.9553	0.8861
GH_FR1	0.1295	0.3738	0.752	0.6847
FR_FRCP1	0.6155	0.4636	0.6847	0.6155
CM_MC2	0.9553	0.9553	1.028	0.8188

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	13/15	12/15	10/15	9/15
GH_FR1	0/15	2/15	7/15	6/15
FR_FRCP1	5/15	3/15	6/15	5/15
CM_MC2	10/15	10/15	11/15	8/15

Graphics





CETIS Summary Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Batch ID:	17-3865-4657	**Test Type:**	Survival-Development-Growth	**Analyst:**	Cat Curran
Start Date:	06 May-15 15:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	07 Jun-15 14:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-0125-1748	06 May-15	06 May-15	16h	Teck Coal	
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	30h (8.6 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	30h (7.5 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	28h (9.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	25h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	4	3.728	3.339	4.116	3.455	4.036	0.1221	0.2442	6.55%	0.0%
FR_UFR1	4	4.009	3.376	4.641	3.613	4.52	0.1989	0.3978	9.92%	-7.53%
GH_FR1	4	1.911	-0.2179	4.04	0	2.977	0.6689	1.338	70.01%	48.73%
FR_FRCP1	4	2.443	2.033	2.854	2.092	2.702	0.129	0.2579	10.56%	34.46%
CM_MC2	4	4.742	4.434	5.05	4.492	4.957	0.0969	0.1938	4.09%	-27.21%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	4.036	3.776	3.644	3.455
FR_UFR1	3.613	3.792	4.109	4.52
GH_FR1	0	1.999	2.668	2.977
FR_FRCP1	2.092	2.439	2.539	2.702
CM_MC2	4.492	4.957	4.718	4.801

July 17/15

Fathead Minnow 32-d Survival and Growth Test

Nautilus Environmental

Analysis ID:	15-4086-4176	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Jun-15 16:46	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	17-3865-4657	**Test Type:**	Survival-Development-Growth	**Analyst:**	Cat Curran
Start Date:	06 May-15 15:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	07 Jun-15 14:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-0125-1748	06 May-15	06 May-15	16h	Teck Coal	
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	30h (8.6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.2%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		FR_UFR1	-1.203	1.943	0.454	6	0.8629	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1577354	0.1577354	1	1.448	0.2742	Non-Significant Effect
Error	0.6536236	0.1089373	6			
Total	0.811359		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.653	47.47	0.4442	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9679	0.6451	0.8807	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	3.728	3.339	4.116	3.71	3.455	4.036	0.1221	6.55%	0.0%
FR_UFR1	4	4.009	3.376	4.641	3.95	3.613	4.52	0.1989	9.92%	-7.53%

Mean Dry Biomass-mg Detail

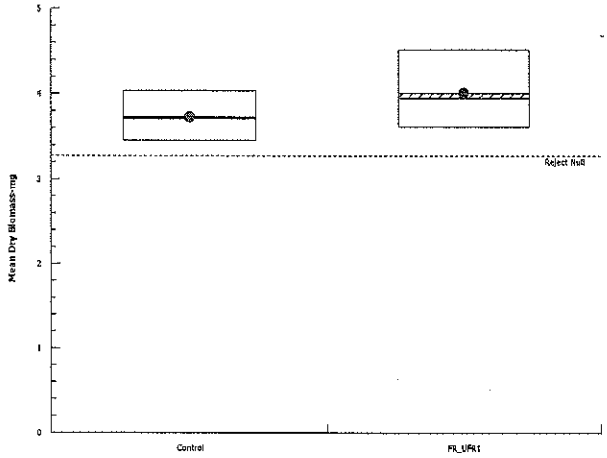
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	4.036	3.776	3.644	3.455
FR_UFR1	3.613	3.792	4.109	4.52

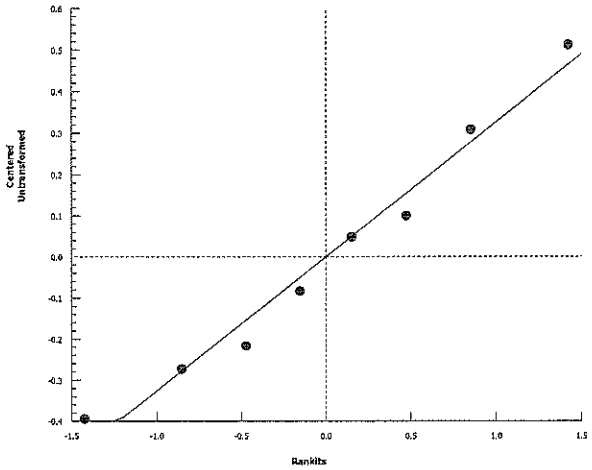
July 17/15

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Analysis ID:	15-4086-4176	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Jun-15 16:46	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Aug 17/15

Fathead Minnow 32-d Survival and Growth Test

Nautilus Environmental

Analysis ID:	08-1909-9591	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Jun-15 16:46	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	17-3865-4657	**Test Type:**	Survival-Development-Growth	**Analyst:**	Cat Curran
Start Date:	06 May-15 15:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	07 Jun-15 14:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-0125-1748	06 May-15	06 May-15	16h	Teck Coal	
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	30h (7.5 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	28h (9.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	25h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	30.3%	

Steel Many-One Rank Sum Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Control		GH_FR1	10	10	0	6	0.0276	Asymp	Significant Effect
		FR_FRCP1	10	10	0	6	0.0276	Asymp	Significant Effect
		CM_MC2	26	10	0	6	0.9996	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	19.56149	6.520498	3	13.35	0.0004	Significant Effect
Error	5.860914	0.4884095	12			
Total	25.42241		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	14.13	11.34	0.0027	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.808	0.8408	0.0035	Non-normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	3.728	3.339	4.116	3.71	3.455	4.036	0.1221	6.55%	0.0%
GH_FR1	4	1.911	-0.2179	4.04	2.333	0	2.977	0.6689	70.01%	48.73%
FR_FRCP1	4	2.443	2.033	2.854	2.489	2.092	2.702	0.129	10.56%	34.46%
CM_MC2	4	4.742	4.434	5.05	4.76	4.492	4.957	0.0969	4.09%	-27.21%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	4.036	3.776	3.644	3.455
GH_FR1	0	1.999	2.668	2.977
FR_FRCP1	2.092	2.439	2.539	2.702
CM_MC2	4.492	4.957	4.718	4.801

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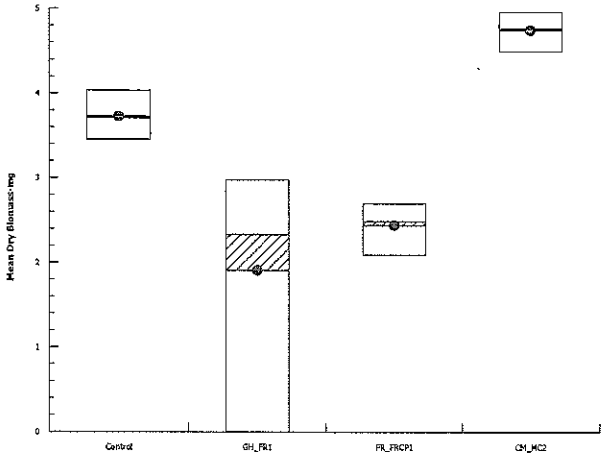
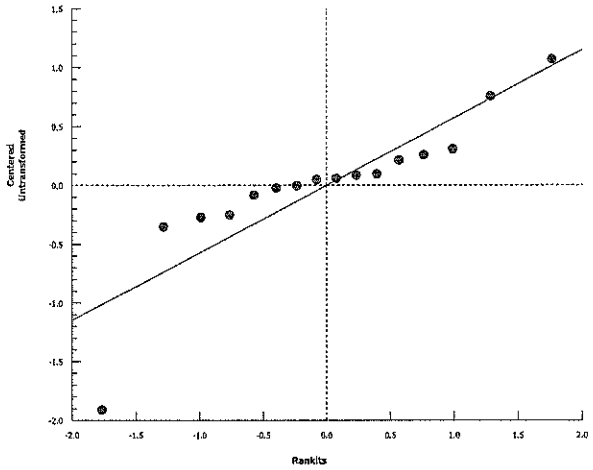
Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Analysis ID:	08-1909-9591	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Jun-15 16:46	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





July 17/15

CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	08-1322-4899	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	18 Jun-15 13:36	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	17-3865-4657	**Test Type:**	Survival-Development-Growth	**Analyst:**	Cat Curran
Start Date:	06 May-15 15:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	07 Jun-15 14:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	30h (8.6 °C)	Teck Coal	
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	30h (7.5 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	28h (9.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	25h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	28.9%	

Steel Many-One Rank Sum Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_FR1	10	10	0	6	0.0276	Asymp	Significant Effect
		FR_FRCP1	10	10	0	6	0.0276	Asymp	Significant Effect
		CM_MC2	25	10	0	6	0.9987	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	20.97021	6.990069	3	13.62	0.0004	Significant Effect
Error	6.156666	0.5130555	12			
Total	27.12687		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	12.08	11.34	0.0071	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8458	0.8408	0.0118	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	4.009	3.376	4.641	3.95	3.613	4.52	0.1989	9.92%	0.0%
GH_FR1	4	1.911	-0.2179	4.04	2.333	0	2.977	0.6689	70.01%	52.33%
FR_FRCP1	4	2.443	2.033	2.854	2.489	2.092	2.702	0.129	10.56%	39.05%
CM_MC2	4	4.742	4.434	5.05	4.76	4.492	4.957	0.0969	4.09%	-18.3%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	3.613	3.792	4.109	4.52
GH_FR1	0	1.999	2.668	2.977
FR_FRCP1	2.092	2.439	2.539	2.702
CM_MC2	4.492	4.957	4.718	4.801

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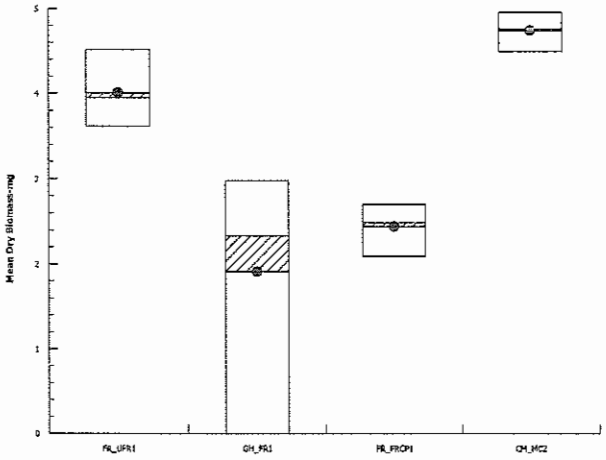
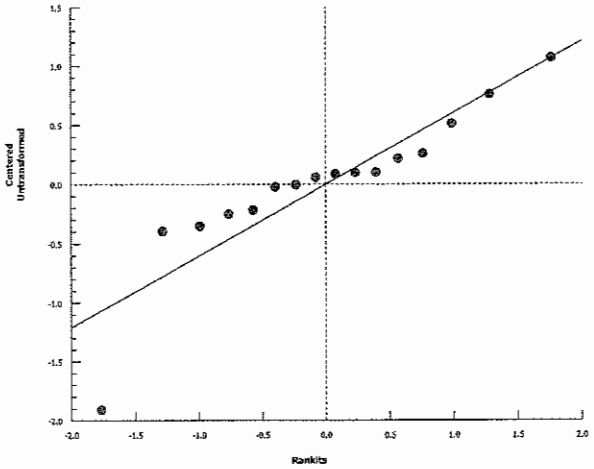
Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Analysis ID:	08-1322-4899	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	18 Jun-15 13:36	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





July 17/15

CETIS Summary Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Batch ID:	17-3865-4657	**Test Type:**	Survival-Development-Growth	**Analyst:**	Cat Curran
Start Date:	06 May-15 15:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	07 Jun-15 14:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-0125-1748	06 May-15	06 May-15	16h	Teck Coal	
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	30h (8.6 °C)		
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	30h (7.5 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	28h (9.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	25h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	4	12.6	10.99	14.21	11.9	14.1	0.5066	1.013	8.04%	0.0%
FR_UFR1	4	12.67	10.84	14.51	11.5	13.9	0.5779	1.156	9.12%	-0.6%
GH_FR1	3	14.97	10.38	19.55	13.4	17	1.065	1.845	12.33%	-18.78%
FR_FRCP1	4	14.22	12.53	15.92	13.2	15.7	0.5329	1.066	7.49%	-12.9%
CM_MC2	4	13.43	12.29	14.56	12.6	14.3	0.3568	0.7136	5.32%	-6.55%

Length-mm Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	14.1	12.3	11.9	12.1
FR_UFR1	11.5	11.9	13.4	13.9
GH_FR1	17	13.4	14.5	
FR_FRCP1	13.8	15.7	13.2	14.2
CM_MC2	13.2	13.6	12.6	14.3

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Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	06-1826-0810	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Jun-15 16:49	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	17-3865-4657	**Test Type:**	Survival-Development-Growth	**Analyst:**	Cat Curran
Start Date:	06 May-15 15:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	07 Jun-15 14:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-0125-1748	06 May-15	06 May-15	16h	Teck Coal	
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	30h (8.6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	11.9%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		FR_UFR1	-0.09759	1.943	1.493	6	0.5373	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01124987	0.01124987	1	0.009524	0.9254	Non-Significant Effect
Error	7.0875	1.18125	6			
Total	7.09875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.301	47.47	0.8339	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8903	0.6451	0.2355	Normal Distribution

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	12.6	10.99	14.21	12.2	11.9	14.1	0.5066	8.04%	0.0%
FR_UFR1	4	12.67	10.84	14.51	12.65	11.5	13.9	0.5779	9.12%	-0.6%

Length-mm Detail

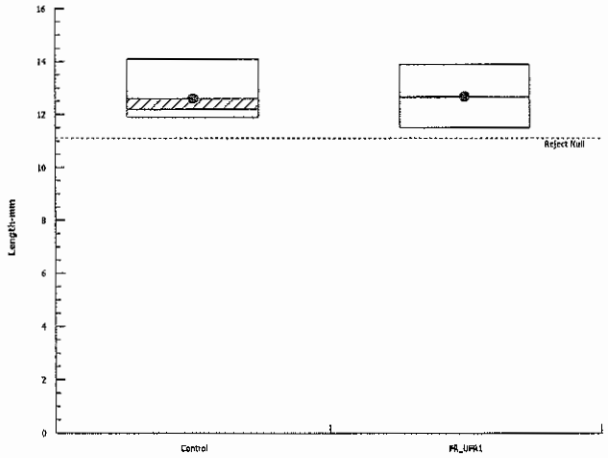
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	14.1	12.3	11.9	12.1
FR_UFR1	11.5	11.9	13.4	13.9

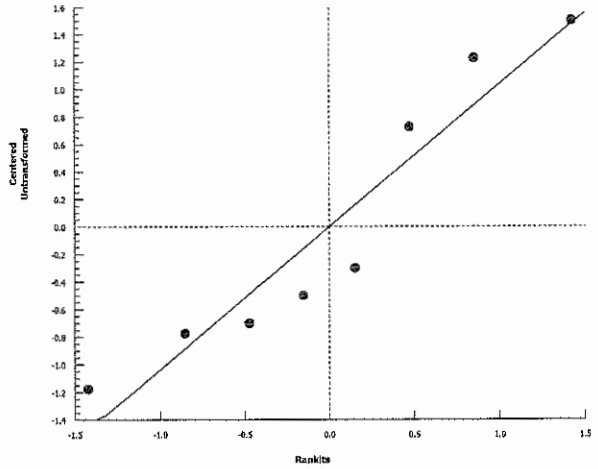
July 17/15

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Analysis ID:	06-1826-0810	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Jun-15 16:49	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	11-4350-5103	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Jul-15 12:30	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	17-3865-4657	**Test Type:**	Survival-Development-Growth	**Analyst:**	Cat Curran
Start Date:	06 May-15 15:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	07 Jun-15 14:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	15-0125-1748	06 May-15	06 May-15	16h	Teck Coal	
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	30h (7.5 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	28h (9.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	25h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	15.1%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		GH_FR1	-2.669	2.318	2.055	5	0.9993	CDF	Non-Significant Effect
		FR_FRCP1	-1.98	2.318	1.902	6	0.9963	CDF	Non-Significant Effect
		CM_MC2	-1.005	2.318	1.902	6	0.9630	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	11.04766	3.682554	3	2.733	0.0944	Non-Significant Effect
Error	14.82167	1.347424	11			
Total	25.86933		14			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	2.07	11.34	0.5579	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9222	0.8328	0.2079	Normal Distribution

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	12.6	10.99	14.21	12.2	11.9	14.1	0.5066	8.04%	0.0%
GH_FR1	3	14.97	10.38	19.55	14.5	13.4	17	1.065	12.33%	-18.78%
FR_FRCP1	4	14.22	12.53	15.92	14	13.2	15.7	0.5329	7.49%	-12.9%
CM_MC2	4	13.43	12.29	14.56	13.4	12.6	14.3	0.3568	5.32%	-6.55%

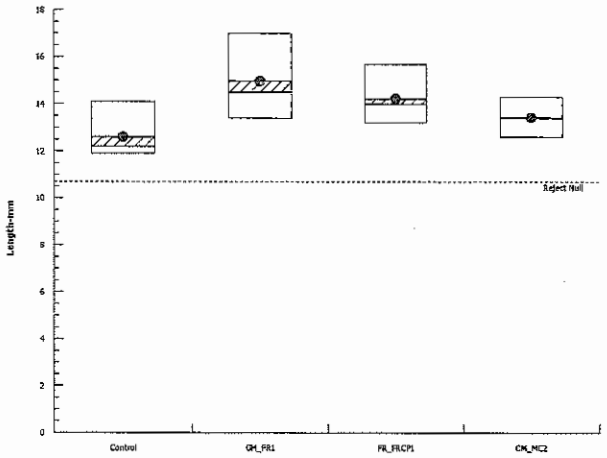
Length-mm Detail

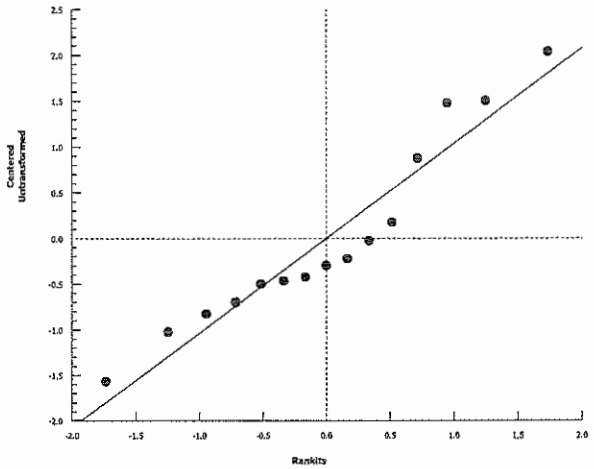
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	14.1	12.3	11.9	12.1
GH_FR1	17	13.4	14.5	
FR_FRCP1	13.8	15.7	13.2	14.2
CM_MC2	13.2	13.6	12.6	14.3

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	11-4350-5103	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Jul-15 12:30	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





July 19/15

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	15-5482-3932	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Jul-15 12:30	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	17-3865-4657	**Test Type:**	Survival-Development-Growth	**Analyst:**	Cat Curran
Start Date:	06 May-15 15:30	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	
Ending Date:	07 Jun-15 14:00	**Species:**	Pimephales promelas	**Brine:**	
Duration:	31d 22h	**Source:**	Aquatic Biosystems, CO	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	05-6734-9954	05 May-15 09:20	06 May-15 08:34	30h (8.6 °C)	Teck Coal	
GH_FR1	00-6619-3392	05 May-15 09:20	06 May-15 08:34	30h (7.5 °C)		
FR_FRCP1	03-2723-8089	05 May-15 11:20	06 May-15 08:34	28h (9.5 °C)		
CM_MC2	01-2075-6743	05 May-15 14:40	06 May-15 08:34	25h (6 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_M_04052015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015-05-04_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_M_04052015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150505_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	15.5%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_FR1	-2.508	2.318	2.118	5	0.9990	CDF	Non-Significant Effect
		FR_FRCP1	-1.832	2.318	1.961	6	0.9947	CDF	Non-Significant Effect
		CM_MC2	-0.8864	2.318	1.961	6	0.9521	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	10.38817	3.462723	3	2.419	0.1214	Non-Significant Effect
Error	15.74917	1.431742	11			
Total	26.13733		14			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1.965	11.34	0.5797	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9596	0.8328	0.6860	Normal Distribution

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	12.67	10.84	14.51	12.65	11.5	13.9	0.5779	9.12%	0.0%
GH_FR1	3	14.97	10.38	19.55	14.5	13.4	17	1.065	12.33%	-18.08%
FR_FRCP1	4	14.22	12.53	15.92	14	13.2	15.7	0.5329	7.49%	-12.23%
CM_MC2	4	13.43	12.29	14.56	13.4	12.6	14.3	0.3568	5.32%	-5.92%

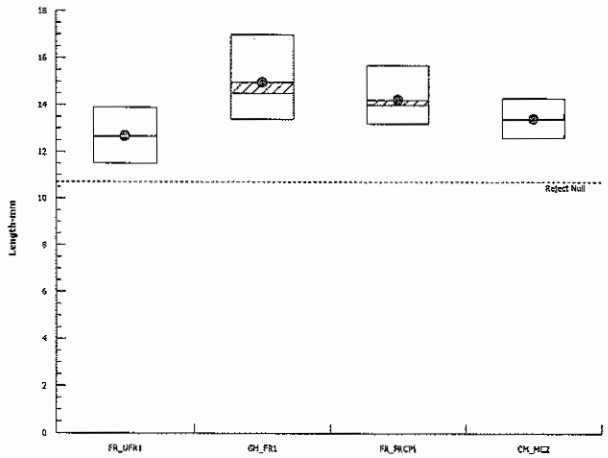
Length-mm Detail

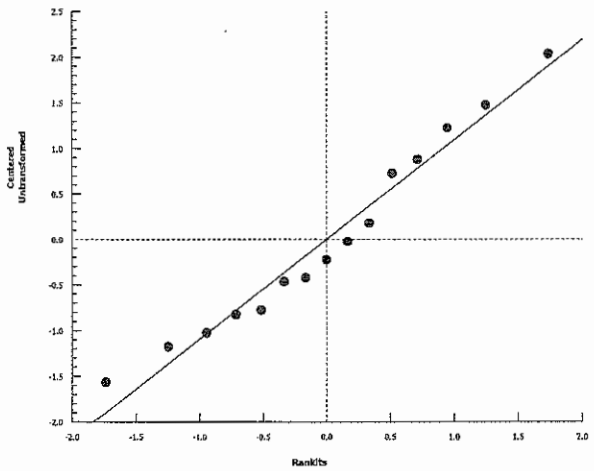
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	11.5	11.9	13.4	13.9
GH_FR1	17	13.4	14.5	
FR_FRCP1	13.8	15.7	13.2	14.2
CM_MC2	13.2	13.6	12.6	14.3

Fathead Minnow 32-d Survival and Growth Test | **Nautilus Environmental**

Analysis ID:	15-5482-3932	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	17 Jul-15 12:30	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





July 17/15

APPENDIX E – *Oncorhynchus mykiss* Toxicity Test Data

Embryo-Alevin Test Summary Sheet

Client:	Teck	Test Date:	April 29 - May 29, 2015
Work Order No.:	15358 - 15362, 15364	Test Species:	*Oncorhynchus mykiss*

Sample Information:

Sample ID:	Various - see table below
Sample Date:	April 28, May 5, May 12, May 19, May 26, 2015
Date Received:	April 29, May 6, May 13, May 20, May 27, 2015
Sample Volume:	2 - 6 x 20 L per refresh

Dilution Water:

Type:	Dechlorinated Tap Water
Hardness (mg/L CaCO3):	8 - 12
Alkalinity (mg/L CaCO3):	6 - 8

Test Organism Information:

Batch No:	042915
Source:	Vancouver Island Trout Hatchery, Duncan, BC
Loading Density:	1.44 g / L

SDS Reference Toxicant Results:

Reference Toxicant ID:	RTE74
Stock Solution ID:	14S04
Date Initiated:	April 29, 2015
7-d EC50 (95% CL):	6.7 (6.5 - 7.0) mg/L SDS

Reference Toxicant Mean and Range:	4.1 (2.2 - 7.6) mg/L SDS
Reference Toxicant CV (%):	36

Test Results: See next page

Reviewed by: _____ Date reviewed: July 29/15

Embryo-Alevin Test Summary Sheet

Client: Teck
Work Order No.: 15358 - 15362, 15364
Test Date: April 29 - May 29, 2015
Test Species: *Oncorhynchus mykiss*

Summaries of Test Results for All Samples:

Sample ID	Survival (%) (Mean ± SD)	Viability (%) (Mean ± SD)	Length (mm) (Mean ± SD)	Wet weight (mg) (Mean ± SD)
Control (paired w/ FR_UFR1)	85.7 ± 3.4	81.5 ± 6.5	19.0 ± 0.6	97.6 ± 7.4
FR_UFR1 (Site Control)	77.6 ± 7.6	72.6 ± 11.6	18.7 ± 1.4	97.7 ± 4.3
Control (paired w/ GH_ER2)	87.5 ± 3.0	86.7 ± 4.6	17.6 ± 0.4	86.4 ± 1.36
GH_ER2 (Site Control)	53.6 ± 19.5*†	53.6 ± 19.5*	18.0 ± 0.7	91.3 ± 5.0
Control (paired w/ FR_FRCP1)	89.2 ± 4.2	86.7 ± 6.1	19.0 ± 0.5	96.7 ± 2.9
FR_FRCP1	73.9 ± 14.9*	72.3 ± 16.2	20.0 ± 0.1	106.2 ± 3.8
Control (paired w/ GH_FR1)	85.0 ± 5.8	81.8 ± 9.3	18.4 ± 0.3	96.2 ± 2.3
GH_FR1	75.5 ± 10.5	75.5 ± 10.5	18.8 ± 0.7	94.7 ± 3.4
Control (paired w/ GH_ERC)	83.8 ± 8.7	82.2 ± 7.2	17.3 ± 0.6	85.9 ± 3.2
GH_ERC	58.0 ± 11.7*	56.3 ± 13.0*	17.5 ± 0.4	91.0 ± 4.0
Control (paired w/ EV_HC1)	92.6 ± 3.8	90.9 ± 4.7	18.0 ± 0.4	90.2 ± 2.6
EV_HC1	69.4 ± 17.5*	68.6 ± 16.0*	18.0 ± 0.5	88.2 ± 0.7†
Control (paired w/ EV_MC2)	83.6 ± 3.0	82.8 ± 3.1	19.5 ± 0.4	96.3 ± 2.6
EV_MC2	86.5 ± 6.1	84.8 ± 8.0	20.3 ± 0.4	100.6 ± 4.4
Control (paired w/ CM_MC2)	85.6 ± 5.3	83.9 ± 7.0	19.8 ± 0.8	98.1 ± 1.7
CM_MC2	68.8 ± 6.4*	68.8 ± 6.4*	20.4 ± 1.1	99.0 ± 7.9
Control (paired w/ LC_LCDSSLCC)	76.7 ± 7.2	74.2 ± 9.6	19.6 ± 0.9	98.4 ± 1.5
LC_LCDSSLCC	78.3 ± 2.0	75.0 ± 4.1	19.8 ± 0.8	99.7 ± 5.4

* Indicates results that were significantly lower relative to sample's own paired laboratory control
† Indicates results that were significantly lower relative to site control FR_UFR1
§ Indicates results that were significantly lower relative to site control GH_ER2

Reviewed by:
Date reviewed: July 28/15

Yuk Embryo-Alevin

~~7-d Chronic~~ Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: FA-URFE1
Work Order #: 15360

Start Date & Time: April 29/15 @ 1545h
Stop Date & Time: MAY 29/15 @ 1000h
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration Control	Days														
	0	1		2		3		4		5		6		7	SSD
	init.	new	old	new	old	new	old	new	old	new	old	new	old	~~final~~	new
Temperature (°C)	14.0	14.0	14.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.0	14.0	
DO (mg/L)	10.1	10	10.1	10.0	10.1	10.2	10.1	10.2	10.0	10.2	9.9	10.1	10.1	10.0	
pH	6.8	7.2	7.2	7.2	7.2	7.2	7.0	7.2	7.1	7.2	7.2	7.1	7.2	7.2	
Cond. (µS/cm)	28	~~259~~ 28		28		28		28		28		28		28	
Initials	A	SSD		EC		A		A		SSD		GL		SSD	

Concentration 100	Days														
	0	1		2		3		4		5		6		7	SSD
	init.	new	old	new	old	new	old	new	old	new	old	new	old	~~final~~	new
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	
DO (mg/L)	10.3	10.3	10.1	10.1	9.9	10.2	10.1	10.1	10.1	10.1	10.0	10.1	10.1	10.2	
pH	8.2	8.2	8.1	8.1	8.0	8.1	8.0	8.1	8.2	7.9	8.1	7.8	8.0	7.8	
Cond. (µS/cm)	260	~~258~~ 259		251		250		251		260		250		258	
Initials	A	SSD		GL		A		A		SSD		GL		SSD	

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: DO-1/3 **pH meter:** pH 1/3 **Conductivity meter:** C-1/3

	Control	100%		
Hardness*	10	148		
Alkalinity*	6	126		

* mg/L as CaCO3

Analysts: A, SSD, EC,
Reviewed by: [signature]
Date reviewed: June 23/15

Sample Description: light yellow

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: FR-UFR1
Work Order #: 15360

Start Date & Time: April 29 2015 @ 1545 h
Stop Date & Time: MAY 29/15 @ 1000 h
Test Species: O. mykiss

(% v/v) Concentration Control	Days 7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.1	9.9	9.9	10.0	10.1	9.8	10.1	9.9	10.0	9.9	10.0	9.9	10.1
pH	7.2	7.2	7.2	7.0	7.0	7.1	7.1	7.1	7.2	7.0	7.0	7.1	7.1	7.1
Cond. (µS/cm)	✓	29		29		29		29		29		29		30
Initials	SSD	SSD		YML		A		A		YML		YML		YML

Concentration 100	Days 7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.2	10.2	10.0	9.9	10.0	10.1	9.8	10.2	9.8	10.1	10.0	9.7	9.9	9.8
pH	7.9	8.0	7.9	7.9	7.9	7.9	8.1	8.0	8.1	7.9	8.0	7.9	8.0	7.9
Cond. (µS/cm)	✓	241		239		243		242		244		241		243
Initials	SSD	SSD		YML		A		A		YML		YML		YML

Concentration	Days 7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days 7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 3/2 pH meter: 3/2 Conductivity meter: 3/2

	Control	100%		
Hardness*	8	128		
Alkalinity*	6	122		

* mg/L as CaCO3

Analysts: AWD, SSD, YML
Reviewed by: [signature]
Date reviewed: June 23/15

Sample Description: light yellow

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: FR-UFR1
Work Order #: 15360

Start Date & Time: April 29, 2015 @ 1545
Stop Date & Time: MAY 29/15 @ 1000 h
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.0	9.9	10.2	10.0	10.1	9.9	10.1	9.9	10.1	10.1	10.0	10.1	10.0
pH	7.1	7.0	7.1	6.9	7.0	7.1	7.0	7.1	7.1	7.1	7.2	7.0	7.2	6.9
Cond. (µS/cm)	—	32		30		30		30		30		30		31
Initials	YYL	SSD		YYL		A		A		A		YYL		YYL

Concentration 100	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	9.8	9.9	10.0	10.0	10.1	10.1	9.8	10.2	10.1	10.2	10.2	9.9	10.1	10.1
pH	8.0	8.1	8.1	7.9	8.0	8.0	8.1	8.0	8.2	8.1	8.2	8.0	8.0	7.9
Cond. (µS/cm)	—	252		244		249		250		248		248		246
Initials	YYL	SSD		YYL		A		A		A		YYL		YYL

Concentration	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	100%		
Hardness*	8	138		
Alkalinity*	6	124		

* mg/L as CaCO3

Analysts: AWD, YYL, SSD
Reviewed by: [illegible]
Date reviewed: June 23/15

Sample Description: light yellow

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: FR_UFR1
Work Order #: 15360

Start Date & Time: April 29, 2015 @ 1545 h
Stop Date & Time: MAY 29/15 @ 1000h
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days														
	21	22		23		24		25		26		27		28	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	
DO (mg/L)	9.9	10.1	10.0	10.1	10.0	10.1	10.1	10.1	9.8	9.9	10.0	10.1	10.0	9.9	
pH	7.0	7.0	7.0	6.9	7.1	6.8	7.1	6.8	7.0	6.8	7.0	6.9	7.0	6.8	
Cond. (µS/cm)	—	30		30		29		29		28		29		30	
Initials	YML	YML		YML						YML		YML		YML	

Concentration 100	Days														
	21	22		23		24		25		26		27		28	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)	14.0	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	
DO (mg/L)	10.0	10.1	9.9	10.1	10.0	10.2	10.1	10.1	9.9	10.0	9.9	9.9	10.1	10.0	
pH	8.0	7.9	8.0	7.9	8.0	7.9	8.1	7.89	8.1	7.9	8.0	7.9	8.0	7.8	
Cond. (µS/cm)	—	249		248		248		247		245		245		244	
Initials	YML	YML		YML						YML		YML		YML	

Concentration	Days														
	21	22		23		24		25		26		27		28	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

Concentration	Days														
	21	22		23		24		25		26		27		28	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

DO meter: 2|3 pH meter: 2|3 Conductivity meter: 2|3

	Control	100%		
Hardness*	12	136		
Alkalinity*	8	122		

* mg/L as CaCO3

Analysts: AWD. YYL
Reviewed by:
Date reviewed: June 23|15

Sample Description: light yellow

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: FR-UFR1
Work Order #: 1S360

Start Date & Time: April 29 2015 @ 1545 h
Stop Date & Time: May 29 2015 @ 1000 h
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	28	29		30 final		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	\	14.0									
DO (mg/L)	10.0	10.0	10.1	\	10.1									
pH	7.0	6.8	6.9	\	6.7									
Cond. (µS/cm)	–	29		33										
Initials	YYL	YYL		YYL										

Concentration 100	Days													
	28	29		30 final		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	\	14.0									
DO (mg/L)	9.9	9.9	10.0	\	10.2									
pH	8.0	7.8	7.9	\	7.7									
Cond. (µS/cm)	–	225		238										
Initials	YYL	YYL		YYL										

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2|3 pH meter: 2|3 Conductivity meter: 2|3

	Control	100%		
Hardness*	10	134		
Alkalinity*	8	114		

* mg/L as CaCO3

Analysts: YYL
Reviewed by: [signature]
Date reviewed: June 22/15

Sample Description: clear

Comments:

Embryo-Alevin-~~Fry~~ KS Toxicity Test
Daily Mortality

Client: Teck
Sample ID: FRUFR1
Work Order #: 15360

Start Date & Time: April 29/15 @ 1545 h
Stop Date: May 29/15 @ 1000 h
Test Species: O. mykiss

Treatments % (v/v)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0	0	0	0	0	0	0	0			
	2	↓	↓	↓	↓	↓	↓	↓	0			
	3	↓	↓	↓	↓	↓	↓	↓	0			
	4	↓	↓	↓	↓	↓	↓	0	0			
100	1	↓	↓	↓	↓	↓	↓	0	0			
	2	↓	↓	↓	↓	↓	↓	1	1			
	3	↓	↓	↓	↓	↓	↓	0	0			
	4	↓	↓	↓	↓	↓	↓	0	0			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		A	SSD	A	A	SSD	SSD	SSD	WML			

Comments: _____

Reviewed by: _____ **Date reviewed:** June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: FRVFRI
Work Order #: 15360

Start Date & Time: April 29 2015 @ 1545 h
Stop Date: May 29, 2015 @ 1000 h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities 8	9	10	11	12	13	14	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0	0	0	0	0	0	0	0			
	2	↓	↓	↓	0	↓	↓	↓	0			
	3	↓	↓	↓	1	↓	↓	↓	1			
	4	↓	↓	↓	0	↓	↓	↓	0			
100	1	↓	↓	↓	0	↓	↓	↓	0			
	2	↓	↓	↓	0	↓	↓	↓	0			
	3	↓	↓	↓	1	1	↓	1	3			
	4	↓	↓	↓	0	1	↓	0	1			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	MM	A	B	MM	MM	MM	MM			

Comments:

Reviewed by: MM **Date reviewed:** June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: FR_UFR1
Work Order #: 15360

Start Date & Time: April 29 2015 @ 1545h
Stop Date: May 29, 2015 @ 1000h
Test Species: *Oncorhynchus mykiss*

Treatments (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
		15	16	17	18	19	20	21				
Control	1	0	0	0	0	0	0	0	0			
	2	↓	↓	↓	↓	↓	↓	0	0			
	3	↓	↓	↓	↓	↓	↓	0	0			
	4	↓	↓	↓	↓	↓	↓	1	1			
100	1	↓	↓	↓	↓	↓	2	0	2			
	2	↓	↓	↓	↓	↓	4	1	5			
	3	↓	↓	1	1	↓	0	0	4 dead 2			
	4	↓	↓	0	0	↓	2	0	2			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
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	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	MM	A	A	~	MM	MM	MM			

Comments: ① eyed stage (control 100%)

Reviewed by: [signature]

Date reviewed: June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: FR-VFR1
Work Order #: 15360

Start Date & Time: April 29, 2015 @ 1545 h
Stop Date: MAY 29/15 @ 1000 h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities 22	23	24	25	26	27	28	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0	00②	1	0	1	1	0	3			
	2	1	00	1		1	2		5			
	3	0①	0	0		0	3		3			
	4	0	1①	0		1	1		3			
100	1	0①	0	2		0	0		2			
	2	0①	0	4					4			
	3	0①	3	0					0			
	4	2①	2	0	↓	↓	↓	↓	4			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		MM	MM	AZ	A	MM	MM	MM	KS			

Comments: ① starting to hatch ② >50% at alevin stage (all)

Reviewed by: [signature]
Date reviewed: June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: FR_UFR1
Work Order #: 15360

Start Date & Time: April 29 2015 @1545 h
Stop Date: May 29; 2015 @ 1000 h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities 29	30	31	32	33	34	35	Total Dead Eggs/Alevins	Total Abnormal Alevins	Total Normal Alevins	Total Exposed
Control	1	0	0						0	1	26	30
	2	1	0						0	yolk Ø 3	22	30
	3	↓	0						0	0	26	30
	4	↓	1						1	yolk Ø 1	23	29
100	1	1	0						1	yolk Ø 1	22	28
	2	0	0						0	yolk Ø 3	17	30
	3	↓	0						0	0	25	30
	4	↓	0						0	yolk Ø 2	23	32
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		yolk	yolk						yolk	yolk	yolk	yolk

Comments: _____

Reviewed by: _____ **Date reviewed:** June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: FR_UFR1

Termination Date: May 29, 2015

Work Order No.: 15360

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control A	1	21.0	✓		
	2	20.0	✓		
	3	20.0	✓		
	4	20.0	✓		
	5	20.0	✓		
	6	20.0	✓		
	7	20.0	✓		
	8	20.0	✓		
	9	21.0	✓		
	10	19.0	✓		
	11	20.0	✓		
	12	19.0	✓		
	13	20.0	✓		
	14	20.0	✓		
	15	20.0	✓		
	16	20.0	✓		
	17	20.0	✓		
	18	19.5	✓		
	19	21.0	✓		
	20	20.0	✓		
	21	20.0	✓		
	22	19.0	✓		
	23	~~20.0~~ 20.0	✓		
	24	20.0	✓		
	25	21.0	✓		
	26	19.5	✓		
	27	16.0	—	✓	Deformed jaw, thin abdominal area / Scoliosis
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.74 g

Number of survivors: 27 (26 normal)

Number of deformed/have difficulty swimming: 1

Initials: YML

Reviewed by:

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: FR_UFR1

Termination Date: May 29, 2015

Work Order No.: 15360

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control B	1	19.5	✓		
	2	19.0	✓		
	3	19.0	✓		
	4	19.0	✓		
	5	19.5	✓		
	6	19.5	✓		
	7	19.0	✓		
	8	19.0	✓		
	9	18.0	✓		
	10	20.0	✓		
	11	19.5	✓		
	12	19.0	✓		
	13	19.0	✓		
	14	17.0	—	✓	Deformed jaw, missing tail.
	15	16.5	—	✓	Thin abdominal section, light color
	16	16.0	—	✓	malformed jaw, thin tail section
	17	19.0	✓		
	18	20.0	✓		
	19	20.0	✓		
	20	20.0	✓		
	21	20.0	✓		
	22	19.0	✓		
	23	16.5	✓		
	24	20.0	✓		
	25	18.0	✓		
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.429

Number of survivors: 25 (22 normal)

Number of deformed/have difficulty swimming: 3

Initials: VMC

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **FR_UFR1**

Termination Date: **May 29, 2015**

Work Order No.: 153600

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control C	1	18.5	✓		
	2	19.0	✓		
	3	18.0	✓		
	4	18.0	✓		
	5	17.5	✓		
	6	19.0	✓		
	7	18.5	✓		
	8	19.0	✓		
	9	19.0	✓		
	10	19.5	✓		
	11	18.0	✓		
	12	17.5	✓		
	13	18.5	✓		
	14	18.0	✓		
	15	19.0	✓		
	16	18.0	✓		
	17	20.5	✓		
	18	18.5	✓		
	19	20.0	✓		
	20	19.5	✓		
	21	18.0	✓		
	22	18.5	✓		
	23	18.0	✓		
	24	19.0	✓		
	25	17.5	✓		
	26	18.0	✓		
	27	YML ~~19.0~~			
	28	YML ~~17.5~~			
	29	YML ~~19.0~~			
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.28g

Number of survivors: 26 (26 normal)

Number of deformed/have difficulty swimming: 0

Initials: YML

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **FR_UFR1**

Termination Date: **May 29, 2015**

Work Order No.: 15360

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control D	1	17.0	✓		
	2	20.0	✓		
	3	19.0	✓		
	4	19.0	✓		
	5	17.5	✓		
	6	19.0	✓		
	7	19.5	✓		
	8	19.0	✓		
	9	19.5	✓		
	10	19.5	✓		
	11	19.0	✓		
	12	20.0	✓		
	13	20.0	✓		
	14	20.0	✓		
	15	19.5	✓		
	16	19.0	✓		
	17	19.0	✓		
	18	19.0	✓		
	19	18.5	✓		
	20	19.0	✓		
	21	17.0	—	✓	shortened body, missing tail.
	22	19.0	✓		
	23	17.5	✓		
	24	19.0	✓		
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.51 g

Number of survivors: 24 (23 normal)

Number of deformed/have difficulty swimming: 1

Initials: YHL

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: FR_UFR1

Termination Date: May 29, 2015

Work Order No.: 15360

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	19.5	✓		
	2	20.0	✓		
	3	20.5	✓		
	4	19.5	✓		
	5	19.5	✓		
	6	19.5	✓		
	7	19.0	✓		
	8	20.0	✓		
	9	21.0	✓		
	10	20.0	✓		
	11	21.5	✓		
	12	19.5	✓		
	13	20.0	✓		
	14	19.5	✓		
	15	20.0	✓		
	16	19.0	✓		
	17	20.5	✓		
	18	20.0	✓		
	19	21.0	✓		
	20	20.0	✓		
	21	15.0	–	✓	shortened body, deformed cranium
	22	20.0	✓		
	23	19.0	✓		
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.36 g

Number of survivors: 23 (22 normal)

Number of deformed/have difficulty swimming: 1

Initials: YML

Reviewed by:

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: FR_UFR1

Termination Date: May 29, 2015

Work Order No.: 15360

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	15.5	✓		
	2	15.5	✓		
	3	16.0	✓		
	4	18.0	✓		
	5	17.0	✓		
	6	19.0	✓		
	7	17.0	✓		
	8	17.0	✓		
	9	17.5	✓		
	10	17.0	✓		
	11	18.0	✓		
	12	17.5	✓		
	13	19.0	✓		
	14	18.0	✓		
	15	~~14~~ 16.5	–	✓	malformed yolk sac, shortened body
	16	15.5	–	✓	malformed yolk sac, curved tail section
	17	15.0	–	✓	malformed cranium and yolk sac
	18	16.5	✓		
	19	17.0	✓		
	20	17.0	✓		
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.899

Number of survivors: 20 (17 normal)

Number of deformed/have difficulty swimming: 3

Initials: YWL

Reviewed by: KW

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **FR_UFR1**

Termination Date: **May 29, 2015**

Work Order No.: 15360

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	20.0	✓		
	2	20.5	✓		
	3	19.0	✓		
	4	20.5	✓		
	5	20.5	✓		
	6	20.0	✓		
	7	20.0	✓		
	8	21.0	✓		
	9	20.5	✓		
	10	21.0	✓		
	11	19.0	✓		
	12	20.0	✓		
	13	19.0	✓		
	14	20.0	✓		
	15	20.0	✓		
	16	19.5	✓		
	17	21.5	✓		
	18	18.0	✓		
	19	20.0	✓		
	20	20.5	✓		
	21	19.0	✓		
	22	20.5	✓		
	23	20.5	✓		
	24	20.0	✓		
	25	20.0	✓		
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.50 g

Number of survivors: 25 (25 normal)

Number of deformed/have difficulty swimming: 0

Initials: YMC

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: FR_UFR1

Termination Date: May 29, 2015

Work Order No.: 15360

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	17.5	✓		
	2	20.0	✓		
	3	19.0	✓		
	4	19.0	✓		
	5	19.0	✓		
	6	19.0	✓		
	7	19.5	✓		
	8	20.0	✓		
	9	20.0	✓		
	10	19.5	✓		
	11	16.0	✓		
	12	19.0	✓		
	13	17.0	✓		
	14	20.0	✓		
	15	17.5	✓		
	16	19.5	✓		
	17	18.0	✓		
	18	18.0	✓		
	19	17.0	✓		
	20	18.0	✓		
	21	18.0	✓		
	22	16.0	✓		
	23	20.0	✓		
	24	16.0	—	✓	missing tail, shortened body, abnormal yolk sac
	25	15.5	—	✓	malformed cranium, shortened body, abnormal yolk sac
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.349

Number of survivors: 25 (23 normal)

Number of deformed/have difficulty swimming: 2

Initials: YMC

Reviewed by: [signature]

Date Reviewed: June 23/15

Client: Teck Coal (FRO)

W.O.#: 15360

Hardness and Alkalinity Datasheet

		Alkalinity					Hardness			
(Day)	Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/L CaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L CaCO_3$)	Technician
(0-7)	FR_FRCP1	Apr 29/15	50	8.7 KL 5	8.7	166	50	16.5	330	KL
(0-7)	FR_UFR1	↓	50	6.4	6.5	126	50	7.6 KL 4	148	KL
(8-14)	FR_FRCP1	May 6/15	50.0 KS	8.0	8.3	154	10 ① KS	3.3	330	KS
(8-14)	FR_UFR1	May 6/15	50.0 KS	6.2	6.3	122	50.0 KS	6.4	128	KS
(15-21)	FR_FRCP1	~~May 6 KS~~ ~~AS~~ 13/15	50	9.0	9.1	178	KS 50 10 ①	3.8	380	KS
(15-21)	FR_UFR1	May 13/15	50	6.3	6.4	124	50	6.9	138	KS
(22-28)	FR_UFR1	MAY 20/15	50	6.2	6.3	122	50	6.8	136	KS
(22-28)	FR_FRCP1	MAY 20/15	50	~~8.1~~ KS 8.5	8.6	168	50	15.7	314	KS
(29-30)	FR_FRCP1	May 27/15	50	7.3	7.5	142	50	12.0	240	KL
(29-30)	FR_UFR1	May 27/15	50	5.8	5.9	114	50	6.7	134	↓

Notes: ① Diluted to 100.0mL with D.I. water

Reviewed by: [signature]

Date Reviewed: June 23/15

Client: Teck

W.O.#: ~~various~~ 15360 YMC

Hardness and Alkalinity Datasheet

(Day)		Alkalinity						Hardness			
	Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
0-7	Dechlor	Apr 29/15	50	0.4	0.5	6		50	0.5	10	YMC
8-14	↓	May 6/15	50	0.4	0.5	6		50	0.4	8	EC
15-21		May 13/15	50	0.4	0.5	6		50	0.4	8	YMC
22-28	✓	MAY 20/15	50	0.5	0.6	8		50	0.6	12	KS
~~28~~ 29-30 YMC		MAY 27/15	50	0.5	0.6	8		50	0.5	10	KS

Notes:

Reviewed by: [signature]

Date Reviewed: June 23/15

3 c.l. – brown

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Rm
Sample ID: GH-EF-2
Work Order #: 15362

Start Date & Time: April 29/15 @ 1545 h
Stop Date & Time: MAY 29/15 @ 1200 h
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration Control	Days														
	0	1		2		3		4		5		6		7	SSD
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	new
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.0	14.0	
DO (mg/L)	10.1	10.0	10.0	10.0	10.0	10.2	10.0	10.2	10.1	10.2	10.0	10.1	10.1	10.0	
pH	6.8	7.2	7.2	7.2	7.2	7.2	7.1	7.2	7.1	7.2	7.1	7.1	7.2	7.2	
Cond. (µS/cm)	28	28		28		28		28		28		28		28	
Initials	A	SSD		EL		A		A		SSD		EL		SSD	

Concentration 100	Days														
	0	1		2		3		4		5		6		7	SSD
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	new
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	
DO (mg/L)	10.3	9.6	10.1	10.1	10.0	10.2	10.0	10.1	10.0	10.2	10.1	10.1	10.1	10.3	
pH	8.2	8.1	8.2	8.1	8.0	8.2	8.1	8.2	8.1	7.9	8.1	7.9	8.2	8.0	
Cond. (µS/cm)	319	322		322		322		321		322		322		319	
Initials	A	SSD		EL		A		A		SSD		EL		SSD	

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: DO-1/3 **pH meter:** pH 1/3 **Conductivity meter:** C-1/3

	Control	100%		
Hardness*	10	1828		
Alkalinity*	6	162		

* mg/L as CaCO3

Analysts: AS, EC, SSD

Reviewed by: [signature]
Date reviewed: June 23/15

Sample Description: light yellowish brown

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: GH - ER2
Work Order #: 15362

Start Date & Time: April 29 2015 @ 1545h
Stop Date & Time: MAY 29/15 @ 1200h
Test Species: O. mykiss

(% v/v) Concentration Control	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.1	10.0	9.9	10.2	10.1	9.9	10.1	9.9	10.0	9.9	10.0	9.9	10.1
pH	7.1	7.2	7.2	7.0	7.1	7.1	7.0	7.1	7.2	7.0	7.1	7.0	7.0	7.1
Cond. (µS/cm)	—	29		29		29		29		29		29		30
Initials	SSD	SSD		YML		A		A		YML		YML		YML

Concentration 100	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.1	9.9	9.8	10.1	10.2	9.8	10.2	9.9	10.1	10.0	9.8	10.0	9.8
pH	8.0	8.0	8.0	7.9	8.0	8.0	8.1	8.0	8.2	8.0	8.2	7.9	8.1	8.0
Cond. (µS/cm)	—	311		309		314		315		319		316		314
Initials	SSD	SSD		YML		A		A		YML		YML		YML

Concentration	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 3/2 pH meter: 3/2 Conductivity meter: 3/2

	Control	100%		
Hardness*	8	160		
Alkalinity*	6	152		

* mg/L as CaCO3

Analysts: SSD, YML, AWD
Reviewed by: [signature]
Date reviewed: June 23/15

Sample Description: light yellowish-brown

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: GH_ER2
Work Order #: 15362

Start Date & Time: April 29, 2015 @ 1545
Stop Date & Time: May 29/15 @ 1200h
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	9.9	10.0	9.9	10.2	10.0	10.1	9.8	10.1	9.9	10.1	10.1	10.0	10.1	10.0
pH	7.1	7.0	7.1	6.9	7.0	7.1	7.0	7.1	7.0	7.1	7.2	7.0	7.1	6.9
Cond. (µS/cm)	—	32		30		30		30		30		30		31
Initials	YML	SSD		YML		A		A		A		YML		YML

Concentration 100	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.0	9.9	10.1	10.0	10.0	9.9	10.1	9.8	10.1	10.1	10.0	10.1	9.8
pH	8.0	8.1	8.1	8.0	8.0	8.0	8.1	8.0	8.1	8.1	8.2	8.0	8.2	8.0
Cond. (µS/cm)	—	309		310		310		310		310		311		309
Initials	YML	SSD		YML		A		A		A		YML		YML

Concentration	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	100%		
Hardness*	8	162		
Alkalinity*	6	154		

* mg/L as CaCO3

Analysts: YML, SSD, AWD
Reviewed by:
Date reviewed: June 2/15

Sample Description: light yellowish-brown

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: GH-ER2
Work Order #: 15362

Start Date & Time: April 29, 2015 @ 1545h
Stop Date & Time: MAY 29/15 @ 1200h
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days														
	21	22		23		24		25		26		27		28	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	
DO (mg/L)	10.0	10.1	9.9	10.1	10.0	10.1	10.0	10.1	9.7	9.9	9.8	10.1	10.0	9.9	
pH	7.0	7.0	7.0	6.9	7.0	6.8	7.0	6.8	7.0	6.8	7.0	6.9	7.0	6.8	
Cond. (µS/cm)	—	30		30		29		29		29		29		30	
Initials	YWL	YWL		YWL		A		A		YWL		YWL		YWL	

Concentration 100	Days														
	21	22		23		24		25		26		27		28	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)	14.0	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	
DO (mg/L)	10.1	10.0	10.0	10.1	10.0	10.1	10.1	10.2	9.8	10.0	9.9	10.0	10.1	9.9	
pH	8.1	7.9	8.1	7.8	8.0	7.9	8.0	7.9	8.0	7.9	8.1	7.9	8.0	7.8	
Cond. (µS/cm)	—	306		305		303		303		302		301		300	
Initials	YWL	YWL		YWL		A		A		YWL		YWL		YWL	

Concentration	Days														
	21	22		23		24		25		26		27		28	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

Concentration	Days														
	21	22		23		24		25		26		27		28	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

DO meter: 2|3 pH meter: 2|3 Conductivity meter: 2|3

	Control	100%		
Hardness*	12	162		
Alkalinity*	8	154		

* mg/L as CaCO3

Analysts: YWL, AWD
Reviewed by: [signature]
Date reviewed: June 23/15

Sample Description: light yellowish-brown

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: GH-ER2
Work Order #: 15362

Start Date & Time: April 29 2015 @ 1545h
Stop Date & Time: May 29 2015 @ 1200h
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	28	29		30 final		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	/	14.0									
DO (mg/L)	9.9	10.0	10.0	/	10.1									
pH	7.0	6.8	6.9	/	6.8									
Cond. (µS/cm)	—	29		K238 31										
Initials	YYL	YYL		YYL										

Concentration 100	Days													
	28	29		30 final		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	/	14.0									
DO (mg/L)	9.8	10.0	10.0	/	10.1									
pH	7.9	7.8	8.0	/	8.0									
Cond. (µS/cm)	—	275		YYL ~~290~~ 290										
Initials	YYL	YYL		YYL										

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 213 pH meter: 213 Conductivity meter: 213

	Control	100%		
Hardness*	10	168		/
Alkalinity*	8	138	/	

* mg/L as CaCO3

Analysts: YYL
Reviewed by: [signature]
Date reviewed: June 23/15

Sample Description: ~~Clear~~ YYL light yellow

Comments:

Embryo-Alevin-~~Fry~~ 15 Toxicity Test
Daily Mortality

Client: Teck
Sample ID: GH-ERZ-(301)
Work Order #: 15362

Start Date & Time: April 29/15 @ 1545h
Stop Date: MAY 29/15 @ 1200h
Test Species: O. mykiss

Treatments (%)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	0	0	0	0	0			
	2	↓	↓	↓	↓	↓	0	↓	0			
	3						1		1			
	4						0	↓	0			
100	1						0	1	1			
	2						1	0	1			
	3						0	1	1			
	4	↓	↓	↓	↓	↓	0	0	0			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		A	SSD	A	A	SSD	SSD	SSD	KS			

Comments: _____

Reviewed by: _____ **Date reviewed:** June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: GH ER2
Work Order #: 15362

Start Date & Time: April 29 2015 @ 1545 h
Stop Date: May 29/15 @ 1200 h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities 8	9	10	11	12	13	14	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0	0	0	0	0	0	0	0			
	2	0	↓	0	↓	↓	↓	↓	0			
	3	0		1					1			
	4	1		0					1			
100	1	0		0		↓	↓		0			
	2	0		0		1	1		2			
	3	0	1	1	↓	0	0	↓	2			
	4	0	1	0		0	1		2			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	MW	A	n	MW	MW	MW	KS			

Comments:

Reviewed by: [signature] **Date reviewed:** June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: GH_ER2
Work Order #: 15362

Start Date & Time: April 29 2015 @ 1545h
Stop Date: May 29/15 @ 1200h
Test Species: *Oncorhynchus mykiss*

Treatments (% v/v)	Rep	Day of Test - No. of Mortalities 0 15	16	17	18	19	20	21	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0	0	0	0	0	0	0	0			
	2	↓	↓	↓	↓	↓	↓	↓	0			
	3	↓	↓	↓	↓	↓	↓	↓	0			
	4	↓	↓	↓	↓	↓	↓	↓	0			
100	1	↓	↓	↓	1	1	↓	↓	1			
	2	↓	↓	1	1	0	1	↓	2			
	3	1	↓	1	2	1	0	↓	6			
	4	0	↓	0	0	0	5	6②	11			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
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	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	WW	A	M	M	WW	WW	KS			

Comments: ① eyed ~~stage~~ yolk stage (control +100%) ② fungus on dead embryos

Reviewed by: KW **Date reviewed:** June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: GH-ER2
Work Order #: 15362

Start Date & Time: April 29, 2015 @ 1545h
Stop Date: MAY 29/15 @ 1200h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities 22	23	24	25	26	27	28	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0①	0	0	0	0	~~0~~1	0	1			
	2	1①	1	0	0	2	0		2			
	3	1①		0	0	2			2			
	4	0①	↓	0	0	0		↓	0			
100	1	↓	10①	2	~~1~~	1	~~1~~	2~~1~~	8			
	2	20	0	0	0	0	~~1~~0	0~~1~~	2			
	3	40	3	2	1	1	↓	↓	11			
	4	0①	1	2	0	2	↓	↓	5			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		MML	MML	AM	AM	MML	MML	MML	KG			

Comments: ①starting to hatch ②>50% at alevin-stage (gll)

Reviewed by: [signature]
Date reviewed: June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: GH_ER2
Work Order #: 15362

Start Date & Time: April 29, 2015 @ 1545h
Stop Date: May 29 2015 @ 1200h
Test Species: *Oncorhynchus mykiss*

Concentration (%v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/Alevins	Total Abnormal Alevins	Total Normal Alevins	Total Exposed
		29	30	31	32	33	34	35				
Control	1	20 YMC	0						20 YMC	0	25	28
	2	1 Ø YMC							1 Ø YMC	0	27	30
	3	1 Ø YMC							1 Ø YMC	1	24	30
	4	3	↓						3	0	28	32
100	1	0	1						1	0	19	30
	2	↓	0						0	0	22	29
	3		0						0	0	10	30
	4	↓	0						0	0	13	31
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
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	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		YMC	YMC						YMC	YMC	YMC	YMC

Comments:

Reviewed by: [signature]

Date reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: GH_ER2

Termination Date: May 29, 2015

Work Order No.: 153602

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control A	1	17.0	✓		
	2	15.5	✓		
	3	17.0	✓		
	4	18.0	✓		
	5	16.5	✓		
	6	17.0	✓		
	7	17.5	✓		
	8	18.0	✓		
	9	15.5	✓		
	10	18.0	✓		
	11	16.5	✓		
	12	18.5	✓		
	13	18.0	✓		
	14	18.0	✓		
	15	17.0	✓		
	16	18.0	✓		
	17	17.5	✓		
	18	19.5	✓		
	19	17.0	✓		
	20	16.5	✓		
	21	18.5	✓		
	22	17.5	✓		
	23	17.5	✓		
	24	18.0	✓		
	25	17.5	✓		
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.19 g

Number of survivors: 25 (25 normal)

Number of deformed/have difficulty swimming: 0

Initials: YML

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: GH_ER2

Termination Date: **May 29, 2015**

Work Order No.: 15362

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control B	1	17.0	✓		
	2	16.0	✓		
	3	16.0	✓		
	4	18.0	✓		
	5	18.0	✓		
	6	18.0	✓		
	7	18.0	✓		
	8	17.0	✓		
	9	17.0	✓		
	10	17.0	✓		
	11	17.0	✓		
	12	19.0	✓		
	13	17.0	✓		
	14	18.0	✓		
	15	17.5	✓		
	16	17.0	✓		
	17	17.5	✓		
	18	18.0	✓		
	19	19.0	✓		
	20	16.0	✓		
	21	17.0	✓		
	22	16.0	✓		
	23	17.0	✓		
	24	17.0	✓		
	25	18.0	✓		
	26	17.0	✓		
	27	16.5	✓		
	28	-		✓ ~~autofeeder egg~~ YW	
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.31 g

Number of survivors: 27 (27 normal)

Number of deformed/have difficulty swimming: 0

Initials: YW

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: GH_ER2

Termination Date: May 29, 2015

Work Order No.: 15362

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control C	1	17.5	✓		
	2	18.0	✓		
	3	18.0	✓		
	4	17.0	✓		
	5	18.0	✓		
	6	19.0	✓		
	7	19.0	✓		
	8	19.0	✓		
	9	19.0	✓		
	10	18.0	✓		
	11	19.0	✓		
	12	17.0	✓		
	13	19.0	✓		
	14	17.5	✓		
	15	18.5	✓		
	16	18.0	✓		
	17	18.5	✓		
	18	19.5	✓		
	19	18.0	✓		
	20	17.0	✓		
	21	18.0	✓		
	22	17.0	✓		
	23	16.0	-	✓	craniofacial deformity, yolksac edema
	24	16.5	✓		
	25	14.5	✓		
	26			✓ ~~dead but untouched~~ YM	
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.19g

Number of survivors: ~~25~~ 24 (24 normal)

Number of deformed/have difficulty swimming: 1

Initials: YM

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: GH_ER2

Termination Date: May 29, 2015

Work Order No.: 15362

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control D	1	18.0	✓		
	2	18.0	✓		
	3	18.5	✓		
	4	18.0	✓		
	5	18.0	✓		
	6	17.5	✓		
	7	19.0	✓		
	8	18.0	✓		
	9	18.5	✓		
	10	18.0	✓		
	11	15.0	✓		
	12	16.0	✓		
	13	17.0	✓		
	14	18.5	✓		
	15	18.0	✓		
	16	19.0	✓		
	17	19.5	✓		
	18	18.0	✓		
	19	18.0	✓		
	20	16.5	✓		
	21	18.0	✓		
	22	18.0	✓		
	23	18.0	✓		
	24	17.0	✓		
	25	20.0	✓		
	26	18.0	✓		
	27	18.0	✓		
	28	18.0	✓		
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.38g

Number of survivors: 28 (28 normal)

Number of deformed/have difficulty swimming: 0

Initials: YML

Reviewed by: GW

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: GH_ER2

Termination Date: May 29, 2015

Work Order No.: 15362

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	20.0	✓		
	2	19.5	✓		
	3	17.0	✓		
	4	19.0	✓		
	5	18.5	✓		
	6	18.0	✓		
	7	18.0	✓		
	8	17.0	✓		
	9	16.5	✓		
	10	18.5	✓		
	11	18.0	✓		
	12	18.0	✓		
	13	17.5	✓		
	14	19.0	✓		
	15	16.5	✓		
	16	19.0	✓		
	17	18.5	✓		
	18	17.0	✓		
	19	18.0	✓		
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.78 g

Number of survivors: 19 (19 normal)

Number of deformed/have difficulty swimming: 0

Initials: YW

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: GH_ER2

Termination Date: May 29, 2015

Work Order No.: 15362

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	16.0	✓		
	2	18.0	✓		
	3	18.0	✓		
	4	17.0	✓		
	5	17.0	✓		
	6	16.0	✓		
	7	17.0	✓		
	8	20.0	✓		
	9	17.5	✓		
	10	19.0	✓		
	11	18.0	✓		
	12	16.0	✓		
	13	17.5	✓		
	14	18.0	✓		
	15	16.0	✓		
	16	17.5	✓		
	17	17.0	✓		
	18	15.5	✓		
	19	18.5	✓		
	20	17.0	✓		
	21	17.0	✓		
	22	16.0	✓		
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.08g

Number of survivors: 22 (22 normal)

Number of deformed/have difficulty swimming: 0

Initials: YWL

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: GH_ER2

Termination Date: May 29, 2015

Work Order No.: 15362

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	19.0	✓		
	2	18.5	✓		
	3	18.0	✓		
	4	18.5	✓		
	5	19.0	✓		
	6	19.5	✓		
	7	19.0	✓		
	8	18.5	✓		
	9	19.0	✓		
	10	18.5	✓		
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 0.93 g

Number of survivors: 10 (10 normal)

Number of deformed/have difficulty swimming: 0

Initials: YHL

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **GH_ER2**

Termination Date: **May 29, 2015**

Work Order No.: 15362

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	16.0	✓		
	2	17.0	✓		
	3	17.0	✓		
	4	17.0	✓		
	5	17.5	✓		
	6	17.5	✓		
	7	16.0	✓		
	8	18.0	✓		
	9	18.5	✓		
	10	19.0	✓		
	11	17.0	✓		
	12	19.0	✓		
	13	19.5	✓		
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): YHL 13 1.09g

Number of survivors: 13 (13 normal)

Number of deformed/have difficulty swimming: 0

Initials: YHL

Reviewed by: [signature]

Date Reviewed: June 23/15

Client: Teck Coal (GH0)

W.O.#: 15362

Hardness and Alkalinity Datasheet

		Alkalinity					Hardness			
(CD41)	Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/L CaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L CaCO_3$)	Technician
(0-7)	GH_ER2	Apr 29/15	50	8.3	8.5	162	50	9.4	188	KL
(8-14)	GH_ER2	May 6/15	50 KS	7.8	8.0	152	50 KS	8.0	160	KS
(15-21)	GH_ER2	May 13/15	50	7.9	8.1	154	50	8.1	162	KS
(22-28)	GH-ER2	MAY 20/15	50	7.9	8.0	154	50	8.1	162	KS
(29-30)	GH_ER2	May 27/15	50	7.0	7.4	138	50	8.4	168	KL

Notes:

Reviewed by: [signature]

Date Reviewed: June 23/15

Client: Teck

W.O.#: ~~various~~ 15362 (INC)

Hardness and Alkalinity Datasheet

Day	Sample ID	Alkalinity: Sample Date	Alkalinity: Sample Volume (mL)	Alkalinity: (mL) 0.02N HCL/H_2SO_4 used to pH 4.5	Alkalinity: (mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Alkalinity: Total Alkalinity ($mg/L CaCO_3$)	Hardness: Sample Volume (mL)	Hardness: Volume of 0.01M EDTA Used (mL)	Hardness: Total Hardness ($mg/L CaCO_3$)	Technician
0-7	Dechlor	Apr 29/15	50	0.4	0.5	6	50	0.5	10	YMC
8-14	↓	May 6/15	50	0.4	0.5	6	50	0.4	8	EC
15-21		May 13/15	50	0.4	0.5	6	50	0.4	8	YMC
22-28		MAY 20/15	50	0.5	0.6	8	50	0.6	12	KS
~~28~~ 29-30 INC	✓	MAY 27/15	50	0.5	0.6	8	50	0.5	10	KS

Notes:

Reviewed by: [signature]

Date Reviewed: June 23/15

~~7~~ 4-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: FC-FRCP1
Work Order #: 15360

Start Date & Time: April 29/15 @ 1545 h
Stop Date & Time: MAY 29/15 @ 1030 h
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration Control	Days														
	0	1		2		3		4		5		6		7	SSD new
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.0	14.0	
DO (mg/L)	10.1	10.0	10.0	10.0	10.0	10.2	10.1	10.2	10.0	10.2	10.1	10.1	10.1	10.0	
pH	6.8	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.1	7.1	7.2	7.2	
Cond. (µS/cm)	28	28		28		28		28		28		28		28	
Initials	A	SSD		EC		A		A		SSD		CL		SSD	

Concentration 100	Days														
	0	1		2		3		4		5		6		7	SSD new
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	
DO (mg/L)	10.3	~~8~~ 9.6	10.1	10.1	9.9	10.2	10.0	10.2	10.1	10.2	10.1	10.1	10.1	10.2	
pH	7.94	8.2	8.0	8.1	7.9	8.1	8.1	8.0	8.1	8.0	8.2	7.9	8.3	7.9	
Cond. (µS/cm)	625	626		624		625		627		628.8		627		578	
Initials	A	SSD		EC		A		A		SSD		CL		SSD	

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: DO-1/3 **pH meter:** pH 1/3 **Conductivity meter:** C-1/3

	Control	100%		
Hardness*	8	330		
Alkalinity*	~~15~~ 10	166		

* mg/L as CaCO3

Analysts: A = ~~YX~~ XS SSD, EC

Reviewed by: [signature]
Date reviewed: June 23/15

Sample Description: Clear

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: FR-FRCP1
Work Order #: 15360

Start Date & Time: April 29 2015 @ 1545
Stop Date & Time: MAY 29/15 @ 1030
Test Species: O. mykiss

(% v/v) Concentration Control	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.1	10.0	9.9	10.1	10.1	9.9	10.1	9.9	10.0	10.0	10.0	9.9	10.1
pH	7.2	7.2	7.1	7.0	7.1	7.1	7.0	7.1	7.1	7.0	7.1	7.1	7.0	7.1
Cond. (µS/cm)	/	29		29		29		29		29		29		30
Initials	SSD	SSD		YML		A		A		YML		YML		YML

Concentration 100	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.0	9.9	10.1	9.9	10.1	9.8	10.1	9.9	10.0	9.8	9.6	10.0	9.9
pH	8.0	8.0	7.9	7.9	7.9	7.9	8.1	7.9	8.1	8.0	8.0	7.9	8.1	8.0
Cond. (µS/cm)	/	572		568		575		574		569		578		574
Initials	SSD	SSD		YML		A		A		YML		YML		YML

Concentration	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 3/2 **pH meter:** 3/2 **Conductivity meter:** 3/2

	Control	100%		
Hardness*	8	330		
Alkalinity*	6	154		

* mg/L as CaCO3

Analysts: SSD, YYL, AWD

Reviewed by:
Date reviewed: June 23/15

Sample Description: Clear

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: ER_FRCP1
Work Order #: 15360

Start Date & Time: April 29, 2015 @ 1545
Stop Date & Time: MAY 29/15 @ 1030
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.2	10.0	10.0	10.2	10.0	10.1	9.9	10.1	9.9	10.1	10.1	10.0	10.1	10.0
pH	7.1	7.0	7.1	6.9	7.0	7.1	7.0	7.1	7.0	7.1	7.1	7.0	7.1	6.9
Cond. (µS/cm)	—	32		30		30		30		30		30		31
Initials	YML	SSD		YML		A		A		A		YML		YML

Concentration 100	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	9.8	10.0	10.0	9.9	10.2	9.9	10.1	9.8	10.1	10.2	10.0	10.2	9.9
pH	8.0	8.2	8.1	8.0	8.0	8.1	8.2	8.1	8.2	8.1	8.2	8.1	8.1	8.0
Cond. (µS/cm)	—	641		648		648		645		650		651		647
Initials	YML	SSD		YML		A		A		A		YML		YML

Concentration	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	100%		
Hardness*	8	380		
Alkalinity*	6	178		

* mg/L as CaCO3

Analysts: YML, AWD, SSD
Reviewed by: [illegible]
Date reviewed: June 23/15

Sample Description: Clear

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: FR-FRCP1
Work Order #: 15360

Start Date & Time: April 29, 2015 @ 1545
Stop Date & Time: MAY 29/15 @ 1030
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.1	9.9	10.1	9.9	10.1	10.1	10.1	9.9	9.9	9.8	10.1	10.2	9.9
pH	7.0	7.0	7.0	6.9	7.1	6.8	7.1	6.8	7.0	6.8	7.0	6.9	7.0	6.8
Cond. (µS/cm)	—	30		30		29		29		29		29		30
Initials	YML	YML		YML		A		A		YML		YML		YML

Concentration 100	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	9.9	10.1	9.9	10.2	10.0	10.2	10.1	10.2	9.8	9.8	10.0	9.9	10.1	9.8
pH	8.0	8.0	8.1	7.9	8.1	7.9	8.0	8.0	8.1	7.9	8.0	8.0	8.1	7.9
Cond. (µS/cm)	—	586		579		574		574		572		573		570
Initials	YML	YML		YML		A		A		YML		YML		YML

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 213 pH meter: 213 Conductivity meter: 213

	Control	100%		
Hardness*	12	314		
Alkalinity*	8	168		

* mg/L as CaCO3

Analysts: YYL, AWD
Reviewed by:
Date reviewed: June 23/15

Sample Description: Clear

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: FR-FRCP1
Work Order #: 15360

Start Date & Time: April 29 2015 @ 1545
Stop Date & Time: May 29 2015 @ 1030
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	28	29		30 final		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0		14.0									
DO (mg/L)	10.0	10.0	9.9		10.0									
pH	7.0	6.8	6.9		6.8									
Cond. (µS/cm)	—	29		33										
Initials	YNL	YNL		YNL										

Concentration 100	Days													
	28	29		30 final		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0		14.0									
DO (mg/L)	9.9	9.7	9.9		9.9									
pH	8.0	7.8	8.0		7.9									
Cond. (µS/cm)	—	406		526										
Initials	YNL	YNL		YNL										

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2|3 pH meter: 2|3 Conductivity meter: 2|3

	Control	100%		
Hardness*	10	240		
Alkalinity*	8	142		

* mg/L as CaCO3

Analysts: YNL
Reviewed by:
Date reviewed: June 23|15

Sample Description: clear

Comments:

KS

Embryo-Alevin-~~Fry~~ Toxicity Test
Daily Mortality

Client: Teck
Sample ID: FRFR (P1
Work Order #: 15360

Start Date & Time: April 29/15 @ 1545h
Stop Date: May 29/15 @ 1030h
Test Species: O mykiss

Treatments (%)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0	0	0	0	0	0	0	0			
	2						1	0	1			
	3						0	0	0			
	4						0	0	0			
100	1						1	1	2			
	2						0	0	0			
	3						0	0	0			
	4						0	0	0			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		A	SSD	A	A	SSD	SSD	SSD	KS			

Comments: _____

Reviewed by: _____ **Date reviewed:** June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: FRFR CP1
Work Order #: 15360

Start Date & Time: April 29 2015 @ 1545 h
Stop Date: MAY 29/15 @ 1030 h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities 8	9	10	11	12	13	14	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0	0	0	2	0	0	0	2			
	2	1	1	1	1	0	1	1	2			
	3	↓	↓	↓	0	0	0	↓	0			
	4	↓	↓	↓	0	0	0	↓	0			
100	1	2	↓	↓	2	3	0	1	8			
	2	1	↓	↓	0	0	1	0	2			
	3	0	↓	↓	0	0	0	0	0			
	4	0	↓	↓	0	0	1	0	1			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	~~~	A	A	~~~	~~~	~~~	KS			

Comments: _____

Reviewed by: _____ **Date reviewed:** June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: FIR-FRCP1
Work Order #: 15360

Start Date & Time: April 29 2015 @ 1545h
Stop Date: May 29/15 @ 1030h
Test Species: *Oncorhynchus mykiss*

Treatments (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
		15 ①	16	17	18	19	20	21				
Control	1	0	0	0	0	0	0	0	0			
	2	↓	↓	↓	↓	↓	↓	0	0			
	3	↓	↓	↓	↓	↓	↓	0	0			
	4	↓	↓	↓	↓	↓	↓	0	0			
100	1	↓	1	↓	1	↓	↓	1	3			
	2	↓	0	↓	0	↓	↓	~~1~~ 2	1			
	3	↓	0	↓	0	↓	↓	1	1			
	4	↓	0	1	0	↓	2	1	4			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	MM	m	m	m	MM	MM	KS			

Comments: ① eyed stage (cont +100's) ② starting to hatch

Reviewed by: [signature]
Date reviewed: June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: FR-FRCP1
Work Order #: 15360

Start Date & Time: April 29, 2015 @ 1545h
Stop Date: May 29/15 @ 1030h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities 22	23	24	25	26	27	28	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0	00	0	0	0	0	0	0			
	2	00	1	1					2			
	3	0	1	2					3			
	4	10	0	2					3			
100	1	10	1	0		↓			2			
	2	0	00	0		1			1			
	3	20	1	1		1			5			
	4	10	0	0	↓	0	↓	↓	1			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		MM	MM	[illegible]	[illegible]	MM	MM	MM	KS			

Comments: ① starting to hatch ② >50% hatched at alevin stage (all)

Reviewed by: [signature]
Date reviewed: June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: FR-FRCP1
Work Order #: 153600

Start Date & Time: April 29, 2015 @ 1545h
Stop Date: May 29, 2015 @ 1030h
Test Species: *Oncorhynchus mykiss*

Concentration (%-v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/Alevins	Total Abnormal Alevins	Total Normal Alevins	Total Exposed
		29	30	31	32	33	34	35				
Control	1	0	0						0	0	28	30
	2								0	1	24	30
	3								0	2	25	30
	4								0	0	27	30
100	1								0	1	15	31
	2	1							1	0	25	30
	3	0							0	1	23	30
	4	0							0	0	25	31
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		NW	NW						NW	NW	NW	NW

Comments:

Reviewed by: [signature]
Date reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: FR_FRCP1

Termination Date: May 29, 2015

Work Order No.: 153160

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Contrd A	1	16.0	✓		
	2	18.0	✓		
	3	19.5	✓		
	4	19.0	✓		
	5	18.0	✓		
	6	20.0	✓		
	7	17.5	✓		
	8	18.5	✓		
	9	18.0	✓		
	10	18.0	✓		
	11	18.0	✓		
	12	21.0	✓		
	13	19.0	✓		
	14	17.5	✓		
	15	17.0	✓		
	16	17.0	✓		
	17	18.0	✓		
	18	19.0	✓		
	19	18.0	✓		
	20	19.0	✓		
	21	19.5	✓		
	22	18.5	✓		
	23	19.0	✓		
	24	19.0	✓		
	25	18.5	✓		
	26	19.0	✓		
	27	18.0	✓		
	28	19.5	✓		
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.619

Number of survivors: 28 (28 normal)

Number of deformed/have difficulty swimming: 0

Initials: YML

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck
Start Date: April 29, 2015
Sample ID: FR_FRCP1
Termination Date: May 29, 2015
Work Order No.: 15360

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control B	1	19.0	✓		
	2	20.0	✓		
	3	18.0	✓		
	4	19.0	✓		
	5	19.0	✓		
	6	20.5	✓		
	7	20.0	✓		
	8	19.0	✓		
	9	20.0	✓		
	10	20.0	✓		
	11	20.0	✓		
	12	19.5	✓		
	13	19.0	✓		
	14	17.5	✓		
	15	20.5	✓		
	16	19.0	✓		
	17	19.0	✓		
	18	20.0	✓		
	19	19.0	✓		
	20	18.5	✓		
	21	19.0	✓		
	22	18.0	✓		
	23	20.0	✓		
	24	18.5	✓		
	25	14.5	—	✓	2 heads, yolksac edema, bent spine at tail
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.49g
Number of survivors: 25 (24 normal)
Number of deformed/have difficulty swimming: 1
Initials: YMC
Reviewed by: KW
Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: FR_FRCP1

Termination Date: May 29, 2015

Work Order No.: 15360

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control C	1	17.0	✓		
	2	19.0	✓		
	3	19.0	✓		
	4	19.0	✓		
	5	20.0	✓		
	6	18.0	✓		
	7	20.0	✓		
	8	18.0	✓		
	9	18.0	✓		
	10	18.5	✓		
	11	20.0	✓		
	12	18.0	✓		
	13	19.0	✓		
	14	18.5	✓		
	15	19.5	✓		
	16	18.0	✓		
	17	19.0	✓		
	18	19.5	✓		
	19	18.0	✓		
	20	21.0	✓		
	21	18.5	✓		
	22	18.5	✓		
	23	17.0	✓		
	24	19.0	✓		
	25	20.0	✓		
	26	15.0	–	✓	Shortened body, lack of pigments, abnormal yolk sac
	27	19.0	–	✓	Deformed cranium, abnormal yolk sac
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.58 g

Number of survivors: 27 (25 normal)

Number of deformed/have difficulty swimming: 2

Initials: YMV

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: FR_FRCP1

Termination Date: May 29, 2015

Work Order No.: 15360

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control D	1	19.5	✓		
	2	18.5	✓		
	3	21.0	✓		
	4	19.0	✓		
	5	19.5	✓		
	6	20.5	✓		
	7	20.0	✓		
	8	19.0	✓		
	9	18.5	✓		
	10	19.0	✓		
	11	19.5	✓		
	12	20.0	✓		
	13	20.0	✓		
	14	20.0	✓		
	15	19.0	✓		
	16	20.0	✓		
	17	20.0	✓		
	18	21.0	✓		
	19	19.0	✓		
	20	20.0	✓		
	21	19.5	✓		
	22	21.0	✓		
	23	20.0	✓		
	24	19.0	✓		
	25	20.5	✓		
	26	20.0	✓		
	27	19.0	✓		
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.66 g

Number of survivors: 27 (27 normal)

Number of deformed/have difficulty swimming: 0

Initials: YMC

Reviewed by:

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: FR_FRCP1

Termination Date: May 29, 2015

Work Order No.: 15360

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	20.0	✓		
	2	20.5	✓		
	3	20.5	✓		
	4	20.0	✓		
	5	20.0	✓		
	6	20.5	✓		
	7	20.5	✓		
	8	21.0	✓		
	9	21.0	✓		
	10	20.5	✓		
	11	19.0	✓		
	12	21.5	✓		
	13	21.0	✓		
	14	19.0	✓		
	15	20.0	✓		
	16	15.0	←	✓	malformed yolk sac, shortened body, deformed cranium
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.789

Number of survivors: 16 (15 normal)

Number of deformed/have difficulty swimming: 1

Initials: YMM

Reviewed by:

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: FR_FRCP1

Termination Date: May 29, 2015

Work Order No.: 15360

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	20.5	✓		
	2	22.0	✓		
	3	20.0	✓		
	4	18.5	✓		
	5	21.0	✓		
	6	20.0	✓		
	7	21.0	✓		
	8	20.0	✓		
	9	21.0	✓		
	10	20.0	✓		
	11	21.0	✓		
	12	18.5	✓		
	13	20.0	✓		
	14	20.0	✓		
	15	20.0	✓		
	16	20.0	✓		
	17	21.0	✓		
	18	21.0	✓		
	19	19.0	✓		
	20	20.0	✓		
	21	20.0	✓		
	22	17.5	✓		
	23	20.0	✓		
	24	20.0	✓		
	25	20.0	✓		
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.659

Number of survivors: 25 (25 normal)

Number of deformed/have difficulty swimming: 0

Initials: YNL

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: FR_FRCP1

Termination Date: May 29, 2015

Work Order No.: 153600

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	20.0	✓		
	2	21.0	✓		
	3	21.0	✓		
	4	19.5	✓		
	5	21.0	✓		
	6	20.0	✓		
	7	20.0	✓		
	8	21.0	✓		
	9	19.0	✓		
	10	20.0	✓		
	11	20.0	✓		
	12	21.0	✓		
	13	21.0	✓		
	14	20.0	✓		
	15	20.0	✓		
	16	16.5	✓		
	17	20.0	✓		
	18	20.0	✓		
	19	21.0	✓		
	20	21.5	✓		
	21	18.0	✓		
	22	19.5	✓		
	23	21.0	✓		
	24	16.0	—	✓	lack of pigments, malformed yolksac, shortened body
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.53 g

Number of survivors: 24 (23 normal)

Number of deformed/have difficulty swimming: 1

Initials: YML

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: FR_FRCP1

Termination Date: May 29, 2015

Work Order No.: 15360

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	19.5	✓		
	2	19.0	✓		
	3	21.0	✓		
	4	21.0	✓		
	5	20.0	✓		
	6	19.5	✓		
	7	19.0	✓		
	8	21.0	✓		
	9	20.5	✓		
	10	21.0	✓		
	11	19.0	✓		
	12	19.0	✓		
	13	20.5	✓		
	14	21.5	✓		
	15	20.0	✓		
	16	19.5	✓		
	17	20.0	✓		
	18	20.0	✓		
	19	17.5	✓		
	20	19.5	✓		
	21	20.5	✓		
	22	20.5	✓		
	23	21.0	✓		
	24	20.5	✓		
	25	19.0	✓		
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.55 g

Number of survivors: 25 (25 normal)

Number of deformed/have difficulty swimming: 0

Initials: MW

Reviewed by: [signature]

Date Reviewed: June 23/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: GH-ERI
Work Order #: 15361

Start Date & Time: April 29/15 @ 1545h
Stop Date & Time: MAY 29/15 / @ 1100h
Test Species: *Oncorhynchus mykiss*

0/0 (v/v) Concentration Control	Days														
	0	1		2		3		4		5		6		7	SSD new
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.0	14.0	
DO (mg/L)	10.1	10	10.1	10.0	10.1	10.2	10.0	10.2	10.1	10.2	10.0	10.1	10.1	10.0	
pH	6.8	7.2	7.2	7.2	~~8~~ 7.2	7.2	7.1	7.2	7.1	7.2	7.1	7.1	7.2	7.2	
Cond. (µS/cm)	28	28		28		28		28		28		28		28	
Initials	A	SSD		EL		A		A		SSD		EL		SSD	

Concentration 100	Days														
	0	1		2		3		4		5		6		7	SSD new
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	
DO (mg/L)	10.3	10.0	10.0	10.0	9.9	10.1	10.0	10.1	10.1	10.1	10.1	10.1	10.1	10.1	
pH	8.1	8.2	8.2	8.1	8.1	8.1	8.0	8.1	8.2	8.0	8.1	8.0	8.0	8.0	
Cond. (µS/cm)	672	674		674		675		674		675		676		673	
Initials	A	SSD		EL		A		A		SSD		EL		SSD	

Concentration	Days														
	0	1		2		3		4		5		6		7	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

Concentration	Days														
	0	1		2		3		4		5		6		7	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

DO meter: DO-1/3 **pH meter:** pH 1/3 **Conductivity meter:** C-1/3

	Control	100%		
Hardness*	10	312		
Alkalinity*	6	188		

* mg/L as CaCO3

Analysts: A, SSD, EC

Reviewed by: [illegible]

Date reviewed: June 23/15

Sample Description: clear

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: GH-FR1
Work Order #: 15361

Start Date & Time: April 29 2015 @ 1545h
Stop Date & Time: May 29/15 @ 1000h
Test Species: O. mykiss

(% v/v) Concentration: Control	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	~~7.2~~ 10.1	10.1	10.2	9.9	10.0	10.1	9.9	10.1	9.9	10.0	10.1	10.0	9.9	10.1
pH	~~10.1~~ 7.2	7.2	7.1	7.0	7.0	7.1	7.1	7.1	7.2	7.0	7.0	7.1	7.0	7.1
Cond. (µS/cm)	✓	29		29		29		29		29		29		30
Initials	SSD	SSD		YYL		A		A		YYL		YYL		YYL

Concentration: 100	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.2	10.1	10.0	10.1	10.2	9.8	10.2	9.9	10.1	9.6	9.9	10.0	9.7
pH	8.0	8.0	8.0	8.0	7.9	8.0	8.1	8.0	8.2	8.1	8.1	8.0	8.1	8.1
Cond. (µS/cm)	✓	610		606		614		613		617		620		614
Initials	SSD	SSD		YYL		A		A		YYL		YYL		YYL

Concentration	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 3/2 **pH meter:** 3/2 **Conductivity meter:** 3/2

	Control	100%		
Hardness*	8	336		
Alkalinity*	6	174		

* mg/L as CaCO3

Analysts: SSD, AWD, YYL
Reviewed by: [signature]
Date reviewed: June 23/15

Sample Description: Clear

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: GH-FR1
Work Order #: 15361

Start Date & Time: April 29, 2015 @ 1545h
Stop Date & Time: MAY 29/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.0	9.9	10.2	10.1	10.1	9.9	10.1	9.9	10.1	10.1	10.0	9.9	10.0
pH	7.0	7.0	7.1	6.9	7.1	7.1	7.0	7.1	7.0	7.1	7.1	7.0	7.1	6.9
Cond. (µS/cm)	—	32		30		30		30		30		30		31
Initials	YML	SSD		YML		↑		↑		↑		YML		YML

Concentration 100	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	9.8	10.0	9.9	10.0	10.1	9.8	10.1	9.9	10.1	10.1	10.1	10.1	10.0
pH	8.0	8.2	8.1	8.0	8.0	8.1	8.1	8.0	8.2	8.0	8.1	8.1	8.2	8.0
Cond. (µS/cm)	—	632		642		M0 636		637		638		644		641
Initials	YML	SSD		YML		↑		↑		↑		YML		YML

Concentration	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	100%		
Hardness*	8	358		
Alkalinity*	6	178		

* mg/L as CaCO3

Analysts: YML, SSD, AWD
Reviewed by: [signature]
Date reviewed: June 23/15

Sample Description: clear

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: GH-FR1
Work Order #: 15361

Start Date & Time: April 29, 2015 @ 1545h
Stop Date & Time: May 29/15 @ ~~1130~~ 1100h YML
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days														
	21	22		23		24		25		26		27		28	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	
DO (mg/L)	9.9	10.1	10.0	10.1	10.0	10.1	10.0	10.1	9.8	9.9	9.9	10.1	10.0	9.9	
pH	7.0	7.0	7.1	6.9	7.0	6.8	7.0	6.8	7.0	6.8	7.0	6.9	7.1	6.8	
Cond. (µS/cm)	—	30		30		29		29		29		29		30	
Initials	YML	YML		YML						YML		YML		YML	

Concentration 100	Days														
	21	22		23		24		25		26		27		28	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)	14.0	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	
DO (mg/L)	10.2	10.2	10.0	10.2	10.1	10.2	10.1	10.1	9.7	9.9	9.9	10.0	10.2	10.0	
pH	8.1	8.0	8.1	8.0	8.0	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.1	7.9	
Cond. (µS/cm)	—	628		624		617		618		616		615		613	
Initials	YML	YML		YML						YML		YML		YML	

Concentration	Days														
	21	22		23		24		25		26		27		28	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

Concentration	Days														
	21	22		23		24		25		26		27		28	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

DO meter: 2|3 pH meter: 2|3 Conductivity meter: 2|3

	Control	100%		
Hardness*	12	336		
Alkalinity*	8	176		

* mg/L as CaCO3

Analysts: YYL, AWD
Reviewed by:
Date reviewed: June 23/15

Sample Description: Clear

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: GHL_FR1
Work Order #: 15361

Start Date & Time: April 29 2015 @ 1545h
Stop Date & Time: May 29 2015 @ ~~1130~~ 1100
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	28	29		30 final		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	/	14.0									
DO (mg/L)	9.9	10.0	10.1	/	10.1									
pH	7.0	6.8	6.9	/	6.9									
Cond. (µS/cm)	–	29		32										
Initials	YML	YML		YML										

Concentration 100	Days													
	28	29		30 final		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	/	14.0									
DO (mg/L)	9.9	9.8	10.0	/	10.0									
pH	8.0	7.9	8.0	/	7.9									
Cond. (µS/cm)	–	517		565										
Initials	YML	YML		YML										

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 213 pH meter: 213 Conductivity meter: 213

	Control		100%			
Hardness*	YML ~~294~~	10	YML ~~10~~	294		
Alkalinity*	YML ~~154~~	8	YML ~~8~~	154		

* mg/L as CaCO3

Analysts: YML
Reviewed by: [signature]
Date reviewed: June 23/15

Sample Description: Clear

Comments:

KS

Embryo-Alevin-~~Fry~~ Toxicity Test
Daily Mortality

Client: Teck GH-FR1 **Start Date & Time:** April 29/15 @ 1545 h
Sample ID: ~~GH-FR1 FR-VFR1~~ 4x **Stop Date:** MAY 29 /15 @ ~~10~~ 1100h
Work Order #: 15361 **Test Species:** O. mykiss

Treatments (%)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Lakewater	1	0	0	0	0	0	0	0	0			
	2	↓	↓	↓	↓	↓	↓	↓	0			
	3	↓	↓	↓	↓	↓	↓	↓	0			
	4	↓	↓	↓	↓	↓	↓	↓	0			
100	1	↓	↓	↓	↓	↓	↓	↓	0			
	2	↓	↓	↓	↓	↓	↓	↓	0			
	3	↓	↓	↓	↓	1	1	↓	2			
	4	↓	↓	↓	↓	1	0	↓	1			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		AS	SSD	AS	AS	SSD	SSD	SSD	KS			

Comments: _____

Reviewed by: _____ **Date reviewed:** June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: GH FRI
Work Order #: 15361

Start Date & Time: April 29 2015 @ 1545 h
Stop Date: May 29/15 @ 1100 h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities 8	9	10	11	12	13	14	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0	0	0	0	0	0	0	0			
	2	0	↓	↓	0	↓	↓	↓	0			
	3	0	↓	↓	0	↓	↓	↓	0			
	4	1	↓	↓	0	↓	↓	↓	1			
100	1	0	↓	↓	2	↓	↓	↓	2			
	2	0	↓	↓	1	↓	↓	↓	1			
	3	0	↓	↓	0	1	↓	1	0 KS 2			
	4	0	↓	↓	1	0	↓	1	KS 2			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	MW	RD	A	MW	MW	MW	KS			

Comments:

Reviewed by: [signature]
Date reviewed: June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: GH-FR1
Work Order #: 15361

Start Date & Time: April 29 2015 @ 1545h
Stop Date: MAY 29/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

Treatments (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
		15 (1)	16	17	18	19	20	21				
Control	1	0	0	1	0	0	0	0	1			
	2	↓	↓	0	↓	↓	↓	0	0			
	3	↓	↓	↓	↓	↓	↓	1	1			
	4	↓	↓	↓	↓	↓	↓	0	0			
100	1	↓	↓	↓	↓	↓	2	0	2			
	2	↓	↓	↓	↓	↓	2	0	3			
	3	1	0	↓	↓	↓	1	1	3			
	4	0	1	↓	1	↓	0	0	2			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	WW	AS	AS	AS	WW	WW	KS			

Comments: Eyed stage (cont & 100%)

Reviewed by: [signature]
Date reviewed: June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: GH_FR1
Work Order #: 15361

Start Date & Time: April 29, 2015 @ 1545h
Stop Date: MAY 29/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities 22	23 (2)	24	25	26	27	28	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0	0	1	0	0	0	0	1			
	2	1	1	1	0	2	1	1	5			
	3	1	0	0	1	0	1	2	4			
	4	0	1	0	1	2	1	1	4			
100	1	0	1	0	1	0	0	1	1			
	2	0	↓	0	↓	1		0	1			
	3	0	1	3	1	0		0	5			
	4	0	1	0	0	0	↓	0	1			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		MMC	MMC	AO	AO	MMC	MMC	MMC	KS			

Comments: (1) starting to hatch (2) >50% at alevin stage (all)

Reviewed by: [signature]
Date reviewed: June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: GH_FR1
Work Order #: 15361

Start Date & Time: April 29, 2015 @ 1545h
Stop Date: May 29 2015 @ 1100h
Test Species: *Oncorhynchus mykiss*

Concentration (%v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/Alevins	Total Abnormal Alevins	Total Normal Alevins	Total Exposed
		29	30	31	32	33	34	35				
Control	1	0	0						0	0	29	31
	2	0							0	0	23	28
	3	1							1	3	22	31
	4	0							0	1	25	31
100	1	0							0	0	25	30
	2	1							1	0	23	29
	3	0							0	0	18	30
	4	0	↓						0	0	23	29
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
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	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		MM	MM						MM	MM	MM	MM

Comments:

Reviewed by: [signature]

Date reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Sample ID: ~~GH_FR1~~ ~~FR_WER1~~ ~~GH_WER1~~ GH_FR1

Work Order No.: 15361

Start Date: **April 29, 2015**

Termination Date: **May 29, 2015**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control A	1	19.5	✓		
	2	18.5	✓		
	3	16.5	✓		
	4	19.5	✓		
	5	19.5	✓		
	6	18.5	✓		
	7	17.5	✓		
	8	18.5	✓		
	9	18.0	✓		
	10	17.0	✓		
	11	19.5	✓		
	12	18.5	✓		
	13	18.5	✓		
	14	17.0	✓		
	15	16.5	✓		
	16	19.0	✓		
	17	19.0	✓		
	18	16.5	✓		
	19	17.5	✓		
	20	19.0	✓		
	21	19.0	✓		
	22	18.5	✓		
	23	18.0	✓		
	24	19.5	✓		
	25	17.0	✓		
	26	16.0	✓		
	27	18.5	✓		
	28	16.0	✓		
	29	18.0	✓		
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.78g

Number of survivors: 29 (29 normal)

Number of deformed/have difficulty swimming: 0

Initials: YMC

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Sample ID: ~~GH_FR1~~ ~~FR_UFR1~~ GH_FR1

Work Order No.: 15361

Start Date: **April 29, 2015**

Termination Date: **May 29, 2015**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control B	1	17.0	✓		
	2	18.0	✓		
	3	16.5	✓		
	4	19.5	✓		
	5	18.0	✓		
	6	20.0	✓		
	7	18.5	✓		
	8	19.5	✓		
	9	19.5	✓		
	10	19.0	✓		
	11	18.0	✓		
	12	19.5	✓		
	13	20.0	✓		
	14	18.5	✓		
	15	18.5	✓		
	16	20.0	✓		
	17	19.0	✓		
	18	17.0	✓		
	19	18.0	✓		
	20	18.0	✓		
	21	20.0	✓		
	22	20.0	✓		
	23	20.0	✓		
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.17 g

Number of survivors: 23 (23 normal)

Number of deformed/have difficulty swimming: 0

Initials: YNL

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Sample ID: ~~GH_FR1~~ ~~FR_UTR1~~ GH_FR1

Work Order No.: 15361

Start Date: April 29, 2015

Termination Date: May 29, 2015

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control C	1	19.0	✓		
	2	20.0	✓		
	3	19.0	✓		
	4	20.0	✓		
	5	18.0	✓		
	6	19.0	✓		
	7	18.0	✓		
	8	19.5	✓		
	9	18.5	✓		
	10	19.0	✓		
	11	18.5	✓		
	12	18.5	✓		
	13	19.0	✓		
	14	19.0	✓		
	15	20.0	✓		
	16	20.0	✓		
	17	19.0	✓		
	18	17.5	✓		
	19	18.0	✓		
	20	20.0	✓		
	21	19.0	✓		
	22	18.0	✓		
	23	16.5	—	✓	yolk sac edema, pale
	24	14.0	—	✓	yolk sac edema, shortened body, pale
	25	16.0	—	✓	shortened body
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.49g

Number of survivors: 25 (22 normal)

Number of deformed/have difficulty swimming: 3

Initials: YHC

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Sample ID: ~~GH_FR1~~ ~~FR_UFR1~~ GH_FR1

Work Order No.: 15361

Start Date: April 29, 2015

Termination Date: May 29, 2015

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control D	1	19.0	✓		
	2	18.5	✓		
	3	19.0	✓		
	4	18.0	✓		
	5	17.0	✓		
	6	18.0	✓		
	7	18.5	✓		
	8	19.0	✓		
	9	17.5	✓		
	10	19.0	✓		
	11	18.0	✓		
	12	17.0	✓		
	13	17.0	✓		
	14	19.0	✓		
	15	18.0	✓		
	16	17.5	✓		
	17	19.5	✓		
	18	19.0	✓		
	19	18.5	✓		
	20	19.5	✓		
	21	19.0	✓		
	22	17.5	✓		
	23	17.5	✓		
	24	17.5	✓		
	25	17.5	✓		
	26	14.5	—	✓	yolksac edema, no tail, shortened body, pale
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.493

Number of survivors: 26 (25 normal)

Number of deformed/have difficulty swimming: 1

Initials: YYL

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Sample ID: ~~GH_FR1~~ ~~FR_UFR1~~ GH_FR1

Work Order No.: 15361

Start Date: April 29, 2015

Termination Date: May 29, 2015

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	19.0	✓		
	2	19.0	✓		
	3	17.5	✓		
	4	18.5	✓		
	5	18.5	✓		
	6	20.0	✓		
	7	19.0	✓		
	8	18.0	✓		
	9	19.0	✓		
	10	18.0	✓		
	11	19.0	✓		
	12	19.0	✓		
	13	18.0	✓		
	14	18.0	✓		
	15	18.0	✓		
	16	20.0	✓		
	17	20.0	✓		
	18	18.5	✓		
	19	18.0	✓		
	20	20.0	✓		
	21	20.5	✓		
	22	17.5	✓		
	23	19.0	✓		
	24	20.0	✓		
	25	17.0	✓		
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.31 g

Number of survivors: 25 (25 normal)

Number of deformed/have difficulty swimming: 0

Initials: HW

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Sample ID: ~~GH_FR1~~ ~~PR_UTR1~~ GH_FR1

Work Order No.: 15361

Start Date: April 29, 2015

Termination Date: May 29, 2015

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	21.0	✓		
	2	21.0	✓		
	3	17.0	✓		
	4	19.5	✓		
	5	20.0	✓		
	6	19.0	✓		
	7	18.5	✓		
	8	17.0	✓		
	9	17.5	✓		
	10	19.0	✓		
	11	20.5	✓		
	12	19.0	✓		
	13	18.0	✓		
	14	19.0	✓		
	15	17.5	✓		
	16	17.0	✓		
	17	19.0	✓		
	18	19.5	✓		
	19	20.5	✓		
	20	18.0	✓		
	21	20.0	✓		
	22	18.0	✓		
	23	20.5	✓		
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.20 g

Number of survivors: 23 (23 normal)

Number of deformed/have difficulty swimming: 0

Initials: YML

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Sample ID: ~~GH_FR1~~ YUL ~~FR_UFR1~~ YUL GH_FR1

Work Order No.: 15361

Start Date: **April 29, 2015**

Termination Date: **May 29, 2015**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	18.0	✓		
	2	20.0	✓		
	3	18.0	✓		
	4	17.5	✓		
	5	16.5	✓		
	6	17.5	✓		
	7	19.0	✓		
	8	18.0	✓		
	9	17.0	✓		
	10	19.0	✓		
	11	20.0	✓		
	12	19.0	✓		
	13	15.0	✓		
	14	17.5	✓		
	15	17.0	✓		
	16	17.0	✓		
	17	15.0	✓		
	18	19.0	✓		
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.65g

Number of survivors: 18 (18 normal)

Number of deformed/have difficulty swimming: 0

Initials: YUL

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Sample ID: ~~GH-FR1~~ ~~PR-UFR1~~ GH-FR1

Work Order No.: 15361

Start Date: April 29, 2015

Termination Date: May 29, 2015

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	19.0	✓		
	2	19.5	✓		
	3	20.0	✓		
	4	20.5	✓		
	5	20.5	✓		
	6	19.0	✓		
	7	20.5	✓		
	8	20.0	✓		
	9	20.0	✓		
	10	21.0	✓		
	11	19.5	✓		
	12	20.0	✓		
	13	19.0	✓		
	14	21.0	✓		
	15	17.0	✓		
	16	20.5	✓		
	17	18.0	✓		
	18	18.5	✓		
	19	20.5	✓		
	20	20.0	✓		
	21	19.0	✓		
	22	17.0	✓		
	23	20.0	✓		
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.28 g

Number of survivors: 23 (23 normal)

Number of deformed/have difficulty swimming: 0

Initials: YW

Reviewed by: [signature]

Date Reviewed: June 23/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: GH - FRC
Work Order #: 15361

Start Date & Time: April 29/15 @ 1545h
Stop Date & Time: MAY 29/15 @ 1130h
Test Species: *Oncorhynchus mykiss*

Concentration: 0% (v/v) Control

	Days														
	0	1		2		3		4		5		6		7	SSD new
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.0	14.0	
DO (mg/L)	10.1	10.3	9.9	10.0	9.9	10.2	10.1	10.2	10.1	10.2	9.9	10.1	10.1	10.0	
pH	6.8	7.2	7.1	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.1	7.1	7.1	7.2	
Cond. (µS/cm)	28	29		28		28		28		28		28		28	
Initials	A	SSD		EC		A		A		SSD		GL		SSD	

Concentration: 100

	Days														
	0	1		2		3		4		5		6		7	SSD new
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	
DO (mg/L)	10.2	10.0	10.0	10.1	9.8	10.2	10.0	10.1	10.1	10.1	10.0	10.1	10.1	10.2	
pH	8.1	8.1	8.0	8.1	7.9	8.2	8.1	8.1	8.2	7.9	8.2	7.8	8.2	7.9	
Cond. (µS/cm)	352	344		344		345		344		345		345		344	
Initials	A	SSD		EC		A		A		SSD		GL		SSD	

Concentration: _____

	Days														
	0	1		2		3		4		5		6		7	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

Concentration: _____

	Days														
	0	1		2		3		4		5		6		7	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

DO meter: DO - 1/3 **pH meter:** pH 1/3 **Conductivity meter:** C-1/3

	Control	100%		
Hardness*	10	170		
Alkalinity*	6	166		

* mg/L as CaCO3

Analysts: A, SSD, EC

Reviewed by: [illegible]

Date reviewed: June 23/15

Sample Description: Light brown with some particulate

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: GH-ERC
Work Order #: 15361

Start Date & Time: April 29 2015 @ 1545h
Stop Date & Time: MAY 29/15 @ 1130h
Test Species: O. mykiss

(% v/v) Concentration Control	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.1	10.0	9.9	10.1	10.1	9.9	10.1	9.9	10.0	10.1	10.0	10.2	10.1
pH	7.2	7.2	7.2	7.0	6.9	7.1	7.0	7.1	7.1	7.0	7.0	7.1	7.0	7.1
Cond. (µS/cm)	✓	29		29		29		29		29		29		30
Initials	SSD	SSD		YYL		^		^		YYL		YYL		YYL

Concentration 100	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.0	10.0	9.9	10.1	10.1	9.8	10.2	9.9	10.0	10.1	9.5	10.0	9.8
pH	8.0	8.1	8.0	8.0	8.1	8.1	8.1	8.1	8.2	8.0	8.1	7.9	8.1	8.0
Cond. (µS/cm)	✓	335		333		337		336		335		339		338
Initials	SSD	SSD		YYL		^		^		YYL		YYL		YYL

Concentration	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 3/2 **pH meter:** 3/2 **Conductivity meter:** 3/2

	Control	100%		
Hardness*	8	180		
Alkalinity*	6	166		

* mg/L as CaCO3

Analysts: SSD, AWD, YYL
Reviewed by: [signature]
Date reviewed: June 23/15

Sample Description: Light brown with some particulate

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: GH_ERC
Work Order #: 15361

Start Date & Time: April 29, 2015 @ 1545h
Stop Date & Time: MAY 29/15 @ 1130 h
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	9.9	10.0	10.0	10.2	10.0	10.1	9.8	10.1	9.8	10.1	10.0	10.0	10.1	10.0
pH	7.1	7.0	7.1	6.9	7.0	7.1	7.0	7.1	7.1	7.1	7.1	7.0	7.1	7.69
Cond. (µS/cm)	–	32		30		30		30		30		30		31
Initials	YYL	SSD		YYL		AD		AD		AD		YYL		YYL

Concentration 100	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	9.9	9.8	9.9	10.0	9.9	10.1	9.9	10.1	9.9	10.2	10.2	9.9	10.1	10.0
pH	8.0	8.1	8.2	7.9	8.1	8.0	8.1	8.0	8.2	8.0	8.1	8.1	8.2	7.9
Cond. (µS/cm)	–	328		329		329		330		330		328		328
Initials	YYL	SSD		YYL		AD		AD		AD		YYL		YYL

Concentration	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	100%		
Hardness*	8	182		
Alkalinity*	6	158		

* mg/L as CaCO3

Analysts: YYL, SSD, AWD
Reviewed by: [illegible]
Date reviewed: June 23/15

Sample Description: light brown with some particulate

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: GH_ERC
Work Order #: 15361

Start Date & Time: April 29, 2015 @ 1545h
Stop Date & Time: MAY 29/15 @ 1130h
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.1	10.1	10.1	10.0	10.1	10.0	10.1	9.8	9.9	10.0	10.1	10.1	9.9
pH	7.1	7.0	7.0	6.9	7.0	6.8	7.0	6.8	7.0	6.8	6.9	6.9	7.0	6.8
Cond. (µS/cm)	–	30		30		29		29		29		29		30
Initials	YML	YML		YML		AM		AM		YML		YML		YML

Concentration 100	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	9.9	10.2	10.0	10.2	10.1	10.2	10.1	10.2	9.9	9.9	10.0	10.0	10.1	9.7
pH	8.2	8.1	8.1	8.1	8.0	8.0	8.1	8.0	8.0	7.9	8.1	7.9	8.0	7.9
Cond. (µS/cm)	–	322		322		320		321		320		318		318
Initials	YML	YML		YML		AM		AM		YML		YML		YML

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2|3 pH meter: 2|3 Conductivity meter: 2|3

	Control	100%		
Hardness*	12	168		
Alkalinity*	~~8~~ 8	154		

* mg/L as CaCO3

Analysts: YML, AWD
Reviewed by:
Date reviewed: June 23|15

Sample Description: light brown with some particulate

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: GH-ERC
Work Order #: 15361

Start Date & Time: April 29 2015 @ 1545h
Stop Date & Time: May 29 2015 @ 1130h
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	28	29		30 final		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	/	14.0									
DO (mg/L)	10.0	10.0	10.1	/	10.1									
pH	7.0	6.8	6.9	/	6.8									
Cond. (µS/cm)	–	29		321										
Initials	YYL	YYL		YYL 1st										

Concentration 100	Days													
	28	29		30 final		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	/	14.0									
DO (mg/L)	9.9	9.9	10.1	/	10.0									
pH	8.0	7.8	8.0	/	7.8									
Cond. (µS/cm)	–	291		307										
Initials	YYL	YYL		YYL										

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2|3 pH meter: 2|3 Conductivity meter: 2|3

	Control	100%		
Hardness*	10	174		
Alkalinity*	8	140		

* mg/L as CaCO3

Analysts: YYL
Reviewed by: [signature]
Date reviewed: June 23/15

Sample Description: light brown with some particulate

Comments:

Embryo-Alevin-~~Fry~~ KS Toxicity Test
Daily Mortality

Client: Teck
Sample ID: GH ERC
Work Order #: 15361

Start Date & Time: April 29/15 @ 1545 h
Stop Date: May 29/15 @ 1130 h
Test Species: O. mykiss

Treatments (%)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0	0	0	0	0	0	0	0			
	2							1	1			
	3							0	0			
	4							0	0			
100	1							0	0			
	2							0	0			
	3							1	1			
	4	↓	↓	↓	↓	↓	↓	1	1			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
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	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	SSD	A	A	SSD	SSD	SSD	KS			

Comments:

Reviewed by: [signature] **Date reviewed:** June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: GH ERC
Work Order #: 15361

Start Date & Time: April 29 2015 @ 1545h
Stop Date: May 29/15 @ 1130 h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
		8	9	10	11	12	13	14				
Control	1	0	1	0	0	0	0	0	1			
	2	↓	0	↓	1	↓	↓	0	1			
	3	↓	↓	↓	0	↓	↓	1	1			
	4	↓	↓	↓	0	↓	↓	0	0			
100	1	↓	↓	↓	1	↓	↓	0	1			
	2	↓	↓	↓	0	↓	↓	0	0			
	3	↓	↓	↓	0	↓	↓	1	1			
	4	↓	↓	↓	0	↓	↓	0	0			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
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	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	MW	A.	m	MM	MM	MM	KS			

Comments:

Reviewed by: [signature] **Date reviewed:** June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: GH-ERC
Work Order #: 15361

Start Date & Time: April 29 2015 @ 1545h
Stop Date: May 29/15 @ 1130h
Test Species: *Oncorhynchus mykiss*

Treatments (% v/v)	Rep	Day of Test - No. of Mortalities ① 15	16	17	18	19	20	21	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0	0	0	0	0	1	0	1			
	2	0	↓	↓	↓	↓	0	↓	0			
	3	1					↓		1			
	4	0						↓	0			
100	1	0			2	2		2	6			
	2	0			0	1		0	1			
	3	2	↓	↓	0	0	↓	1	3			
	4	0	↓	↓	1	0	2	2	5			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	MM	A	A	A	MM	MM	KS			

Comments: Eyed Stage (cont & 100%)

Reviewed by: [signature]
Date reviewed: June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: GH_ERC
Work Order #: 15361

Start Date & Time: April 29, 2015 @ 1545h
Stop Date: May 29/15 @ 1130h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities 22	23	24	25	26	27	28	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0①	1	0	0	0	0	1	2			
	2	1	1①	0	1	1	0	0	3			
	3	1①	0	1	0	1	0	1	3			
	4	↓	0①	0	0	0	0	0	0			
100	1	1①	3	1	0	1	0	0	6			
	2	4①	0	0	0	1	1	1	6			
	3	1①	4③	0	0	4	↓	0	9			
	4	0①	6③	2	1	0	↓	0	9			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		MM	MM	AD	AD	MM	MM	MM	KS			

Comments: ①starting to hatch ②>50% hatched to alevin stage (all)
③fungal growth on some embryos - removed.

Reviewed by: [signature] **Date reviewed:** June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: GH_ERC
Work Order #: 15361

Start Date & Time: April 29, 2015 @ 1545 h
Stop Date: May 29, 2015 @ 1130 h
Test Species: *Oncorhynchus mykiss*

Concentration (%v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/Alevins	Total Abnormal Alevins	Total Normal Alevins	Total Exposed
		29	30	31	32	33	34	35				
Control	1	0	0						0	~~0~~ 1	26	~~30~~ 31
	2	~~3~~ 3	↓						~~1~~ 3	0	21	29
	3	0	↓						0	0	24	29
	4	~~2~~ 2	↓						~~1~~ 2	1	26	29
100	1	0	↓						0	0	16	29
	2	↓	↓						0	0	21	29
	3	↓	↓						0	2	14	30
	4	↓	1						1	0	15	31
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials												

Comments:

Reviewed by: [signature] **Date reviewed:** June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: GH_ERC

Termination Date: May 29, 2015

Work Order No.: 15361

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control A	1	17.0	✓		
	2	17.5	✓		
	3	19.0	✓		
	4	18.0	✓		
	5	16.5	✓		
	6	19.0	✓		
	7	18.0	✓		
	8	20.5	✓		
	9	18.0	✓		
	10	17.0	✓		
	11	20.0	✓		
	12	18.0	✓		
	13	18.0	✓		
	14	18.0	✓		
	15	17.5	✓		
	16	18.0	✓		
	17	18.0	✓		
	18	19.0	✓		
	19	17.0	✓		
	20	17.0	✓		
	21	16.5	✓		
	22	18.0	✓		
	23	19.0	✓		
	24	19.5	✓		
	25	18.0	✓		
	26	18.5	✓		
	27	12.5	—	✓	tail is curled into back, shortened body
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.44 g

Number of survivors: 27 (26 normal)

Number of deformed/have difficulty swimming: 1

Initials: YYL

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **GH_ERC**

Termination Date: **May 29, 2015**

Work Order No.: 15361

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control B	1	17.5	✓		
	2	18.0	✓		
	3	18.0	✓		
	4	17.5	✓		
	5	17.0	✓		
	6	17.0	✓		
	7	18.0	✓		
	8	18.5	✓		
	9	17.0	✓		
	10	16.5	✓		
	11	20.0	✓		
	12	16.0	✓		
	13	17.0	✓		
	14	17.5	✓		
	15	18.0	✓		
	16	18.0	✓		
	17	17.0	✓		
	18	17.0	✓		
	19	15.5	✓		
	20	19.0	✓		
	21	15.5	✓		
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.79 g

Number of survivors: 21 (21 normal)

Number of deformed/have difficulty swimming: 0

Initials: YML

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: GH_ERC

Termination Date: May 29, 2015

Work Order No.: 15361

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control C	1	18.5	✓		
	2	17.0	✓		
	3	18.0	✓		
	4	16.0	✓		
	5	18.0	✓		
	6	19.0	✓		
	7	16.5	✓		
	8	16.0	✓		
	9	15.0	✓		
	10	16.0	✓		
	11	15.5	✓		
	12	17.0	✓		
	13	19.0	✓		
	14	16.5	✓		
	15	18.0	✓		
	16	17.0	✓		
	17	18.0	✓		
	18	18.0	✓		
	19	16.0	✓		
	20	17.0	✓		
	21	17.0	✓		
	22	19.0	✓		
	23	18.5	✓		
	24	19.0	✓		
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): ~~1.79 g~~ 2.05 g

Number of survivors: 24 (24 normal)

Number of deformed/have difficulty swimming: 0

Initials: YML

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **GH_ERC**

Termination Date: **May 29, 2015**

Work Order No.: 15361

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control D	1	17.5	✓		
	2	15.5	✓		
	3	19.5	✓		
	4	17.0	✓		
	5	16.5	✓		
	6	18.0	✓		
	7	15.0	✓		
	8	17.0	✓		
	9	15.0	✓		
	10	17.0	✓		
	11	16.0	✓		
	12	14.0	✓		
	13	16.5	✓		
	14	17.5	✓		
	15	18.0	✓		
	16	17.5	✓		
	17	15.0	✓		
	18	17.0	✓		
	19	15.5	✓		
	20	16.0	✓		
	21	17.5	✓		
	22	17.0	✓		
	23	15.5	✓		
	24	17.5	✓		
	25	16.0	✓		
	26	17.0	✓		
	27	13.5		✓	missing tail, shortened body
	28			✓	~~unhatched but dyed~~ YHC
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.23g

Number of survivors: 27 (26 normal)

Number of deformed/have difficulty swimming: 1

Initials: YHC

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: GH_ERC

Termination Date: May 29, 2015

Work Order No.: 15361

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	18.0	✓		
	2	17.0	✓		
	3	17.0	✓		
	4	16.5	✓		
	5	18.0	✓		
	6	19.0	✓		
	7	18.0	✓		
	8	17.0	✓		
	9	19.0	✓		
	10	18.0	✓		
	11	18.0	✓		
	12	18.0	✓		
	13	18.5	✓		
	14	17.0	✓		
	15	17.5	✓		
	16	17.0	✓		
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): ~~1.27g~~ YHL 1.47 g

Number of survivors: 16 (16 normal)

Number of deformed/have difficulty swimming: 0

Initials: YHL

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **GH_ERC**

Termination Date: **May 29, 2015**

Work Order No.: 15361

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	18.0	✓		
	2	17.5	✓		
	3	18.0	✓		
	4	18.0	✓		
	5	18.0	✓		
	6	18.0	✓		
	7	20.0	✓		
	8	19.5	✓		
	9	19.0	✓		
	10	17.5	✓		
	11	17.5	✓		
	12	~~18.0~~ 18.5	✓		
	13	17.5	✓		
	14	17.5	✓		
	15	16.5	✓		
	16	17.0	✓		
	17	18.0	✓		
	18	18.0	✓		
	19	18.0	✓		
	20	17.0	✓		
	21	18.0	✓		
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.869

Number of survivors: 21 (21 normal)

Number of deformed/have difficulty swimming: 0

Initials: YYL

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: GH_ERC

Termination Date: May 29, 2015

Work Order No.: 15361

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	19.0	✓		
	2	19.0	✓		
	3	16.5	✓		
	4	16.5	✓		
	5	18.5	✓		
	6	16.0	✓		
	7	17.0	✓		
	8	17.5	✓		
	9	17.0	✓		
	10	17.5	✓		
	11	18.5	✓		
	12	16.5	✓		
	13	18.0	✓		
	14	19.0	✓		
	15	12.0	—	✓	~~beat~~ missing tail, short body
	16	16.0	—	✓	missing tail
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.543

Number of survivors: 16 (14 normal)

Number of deformed/have difficulty swimming: 2

Initials: YML

Reviewed by:

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **GH_ERC**

Termination Date: **May 29, 2015**

Work Order No.: 15361

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	18.5	✓		
	2	17.0	✓		
	3	17.0	✓		
	4	16.0	✓		
	5	16.5	✓		
	6	16.0	✓		
	7	18.5	✓		
	8	18.0	✓		
	9	19.0	✓		
	10	18.0	✓		
	11	16.0	✓		
	12	17.0	✓		
	13	18.0	✓		
	14	16.0	✓		
	15	15.5	✓		
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.31 g

Number of survivors: 15 (15 normal)

Number of deformed/have difficulty swimming: 0

Initials: YMC

Reviewed by: [signature]

Date Reviewed: June 23/15

Client: Teck Coal (GHO)

W.O.#: 15361

Hardness and Alkalinity Datasheet

(Day)	Sample ID	Sample Date	Alkalinity: Sample Volume (mL)	Alkalinity: (mL) 0.02N HCL/H_2SO_4 used to pH 4.5	Alkalinity: (mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Alkalinity: Total Alkalinity ($mg/L CaCO_3$)	Hardness: Sample Volume (mL)	Hardness: Volume of 0.01M EDTA Used (mL)	Hardness: Total Hardness ($mg/L CaCO_3$)	Technician
(0-7)	GH_FR1	~~May~~ KL April 29/15	50	9.5	9.6	188	~~50~~ KL	15.6	312	KL
(0-7)	GH_ERC	~~May~~ KL April 29/15	50	8.5	8.7	166	50	8.5	170	KL
(8-14)	GH_ERC	May 6/15	50 KS	8.4	8.5	166	50 KS	9.0	180	KS
(8-14)	GH-FR1	May 6/15	50 KS	8.8	8.9	174	50 KS	16.8	336	KS
(15-21)	GH-FR1	May 13/15	50	9.1	9.3	178	50	17.9	358	KS
(15-21)	GH_ERC	May 13/15	50	8.1	8.3	158	50	9.1	182	KS
(22-28)	GH_~~FR1~~ FR1 KS	May 20/15	50	9.0	9.2	~~180~~ KS 176	50	16.8	336	KS
(22-28)	GH_ERC	May 20/15	50	7.8	7.9	154	50	8.4	168	KS
(29-30)	GH_FR1	May 27/15	50	7.8 KL	8.1	154	50	14.7	294	KL
(29-30)	GH_ERC	May 27/15	50	7.1	7.2	140	50	8.7	174	↓

Notes:

Reviewed by: [signature]

Date Reviewed: June 23/15

Client: Teck

W.O.#: ~~Various~~ 15361 YMC

Hardness and Alkalinity Datasheet

Day	Sample ID	Sample Date	Alkalinity: Sample Volume (mL)	Alkalinity: (mL) 0.02N HCL/H_2SO_4 used to pH 4.5	Alkalinity: (mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Alkalinity: Total Alkalinity ($mg/L CaCO_3$)	Hardness: Sample Volume (mL)	Hardness: Volume of 0.01M EDTA Used (mL)	Hardness: Total Hardness ($mg/L CaCO_3$)	Technician
0-7	Dechlor	Apr 29/15	50	0.4	0.5	6	50	0.5	10	YMC
8-14	↓	May 6/15	50	0.4	0.5	6	50	0.4	8	EC
15-21	↓	May 13/15	50	0.4	0.5	6	50	0.4	8	YMC
22-28	↓	MAY 20/15	50	0.5	0.6	8	50	0.6	12	KS
~~28~~ 29-35 YMC	↓	MAY 27/15	50	0.5	0.6	8	50	0.5	10	KS

Notes:

Reviewed by: [signature]

Date Reviewed: June 23/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: EV HC1
Work Order #: 15359

Start Date & Time: April 29/15 @ 1545 h
Stop Date & Time: MAY 29/15 @ 1230 h
Test Species: *Oncorhynchus mykiss*

o/o (v/v) Concentration control	Days														
	0	1		2		3		4		5		6		7	SSD new
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	
DO (mg/L)	10.1	10.0	10.0	10.0	10.1	10.2	10.0	10.2	10.0	10.2	10.1	10.1	10.1	10.0	
pH	6.8	7.2	7.1	7.2	7.2	7.2	7.1	7.2	7.1	7.2	7.1	7.1	7.1	7.2	
Cond. (µS/cm)	28	28		28		28		28		28		28		28	
Initials	A	SSD		EC		A		A		SSD		EC		SSD	

Concentration 100	Days														
	0	1		2		3		4		5		6		7	new SSD ~~new~~
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	
DO (mg/L)	10.3	10.3	10.1	10.1	9.9	10.2	10.1	10.1	10.1	10.1	10.1	10.1	10.1	10.2	
pH	8.2	8.3	8.2	8.2	8.1	8.2	8.2	8.2	8.2	8.1	8.2	8.0	8.2	7.9	
Cond. (µS/cm)	629	633		639		640		638		633		630		634	
Initials	A	SSD		EC		A		A		SSD		EC		SSD	

Concentration	Days														
	0	1		2		3		4		5		6		7	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

Concentration	Days														
	0	1		2		3		4		5		6		7	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

DO meter: DO-1/3 **pH meter:** pH 1/3 **Conductivity meter:** C-1/3

	Control	100%		
Hardness*	10	342		
Alkalinity*	6	198		

* mg/L as CaCO3

Analysts: A, SSD, EC

Reviewed by:
Date reviewed: June 23/15

Sample Description: Neon

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: EV HCl
Work Order #: 15359

Start Date & Time: April 29 2015 @ 1545h
Stop Date & Time: MAY 29/15 @ 1230h
Test Species: O. mykiss

(% v/v) Concentration Control	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.1	10.2	9.9	10.1	10.1	9.8	10.1	9.9	10.0	9.9	10.0	9.9	10.1
pH	7.2	7.2	7.1	7.0	7.1	7.1	7.0	7.1	7.1	7.0	7.1	7.1	7.0	7.1
Cond. (µS/cm)	✓	29		29		29		29		29		29		30
Initials	SSD	SSD		YYL		A		A		YYL		YYL		YYL

Concentration 100	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.0	10.1	9.7	10.1	10.1	9.9	10.1	9.9	9.9	9.8	9.4	9.9	9.7
pH	8.1	8.2	8.1	8.1	8.2	8.1	8.1	8.1	8.2	8.1	8.2	8.0	8.2	8.2
Cond. (µS/cm)	✓	540		539		545		546		548 YYL		550 YYL		545 YYL
Initials	SSD	SSD		YYL		A		A						

Concentration	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 3/2 pH meter: 3/2 Conductivity meter: 3/2

	Control	100%		
Hardness*	8	340		
Alkalinity*	6	188		

* mg/L as CaCO3

Analysts: SSD, AWD, YYL
Reviewed by: [illegible]
Date reviewed: June 23/15

Sample Description: Clear

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: EV_HCl
Work Order #: 15359

Start Date & Time: April 29, 2015 @ 1545 h
Stop Date & Time: MAY 29/15 @ 1230 h
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.6	10.0	10.2	10.0	9.1	9.8	10.1	9.9	10.1	10.1	10.0	10.1	10.0
pH	7.1	7.0	7.1	6.9	7.1	7.1	7.0	7.1	7.0	7.1	7.1	7.0	7.1	6.9
Cond. (µS/cm)	—	32		30		30		30		30		30		31
Initials	YYL	SSD		YYL		A		A		A		YYL		YYL

Concentration 100	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.0	9.9	10.0	9.8	10.1	9.9	10.1	9.8	10.0	10.2	9.9	10.1	10.1
pH	8.1	8.3	8.3	8.1	8.1	8.1	8.2	8.1	8.2	8.0	8.2	8.1	8.2	8.1
Cond. (µS/cm)	—	566		569		564		564		565		571		570
Initials	YYL	SSD		YYL		A		A		A		YYL		YYL

Concentration	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	100%		
Hardness*	8	322		
Alkalinity*	6	188		

* mg/L as CaCO3

Analysts: YYL, SSD, AWD
Reviewed by: [signature]
Date reviewed: June 23/15

Sample Description: clear ~~light brown with some particulate~~ KS

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: EV_HC1
Work Order #: 15359

Start Date & Time: April 29, 2015 @ 1545 h
Stop Date & Time: MAY 29/15 @ 1230 h
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.1	10.1	10.1	9.9	10.1	10.0	10.1	9.9	9.9	10.0	10.1	10.0	9.9
pH	7.0	7.0	7.1	6.9	7.0	6.8	7.0	6.8	7.0	6.8	7.0	6.9	7.0	6.8
Cond. (µS/cm)	—	30		30		29		29		29		29		30
Initials	YML	YML		YML						YML		YML		YML

Concentration 100	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.1	9.8	10.1	9.9	10.2	10.0	10.2	9.8	10.0	10.1	10.0	9.9	9.8
pH	8.1	8.1	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.1	8.1	8.0	8.1	8.0
Cond. (µS/cm)	—	550		554		547		548		548		547		544
Initials	YML	YML		YML						YML		YML		YML

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	100%		
Hardness*	12	286		
Alkalinity*	8	180		

* mg/L as CaCO3

Analysts: YML, AMD, KS
Reviewed by: [signature]
Date reviewed: June 23/15

Sample Description: Clear ~~light brown with some particulate~~ KS

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: EV_HC1
Work Order #: 15359

Start Date & Time: April 29 2015 @ 1545 h
Stop Date & Time: May 29, 2015 @ 1230 h
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	28	29		30 final		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	/	14.0									
DO (mg/L)	10.1	10.0	9.9	/	10.1									
pH	7.0	6.8	7.0	/	6.8									
Cond. (µS/cm)	–	29		32										
Initials	YYL	YYL		YYL										

Concentration 100	Days													
	28	29		30 final		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	/	14.0									
DO (mg/L)	10.1	9.6	10.0	/	12.1									
pH	8.0	8.0	8.0	/	7.9									
Cond. (µS/cm)	–	469		509										
Initials	YYL	YYL		YYL										

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 213 pH meter: 213 Conductivity meter: 213

	Control	100%		
Hardness*	10	246		
Alkalinity*	8	154		

* mg/L as CaCO3

Analysts: YYL
Reviewed by: [signature]
Date reviewed: June 23/15

Sample Description: clear

Comments:

KS

Embryo-Alevin-~~Fry~~ Toxicity Test
Daily Mortality

Client: Teck
Sample ID: EV HCL
Work Order #: 15359

Start Date & Time: April 29/15 @ 1545 h
Stop Date: May 29 /15 @ 1230 h
Test Species: O mykiss

Treatments (%(v/v))	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0	0	0	0	0	0	2	2			
	2	↓	↓	↓	↓	↓	↓	1	1			
	3	↓	↓	↓	↓	↓	↓	0	0			
	4	↓	↓	↓	↓	↓	↓	↓	0			
100	1	↓	↓	↓	↓	↓	↓	↓	0			
	2	↓	↓	↓	↓	↓	1	↓	1			
	3	↓	↓	↓	↓	↓	0	↓	0			
	4	↓	↓	↓	↓	↓	0	↓	0			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
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	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		AS	SSD	AS	AS	SSD	SSD	SSD	KS			

Comments: _____

Reviewed by: _____ **Date reviewed:** June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: EV HCl
Work Order #: 15359

Start Date & Time: April 29 2015 @ 1545h
Stop Date: MAY 29/15 @ 1230h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
		8	9	10	11	12	13	14				
Control	1	0	0	0	0	0	0	0	0			
	2	↓	0	↓	↓	↓	↓	↓	0			
	3		0						0			
	4		1						1			
100	1		0						0			
	2		↓						0			
	3		↓						0			
	4	↓	↓	↓	↓	↓	↓	↓	0			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
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	1											
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	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	[illegible]	A	[illegible]	[illegible]	[illegible]	[illegible]	KG			

Comments:

Reviewed by: [signature] **Date reviewed:** June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: EV-HCl
Work Order #: 153597

Start Date & Time: April 29 2015 @ 1545h
Stop Date: MAY 29/15 @ 1230h
Test Species: *Oncorhynchus mykiss*

Treatments (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
		① 15	16	17	18	19	20	21				
Control	1	0	0	0	0	0	0	0	0			
	2	↓	↓	↓	↓	↓	↓	↓	0			
	3								0			
	4						↓	↓	0			
100	1			↓			1	0	1			
	2			3			2	1	6			
	3		↓	2			4	3	7			
	4	↓	1	0	1	1	5②	1	9			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
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	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	MM✓	✓	✓	✓	MM✓	MM✓	KS			

Comments: Delayed stage (control) @slight mould growth on 3 embryos.

Reviewed by: [signature]
Date reviewed: June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: EV_HCl
Work Order #: 15359

Start Date & Time: April 29, 2015 @ 1545 h
Stop Date: MAY 29/15 @ 1230 h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
		22	23	24	25	26	27	28				
Control	1	0 ①	1	0	0	0	0 1	0	1			
	2	1 ①	0	0			0	0	0			
	3		1 ①	0			~~0~~ 1	0	1			
	4	1 ①		0			0	1	1			
100	1	↓ ①		1			~~1~~ 0	0	1			
	2	~~1~~ 2 ②	↓	0			0	0	2			
	3	4 ①	1	0		↓	0	0	5			
	4	0 ①	1	2	↓	1	0	0	4			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
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	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		MM	MM	AD	AD	MM	MM	MM	KS			

Comments: ① starting to hatch ② >50% at alevin stage (all)

Reviewed by: [signature] **Date reviewed:** June 23/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: EV-HCl
Work Order #: 15359

Start Date & Time: April 29, 2015 @ 1545h
Stop Date: May 29 2015 @ 1230h
Test Species: *Oncorhynchus mykiss*

Concentration (%v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/Alevins	Total Abnormal Alevins	Total Normal Alevins	Total Exposed
		29	30	31	32	33	34	35				
Control	1	1 ~~yuk~~	0						1 yuk	0	28	32
	2	0							0	0	29	30
	3	1							1	0	26	28
	4	0							0	2	26	30
100	1	0							0	1	27	30
	2	0							0	0	22	31
	3	0							0	0	18	30
	4	1	↓						1	0	16	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
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	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		YMC	YMC						YMC	YMC	YMC	YMC

Comments:

Reviewed by: CC **Date reviewed:** June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: EC_HC1

Termination Date: May 29, 2015

Work Order No.: 15359

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control A	1	18.0	✓		
	2	19.0	✓		
	3	19.5	✓		
	4	16.0	✓		
	5	19.0	✓		
	6	17.0	✓		
	7	19.0	✓		
	8	18.0	✓		
	9	17.5	✓		
	10	19.0	✓		
	11	19.0	✓		
	12	20.0	✓		
	13	19.0	✓		
	14	18.0	✓		
	15	18.0	✓		
	16	17.5	✓		
	17	20.0	✓		
	18	17.0	✓		
	19	19.5	✓		
	20	15.5	✓		
	21	17.5	✓		
	22	18.0	✓		
	23	15.5	✓		
	24	17.5	✓		
	25	17.0	✓		
	26	18.0	✓		
	27	17.5	✓		
	28	19.0	✓		
	29			✓	~~expect but unhatched egg~~ YHC
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.43g

Number of survivors: 28 (28 normal)

Number of deformed/have difficulty swimming: 0

Initials: YHC

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: EQ_HC1

Termination Date: May 29, 2015

Work Order No.: 153359

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control B	1	16.5	✓		
	2	18.0	✓		
	3	20.0	✓		
	4	17.0	✓		
	5	17.0	✓		
	6	18.5	✓		
	7	16.0	✓		
	8	17.0	✓		
	9	18.0	✓		
	10	17.0	✓		
	11	18.0	✓		
	12	17.0	✓		
	13	18.0	✓		
	14	19.0	✓		
	15	18.0	✓		
	16	17.0	✓		
	17	18.0	✓		
	18	18.0	✓		
	19	16.0	✓		
	20	17.0	✓		
	21	16.5	✓		
	22	16.0	✓		
	23	19.5	✓		
	24	18.0	✓		
	25	18.0	✓		
	26	17.0	✓		
	27	17.0	✓		
	28	17.0	✓		
	29	18.0	✓		
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.65g

Number of survivors: 29 (29 normal)

Number of deformed/have difficulty swimming: 0

Initials: YHL

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Sample ID: EC_HC1

Work Order No.: 15359

Start Date: April 29, 2015

Termination Date: May 29, 2015

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control C	1	17.5	✓		
	2	16.0	✓		
	3	16.5	✓		
	4	17.5	✓		
	5	17.0	✓		
	6	16.5	✓		
	7	18.5	✓		
	8	19.0	✓		
	9	19.0	✓		
	10	20.0	✓		
	11	18.0	✓		
	12	20.0	✓		
	13	19.5	✓		
	14	20.0	✓		
	15	17.0	✓		
	16	17.0	✓		
	17	19.0	✓		
	18	17.0	✓		
	19	19.0	✓		
	20	17.0	✓		
	21	17.0	✓		
	22	19.5	✓		
	23	18.5	✓		
	24	18.0	✓		
	25	18.5	✓		
	26	18.0	✓		
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.33 g

Number of survivors: 26 (26 normal)

Number of deformed/have difficulty swimming: 0

Initials: YML

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: EC_HC1

Termination Date: May 29, 2015

Work Order No.: 15359

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control D	1	18.5	✓		
	2	18.0	✓		
	3	17.0	✓		
	4	19.0	✓		
	5	19.5	✓		
	6	19.0	✓		
	7	18.0	✓		
	8	17.5	✓		
	9	18.0	✓		
	10	20.0	✓		
	11	17.5	✓		
	12	19.0	✓		
	13	18.5	✓		
	14	21.0	✓		
	15	19.5	✓		
	16	18.5	✓		
	17	19.0	✓		
	18	16.0	✓		
	19	17.5	✓		
	20	19.0	✓		
	21	19.0	✓		
	22	20.0	✓		
	23	17.0	✓		
	24	19.0	✓		
	25	19.0	✓		
	26	17.0	–	✓	yolksac edema
	27	19.0	✓		
	28	14.5	–	✓	yolksac edema, missing tail, pale pigmentation
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.609

Number of survivors: 28 (26 normal)

Number of deformed/have difficulty swimming: 2

Initials: YMC

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Sample ID: EC_HC1

Work Order No.: 15359

Start Date: April 29, 2015

Termination Date: May 29, 2015

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	17.0	✓		
	2	16.0	✓		
	3	18.0	✓		
	4	17.0	✓		
	5	17.0	✓		
	6	19.0	✓		
	7	18.5	✓		
	8	19.0	✓		
	9	17.0	✓		
	10	14.5	–	✓	yolk sac edema, missing tail, pak thm body
	11	18.0	✓		
	12	17.0	✓		
	13	19.0	✓		
	14	19.0	✓		
	15	18.0	✓		
	16	19.0	✓		
	17	19.0	✓		
	18	17.0	✓		
	19	19.5	✓		
	20	18.5	✓		
	21	20.0	✓		
	22	17.0	✓		
	23	17.5	✓		
	24	20.0	✓		
	25	19.0	✓		
	26	18.0	✓		
	27	18.5	✓		
	28	21.0	✓		
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.493 g

Number of survivors: 28 (27 normal)

Number of deformed/have difficulty swimming: 1

Initials: YHL

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Sample ID: E~~C~~ HC1 (YUC)

Work Order No.: 15359

Start Date: **April 29, 2015**

Termination Date: **May 29, 2015**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 ~~C~~ YUC B	1	19.0	✓		
	2	20.0	✓		
	3	19.0	✓		
	4	18.0	✓		
	5	17.0	✓		
	6	19.0	✓		
	7	18.5	✓		
	8	18.5	✓		
	9	19.0	✓		
	10	18.0	✓		
	11	19.0	✓		
	12	18.5	✓		
	13	18.5	✓		
	14	19.0	✓		
	15	20.0	✓		
	16	19.0	✓		
	17	20.5	✓		
	18	18.0	✓		
	19	18.0	✓		
	20	17.0	✓		
	21	18.0	✓		
	22	17.5	✓		
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.95g

Number of survivors: 22 (22 normal)

Number of deformed/have difficulty swimming: 0

Initials: YUC

Reviewed by: [signature]

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Sample ID: EC_HC1

Work Order No.: 15359

Start Date: April 29, 2015

Termination Date: May 29, 2015

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B C	1	17.0	✓		
	2	17.0	✓		
	3	18.0	✓		
	4	18.0	✓		
	5	17.0	✓		
	6	17.0	✓		
	7	19.5	✓		
	8	18.0	✓		
	9	17.0	✓		
	10	19.0	✓		
	11	16.0	✓		
	12	17.0	✓		
	13	18.5	✓		
	14	16.0	✓		
	15	17.5	✓		
	16	17.0	✓		
	17	15.5	✓		
	18	16.0	✓		
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.589

Number of survivors: 18 (18 normal)

Number of deformed/have difficulty swimming: 0

Initials: YMC

Reviewed by:

Date Reviewed: June 23/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: EC HC1

Termination Date: May 29, 2015

Work Order No.: 15359

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	17.5	✓		
	2	15.5	✓		
	3	18.0	✓		
	4	19.5	✓		
	5	18.0	✓		
	6	18.0	✓		
	7	17.5	✓		
	8	18.5	✓		
	9	19.0	✓		
	10	19.5	✓		
	11	16.0	✓		
	12	19.0	✓		
	13	18.0	✓		
	14	18.0	✓		
	15	18.0	✓		
	16	17.5	✓		
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.405

Number of survivors: 16 (16 normal)

Number of deformed/have difficulty swimming: 0

Initials: YMC

Reviewed by: [signature]

Date Reviewed: June 23/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: EVMC2
Work Order #: 15359

Start Date & Time: April 29/15 @ 1545h
Stop Date & Time: MAY 29/15 @ 1330h
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration Control	Days														
	0	1		2		3		4		5		6		7	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	SSD new
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.0	14.0	
DO (mg/L)	10.1	10	10.0	10.0	9.9	10.2	10.1	10.2	10.2	10.2	10.0	10.1	10.1	10.0	
pH	6.8	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.1	7.2	7.1	7.1	7.2	7.2	
Cond. (µS/cm)	28	28		28		28		28		28		28		28	
Initials	A	SSD		EC		AD		A		SSD		EC		SSD	

Concentration 100	Days														
	0	1		2		3		4		5		6		7	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	SSD new
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	
DO (mg/L)	10.3	10.4	10.0	10.0	9.9	10.2	10.2	10.2	10.1	10.1	10.1	10.1	10.1	9.9	
pH	8.5	8.5	8.1	8.4	8.0	8.5	8.1	8.4	8.4	8.2	8.2	7.7	8.1	7.9	
Cond. (µS/cm)	349	346		347		348		347		352		385		353	
Initials	A	SSD		EC		AD		A		SSD		EC		SSD	

Concentration	Days														
	0	1		2		3		4		5		6		7	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

Concentration	Days														
	0	1		2		3		4		5		6		7	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

DO meter: DO-1/3 **pH meter:** pH 1/3 **Conductivity meter:** C-1/3

	Control	100%		
Hardness*	10	196		
Alkalinity*	6	130		

* mg/L as CaCO3

Analysts: A, SSD, EC
Reviewed by:
Date reviewed: June 24/15

Sample Description: Light brown with some particulates

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: EV MC2
Work Order #: 15359

Start Date & Time: April 29 2015 @ 1545h
Stop Date & Time: MAY 29/15 @ 1330h
Test Species: O. mykiss

(% v/v) Concentration Control	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.01	9.9	9.9	10.0	10.1	9.8	10.1	9.9	10.0	9.9	10.0	9.9	10.1
pH	7.2	7.2	7.1	7.0	7.0	7.1	7.0	7.1	7.2	7.0	7.1	7.1	7.0	7.1
Cond. (µS/cm)	/	29		29		29		29		29		29		30
Initials	SSD	SSD		YYL		^		^		YYL		YYL		YYL

Concentration 100	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.1	10.0	10.0	10.1	10.1	9.9	10.0	9.8	10.1	10.0	9.9	10.0	9.8
pH	7.8	7.9	7.9	7.8	7.9	7.9	8.0	7.9	8.1	7.9	8.1	7.7	8.1	7.8
Cond. (µS/cm)	/	296		294		297		298		299		305		304
Initials	SSD	SSD		YYL		^		^		YYL		YYL		YYL

Concentration	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 3/2 **pH meter:** 3/2 **Conductivity meter:** 3/2

	Control	100		
Hardness*	8	158		
Alkalinity*	6	114		

* mg/L as CaCO3

Analysts: SSD, AWD, YYL

Reviewed by: [signature]
Date reviewed: June 24/15

Sample Description: light brown with some particulate

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: EV_MC2
Work Order #: 15359

Start Date & Time: April 29, 2015 @ 1545
Stop Date & Time: MAY 29/15 @ 1330h
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days														
	14	15		16		17		18		19		20		21	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	
DO (mg/L)	10.0	10.0	10.0	10.2	10.1	10.1	9.8	10.1	9.9	10.1	10.1	10.0	10.1	10.0	
pH	7.1	7.0	7.1	6.9	7.0	7.1	7.1	7.1	7.0	7.1	7.2	7.0	7.1	6.9	
Cond. (µS/cm)	—	32		30		30		30		30		30		31	
Initials	YYL	SSD		YYL		AWD		AWD		AWD		YYL		YYL	

Concentration 100	Days														
	14	15		16		17		18		19		20		21	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	
DO (mg/L)	9.9	9.8	10.0	9.9	10.1	10.1	9.8	10.0	9.8	10.1	10.1	9.7	10.0	10.0	
pH	8.0	8.2	8.1	8.0	8.0	8.1	8.2	8.1	8.2	8.1	8.2	8.1	8.1	8.0	
Cond. (µS/cm)	—	378		379		378		380		379		381		378	
Initials	YYL	SSD		YYL		AWD		AWD		AWD		YYL		YYL	

Concentration	Days														
	14	15		16		17		18		19		20		21	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

Concentration	Days														
	14	15		16		17		18		19		20		21	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	100%		
Hardness*	8	186		
Alkalinity*	6	124		

* mg/L as CaCO3

Analysts: YYL, SSD, AWD
Reviewed by: [signature]
Date reviewed: June 24/15

Sample Description: light brown with some particulate

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: EV_MC2
Work Order #: 15359

Start Date & Time: April 29, 2015 @ 1545h
Stop Date & Time: MAY 29/15 @ 1330h
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.1	9.9	10.1	10.0	10.1	10.0	10.1	9.7	9.9	9.8	10.1	10.0	9.9
pH	7.0	7.0	7.1	6.9	7.0	6.8	7.0	6.8	6.9	6.8	7.0	6.9	7.0	6.8
Cond. (µS/cm)	–	30		30		29		29		29		29		30
Initials	YML	YML		YML		A		A		YML		YML		YML

Concentration 100	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.1	9.9	10.0	10.1	10.2	10.1	10.1	9.8	9.8	9.9	10.0	10.1	9.9
pH	8.0	8.1	8.0	8.0	8.0	8.0	8.1	8.0	8.1	7.9	8.1	8.0	8.1	7.9
Cond. (µS/cm)	–	309		307		305		306		306		303		302
Initials	YML	YML		YML		A		A		YML		YML		YML

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	100%		
Hardness*	12	166		
Alkalinity*	~~6~~ 8	112		

* mg/L as CaCO3

Analysts: YML, AWD
Reviewed by: KC
Date reviewed: June 24/15

Sample Description: light brown with some particulate

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: EV-MC2
Work Order #: 15359

Start Date & Time: April 29 2015 @ 1545h
Stop Date & Time: May 29 2015 @ 1330h
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	28	29		30 final		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	/	14.0									
DO (mg/L)	10.1	10.0	10.1	/	10.0									
pH	7.1	6.8	6.9	/	6.9									
Cond. (µS/cm)	–	29		32										
Initials	YWL	YWL		YWL										

Concentration 100	Days													
	28	29		30 final		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	/	14.0									
DO (mg/L)	10.0	10.1	9.9	/	10.0									
pH	8.1	7.7	8.0	/	7.8									
Cond. (µS/cm)	–	279		292										
Initials	YWL	YWL		YWL										

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 213 pH meter: 213 Conductivity meter: 213

	Control	100%		
Hardness*	10	144		
Alkalinity*	8	94		

* mg/L as CaCO3

Analysts: YWL
Reviewed by: [signature]
Date reviewed: June 24/15

Sample Description: light brown with some particulate

Comments:

Embryo-Alevin-Fry Toxicity Test
Daily Mortality

KS

Client: Teck
Sample ID: EV MC2
Work Order #: 15359

Start Date & Time: April 29/15 @ 1545h
Stop Date: May 29/15 @ 1330h
Test Species: O. mykiss

Treatments (%) (v/v)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0	0	0	0	0	0	1	1			
	2	1	1	1	1	1	1	0	0			
	3	1	1	1	1	1	1	1	0			
100	4	1	1	1	1	1	1	1	0			
~~62.5~~	1	↓	↓	↓	↓	↓	↓	↓	0			
	2								0			
	3								0			
	4								0			
~~31.25~~	1											
	2											
	3											
	4											
~~15.6~~	1											
	2											
	3											
	4											
~~7.8~~	1											
	2											
	3											
	4											
~~3.9~~	1											
	2											
	3											
	4											
~~1.95~~	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	SSD	SSD	SSD	SSD	SSD	SSD	KS			

Comments: _____

Reviewed by: _____ **Date reviewed:** June 24/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: EV MC2
Work Order #: 15359

Start Date & Time: April 29 2015 @ 1545h
Stop Date: MAY 29/15 @ 1330h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
		8	9	10	11	12	13	14				
Control	1	0	0	0	0	0	0	0	0			
	2	1	0	↓	↓	↓	↓	↓	1			
	3	0	1						1			
	4	0	2						2			
100	1	0	1			↓			1			
	2	0	0			1			1			
	3	1	0			0			1			
	4	0	0	↓	↓	0	↓	↓	0			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	KS			

Comments: _____

Reviewed by: [signature] **Date reviewed:** June 24/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: EV_MC2
Work Order #: 15359

Start Date & Time: April 29 2015 @ 1545h
Stop Date: MAY 29/15 @ 1330h
Test Species: *Oncorhynchus mykiss*

Treatments (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
		① 15	16	17	18	19	20	21				
Control	1	1	0	0	0	0	0	0	1			
	2	0	↓	↓	↓	1	↓	0	1			
	3	↓	↓	↓	↓	0	↓	0	0			
	4	↓	↓	↓	↓	0	↓	1	1			
100	1	↓	↓	↓	↓	0	↓	0	0			
	2	↓	↓	↓	↓	0	1	0	1			
	3	↓	↓	↓	↓	1	0	0②	1			
	4	↓	↓	↓	↓	0	0	2	2			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	MW	AF	AF	AF	MW	MW	KG			

Comments: ①eyed stage (control + 100%) ②starting to hatch

Reviewed by: [signature]
Date reviewed: June 24/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: EV-MC2
Work Order #: 15359

Start Date & Time: April 29, 2015 @ 1545h
Stop Date: May 29/15 @ 1330h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities 22	23 (2)	24	25	26	27	28	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0(2)	0	0	0	0	0 (1)	1	1			
	2	0(2)	0	0	1	1	0	1	3			
	3	0(2)	1	1	0	0	1	0	3			
	4	1(1)	0	0	0	1	0	1	3			
100	1	0(2)	1	0	0	0	|	0	1			
	2	3(1)	0	0	0	0	|	|	3			
	3	1	0	0	0	0	|	|	1			
	4	1(1)	0	0	0	↓	↓	↓	3			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		MW	MW	A	A	MW	MW	MW	KS			

Comments: (1) starting to hatch (2) >50% at alevin stage call)

Reviewed by: [signature]

Date reviewed: June 24/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: EV_MC2
Work Order #: 15359

Start Date & Time: April 29, 2015 @ 1545h
Stop Date: May 29 2015 @ 1330h
Test Species: *Oncorhynchus mykiss*

Concentration (%v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/Alevins	Total Abnormal Alevins	Total Normal Alevins	Total Exposed
		29	30	31	32	33	34	35				
Control	1	0	02						02	1	26	32
	2		0						0	0	24	29
	3								0	0	27	31
	4								0	0	24	30
100	1								0	0	28	30
	2								1	1	24	31
	3		0						0	0	27	30
	4		0						0	1	22	28
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials												

Comments: _____

Reviewed by: _____ **Date reviewed:** June 29/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: EV_MC2

Termination Date: May 29, 2015

Work Order No.: 15359

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control A	1	13.0		✓	- yolksac edema, bent tail, pale + thin
	2	20.0	✓		
	3	21.0	✓		
	4	19.5	✓		
	5	20.0	✓		
	6	20.0	✓		
	7	19.0	✓		
	8	21.0	✓		
	9	21.5	✓		
	10	20.0	✓		
	11	20.0	✓		
	12	21.0	✓		
	13	20.0	✓		
	14	20.0	✓		
	15	20.0	✓		
	16	18.0	✓		
	17	20.5	✓		
	18	21.0	✓		
	19	19.0	✓		
	20	19.0	✓		
	21	19.0	✓		
	22	20.0	✓		
	23	20.0	✓		
	24	20.5	✓		
	25	19.0	✓		
	26	20.0	✓		
	27	19.0	✓		
	28	-		✓	~~- eyed but unhatched~~ YHL
	29	-		✓	~~- eyed but unhatched~~ YHL
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.70 g

Number of survivors: 27 (~~27~~ 26 normal)

Number of deformed/have difficulty swimming: 1

Initials: YHL

Reviewed by: [signature]

Date Reviewed: June 24/15

Alevin Test Data Sheet
Deformities

Client: Tech

Start Date: **April 29, 2015**

Sample ID: **EV_MC2**

Termination Date: **May 29, 2015**

Work Order No.: 15359

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control B	1	18.0	✓		
	2	18.5	✓		
	3	19.5	✓		
	4	19.0	✓		
	5	19.0	✓		
	6	20.0	✓		
	7	19.5	✓		
	8	20.0	✓		
	9	17.0	✓		
	10	20.0	✓		
	11	22.0	✓		
	12	20.0	✓		
	13	20.0	✓		
	14	19.0	✓		
	15	18.0	✓		
	16	19.0	✓		
	17	19.0	✓		
	18	20.0	✓		
	19	19.0	✓		
	20	15.5	✓		
	21	18.0	✓		
	22	18.5	✓		
	23	19.0	✓		
	24	18.5	✓		
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.269

Number of survivors: 24 (24 normal)

Number of deformed/have difficulty swimming: 0

Initials: YYL

Reviewed by: [signature]

Date Reviewed: June 29/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **EV_MC2**

Termination Date: **May 29, 2015**

Work Order No.: 15359

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control C	1	20.5	✓		
	2	19.5	✓		
	3	19.0	✓		
	4	19.0	✓		
	5	20.0	✓		
	6	19.5	✓		
	7	19.0	✓		
	8	19.0	✓		
	9	18.5	✓		
	10	20.0	✓		
	11	17.5	✓		
	12	19.5	✓		
	13	19.0	✓		
	14	19.0	✓		
	15	20.0	✓		
	16	19.5	✓		
	17	19.0	✓		
	18	19.0	✓		
	19	19.5	✓		
	20	19.0	✓		
	21	20.0	✓		
	22	20.0	✓		
	23	20.0	✓		
	24	20.0	✓		
	25	19.0	✓		
	26	19.0	✓		
	27	19.0	✓		
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.573

Number of survivors: 27 (27 normal)

Number of deformed/have difficulty swimming: 0

Initials: YMC

Reviewed by: [signature]

Date Reviewed: June 24/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: EV_MC2

Termination Date: May 29, 2015

Work Order No.: 15359

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control D	1	20.0	✓		
	2	20.0	✓		
	3	21.0	✓		
	4	19.5	✓		
	5	20.0	✓		
	6	21.5	✓		
	7	20.0	✓		
	8	20.5	✓		
	9	21.0	✓		
	10	20.0	✓		
	11	17.5	✓		
	12	20.0	✓		
	13	19.0	✓		
	14	19.5	✓		
	15	20.5	✓		
	16	20.5	✓		
	17	19.5	✓		
	18	19.0	✓		
	19	19.5	✓		
	20	19.5	✓		
	21	21.5	✓		
	22	21.0	✓		
	23	20.0	✓		
	24	~~18.0~~ 18.0	✓		
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.309

Number of survivors: 24 (24 normal)

Number of deformed/have difficulty swimming: 0

Initials: YMW

Reviewed by: [signature]

Date Reviewed: June 24/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **EV_MC2**

Termination Date: **May 29, 2015**

Work Order No.: 15359

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	21.0	✓		
	2	17.5	✓		
	3	20.0	✓		
	4	20.5	✓		
	5	21.0	✓		
	6	20.0	✓		
	7	20.5	✓		
	8	19.0	✓		
	9	19.5	✓		
	10	21.0	✓		
	11	21.0	✓		
	12	21.0	✓		
	13	17.0	✓		
	14	19.0	✓		
	15	20.0	✓		
	16	~~20~~ 21.0	✓		
	17	21.5	✓		
	18	20.0	✓		
	19	20.0	✓		
	20	20.0	✓		
	21	19.5	✓		
	22	19.0	✓		
	23	21.0	✓		
	24	20.5	✓		
	25	20.0	✓		
	26	19.0	✓		
	27	20.0	✓		
	28	19.5	✓		
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.759

Number of survivors: 28 (28 normal)

Number of deformed/have difficulty swimming: 0

Initials: YML

Reviewed by: [signature]

Date Reviewed: June 24/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **EV_MC2**

Termination Date: **May 29, 2015**

Work Order No.: 15359

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	21.0	✓		
	2	21.0	✓		
	3	20.0	✓		
	4	20.0	✓		
	5	19.0	✓		
	6	21.0	✓		
	7	20.5	✓		
	8	20.0	—	✓	yolk sac edema
	9	20.0	✓		
	10	21.0	✓		
	11	21.5	✓		
	12	22.0	✓		
	13	20.0	✓		
	14	20.5	✓		
	15	21.0	✓		
	16	20.5	✓		
	17	21.0	✓		
	18	20.5	✓		
	19	20.0	✓		
	20	21.0	✓		
	21	21.0	✓		
	22	21.0	✓		
	23	20.0	✓		
	24	22.0	✓		
	25	20.0	✓		
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.689

Number of survivors: 25 (25 normal)

Number of deformed/have difficulty swimming: 1

Initials: YMC

Reviewed by: [signature]

Date Reviewed: June 24/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **EV_MC2**

Termination Date: **May 29, 2015**

Work Order No.: 15359

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	20.5	✓		
	2	21.0	✓		
	3	20.0	✓		
	4	20.0	✓		
	5	20.0	✓		
	6	21.0	✓		
	7	21.5	✓		
	8	21.0	✓		
	9	20.0	✓		
	10	20.5	✓		
	11	21.0	✓		
	12	21.0	✓		
	13	21.0	✓		
	14	22.0	✓		
	15	21.0	✓		
	16	20.0	✓		
	17	20.5	✓		
	18	YMC ~~20~~ 21.5	✓		
	19	20.5	✓		
	20	21.5	✓		
	21	21.0	✓		
	22	21.0	✓		
	23	20.0	✓		
	24	20.0	✓		
	25	21.0	✓		
	26	20.0	✓		
	27	21.0	✓		
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.679

Number of survivors: 27 (27 normal)

Number of deformed/have difficulty swimming: 0

Initials: YMC

Reviewed by: [signature]

Date Reviewed: June 29/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: EV_MC2

Termination Date: May 29, 2015

Work Order No.: 15359

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	20.0	/		
	2	19.5	/		
	3	20.0	/		
	4	21.0	/		
	5	20.5	/		
	6	21.0	/		
	7	20.0	/		
	8	19.0	/		
	9	21.5	/		
	10	20.5	/		
	11	20.5	/		
	12	20.0	/		
	13	19.5	/		
	14	18.5	/		
	15	19.0	/		
	16	20.0	/		
	17	15.0	—	√	yolk sac edema, no tail, cranio-facial
	18	20.0	/		
	19	18.0	/		
	20	21.0	/		
	21	21.5	/		
	22	21.0	/		
	23	20.0	/		
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.26g

Number of survivors: 23 (22 normal)

Number of deformed/have difficulty swimming: 1

Initials: YNL

Reviewed by: [signature]

Date Reviewed: June 24/15

Client: Teck Coal (EVO)

W.O.#: 135 KL 15359

Hardness and Alkalinity Datasheet

		Alkalinity					Hardness			
DAY	Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
(0-7)	EV_HC1	Aug 29/15	50	10.1	10.3	198	50	17.1	342	KL
(0-7)	EV_MC2	↓	50	6.7	6.9	130	50	9.8	196	KL
(8-14)	EV_HC1	May 6/15	50 ~~KS~~	9.5	9.6	188	10 ~~KS~~ ①	3.4	340	KS
(8-14)	EV_MC2	May 6/15	50 ~~KS~~	5.9	6.1	114	50 ~~KS~~	7.9	158	KS
(15-21)	EV-HC1	May 13/15	50	9.6	9.8	188	50	16.1	322	KS
(15-21)	EV_MC2	May 13/15	50	~~5.3~~ 6.4	6.6	124	50	9.3	186	KS
(22-28)	EV-HC1	MAY 20/15	50	9.1	9.2	180	50	14.3	286	KS
(22-28)	EV_MC2	MAY 20/15	50	5.8	6.0	112	50	8.3	166	KS
(29-30)	EV_HC1	May 27/15	50	8.0	8.3	154	50	12.3	246	KL
(29-30)	EV_MC2	May 27/15	50	4.9	5.0 ~~#~~ 1	94	50	7.2	144	↓

Notes: ① Diluted to 100.0mL with D.I. water

Reviewed by: [signature]

Date Reviewed: June 23/15

Client: Teck

W.O.#: ~~various~~ 15359

Hardness and Alkalinity Datasheet

Day) Sample ID	Sample Date	Alkalinity: Sample Volume (mL)	Alkalinity: (mL) 0.02N HCL/H_2SO_4 used to pH 4.5	Alkalinity: (mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Alkalinity: Total Alkalinity ($mg/L CaCO_3$)	Hardness: Sample Volume (mL)	Hardness: Volume of 0.01M EDTA Used (mL)	Hardness: Total Hardness ($mg/L CaCO_3$)	Technician
2-7 Dechlor	Apr 29/15	50	0.4	0.5	6	50	0.5	10	MM
8-14 ↓	May 6/15	50	0.4	0.5	6	50	0.4	8	EC
15-21	May 13/15	50	0.4	0.5	6	50	0.4	8	MM
22-28	MAY 20/15	50	0.5	0.6	8	50	0.6	12	KS
~~28~~ 29-30 MC	MAY 27/15	50	0.5	0.6	8	50	0.5	10	KS

Notes:

Reviewed by: KM

Date Reviewed: June 23/15

YuL

~~7~~-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: CM-MC2
Work Order #: 15358
Start Date & Time: ~~April~~ 29/15 @ 1545h
Stop Date & Time: MAY 29/15 @ 1400h
Test Species: *Oncorhynchus mykiss*

0/0 (v/v) Concentration Control	Days													
	0	1		2		3		4		5		6		7 (new)
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.0	14.0
DO (mg/L)	10.1	10.0	10.0	10.0	9.8	10.2	10.1	10.2	10.1	10.2	10.0	10.1	10.1	10.0
pH	6.8	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.1	7.1	7.2	7.2
Cond. (µS/cm)	28	28		28		28		28		28		28		28
Initials	A	SSD		EC		A		A		SSD		CL		SSD

Concentration 100	Days													
	0	1		2		3		4		5		6		7 (new)
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.3	10.4	10.1	10.1	9.8	10.2	10.2	10.2	10.1	10.1	10.0	10.1	10.1	10.0
pH	8.3	8.2	8.2	8.2	8.0	8.1	8.1	8.1	8.2	8.0	8.1	7.9	8.2	7.9
Cond. (µS/cm)	~~369~~	601		602		601		600		608		582		601
Initials	A	SSD		EC		A		A		SSD		CL		SSD

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: DO-1/3 **pH meter:** pH 1/3 **Conductivity meter:** C-1/3

	Control	100%		
Hardness*	10	298		
Alkalinity*	6	174		

* mg/L as CaCO3

Analysts: A, SSD, EC
Reviewed by: CL
Date reviewed: June 24/15

Sample Description: Light brown with some particulat

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: CM-MC2
Work Order #: 15358

Start Date & Time: April 29, 2015 @ 1545h
Stop Date & Time: May 29/15 @ 1400h
Test Species: Oncorhynchus mykiss

(% v/v) Concentration Control	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	9.9	10.1	10.0	9.9	10.2	10.1	9.8	10.1	9.8	10.0	10.1	10.0	10.1	10.1
pH	7.1	7.2	7.2	7.0	7.1	7.1	7.0	7.1	7.1	7.0	7.1	7.1	7.1	7.1
Cond. (µS/cm)	✓	29		29		29		29		29		29		30
Initials	SSD	SSD		YNL		^		^		YNL		YNL		YNL

Concentration 100	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	13.5	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.1	9.9	10.0	10.0	10.2	9.9	10.1	9.9	10.2	10.1	9.9	9.9	10.0
pH	7.9	8.2	8.0	8.1	8.0	8.1	8.1	8.1	8.2	8.1	8.2	8.1	8.1	8.2
Cond. (µS/cm)	✓	482		479		485		482		490		490		485
Initials	SSD	SSD		YNL		^		^		YNL		YNL		YNL

Concentration	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 3/2 **pH meter:** 3/2 **Conductivity meter:** 3/2

	Control	100%		
Hardness*	8	250		
Alkalinity*	6	154		

* mg/L as CaCO3

Analysts: SSD, YNL, AWD
Reviewed by: [signature]
Date reviewed: June 29/15

Sample Description: light brown with some particulate

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: CM_MC2
Work Order #: 15358

Start Date & Time: April 29, 2015 @ 1545
Stop Date & Time: MAY 29/15 @ 1400h
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.0	10.0	10.2	10.1	10.1	9.9	10.1	10.1	10.1	10.1	10.0	10.1	10.0
pH	7.1	7.0	7.1	6.9	7.0	7.1	7.1	7.1	7.1	7.1	7.2	7.0	7.0	6.9
Cond. (µS/cm)	—	32		30		30		30		30		30		31
Initials	YYL	SSD		YYL		AWD		AWD		AWD		YYL		YYL

Concentration 100	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	9.9	10.0	10.1	10.0	10.0	9.8	10.1	9.9	10.1	10.1	10.0	10.2	10.0
pH	8.0	8.3	8.2	8.1	8.0	8.1	8.2	8.1	8.2	8.0	8.1	8.1	8.2	8.0
Cond. (µS/cm)	—	516		518		515		516		516		521		518
Initials	YYL	SSD		YYL		AWD		AWD		AWD		YYL		YYL

Concentration	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	100%		
Hardness*	8	260		
Alkalinity*	6	160		

* mg/L as CaCO3

Analysts: YYL, SSD, AWD
Reviewed by: [signature]
Date reviewed: June 24/15

Sample Description: light brown with some particulate

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: CM_MC2
Work Order #: 15358

Start Date & Time: April 29, 2015 @ 1545h
Stop Date & Time: MAY 29/15 @ 1400h
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.1	9.9	10.1	10.0	10.1	10.0	10.1	9.9	9.9	9.9	10.1	10.0	9.9
pH	7.0	7.0	7.0	6.9	7.0	6.8	7.0	6.8	7.0	6.8	7.0	6.9	7.0	6.8
Cond. (µS/cm)	–	30		30		29		29		29		29		30
Initials	YYL	YYL		YYL		A		A		YYL		YYL		YYL

Concentration 100	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.2	10.1	10.0	10.2	10.0	10.2	10.1	10.1	9.8	9.9	10.1	10.0	9.8	9.7
pH	8.1	8.1	8.1	8.0	8.0	8.0	8.0	8.0	8.1	8.1	8.1	8.1	8.0	8.0
Cond. (µS/cm)	–	494		494		489		490		488		488		487
Initials	YYL	YYL		YYL		A		A		YYL		YYL		YYL

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	100%		
Hardness*	12	250		
Alkalinity*	8	148		

* mg/L as CaCO3

Analysts: YYL, AWD
Reviewed by: [signature]
Date reviewed: June 24/15

Sample Description: light brown with some particulate

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: CM-MC2
Work Order #: 15358

Start Date & Time: April 29 2015 @ 1545 h
Stop Date & Time: May 29 2015 @ 1400 h
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	28	29		30 final		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0		14.0									
DO (mg/L)	9.9	10.0	10.1		10.1									
pH	7.0	6.8	6.9		6.8									
Cond. (µS/cm)	–	29		31										
Initials	YYL	YYL		YYL										

Concentration 100	Days													
	28	29		30 final		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0		14.0									
DO (mg/L)	9.8	10.1	10.1		10.1									
pH	8.0	7.9	7.9		7.9									
Cond. (µS/cm)	–	346		414										
Initials	YYL	YYL		YYL										

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 213 pH meter: 213 Conductivity meter: 213

	Control	100%		
Hardness*	10	190		
Alkalinity*	8	112		

* mg/L as CaCO3

Analysts: YYL
Reviewed by: [signature]
Date reviewed: June 29/15

Sample Description: light brown with some particulate

Comments:

Embryo-Alevin-~~Fry~~ Toxicity Test
Daily Mortality

Client: Teck
Sample ID: CM MC2
Work Order #: 15-358

Start Date & Time: April 29/15 @ 1545h
Stop Date: MAY 29/15 @ 1400h
Test Species: O. mykiss

Treatments (%(v/v))	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0	0	0	0	0	1	0	1			
	2	↓	↓	↓	↓	1	0	0	0			
	3					1	0	0	0			
	4					1	0	0	0			
100	1					1	1	0	1			
	2					1	0	1	2			
	3					1	0	0	1			
	4					0	0	1	2			
	1											
	2							X				
	3											
	4							X				
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		h	SSD	ds	ds	SSD	SSD	SSD	KS			

Comments: _____

Reviewed by: _____ **Date reviewed:** June 24/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: CM MC2
Work Order #: 15358

Start Date & Time: April 29 2015 @ 1545 h
Stop Date: MAY 29/15 @ 1400 h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities 8	9	10	11	12	13	14	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0	0	0	0	0	0	0	0			
	2	↓	↓	↓	↓	↓	0	↓	0			
	3	↓	↓	↓	↓	↓	1	↓	1			
	4	↓	↓	↓	↓	↓	0	↓	0			
100	1	↓	↓	↓	↓	↓	0	↓	0			
	2	↓	↓	↓	↓	↓	0	↓	0			
	3	↓	↓	↓	↓	↓	0	↓	0			
	4	↓	1	↓	↓	↓	1	↓	2			
	1											
	2											
	3											
	4											
	1											
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	3											
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	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	MM	A	A	MM	MM	MM	KS			

Comments:

Reviewed by: [signature] **Date reviewed:** June 24/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: CM_MC2
Work Order #: 153588

Start Date & Time: April 29 2015 @ 1545 h
Stop Date: MAY 29/15 @ 1400 h
Test Species: *Oncorhynchus mykiss*

Treatments (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
		15 ①	16	17	18	19	20	21				
Control	1	0	0	0	0	0	0	0	0			
	2	1	↓	↓	↓	↓	0	↓	1			
	3	0	↓	↓	↓	↓	1	↓	1			
	4	↓	↓	↓	↓	↓	0	↓	0			
100	1	↓	↓	1	↓	1	1	1	4			
	2	↓	↓	0	1	1	1	0	3			
	3	↓	↓	0	↓	2	1	2 ②	5			
	4	↓	1	0	0	~~0~~ M	1	0	2			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
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	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	ww	~~~	~~~	~~~	ww	ww	KS			

Comments: ① eyed stage (cont & 100%) ② starting to hatch

Reviewed by: KS
Date reviewed: June 29/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: CM_MC2
Work Order #: 15358

Start Date & Time: April 29, 2015 @ 1545 h
Stop Date: May 29, 2015 @ 1400 h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
		22	23	24	25	26	27	28				
Control	1	1	0	1	0	1	1	0	4			
	2	1	1	1		1	0	1	4			
	3	0	1	0		2	1	0	3			
	4	1	↓	0		0	0	1	1			
100	1	2	1	2		1	1	1	6			
	2	3	0	0		0	1	1	3			
	3	0	0	1		0	1	1	1			
	4	1	3	0	↓	1	↓	↓	5			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials				AT	AT							

Comments: ① starting to hatch ② >50% at alevin stage (gill)

Reviewed by: [signature]
Date reviewed: June 29/15

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: CM-MC2
Work Order #: 15358

Start Date & Time: April 29, 2015 @ 1545 h
Stop Date: May 29 2015 @ 1400 h
Test Species: *Oncorhynchus mykiss*

Concentration (%v/v)	Rep	Day of Test - No. of Mortalities 29	30	31	32	33	34	35	Total Dead Eggs/Alevins	Total Abnormal Alevins	Total Normal Alevins	Total Exposed
Control	1	0	0						0	2	23	30
	2	0	0						0	0	25	30
	3	0	0						0	0	23	28
	4	1	0						1	0	29	31
100	1	0	0						0	0	20	31
	2	↓	1						1	0	21	30
	3		0						0	0	24	31
	4		0						0	0	19	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		MMC	MMC						MMC	MMC	MMC	MMC

Comments:

Reviewed by: [signature] **Date reviewed:** June 29/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: April 29, 2015

Sample ID: CM_MC2

Termination Date: May 29, 2015

Work Order No.: 15358

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control A	1	19.0	✓		
	2	19.0	✓		
	3	19.0	✓		
	4	19.5	✓		
	5	19.0	✓		
	6	17.0	✓		
	7	19.0	✓		
	8	20.5	✓		
	9	20.5	✓		
	10	19.0	✓		
	11	20.0	✓		
	12	19.0	✓		
	13	18.5	✓		
	14	19.0	✓		
	15	18.0	✓		
	16	19.0	✓		
	17	18.0	✓		
	18	12.5	–	✓	- no tail, yolksac edema, pale
	19	16.0	–	✓	- no tail, yolksac edema, pale
	20	19.0	✓		
	21	19.5	✓		
	22	19.0	✓		
	23	19.5	✓		
	24	19.5	✓		
	25	19.5	✓		
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): ~~1.09g~~ YMC 2.49g

Number of survivors: 25 (23 normal)

Number of deformed/have difficulty swimming: 2

Initials: YMC

Reviewed by: KM

Date Reviewed: June 24/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **CM_MC2**

Termination Date: **May 29, 2015**

Work Order No.: 153580

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control B	1	20.0	✓		
	2	19.0	✓		
	3	20.0	✓		
	4	21.0	✓		
	5	20.0	✓		
	6	21.0	✓		
	7	20.0	✓		
	8	21.5	✓		
	9	21.0	✓		
	10	20.0	✓		
	11	20.5	✓		
	12	19.0	✓		
	13	21.0	✓		
	14	21.5	✓		
	15	21.0	✓		
	16	20.0	✓		
	17	20.0	✓		
	18	21.0	✓		
	19	21.0	✓		
	20	20.5	✓		
	21	20.5	✓		
	22	20.0	✓		
	23	19.5	✓		
	24	19.5	✓		
	25	20.0	✓		
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.41 g

Number of survivors: 25 (25 normal)

Number of deformed/have difficulty swimming: 0

Initials: MWL

Reviewed by: [signature]

Date Reviewed: June 24/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **CM_MC2**

Termination Date: **May 29, 2015**

Work Order No.: 15358

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control C	1	19.5	✓		
	2	21.0	✓		
	3	20.0	✓		
	4	20.0	✓		
	5	20.0	✓		
	6	21.0	✓		
	7	21.0	✓		
	8	21.5	✓		
	9	21.5	✓		
	10	21.0	✓		
	11	21.5	✓		
	12	20.5	✓		
	13	22.0	✓		
	14	20.5	✓		
	15	21.5	✓		
	16	18.5	✓		
	17	20.5	✓		
	18	20.0	✓		
	19	21.0	✓		
	20	21.0	✓		
	21	17.0	✓		
	22	17.5	✓		
	23	16.5	✓		
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.29g

Number of survivors: 23 (23 normal)

Number of deformed/have difficulty swimming: 0

Initials: YNL

Reviewed by: [signature]

Date Reviewed: June 29/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **CM_MC2**

Termination Date: **May 29, 2015**

Work Order No.: 15358

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control D	1	19.0	✓		
	2	21.0	✓		
	3	19.5	✓		
	4	21.0	✓		
	5	19.0	✓		
	6	19.0	✓		
	7	20.5	✓		
	8	21.0	✓		
	9	21.0	✓		
	10	21.0	✓		
	11	19.0	✓		
	12	20.0	✓		
	13	21.0	✓		
	14	19.0	✓		
	15	21.0	✓		
	16	20.0	✓		
	17	21.0	✓		
	18	21.5	✓		
	19	18.0	✓		
	20	19.0	✓		
	21	19.0	✓		
	22	19.5	✓		
	23	20.5	✓		
	24	20.5	✓		
	25	21.0	✓		
	26	19.5	✓		
	27	20.0	✓		
	28	20.5	✓		
	29	20.0	✓		
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.81g

Number of survivors: 29 (29 normal)

Number of deformed/have difficulty swimming: 0

Initials: YWL

Reviewed by: [signature]

Date Reviewed: June 24/15

Alevin Test Data Sheet
Deformities

Client: Teck

Sample ID: ~~LC-LCDSSLCC~~ YMC CM_MC2

Work Order No.: 15358

Start Date: **April 29, 2015**

Termination Date: **May 29, 2015**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	22.0	✓		
	2	20.5	✓		
	3	22.5	✓		
	4	21.0	✓		
	5	21.5	✓		
	6	21.0	✓		
	7	21.0	✓		
	8	22.0	✓		
	9	21.0	✓		
	10	20.5	✓		
	11	21.0	✓		
	12	20.5	✓		
	13	20.0	✓		
	14	22.0	✓		
	15	21.0	✓		
	16	21.0	✓		
	17	21.0	✓		
	18	21.0	✓		
	19	21.0	✓		
	20	21.0	✓		
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.119

Number of survivors: 20 (20 normal)

Number of deformed/have difficulty swimming: 0

Initials: YMC

Reviewed by: [signature]

Date Reviewed: June 24/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **CM_MC2**

Termination Date: **May 29, 2015**

Work Order No.: 153589

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 ~~Control~~ YML B	1	20.0	/		
	2	19.0	/		
	3	20.0	/		
	4	21.0	/		
	5	20.0	/		
	6	21.0	/		
	7	20.0	/		
	8	21.5	/		
	9	21.0	/		
	10	20.0	/		
	11	20.5	/		
	12	19.0	/		
	13	21.0	/		
	14	21.5	/		
	15	21.0	/		
	16	20.0	/		
	17	20.0	/		
	18	21.0	/		
	19	21.0	/		
	20	20.5	/		
	21	20.5	/		
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.029

Number of survivors: 21 (21 normal)

Number of deformed/have difficulty swimming: 0

Initials: YML

Reviewed by: [signature]

Date Reviewed: June 24/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **CM_MC2**

Termination Date: **May 29, 2015**

Work Order No.: 15358

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	19.5	✓		
	2	20.0	✓		
	3	20.0	✓		
	4	20.0	✓		
	5	17.5	✓		
	6	20.5	✓		
	7	18.5	✓		
	8	18.5	✓		
	9	20.0	✓		
	10	20.0	✓		
	11	18.0	✓		
	12	17.0	✓		
	13	19.0	✓		
	14	18.5	✓		
	15	19.0	✓		
	16	17.0	✓		
	17	18.0	✓		
	18	19.0	✓		
	19	18.5	✓		
	20	18.0	✓		
	21	18.5	✓		
	22	16.5	✓		
	23	21.0	✓		
	24	19.0	✓		
	25	~~20.0~~ YMC	~~Live~~		
	26	~~20.0~~ YMC	~~✓~~ YMC		
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): ~~2.32g~~ YMC 2.14 g

Number of survivors: 24 (24 normal)

Number of deformed/have difficulty swimming: 0

Initials: YMC

Reviewed by: [signature]

Date Reviewed: June 24/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **CM_MC2**

Termination Date: **May 29, 2015**

Work Order No.: 15358

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	21.5	✓		
	2	22.5	✓		
	3	20.5	✓		
	4	22.5	✓		
	5	21.0	✓		
	6	20.0	✓		
	7	21.0	✓		
	8	22.0	✓		
	9	21.0	✓		
	10	21.5	✓		
	11	20.0	✓		
	12	21.5	✓		
	13	21.0	✓		
	14	20.0	✓		
	15	21.5	✓		
	16	21.5	✓		
	17	22.0	✓		
	18	21.5	✓		
	19	21.0	✓		
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.00g

Number of survivors: 19 (19 normal)

Number of deformed/have difficulty swimming: 0

Initials: YNC

Reviewed by: [signature]

Date Reviewed: June 29/15

Client: Teck Coal (CMO)

W.O.#: 15358

Hardness and Alkalinity Datasheet

(Day)			Alkalinity					Hardness			
	Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
(0-7)	CM_MC2	Apr 29/15	50	8.9	9.1	174		50	14.9	298	KL
(8-14)	CM-MC2	May 6/15	50 ~~0~~ KS	7.8	7.9	154		50 ~~0~~ KS	12.5	250	KS
(15-21)	CM-MC2	May 13/15	50	8.1	8.2	160		50	13.0	260	KS
(22-28)	CM-MC2	MAY 20/15	50	7.5	7.6	148		50	12.5	250	KS
(29-30)	CM_MC2	May 27/15	50	5.8	6.0	112		50	9.5	190	KL

Notes:

Reviewed by: KL

Date Reviewed: June 24/15

Client: Teck

W.O.#: ~~various~~ 15358 YMC

Hardness and Alkalinity Datasheet

Day	Sample ID	Sample Date	Alkalinity: Sample Volume (mL)	Alkalinity: (mL) 0.02N HCL/H_2SO_4 used to pH 4.5	Alkalinity: (mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Alkalinity: Total Alkalinity ($mg/LCaCO_3$)	Hardness: Sample Volume (mL)	Hardness: Volume of 0.01M EDTA Used (mL)	Hardness: Total Hardness ($mg/L\ CaCO_3$)	Technician
0-7	Dechlor	Apr 29/15	50	0.4	0.5	6	50	0.5	10	YMC
8-14	↓	May 6/15	50	0.4	0.5	6	50	0.4	8	EC
15-21		May 13/15	50	0.4	0.5	6	50	0.4	8	YMC
22-28		MAY 20/15	50	0.5	0.6	8	50	0.6	12	KS
~~28~~ 29-30 YMC	✓	MAY 27/15	50	0.5	0.6	8	50	0.5	10	KS

Notes:

Reviewed by: EC

Date Reviewed: June 24/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-LCDSJLCC
Work Order #: 15364

Start Date & Time: May 29/15 @ 1545 h
Stop Date & Time: MAY 29/15 @ 1430 h
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration: Control	Days														
	0	1		2		3		4		5		6		7	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	SSD new
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.0	14.0	
DO (mg/L)	10.1	10.0	10.1	10.0	9.9	10.2	10.1	10.2	10.1	10.2	10.1	10.1	10.1	10.0	
pH	6.8	7.2	7.3	7.2	7.2	7.2	7.1	7.2	7.1	7.2	7.2	7.1	7.2	7.2	
Cond. (µS/cm)	28	28		28		28		28		28		29		28	
Initials	A	SSD		EC		A		A		SSD		GL		SSD	

Concentration: 100	Days														
	0	1		2		3		4		5		6		7	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	SSD new
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.0	14.0	
DO (mg/L)	10.3	10.2	10.0	10.1	9.9	10.2	10.1	10.1	10.0	10.1	10.1	9.9	10.1	10.1	
pH	8.2	8.2	8.1	8.2	8.1	8.2	8.1	8.2	8.3	8.0	8.2	8.1	8.2	8.1	
Cond. (µS/cm)	623	624		637		635		631		620		620		619	
Initials	A	SSD		EC		A		A		SSD		GL		SSD	

Concentration	Days														
	0	1		2		3		4		5		6		7	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

Concentration	Days														
	0	1		2		3		4		5		6		7	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

DO meter: DO-1/3 **pH meter:** pH 1/3 **Conductivity meter:** C-1/3

	Control	100%		
Hardness*	10	322		
Alkalinity*	6	176		

* mg/L as CaCO3

Analysts: A, SSD, EC
Reviewed by: EC
Date reviewed: June 24/15

Sample Description: Light yellow with some particulates

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: LCDSSLCC
Work Order #: 15364

Start Date & Time: April 29 2015 @ 1545h
Stop Date & Time: MAY 29/15' @ 1430h
Test Species: O. mykiss

(% v/v) Concentration Control	Days 7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.1	10.0	10.0	9.9	10.1	9.9	10.1	9.9	10.0	10.0	10.0	10.0	10.1
pH	7.2	7.2	7.2	7.0	7.1	7.1	7.0	7.1	7.2	7.0	7.0	7.1	7.0	7.1
Cond. (µS/cm)	—	29		29		29		29		29		29		30
Initials	SSD	SSD		YYL		A		A		YYL		YYL		YYL

Concentration 100	Days 7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	13.5	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.1	9.9	10.1	10.1	10.1	9.9	10.2	9.9	10.1	9.9	9.9	9.9	10.0
pH	8.0	8.1	8.0	8.1	8.0	8.1	8.2	8.1	8.2	8.1	8.2	8.1	8.0	8.2
Cond. (µS/cm)	—	529		526		528		530		536		537		532
Initials	SSD	SSD		YYL		A		A		YYL		YYL		YYL

Concentration	Days 7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days 7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 3/2 pH meter: 3/2 Conductivity meter: 3/2

	Control	100%		
Hardness*	8	272		
Alkalinity*	6	162		

* mg/L as CaCO3

Analysts: SSD, YYL, AWD
Reviewed by:
Date reviewed: June 24/15

Sample Description: light yellow with some particulate

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: LCDSSLCC
Work Order #: 15364

Start Date & Time: April 29, 2015 @ 1545
Stop Date & Time: MAY 29/15 @ 1430 h
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.0	9.9	10.2	10.0	10.1	9.9	10.1	9.9	10.1	10.1	10.0	10.2	10.0
pH	7.1	7.0	7.1	6.9	7.1	7.1	7.0	7.1	7.0	7.1	7.2	7.0	7.0	6.9
Cond. (µS/cm)	–	32		30		30		30		30		30		31
Initials	YML	SSD		YML		A		A		A		YML		YML

Concentration 100	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	9.9	9.9	10.0	10.1	10.0	10.1	9.8	10.0	9.8	10.1	10.2	9.9	10.1	10.1
pH	7.9	8.2	8.2	8.0	8.0	8.1	8.2	8.0	8.2	8.1	8.2	8.1	8.2	8.0
Cond. (µS/cm)	–	588		590		586		586		588		593		591
Initials	YML	SSD		YML		A		A		A		YML		YML

Concentration	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	100%		
Hardness*	8	304		
Alkalinity*	6	172		

* mg/L as CaCO3

Analysts: YML, SSD, AWD
Reviewed by:
Date reviewed: June 29/15

Sample Description: light yellow w/ some particulate

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: LCDSSLCC
Work Order #: 15364

Start Date & Time: April 29, 2015 @ 1545h
Stop Date & Time: MAY 29/15 @ 1430h
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.1	10.0	10.1	10.0	10.1	10.0	10.1	9.9	9.9	10.1	10.1	9.9	9.9
pH	7.1	7.0	7.1	6.9	7.0	6.8	7.0	6.8	7.0	6.8	7.0	6.9	7.1	6.8
Cond. (µS/cm)	–	30		30		29		29		29		29		30
Initials	YML	YML		YML		A		A		YML		YML		YML

Concentration 100	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.2	10.0	10.2	9.9	10.2	10.1	10.1	9.8	9.7	10.0	10.0	10.0	9.8
pH	8.1	8.0	8.1	8.0	8.0	8.0	8.0	8.0	8.1	8.1	8.2	8.0	8.1	8.0
Cond. (µS/cm)	–	555		553		546		547		548		545		544
Initials	YML	YML		YML		A		A		YML		YML		YML

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	100%		
Hardness*	12	YML 196 282		
Alkalinity*	8	YML 159 160		

* mg/L as CaCO3

Analysts: YYL, AWD
Reviewed by: [signature]
Date reviewed: June 24/15

Sample Description: light yellow w/ some particulate

Comments:

Embryo-Alevin Freshwater Toxicity Test
Water Quality Measurements

Client: Teck
Sample ID: LC_LCDSSLCC
Work Order #: 15364

Start Date & Time: April 29 2015 @ 1545h
Stop Date & Time: May 29 2015 @ 1430h
Test Species: *Oncorhynchus mykiss*

(% v/v) Concentration Control	Days													
	28	29		30 final		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	/	14.0									
DO (mg/L)	10.1	10.0	9.9	/	10.0									
pH	7.1	6.9	7.0	/	7.0									
Cond. (µS/cm)	–	29		32										
Initials	YML	YML		YML										

Concentration 100	Days													
	28	29		30 final		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	14.0	14.0	14.0	/	14.0									
DO (mg/L)	10.0	9.9	10.0	/	10.1									
pH	8.1	7.9	8.0	/	7.9									
Cond. (µS/cm)	–	YML 376	476	462										
Initials	YML	YML		YML										

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 213 pH meter: 213 Conductivity meter: 213

	Control	100%		
Hardness*	10	196		
Alkalinity*	8	134		

* mg/L as CaCO3

Analysts: YML
Reviewed by: [signature]
Date reviewed: June 24/15

Sample Description: light yellow with some particulate

Comments:

Embryo-Alevin-~~Fry~~ KS Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC LCDSS LCC
Work Order #: 15364

Start Date & Time: April 29/15 @ 1545
Stop Date: May 29/15 @ 1430
Test Species: O. mykiss

Treatments % (v/v)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0	0	0	0	0	0	1	1			
	2							0	0			
	3							1	1			
	4							0	0			
100 % ~~6.25~~ m	1							0	0			
	2							1	1			
	3					1		0	1			
	4					0		0	0			
~~12.5~~ m	1											
	2											
	3											
	4											
~~25~~ m	1											
	2											
	3											
	4											
~~50~~ m	1											
	2											
	3											
	4											
~~100~~ m	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		m	SSD	m	m	SSD	SSD	SSD	KS			

Comments:

Reviewed by: _____ **Date reviewed:** _____

Nautilus Environmental

Version 1.0 Issued June 26, 2006

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC LCDSSL CC
Work Order #: 153664

Start Date & Time: April 29 2015 @ 1545
Stop Date: May 29/15 @ 1430
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities 8	9	10	11	12	13	14	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	3	1	1	0	0	0	0	5			
	2	0	0	0		0			0			
	3					1			1			
	4					0			0			
100	1					0			0			
	2					0			0			
	3					1			2			
	4	1				1		0	2			
	1											
	2											
	3											
	4											
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	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	MW	A	A	MW	MW	MW	KS			

Comments: _____

Reviewed by: _____ **Date reviewed:** _____

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: TRCR
Sample ID: LC-LCDSSLCC
Work Order #: 153694

Start Date & Time: April 29 2015 @ 1545
Stop Date: May 29/15 @ 1430
Test Species: *Oncorhynchus mykiss*

Treatments (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
		15 (1)	16	17	18	19	20	21				
Control	1	0	0	0	0	0	0	1	1			
	2	0			1		0	0	1			
	3	0			0		0	1	1			
	4	1			0		1	0	2			
100	1	1			1		2	1	5			
	2	0			0		1	0	1			
	3	0			0		0	1	1			
	4	0	↓	↓	0	↓	1	1	2			
	1											
	2											
	3											
	4											
	1											
	2											
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	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	[illegible]	∩	∩	∩	[illegible]	[illegible]	VS			

Comments: Ⓞ eyed stage (count & 100's)

Reviewed by: _____ **Date reviewed:** _____

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC LCDSSLCC
Work Order #: 15364

Start Date & Time: April 29, 2015 @ 1545
Stop Date: May 29, 2015 @ 1430
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities 22	23	24	25	26	27	28	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0	1	0	0	1	1	0	3			
	2	1	0	2	1	1	1		5			
	3	0	1	0		3	0		4			
	4	0	0	1		0	1		2			
100	1	10	0	0			0		1			
	2	10	1	0	1		1	1	4			
	3	10	1	1	0			0	3			
	4	10	1	0	0			1	3			
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		MM	MM	AS	MM	MM	MM	MM	MM			

Comments: ① starting to hatch ② > 50% alevin stage (all)

Reviewed by: _____ **Date reviewed:** _____

Embryo-Alevin Freshwater Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_LCOSSLCC
Work Order #: 15364

Start Date & Time: April 29, 2015 @ 1545
Stop Date: May 29 '2015 @ 1430
Test Species: *Oncorhynchus mykiss*

Concentration (%v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/Alevins	Total Abnormal Alevins	Total Normal Alevins	Total Exposed
		29	30	31	32	33	34	35				
Control	1	0	0						0	2	18	30
	2	0	↓						0	0	24	30
	3	0							0	0	23	30
	4	1							1	1	24	30
100	1	0							0	3	21	30
	2	0							0	0	24	30
	3	0							0	1	23	31
	4	0	↓						0	0	22	29
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		YML	YML						YML	YML	YML	YML

Comments: _____

Reviewed by: _____ **Date reviewed:** _____

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **LC_LCDSSLCC**

Termination Date: **May 29, 2015**

Work Order No.: 15364

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control A	1	19.0	✓		
	2	19.0	✓		
	3	19.0	✓		
	4	19.5	✓		
	5	19.0	✓		
	6	17.0	✓		
	7	19.0	✓		
	8	20.5	✓		
	9	20.5	✓		
	10	19.0	✓		
	11	20.0	✓		
	12	19.0	✓		
	13	18.5	✓		
	14	19.0	✓		
	15	18.0	✓		
	16	19.0	✓		
	17	18.0	✓		
	18	12.5	—	✓	-no tail, yolksac edema, pale pigmentation
	19	16.0	—	✓	-no tail, yolksac edema, pale pigmentation.
	20	18.0	✓		
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.99 g

Number of survivors: 20 (18 normal)

Number of deformed/have difficulty swimming:

Initials: YNL

Reviewed by:

Date Reviewed: June 24/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **LC_LCDSSLCC**

Termination Date: **May 29, 2015**

Work Order No.: 15364

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control B	1	19.0	✓		
	2	19.5	✓		
	3	18.5	✓		
	4	20.0	✓		
	5	19.0	✓		
	6	20.0	✓		
	7	21.0	✓		
	8	20.0	✓		
	9	21.0	✓		
	10	20.0	✓		
	11	21.5	✓		
	12	21.0	✓		
	13	20.0	✓		
	14	20.5	✓		
	15	19.0	✓		
	16	21.0	✓		
	17	21.5	✓		
	18	21.0	✓		
	19	20.0	✓		
	20	20.0	✓		
	21	21.0	✓		
	22	21.0	✓		
	23	20.5	✓		
	24	20.5	✓		
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.31 g

Number of survivors: 24 (24 normal)

Number of deformed/have difficulty swimming: 0

Initials: YMC

Reviewed by: [signature]

Date Reviewed: June 24/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **LC_LCDSSLCC**

Termination Date: **May 29, 2015**

Work Order No.: 15364

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control C	1	19.5	✓		
	2	21.0	✓		
	3	20.0	✓		
	4	20.0	✓		
	5	20.0	✓		
	6	21.0	✓		
	7	21.0	✓		
	8	21.5	✓		
	9	21.5	✓		
	10	21.0	✓		
	11	21.5	✓		
	12	20.5	✓		
	13	22.0	✓		
	14	20.5	✓		
	15	21.5	✓		
	16	18.5	✓		
	17	20.5	✓		
	18	20.0	✓		
	19	21.0	✓		
	20	21.0	✓		
	21	17.0	✓		
	22	17.5	✓		
	23	16.5	✓		
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.29 g

Number of survivors: 23 (23 normal)

Number of deformed/have difficulty swimming: 0

Initials: YMC

Reviewed by: [signature]

Date Reviewed: June 24/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: LC_LCDSSLCC

Termination Date: **May 29, 2015**

Work Order No.: 15364

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control D	1	21.0	✓		
	2	20.5	✓		
	3	20.0	✓		
	4	17.5	✓		
	5	20.0	✓		
	6	20.0	✓		
	7	20.0	✓		
	8	18.0	✓		
	9	19.0	✓		
	10	17.5	✓		
	11	20.0	✓		
	12	20.0	✓		
	13	19.0	✓		
	14	20.5	✓		
	15	20.0	✓		
	16	20.0	✓		
	17	18.5	✓		
	18	19.0	✓		
	19	19.5	✓		
	20	17.0	✓		
	21	18.0	✓		
	22	19.0	✓		
	23	19.5	✓		
	24	20.5	✓		
	25	15.5	–	✓	- missing tail
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.46g

Number of survivors: 25 (24 normal)

Number of deformed/have difficulty swimming: 1

Initials: YM

Reviewed by: [signature]

Date Reviewed: June 24/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: ~~CM MG2~~ LC_LCDS3LCC

Termination Date: **May 29, 2015**

Work Order No.: 15364

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	20.0	✓		
	2	21.0	✓		
	3	21.0	✓		
	4	20.0	✓		
	5	21.0	✓		
	6	19.5	✓		
	7	21.0	✓		
	8	21.0	✓		
	9	19.5	✓		
	10	20.0	✓		
	11	20.0	✓		
	12	19.0	✓		
	13	20.5	✓		
	14	17.5	✓		
	15	19.0	✓		
	16	19.5	✓		
	17	20.0	✓		
	18	20.5	✓		
	19	19.0	✓		
	20	19.5	✓		
	21	17.0	✓		
	22	14.0	–	✓	-yolksac edema, craniofacial deformity
	23	14.0	–	✓	-yolksac edema
	24	14.5	–	✓	-yolksac edema
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.39g

Number of survivors: 24 (21 normal)

Number of deformed/have difficulty swimming: 3

Initials: YMC

Reviewed by: [signature]

Date Reviewed: June 24/15

Alevin Test Data Sheet
Deformities

Client: Teck

Sample ID: ~~CM-MC2~~ YML LC_LCDSSLCC

Work Order No.: 15364

Start Date: **April 29, 2015**

Termination Date: **May 29, 2015**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	19.0	✓		
	2	19.5	✓		
	3	19.0	✓		
	4	18.0	✓		
	5	18.0	✓		
	6	18.0	✓		
	7	20.0	✓		
	8	19.0	✓		
	9	17.0	✓		
	10	20.0	✓		
	11	17.0	✓		
	12	20.0	✓		
	13	19.0	✓		
	14	19.0	✓		
	15	19.0	✓		
	16	21.0	✓		
	17	19.0	✓		
	18	20.0	✓		
	19	20.0	✓		
	20	20.0	✓		
	21	18.0	✓		
	22	20.0	✓		
	23	18.5	✓		
	24	19.0	✓		
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.219 g

Number of survivors: 24 (24 normal)

Number of deformed/have difficulty swimming: 0

Initials: YML

Reviewed by: [signature]

Date Reviewed: June 24/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **LC_LCDSSLCC**

Termination Date: **May 29, 2015**

Work Order No.: 153604

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	21.0	✓		
	2	21.5	✓		
	3	21.0	✓		
	4	22.0	✓		
	5	20.0	✓		
	6	20.0	✓		
	7	20.5	✓		
	8	20.0	✓		
	9	19.5	✓		
	10	21.0	✓		
	11	21.0	✓		
	12	20.5	✓		
	13	20.0	✓		
	14	21.0	✓		
	15	18.5	✓		
	16	20.0	✓		
	17	20.0	✓		
	18	21.0	✓		
	19	18.5	✓		
	20	20.0	✓		
	21	21.5	✓		
	22	21.0	✓		
	23	22.0	✓		
	24	17.5	—	✓	- yolksac edema
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.473

Number of survivors: 24 (23 normal)

Number of deformed/have difficulty swimming: 1

Initials: YWL

Reviewed by: [signature]

Date Reviewed: June 24/15

Alevin Test Data Sheet
Deformities

Client: Teck

Start Date: **April 29, 2015**

Sample ID: **LC_LCDSSLCC**

Termination Date: **May 29, 2015**

Work Order No.: 153694

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	20.0	✓		
	2	19.5	✓		
	3	21.5	✓		
	4	21.0	✓		
	5	20.0	✓		
	6	20.5	✓		
	7	22.0	✓		
	8	21.0	✓		
	9	21.5	✓		
	10	22.0	✓		
	11	20.0	✓		
	12	20.0	✓		
	13	19.0	✓		
	14	20.0	✓		
	15	20.0	✓		
	16	20.0	✓		
	17	19.5	✓		
	18	21.5	✓		
	19	21.5	✓		
	20	20.0	✓		
	21	20.5	✓		
	22	22.0	✓		
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.29g

Number of survivors: 22 (22 normal)

Number of deformed/have difficulty swimming: 0

Initials: MMC

Reviewed by: [signature]

Date Reviewed: June 24/15

Client: Teck Coal (LCO)

W.O.#: 15364

Hardness and Alkalinity Datasheet

		Alkalinity					Hardness			
(DOY)	Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
(0-7)	LC_LCDSSLCC	Apr 29/15 *	50	9.0	9.2	176	50	16.1	322	KL
(8-14)	LC-LCDSSLCC	May6/15	50 e KS	8.3	8.5	162	50 e KS	13.6	272	KS
(15-21)	LC-LCDSSLCC	May13/15	50	8.7	8.8	172	50	15.2	304	KS
(22-28)	LC-LCDSSLCC	MAY20/15	50	8.2	8.4	160	50	14.1	282	KS
(29-30)	LC-LCDSSLCC	May27/15	50	6.8 KL 9	7.1	134	50	9.8	196	KL

Notes:

Reviewed by: [signature]

Date Reviewed: June 24/15

Client: Teck

W.O.#: ~~various~~ 15364 YMC

Hardness and Alkalinity Datasheet

(Day)			Alkalinity				Hardness			
	Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/L CaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L CaCO_3$)	Technician
0-7	Dechlor	Apr 29/15	50	0.4	0.5	6	50	0.5	10	YMC
8-14	↓	May 6/15	50	0.4	0.5	6	50	0.4	8	EC
15-21	↓	May 13/15	50	0.4	0.5	6	50	0.4	8	YMC
22-28	↓	MAY 20/15	50	0.5	0.6	8	50	0.6	12	KS
~~28~~ 29-35 YMC	↓	MAY 27/15	50	0.5	0.6	8	50	0.5	10	KS

Notes:

Reviewed by: [signature]

Date Reviewed: June 24/15

CETIS Summary Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Batch ID:	01-5521-3113	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 18h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	02-2324-3825	28 Apr-15 09:02	29 Apr-15 07:20	31h (8.5 °C)	Teck Coal	
GH_ER2	01-6818-1046	28 Apr-15	29 Apr-15 07:20	40h (7 °C)		
FR_FRCP1	05-6493-7701	28 Apr-15 10:30	29 Apr-15 07:20	29h (8.5 °C)		
GH_FR1	04-0342-2568	28 Apr-15 08:40	29 Apr-15 07:20	31h (7 °C)		
GH_ERC	05-7162-3210	28 Apr-15 07:40	29 Apr-15 07:20	32h (7 °C)		
EV_HC1	17-6997-4694	28 Apr-15 08:40	29 Apr-15 07:20	31h (6.5 °C)		
EV_MC2	06-5856-0786	28 Apr-15 12:05	29 Apr-15 07:20	28h (6.5 °C)		
CM_MC2	15-7434-2364	28 Apr-15 09:20	29 Apr-15 07:20	30h (5.8 °C)		
LC_LCDSSLCC	14-0968-3826	28 Apr-15 10:27	29 Apr-15 07:20	29h (8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1		
GH_ER2	Water Sample	Teck Coal	GH_ER2		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
GH_ERC	Water Sample	Teck Coal	GH_ERC		
EV_HC1	Water Sample	Teck Coal	EV_HC1		
EV_MC2	Water Sample	Teck Coal	EV_MC2		
CM_MC2	Water Sample	Teck Coal	CM_MC2		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC		

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
FR_UFR1	4	0.7757	0.6547	0.8966	0.6667	0.8333	0.038	0.07601	9.8%	0.0%
GH_ER2	4	0.5362	0.2264	0.846	0.3333	0.7586	0.09735	0.1947	36.31%	30.88%
FR_FRCP1	4	0.739	0.5015	0.9765	0.5161	0.8333	0.07463	0.1493	20.2%	4.73%
GH_FR1	4	0.7549	0.5878	0.9219	0.6	0.8333	0.05249	0.105	13.91%	2.68%
GH_ERC	4	0.5797	0.3934	0.766	0.4839	0.75	0.05854	0.1171	20.19%	25.26%
EV_HC1	4	0.6941	0.4152	0.973	0.5333	0.9333	0.08764	0.1753	25.25%	10.52%
EV_MC2	4	0.8653	0.768	0.9626	0.8065	0.9333	0.03058	0.06116	7.07%	-11.56%
CM_MC2	4	0.6882	0.5859	0.7905	0.6333	0.7742	0.03214	0.06428	9.34%	11.28%
LC_LCDSSLCC	4	0.7832	0.7507	0.8157	0.7586	0.8	0.01021	0.02041	2.61%	-0.97%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	0.8214	0.6667	0.8333	0.7813
GH_ER2	0.6333	0.7586	0.3333	0.4194
FR_FRCP1	0.5161	0.8333	0.8	0.8065
GH_FR1	0.8333	0.7931	0.6	0.7931
GH_ERC	0.5517	0.75	0.5333	0.4839
EV_HC1	0.9333	0.7097	0.6	0.5333
EV_MC2	0.9333	0.8065	0.9	0.8214
CM_MC2	0.6452	0.7	0.7742	0.6333
LC_LCDSSLCC	0.8	0.8	0.7742	0.7586

FR_UFR1 is a site control

July 24/15

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	23/28	20/30	25/30	25/32
GH_ER2	19/30	22/29	10/30	13/31
FR_FRCP1	16/31	25/30	24/30	25/31
GH_FR1	25/30	23/29	18/30	23/29
GH_ERC	16/29	21/28	16/30	15/31
EV_HC1	28/30	22/31	18/30	16/30
EV_MC2	28/30	25/31	27/30	23/28
CM_MC2	20/31	21/30	24/31	19/30
LC_LCDSSLCC	24/30	24/30	24/31	22/29

FR_UFR1 is a site control

July 24/15

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	18-6361-3100	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	06-7849-4849	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 18h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control ~~FR_UFR1~~	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
FR_UFR1 ~~FR_UFR1~~	02-2324-3825	28 Apr-15 09:02	29 Apr-15 07:20	31h (8.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	8.6%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control ~~FR_UFR1~~		FR_UFR1	2.049	1.943	0.098	6	0.0432	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02149972	0.02149972	1	4.2	0.0863	Non-Significant Effect
Error	0.03071626	0.005119376	6			
Total	0.05221597		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.237	47.47	0.3605	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9138	0.6451	0.3819	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.8569	0.8036	0.9102	0.85	0.8276	0.9	0.01675	3.91%	0.0%
FR_UFR1	4	0.7757	0.6547	0.8966	0.8013	0.6667	0.8333	0.038	9.8%	9.48%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.185	1.107	1.263	1.174	1.143	1.249	0.02458	4.15%	0.0%
FR_UFR1	4	1.081	0.9403	1.222	1.109	0.9553	1.15	0.04422	8.18%	8.75%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.9	0.8333	0.8667	0.8276
FR_UFR1	0.8214	0.6667	0.8333	0.7813

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1.249	1.15	1.197	1.143
FR_UFR1	1.135	0.9553	1.15	1.084

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control ~~FR_UFR1~~	27/30	25/30	26/30	24/29
FR_UFR1	23/28	20/30	25/30	25/32

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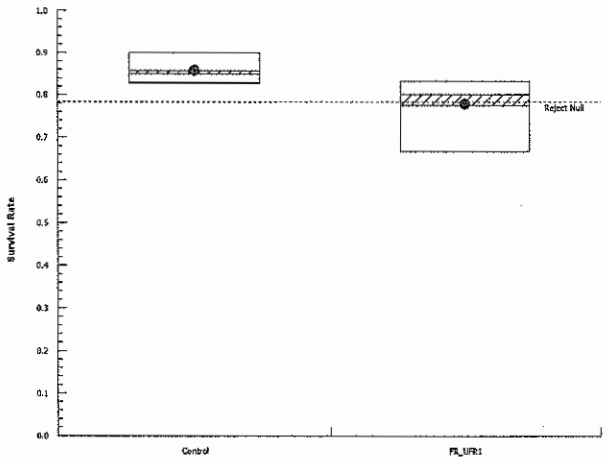
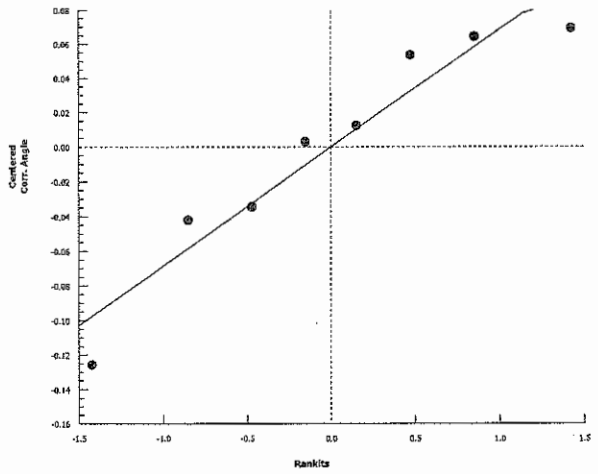
Salmonid Embryo-Alevin Survival and Development Test | **Nautilus Environmental**

Analysis ID:	18-6361-3100	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





July 24/15

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	06-1412-4872	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:20	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	15-4503-3924	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 12:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
GH_ER2	01-6818-1046	28 Apr-15	29 Apr-15 07:20	40h (7 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
GH_ER2	Water Sample	Teck Coal	GH_ER2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	17.9%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control-GHER2		GH_ER2	3.759	1.943	0.200	6	0.0047	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.2997727	0.2997727	1	14.13	0.0094	Significant Effect
Error	0.1272887	0.02121478	6			
Total	0.4270613		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	20.83	47.47	0.0328	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9871	0.6451	0.9892	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.8753	0.8277	0.9229	0.8839	0.8333	0.9	0.01494	3.41%	0.0%
GH_ER2	4	0.5362	0.2264	0.846	0.5263	0.3333	0.7586	0.09735	36.31%	38.75%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.212	1.141	1.282	1.223	1.15	1.249	0.02204	3.64%	0.0%
GH_ER2	4	0.8244	0.5042	1.145	0.8124	0.6155	1.057	0.1006	24.41%	31.96%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.8929	0.9	0.8333	0.875
GH_ER2	0.6333	0.7586	0.3333	0.4194

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1.237	1.249	1.15	1.209
GH_ER2	0.9204	1.057	0.6155	0.7044

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	25/28	27/30	25/30	28/32
GH_ER2	19/30	22/29	10/30	13/31

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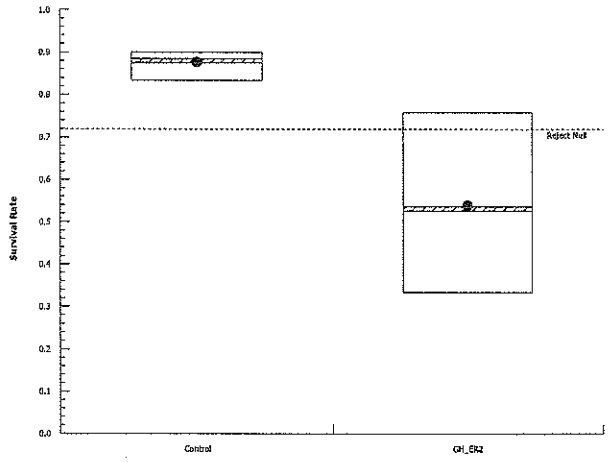
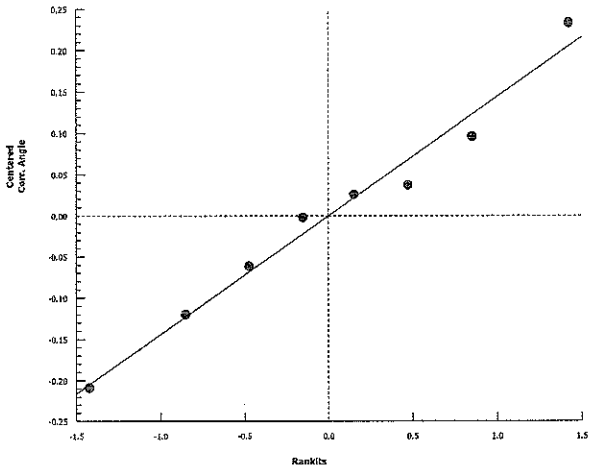
Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID:	06-1412-4872	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:20	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





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CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	12-7021-7459	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:32	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-0178-4273	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 10:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
FR_FRCP1	05-6493-7701	28 Apr-15 10:30	29 Apr-15 07:20	29h (8.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	13.8%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control ~~FR_FRCP1~~		FR_FRCP1	2.235	1.943	0.170	6	0.0334	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.07679061	0.07679061	1	4.996	0.0668	Non-Significant Effect
Error	0.09221381	0.01536897	6			
Total	0.1690044		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	6.058	47.47	0.1732	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8235	0.6451	0.0508	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.8917	0.8249	0.9584	0.9	0.8333	0.9333	0.02097	4.7%	0.0%
FR_FRCP1	4	0.739	0.5015	0.9765	0.8032	0.5161	0.8333	0.07463	20.2%	17.12%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.239	1.134	1.345	1.249	1.15	1.31	0.033	5.32%	0.0%
FR_FRCP1	4	1.044	0.7851	1.302	1.111	0.8015	1.15	0.08121	15.56%	15.81%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.9333	0.8333	0.9	0.9
FR_FRCP1	0.5161	0.8333	0.8	0.8065

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1.31	1.15	1.249	1.249
FR_FRCP1	0.8015	1.15	1.107	1.115

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	28/30	25/30	27/30	27/30
FR_FRCP1	16/31	25/30	24/30	25/31

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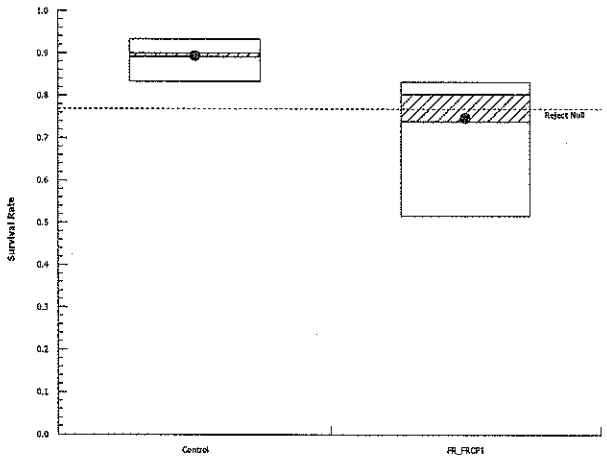
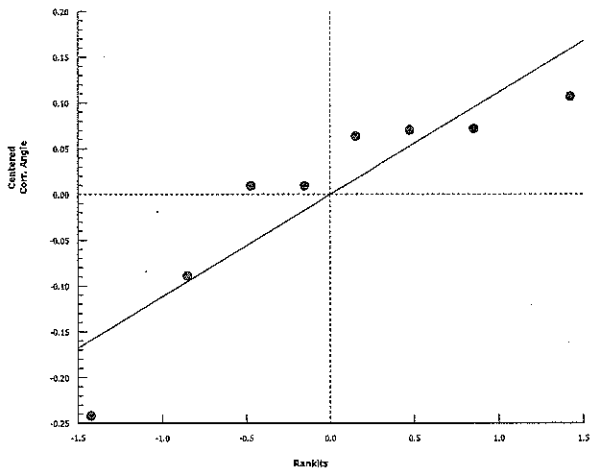
Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID:	12-7021-7459	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:32	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





July 24/15

CETIS Analytical Report

Test Code: 15361-GH_FR1a | 09-3436-7831

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	05-9823-8688	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:45	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	11-3405-4903	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
GH_FR1	04-0342-2568	28 Apr-15 08:40	29 Apr-15 07:20	31h (7 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
GH_FR1	Water Sample	Teck Coal	GH_FR1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	13.0%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control ~~GH_FR1~~		GH_FR1	1.643	1.943	0.144	6	0.0757	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0297403	0.0297403	1	2.7	0.1514	Non-Significant Effect
Error	0.06607948	0.01101325	6			
Total	0.09581979		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.674	47.47	0.6827	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9716	0.6451	0.9106	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.8505	0.758	0.9431	0.8301	0.8065	0.9355	0.02908	6.84%	0.0%
GH_FR1	4	0.7549	0.5878	0.9219	0.7931	0.6	0.8333	0.05249	13.91%	11.24%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.18	1.036	1.325	1.146	1.115	1.314	0.04538	7.69%	0.0%
GH_FR1	4	1.058	0.8715	1.245	1.099	0.8861	1.15	0.05871	11.09%	10.33%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.9355	0.8214	0.8065	0.8387
GH_FR1	0.8333	0.7931	0.6	0.7931

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1.314	1.135	1.115	1.158
GH_FR1	1.15	1.099	0.8861	1.099

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	29/31	23/28	25/31	26/31
GH_FR1	25/30	23/29	18/30	23/29

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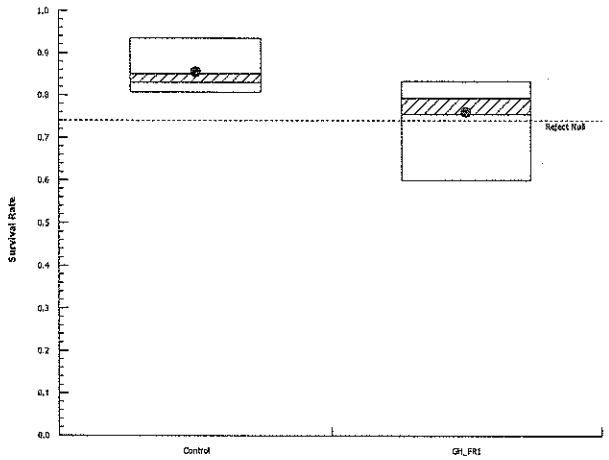
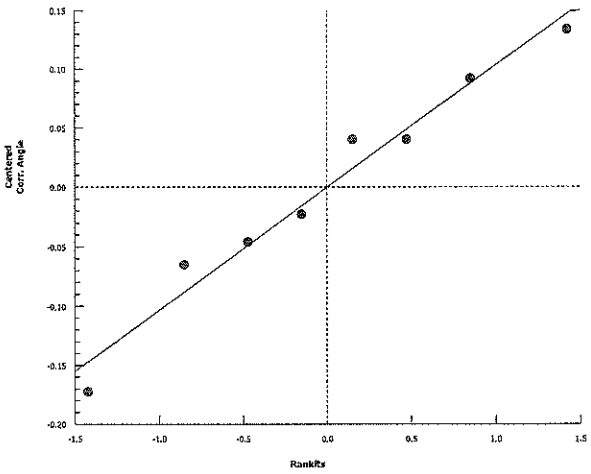
Salmonid Embryo-Alevin Survival and Development Test | **Nautilus Environmental**

Analysis ID:	05-9823-8688	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:45	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





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Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	02-9576-3995	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:56	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	20-0373-2907	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 11:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
GH_ERC	05-7162-3210	28 Apr-15 07:40	29 Apr-15 07:20	32h (7 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
GH_ERC	Water Sample	Teck Coal	GH_ERC		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	15.5%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control~GH_ERC		GH_ERC	3.484	1.943	0.167	6	0.0065	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1789294	0.1789294	1	12.14	0.0131	Significant Effect
Error	0.08846924	0.01474487	6			
Total	0.2673987		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.046	47.47	0.9713	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9437	0.6451	0.6483	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.8384	0.6997	0.9772	0.8493	0.7241	0.931	0.0436	10.4%	0.0%
GH_ERC	4	0.5797	0.3934	0.766	0.5425	0.4839	0.75	0.05854	20.19%	30.86%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.167	0.9762	1.358	1.173	1.018	1.305	0.06003	10.29%	0.0%
GH_ERC	4	0.8681	0.6727	1.063	0.828	0.7693	1.047	0.0614	14.14%	25.63%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.871	0.7241	0.8276	0.931
GH_ERC	0.5517	0.75	0.5333	0.4839

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1.203	1.018	1.143	1.305
GH_ERC	0.8372	1.047	0.8188	0.7693

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	27/31	21/29	24/29	27/29
GH_ERC	16/29	21/28	16/30	15/31

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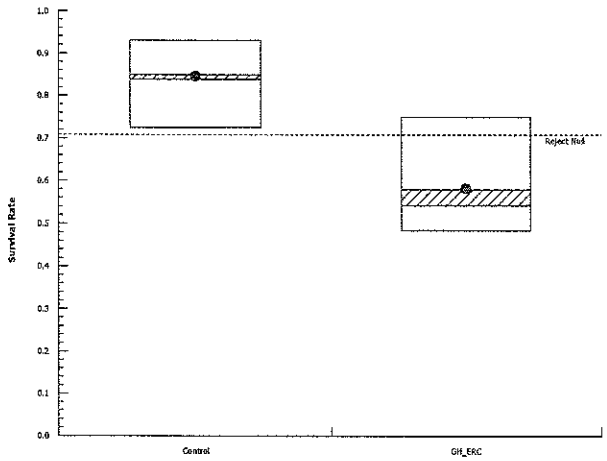
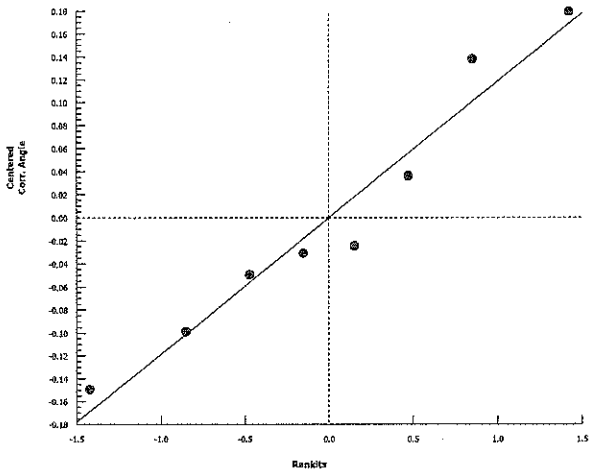
Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID:	02-9576-3995	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:56	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





July 24/15

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	05-0536-4488	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	16-1248-1807	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 12:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 21h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
EV_MC2	06-5856-0786	28 Apr-15 12:05	29 Apr-15 07:20	28h (6.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
EV_MC2	Water Sample	Teck Coal	EV_MC2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	9.33%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control-EV_MC2		EV_MC2	-0.9429	1.943	0.098	6	0.8089	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004555915	0.004555915	1	0.889	0.3821	Non-Significant Effect
Error	0.03074839	0.005124731	6			
Total	0.0353043		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	5.313	47.47	0.2036	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9645	0.6451	0.8516	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.8356	0.7883	0.8829	0.8357	0.8	0.871	0.01486	3.56%	0.0%
EV_MC2	4	0.8653	0.768	0.9626	0.8607	0.8065	0.9333	0.03058	7.07%	-3.56%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.154	1.09	1.219	1.154	1.107	1.203	0.02015	3.49%	0.0%
EV_MC2	4	1.202	1.054	1.35	1.192	1.115	1.31	0.04644	7.73%	-4.13%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.8438	0.8276	0.871	0.8
EV_MC2	0.9333	0.8065	0.9	0.8214

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1.164	1.143	1.203	1.107
EV_MC2	1.31	1.115	1.249	1.135

Survival Rate Binomials

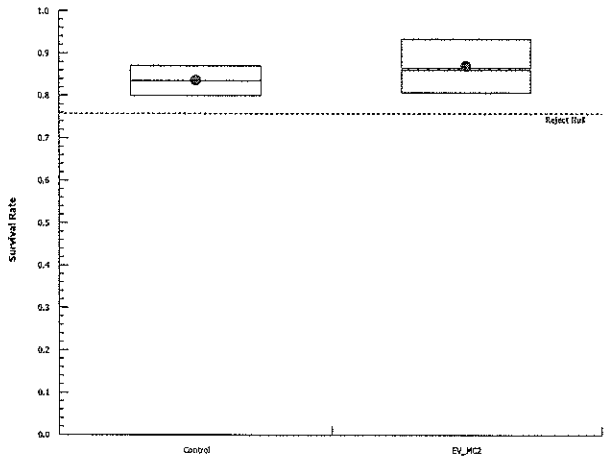
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	27/32	24/29	27/31	24/30
EV_MC2	28/30	25/31	27/30	23/28

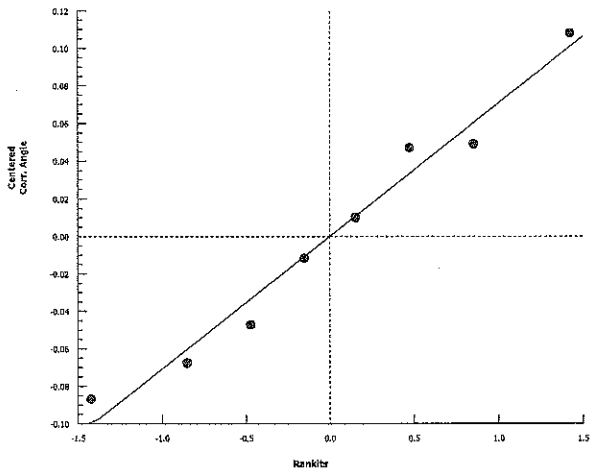
July 24/15

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID:	05-0536-4488	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





July 24/15

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	14-7784-2572	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:17	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	00-3768-9217	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 13:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
EV_HC1	17-6997-4694	28 Apr-15 08:40	29 Apr-15 07:20	31h (6.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
EV_HC1	Water Sample	Teck Coal	EV_HC1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	16.1%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control-EV_HC1		EV_HC1	2.597	1.943	0.223	6	0.0204	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1770926	0.1770926	1	6.745	0.0408	Significant Effect
Error	0.1575291	0.02625486	6			
Total	0.3346218		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	8.915	47.47	0.1054	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9118	0.6451	0.3670	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.9259	0.8655	0.9862	0.931	0.875	0.9667	0.01896	4.1%	0.0%
EV_HC1	4	0.6941	0.4152	0.973	0.6548	0.5333	0.9333	0.08764	25.25%	25.04%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.302	1.186	1.417	1.305	1.209	1.387	0.03639	5.59%	0.0%
EV_HC1	4	1.004	0.6583	1.35	0.9439	0.8188	1.31	0.1086	21.64%	22.86%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.875	0.9667	0.9286	0.9333
EV_HC1	0.9333	0.7097	0.6	0.5333

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1.209	1.387	1.3	1.31
EV_HC1	1.31	1.002	0.8861	0.8188

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	28/32	29/30	26/28	28/30
EV_HC1	28/30	22/31	18/30	16/30

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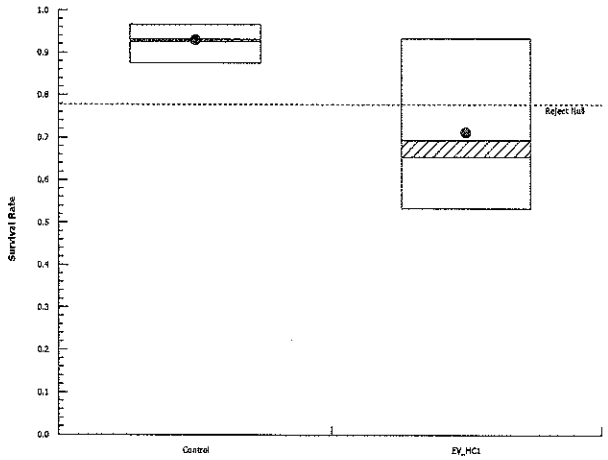
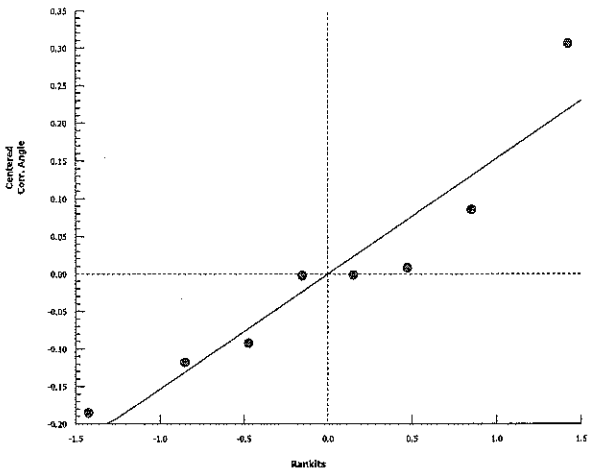
Analysis ID:	14-7784-2572	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:17	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





July 24/15

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	05-0987-4885	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	09-0090-0573	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 14:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
CM_MC2	15-7434-2364	28 Apr-15 09:20	29 Apr-15 07:20	30h (5.8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
CM_MC2	Water Sample	Teck Coal	CM_MC2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	9.13%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control-CM_MC2		CM_MC2	3.751	1.943	0.107	6	0.0047	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.08594643	0.08594643	1	14.07	0.0095	Significant Effect
Error	0.0366412	0.006106867	6			
Total	0.1225876		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.433	47.47	0.7748	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.7879	0.6451	0.0212	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.8559	0.771	0.9408	0.8333	0.8214	0.9355	0.02668	6.23%	0.0%
CM_MC2	4	0.6882	0.5859	0.7905	0.6726	0.6333	0.7742	0.03214	9.34%	19.6%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.187	1.052	1.322	1.15	1.135	1.314	0.04241	7.14%	0.0%
CM_MC2	4	0.98	0.8672	1.093	0.9619	0.9204	1.076	0.03543	7.23%	17.46%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.8333	0.8333	0.8214	0.9355
CM_MC2	0.6452	0.7	0.7742	0.6333

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1.15	1.15	1.135	1.314
CM_MC2	0.9327	0.9912	1.076	0.9204

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	25/30	25/30	23/28	29/31
CM_MC2	20/31	21/30	24/31	19/30

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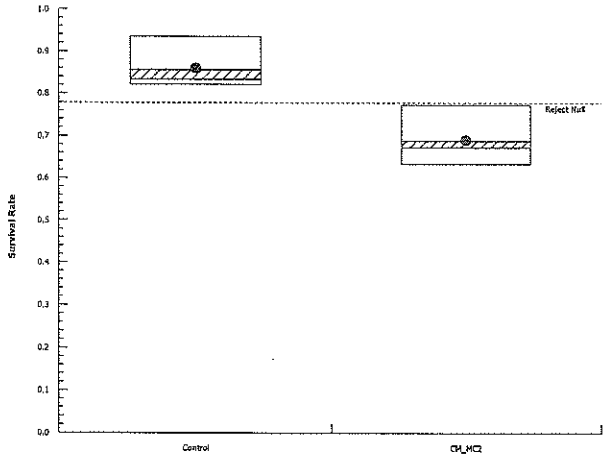
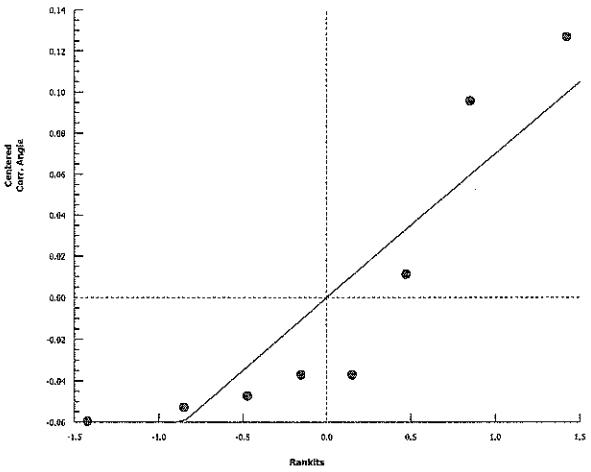
Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID:	05-0987-4885	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





July 24/15

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	21-2942-6266	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-3350-5051	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 14:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 23h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
LC_LCDSSLCC	14-0968-3826	28 Apr-15 10:27	29 Apr-15 07:20	29h (8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	9.42%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control-LC-LCDSSLCC		LC_LCDSSLCC	-0.3883	1.943	0.085	6	0.6444	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005734109	0.0005734109	1	0.1508	0.7112	Non-Significant Effect
Error	0.0228141	0.003802349	6			
Total	0.02338751		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	11.48	47.47	0.0752	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9338	0.6451	0.5512	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.7667	0.6521	0.8812	0.7833	0.6667	0.8333	0.036	9.39%	0.0%
LC_LCDSSLCC	4	0.7832	0.7507	0.8157	0.7871	0.7586	0.8	0.01021	2.61%	-2.16%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.07	0.9368	1.203	1.087	0.9553	1.15	0.04182	7.82%	0.0%
LC_LCDSSLCC	4	1.087	1.047	1.126	1.091	1.057	1.107	0.01234	2.27%	-1.58%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.6667	0.8	0.7667	0.8333
LC_LCDSSLCC	0.8	0.8	0.7742	0.7586

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.9553	1.107	1.067	1.15
LC_LCDSSLCC	1.107	1.107	1.076	1.057

Survival Rate Binomials

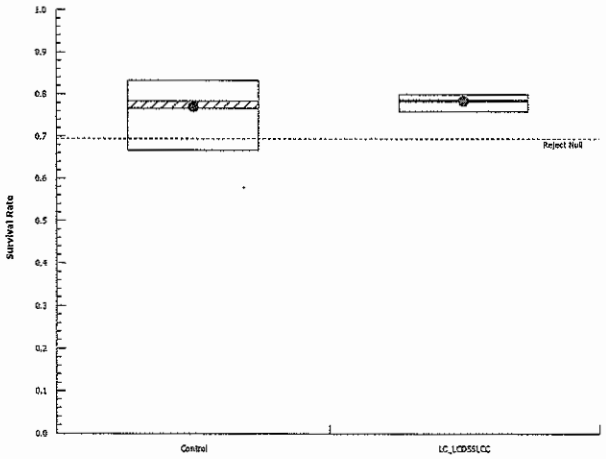
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	20/30	24/30	23/30	25/30
LC_LCDSSLCC	24/30	24/30	24/31	22/29

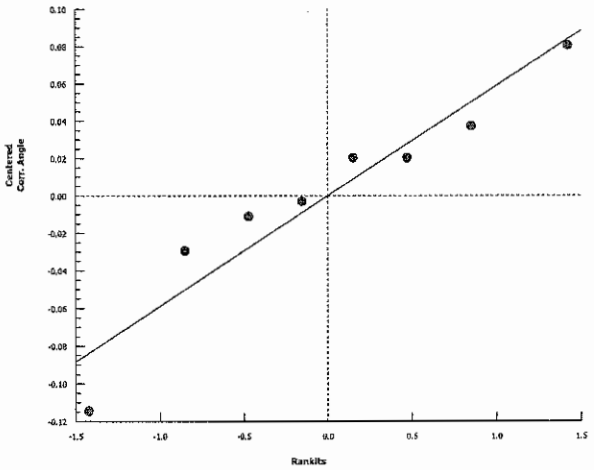
July 24/15

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID:	21-2942-6266	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





July 24/15

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	12-5535-1642	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Jul-15 9:07	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	01-5521-3113	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 18h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	02-2324-3825	28 Apr-15 09:02	29 Apr-15 07:20	31h (8.5 °C)	Teck Coal	
GH_ER2	01-6818-1046	28 Apr-15	29 Apr-15 07:20	40h (7 °C)		
FR_FRCP1	05-6493-7701	28 Apr-15 10:30	29 Apr-15 07:20	29h (8.5 °C)		
GH_FR1	04-0342-2568	28 Apr-15 08:40	29 Apr-15 07:20	31h (7 °C)		
GH_ERC	05-7162-3210	28 Apr-15 07:40	29 Apr-15 07:20	32h (7 °C)		
EV_HC1	17-6997-4694	28 Apr-15 08:40	29 Apr-15 07:20	31h (6.5 °C)		
EV_MC2	06-5856-0786	28 Apr-15 12:05	29 Apr-15 07:20	28h (6.5 °C)		
CM_MC2	15-7434-2364	28 Apr-15 09:20	29 Apr-15 07:20	30h (5.8 °C)		
LC_LCDSSLCC	14-0968-3826	28 Apr-15 10:27	29 Apr-15 07:20	29h (8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1		
GH_ER2	Water Sample	Teck Coal	GH_ER2		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
GH_ERC	Water Sample	Teck Coal	GH_ERC		
EV_HC1	Water Sample	Teck Coal	EV_HC1		
EV_MC2	Water Sample	Teck Coal	EV_MC2		
CM_MC2	Water Sample	Teck Coal	CM_MC2		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	28.4%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_ER2	2.681	2.511	0.241	6	0.0351	CDF	Significant Effect
		FR_FRCP1	0.3916	2.511	0.241	6	0.7711	CDF	Non-Significant Effect
		GH_FR1	0.2368	2.511	0.241	6	0.8242	CDF	Non-Significant Effect
		GH_ERC	2.224	2.511	0.241	6	0.0880	CDF	Non-Significant Effect
		EV_HC1	0.804	2.511	0.241	6	0.5963	CDF	Non-Significant Effect
		EV_MC2	-1.264	2.511	0.241	6	0.9967	CDF	Non-Significant Effect
		CM_MC2	1.056	2.511	0.241	6	0.4780	CDF	Non-Significant Effect
		LC_LCDSSLCC	-0.05988	2.511	0.241	6	0.9021	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.4258821	0.05323527	8	2.903	0.0179	Significant Effect
Error	0.4950786	0.01833624	27			
Total	0.9209607		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	12.51	20.09	0.1299	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9839	0.9166	0.8661	Normal Distribution

FR_UFR1 is a site control

July 24/15

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID: 12-5535-1642 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 23 Jul-15 9:07 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	0.7757	0.6547	0.8966	0.8013	0.6667	0.8333	0.038	9.8%	0.0%
GH_ER2	4	0.5362	0.2264	0.846	0.5263	0.3333	0.7586	0.09735	36.31%	30.88%
FR_FRCP1	4	0.739	0.5015	0.9765	0.8032	0.5161	0.8333	0.07463	20.2%	4.73%
GH_FR1	4	0.7549	0.5878	0.9219	0.7931	0.6	0.8333	0.05249	13.91%	2.68%
GH_ERC	4	0.5797	0.3934	0.766	0.5425	0.4839	0.75	0.05854	20.19%	25.26%
EV_HC1	4	0.6941	0.4152	0.973	0.6548	0.5333	0.9333	0.08764	25.25%	10.52%
EV_MC2	4	0.8653	0.768	0.9626	0.8607	0.8065	0.9333	0.03058	7.07%	-11.56%
CM_MC2	4	0.6882	0.5859	0.7905	0.6726	0.6333	0.7742	0.03214	9.34%	11.28%
LC_LCDSSLCC	4	0.7832	0.7507	0.8157	0.7871	0.7586	0.8	0.01021	2.61%	-0.97%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	1.081	0.9403	1.222	1.109	0.9553	1.15	0.04422	8.18%	0.0%
GH_ER2	4	0.8244	0.5042	1.145	0.8124	0.6155	1.057	0.1006	24.41%	23.74%
FR_FRCP1	4	1.044	0.7851	1.302	1.111	0.8015	1.15	0.08121	15.56%	3.47%
GH_FR1	4	1.058	0.8715	1.245	1.099	0.8861	1.15	0.05871	11.09%	2.1%
GH_ERC	4	0.8681	0.6727	1.063	0.828	0.7693	1.047	0.0614	14.14%	19.7%
EV_HC1	4	1.004	0.6583	1.35	0.9439	0.8188	1.31	0.1086	21.64%	7.12%
EV_MC2	4	1.202	1.054	1.35	1.192	1.115	1.31	0.04644	7.73%	-11.2%
CM_MC2	4	0.98	0.8672	1.093	0.9619	0.9204	1.076	0.03543	7.23%	9.35%
LC_LCDSSLCC	4	1.087	1.047	1.126	1.091	1.057	1.107	0.01234	2.27%	-0.53%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	0.8214	0.6667	0.8333	0.7813
GH_ER2	0.6333	0.7586	0.3333	0.4194
FR_FRCP1	0.5161	0.8333	0.8	0.8065
GH_FR1	0.8333	0.7931	0.6	0.7931
GH_ERC	0.5517	0.75	0.5333	0.4839
EV_HC1	0.9333	0.7097	0.6	0.5333
EV_MC2	0.9333	0.8065	0.9	0.8214
CM_MC2	0.6452	0.7	0.7742	0.6333
LC_LCDSSLCC	0.8	0.8	0.7742	0.7586

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	1.135	0.9553	1.15	1.084
GH_ER2	0.9204	1.057	0.6155	0.7044
FR_FRCP1	0.8015	1.15	1.107	1.115
GH_FR1	1.15	1.099	0.8861	1.099
GH_ERC	0.8372	1.047	0.8188	0.7693
EV_HC1	1.31	1.002	0.8861	0.8188
EV_MC2	1.31	1.115	1.249	1.135
CM_MC2	0.9327	0.9912	1.076	0.9204
LC_LCDSSLCC	1.107	1.107	1.076	1.057

FR_UFR1 is a site control

July 24/15

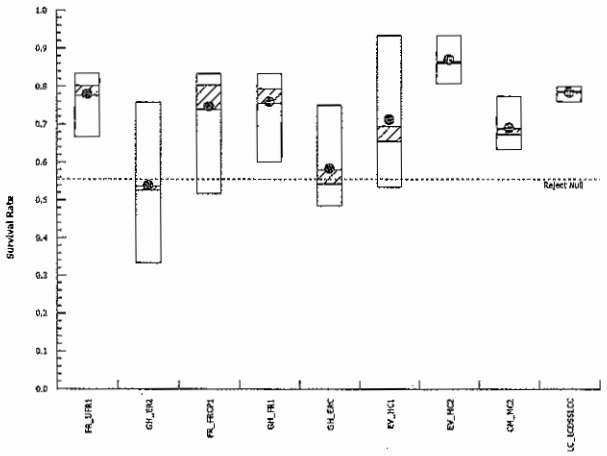
Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

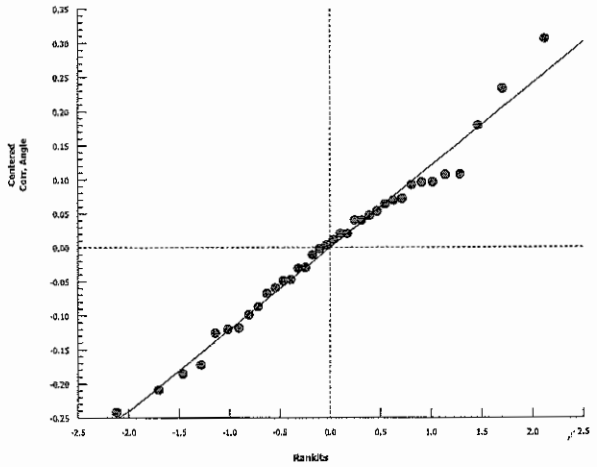
Analysis ID:	12-5535-1642	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Jul-15 9:07	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	23/28	20/30	25/30	25/32
GH_ER2	19/30	22/29	10/30	13/31
FR_FRCP1	16/31	25/30	24/30	25/31
GH_FR1	25/30	23/29	18/30	23/29
GH_ERC	16/29	21/28	16/30	15/31
EV_HC1	28/30	22/31	18/30	16/30
EV_MC2	28/30	25/31	27/30	23/28
CM_MC2	20/31	21/30	24/31	19/30
LC_LCDSSLCC	24/30	24/30	24/31	22/29

Graphics





FR_UFR1 is a site control

July 24/15

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	17-0751-8561	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 Jul-15 15:24	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	16-8111-1466	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 18h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
GH_ER2	01-6818-1046	28 Apr-15	29 Apr-15 07:20	40h (7 °C)	Teck Coal	
FR_UFR1	02-2324-3825	28 Apr-15 09:02	29 Apr-15 07:20	31h (8.5 °C)		
FR_FRCP1	05-6493-7701	28 Apr-15 10:30	29 Apr-15 07:20	29h (8.5 °C)		
GH_FR1	04-0342-2568	28 Apr-15 08:40	29 Apr-15 07:20	31h (7 °C)		
GH_ERC	05-7162-3210	28 Apr-15 07:40	29 Apr-15 07:20	32h (7 °C)		
EV_HC1	17-6997-4694	28 Apr-15 08:40	29 Apr-15 07:20	31h (6.5 °C)		
EV_MC2	06-5856-0786	28 Apr-15 12:05	29 Apr-15 07:20	28h (6.5 °C)		
CM_MC2	15-7434-2364	28 Apr-15 09:20	29 Apr-15 07:20	30h (5.8 °C)		
LC_LCDSSLCC	14-0968-3826	28 Apr-15 10:27	29 Apr-15 07:20	29h (8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
GH_ER2	Water Sample	Teck Coal	GH_ER2		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
GH_ERC	Water Sample	Teck Coal	GH_ERC		
EV_HC1	Water Sample	Teck Coal	EV_HC1		
EV_MC2	Water Sample	Teck Coal	EV_MC2		
CM_MC2	Water Sample	Teck Coal	CM_MC2		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	43.3%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
GH_ER2		FR_UFR1	-2.681	2.511	0.241	6	1.0000	CDF	Non-Significant Effect
		FR_FRCP1	-2.289	2.511	0.241	6	0.9999	CDF	Non-Significant Effect
		GH_FR1	-2.444	2.511	0.241	6	1.0000	CDF	Non-Significant Effect
		GH_ERC	-0.4569	2.511	0.241	6	0.9621	CDF	Non-Significant Effect
		EV_HC1	-1.877	2.511	0.241	6	0.9996	CDF	Non-Significant Effect
		EV_MC2	-3.945	2.511	0.241	6	1.0000	CDF	Non-Significant Effect
		CM_MC2	-1.625	2.511	0.241	6	0.9991	CDF	Non-Significant Effect
		LC_LCDSSLCC	-2.741	2.511	0.241	6	1.0000	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.4258821	0.05323527	8	2.903	0.0179	Significant Effect
Error	0.4950786	0.01833624	27			
Total	0.9209607		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	12.51	20.09	0.1299	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9839	0.9166	0.8661	Normal Distribution

GH-ER2 is a site control

July 24/15

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID: 17-0751-8561 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 22 Jul-15 15:24 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
GH_ER2	4	0.5362	0.2264	0.846	0.5263	0.3333	0.7586	0.09735	36.31%	0.0%
FR_UFR1	4	0.7757	0.6547	0.8966	0.8013	0.6667	0.8333	0.038	9.8%	-44.67%
FR_FRCP1	4	0.739	0.5015	0.9765	0.8032	0.5161	0.8333	0.07463	20.2%	-37.83%
GH_FR1	4	0.7549	0.5878	0.9219	0.7931	0.6	0.8333	0.05249	13.91%	-40.79%
GH_ERC	4	0.5797	0.3934	0.766	0.5425	0.4839	0.75	0.05854	20.19%	-8.13%
EV_HC1	4	0.6941	0.4152	0.973	0.6548	0.5333	0.9333	0.08764	25.25%	-29.45%
EV_MC2	4	0.8653	0.768	0.9626	0.8607	0.8065	0.9333	0.03058	7.07%	-61.39%
CM_MC2	4	0.6882	0.5859	0.7905	0.6726	0.6333	0.7742	0.03214	9.34%	-28.35%
LC_LCDSSLCC	4	0.7832	0.7507	0.8157	0.7871	0.7586	0.8	0.01021	2.61%	-46.08%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
GH_ER2	4	0.8244	0.5042	1.145	0.8124	0.6155	1.057	0.1006	24.41%	0.0%
FR_UFR1	4	1.081	0.9403	1.222	1.109	0.9553	1.15	0.04422	8.18%	-31.14%
FR_FRCP1	4	1.044	0.7851	1.302	1.111	0.8015	1.15	0.08121	15.56%	-26.59%
GH_FR1	4	1.058	0.8715	1.245	1.099	0.8861	1.15	0.05871	11.09%	-28.39%
GH_ERC	4	0.8681	0.6727	1.063	0.828	0.7693	1.047	0.0614	14.14%	-5.31%
EV_HC1	4	1.004	0.6583	1.35	0.9439	0.8188	1.31	0.1086	21.64%	-21.8%
EV_MC2	4	1.202	1.054	1.35	1.192	1.115	1.31	0.04644	7.73%	-45.82%
CM_MC2	4	0.98	0.8672	1.093	0.9619	0.9204	1.076	0.03543	7.23%	-18.87%
LC_LCDSSLCC	4	1.087	1.047	1.126	1.091	1.057	1.107	0.01234	2.27%	-31.83%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_ER2	0.6333	0.7586	0.3333	0.4194
FR_UFR1	0.8214	0.6667	0.8333	0.7813
FR_FRCP1	0.5161	0.8333	0.8	0.8065
GH_FR1	0.8333	0.7931	0.6	0.7931
GH_ERC	0.5517	0.75	0.5333	0.4839
EV_HC1	0.9333	0.7097	0.6	0.5333
EV_MC2	0.9333	0.8065	0.9	0.8214
CM_MC2	0.6452	0.7	0.7742	0.6333
LC_LCDSSLCC	0.8	0.8	0.7742	0.7586

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_ER2	0.9204	1.057	0.6155	0.7044
FR_UFR1	1.135	0.9553	1.15	1.084
FR_FRCP1	0.8015	1.15	1.107	1.115
GH_FR1	1.15	1.099	0.8861	1.099
GH_ERC	0.8372	1.047	0.8188	0.7693
EV_HC1	1.31	1.002	0.8861	0.8188
EV_MC2	1.31	1.115	1.249	1.135
CM_MC2	0.9327	0.9912	1.076	0.9204
LC_LCDSSLCC	1.107	1.107	1.076	1.057

GH-ER2 is a site control

July 24/15

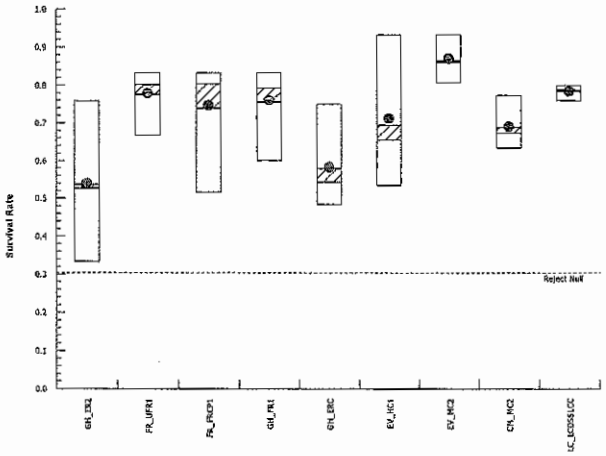
Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

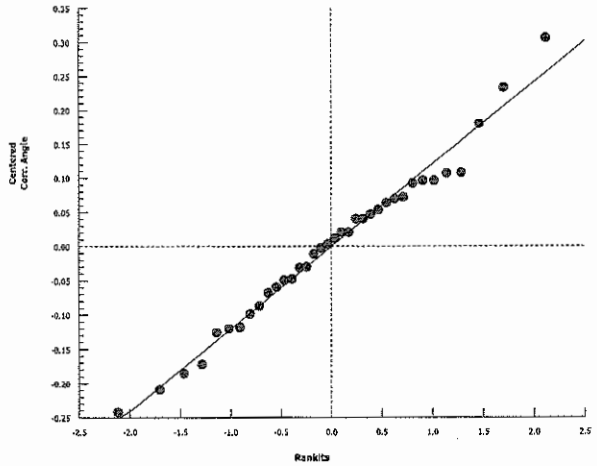
Analysis ID:	17-0751-8561	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 Jul-15 15:24	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_ER2	19/30	22/29	10/30	13/31
FR_UFR1	23/28	20/30	25/30	25/32
FR_FRCP1	16/31	25/30	24/30	25/31
GH_FR1	25/30	23/29	18/30	23/29
GH_ERC	16/29	21/28	16/30	15/31
EV_HC1	28/30	22/31	18/30	16/30
EV_MC2	28/30	25/31	27/30	23/28
CM_MC2	20/31	21/30	24/31	19/30
LC_LCDSSLCC	24/30	24/30	24/31	22/29

Graphics





GH-ER2 is a 5th control

July 24/15

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Batch ID:	01-5521-3113	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 18h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	02-2324-3825	28 Apr-15 09:02	29 Apr-15 07:20	31h (8.5 °C)	Teck Coal	
GH_ER2	01-6818-1046	28 Apr-15	29 Apr-15 07:20	40h (7 °C)		
FR_FRCP1	05-6493-7701	28 Apr-15 10:30	29 Apr-15 07:20	29h (8.5 °C)		
GH_FR1	04-0342-2568	28 Apr-15 08:40	29 Apr-15 07:20	31h (7 °C)		
GH_ERC	05-7162-3210	28 Apr-15 07:40	29 Apr-15 07:20	32h (7 °C)		
EV_HC1	17-6997-4694	28 Apr-15 08:40	29 Apr-15 07:20	31h (6.5 °C)		
EV_MC2	06-5856-0786	28 Apr-15 12:05	29 Apr-15 07:20	28h (6.5 °C)		
CM_MC2	15-7434-2364	28 Apr-15 09:20	29 Apr-15 07:20	30h (5.8 °C)		
LC_LCDSSLCC	14-0968-3826	28 Apr-15 10:27	29 Apr-15 07:20	29h (8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1		
GH_ER2	Water Sample	Teck Coal	GH_ER2		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
GH_ERC	Water Sample	Teck Coal	GH_ERC		
EV_HC1	Water Sample	Teck Coal	EV_HC1		
EV_MC2	Water Sample	Teck Coal	EV_MC2		
CM_MC2	Water Sample	Teck Coal	CM_MC2		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC		

Proportion Normal Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
FR_UFR1	4	0.7261	0.5412	0.9111	0.5667	0.8333	0.05811	0.1162	16.01%	0.0%
GH_ER2	4	0.5362	0.2264	0.846	0.3333	0.7586	0.09735	0.1947	36.31%	26.16%
FR_FRCP1	4	0.7226	0.4656	0.9795	0.4839	0.8333	0.08074	0.1615	22.35%	0.49%
GH_FR1	4	0.7549	0.5878	0.9219	0.6	0.8333	0.05249	0.105	13.91%	-3.96%
GH_ERC	4	0.5631	0.3563	0.7698	0.4667	0.75	0.06496	0.1299	23.07%	22.46%
EV_HC1	4	0.6858	0.4307	0.9408	0.5333	0.9	0.08014	0.1603	23.37%	5.56%
EV_MC2	4	0.8483	0.7206	0.976	0.7742	0.9333	0.04012	0.08023	9.46%	-16.83%
CM_MC2	4	0.6882	0.5859	0.7905	0.6333	0.7742	0.03214	0.06428	9.34%	5.23%
LC_LCDSSLCC	4	0.7501	0.6843	0.816	0.7	0.8	0.02069	0.04139	5.52%	-3.31%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	0.7857	0.5667	0.8333	0.7188
GH_ER2	0.6333	0.7586	0.3333	0.4194
FR_FRCP1	0.4839	0.8333	0.7667	0.8065
GH_FR1	0.8333	0.7931	0.6	0.7931
GH_ERC	0.5517	0.75	0.4667	0.4839
EV_HC1	0.9	0.7097	0.6	0.5333
EV_MC2	0.9333	0.7742	0.9	0.7857
CM_MC2	0.6452	0.7	0.7742	0.6333
LC_LCDSSLCC	0.7	0.8	0.7419	0.7586

FR_UFR1 is a site control

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Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Proportion Normal Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	22/28	17/30	25/30	23/32
GH_ER2	19/30	22/29	10/30	13/31
FR_FRCP1	15/31	25/30	23/30	25/31
GH_FR1	25/30	23/29	18/30	23/29
GH_ERC	16/29	21/28	14/30	15/31
EV_HC1	27/30	22/31	18/30	16/30
EV_MC2	28/30	24/31	27/30	22/28
CM_MC2	20/31	21/30	24/31	19/30
LC_LCDSSLCC	21/30	24/30	23/31	22/29

FR_UFR1 is a site control

July 24/15

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	04-2271-6139	**Endpoint:**	Proportion Normal (Viability)	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	06-7849-4849	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 18h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
FR_UFR1	02-2324-3825	28 Apr-15 09:02	29 Apr-15 07:20	31h (8.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	15.2%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control ~~FR_UFR1~~		FR_UFR1	1.363	1.943	0.149	6	0.1110	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02172516	0.02172516	1	1.857	0.2219	Non-Significant Effect
Error	0.07019959	0.01169993	6			
Total	0.09192476		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.452	47.47	0.4808	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9287	0.6451	0.5047	Normal Distribution

Proportion Normal Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.8149	0.7123	0.9176	0.8299	0.7333	0.8667	0.03226	7.92%	0.0%
FR_UFR1	4	0.7261	0.5412	0.9111	0.7522	0.5667	0.8333	0.05811	16.01%	10.9%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.13	0.9992	1.261	1.148	1.028	1.197	0.04117	7.29%	0.0%
FR_UFR1	4	1.026	0.8208	1.231	1.051	0.8523	1.15	0.06446	12.57%	9.22%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.8667	0.7333	0.8667	0.7931
FR_UFR1	0.7857	0.5667	0.8333	0.7188

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1.197	1.028	1.197	1.099
FR_UFR1	1.09	0.8523	1.15	1.012

Proportion Normal Binomials

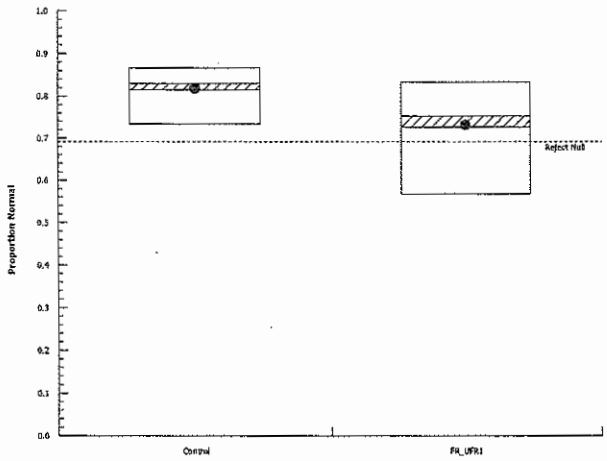
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	26/30	22/30	26/30	23/29
FR_UFR1	22/28	17/30	25/30	23/32

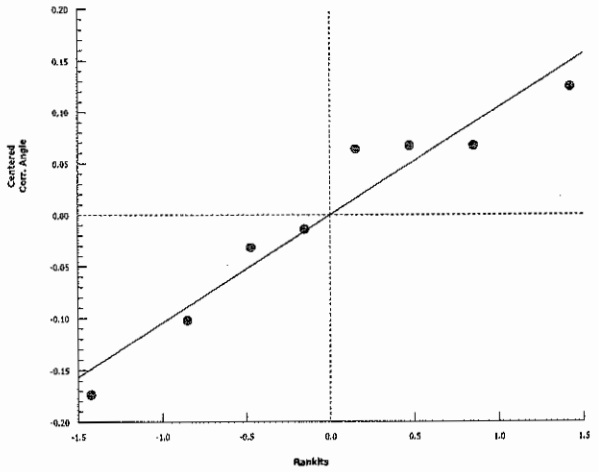
July 24/15

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID:	04-2271-6139	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





July 24/15

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	11-1832-6209	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:20	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	15-4503-3924	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 12:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
GH_ER2	01-6818-1046	28 Apr-15	29 Apr-15 07:20	40h (7 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
GH_ER2	Water Sample	Teck Coal	GH_ER2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	18.8%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control ~~GH ER2~~		GH_ER2	3.562	1.943	0.205	6	0.0059	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.2833136	0.2833136	1	12.69	0.0119	Significant Effect
Error	0.1339644	0.0223274	6			
Total	0.417278		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	9.711	47.47	0.0941	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9782	0.6451	0.9537	Normal Distribution

Proportion Normal Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.867	0.794	0.9399	0.8839	0.8	0.9	0.02293	5.29%	0.0%
GH_ER2	4	0.5362	0.2264	0.846	0.5263	0.3333	0.7586	0.09735	36.31%	38.16%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.201	1.098	1.303	1.223	1.107	1.249	0.03228	5.38%	0.0%
GH_ER2	4	0.8244	0.5042	1.145	0.8124	0.6155	1.057	0.1006	24.41%	31.35%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.8929	0.9	0.8	0.875
GH_ER2	0.6333	0.7586	0.3333	0.4194

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1.237	1.249	1.107	1.209
GH_ER2	0.9204	1.057	0.6155	0.7044

Proportion Normal Binomials

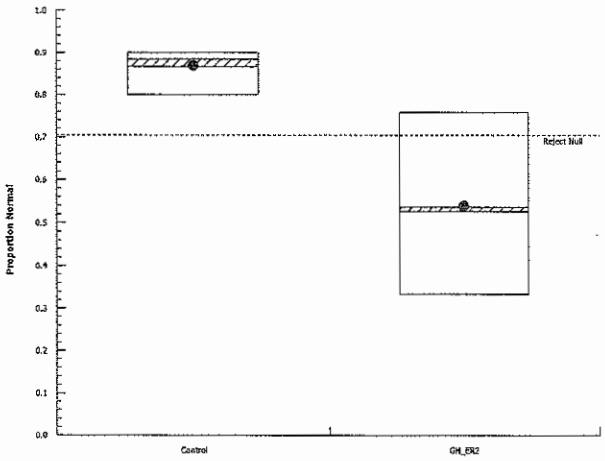
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	25/28	27/30	24/30	28/32
GH_ER2	19/30	22/29	10/30	13/31

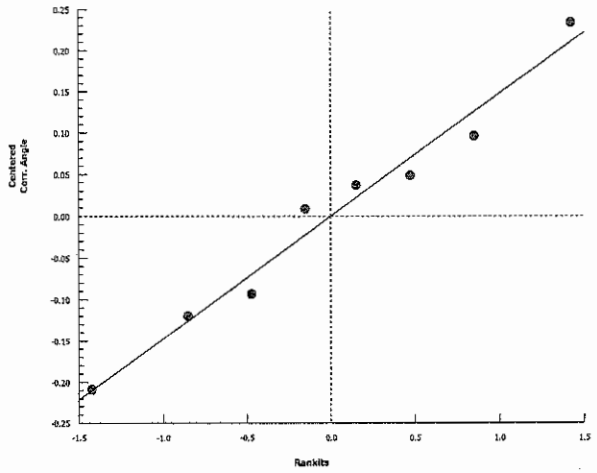
July 29/15

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID:	11-1832-6209	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:20	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





July 24/15

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	02-6261-7664	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:32	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-0178-4273	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 10:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
FR_FRCP1	05-6493-7701	28 Apr-15 10:30	29 Apr-15 07:20	29h (8.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	17.0%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control-FR_FRCP1		FR_FRCP1	1.814	1.943	0.191	6	0.0598	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0638384	0.0638384	1	3.29	0.1196	Non-Significant Effect
Error	0.1164299	0.01940498	6			
Total	0.1802683		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.574	47.47	0.3234	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8792	0.6451	0.1849	Normal Distribution

Proportion Normal Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.8667	0.7698	0.9635	0.8667	0.8	0.9333	0.03043	7.02%	0.0%
FR_FRCP1	4	0.7226	0.4656	0.9795	0.7866	0.4839	0.8333	0.08074	22.35%	16.63%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.204	1.057	1.351	1.2	1.107	1.31	0.04606	7.65%	0.0%
FR_FRCP1	4	1.025	0.7483	1.302	1.091	0.7693	1.15	0.08707	16.98%	14.84%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.9333	0.8	0.8333	0.9
FR_FRCP1	0.4839	0.8333	0.7667	0.8065

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1.31	1.107	1.15	1.249
FR_FRCP1	0.7693	1.15	1.067	1.115

Proportion Normal Binomials

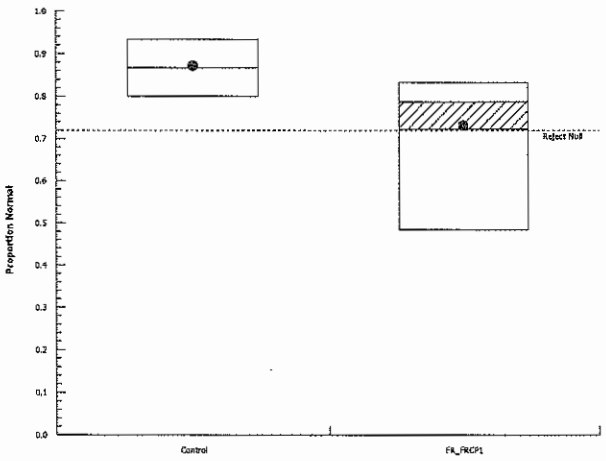
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	28/30	24/30	25/30	27/30
FR_FRCP1	15/31	25/30	23/30	25/31

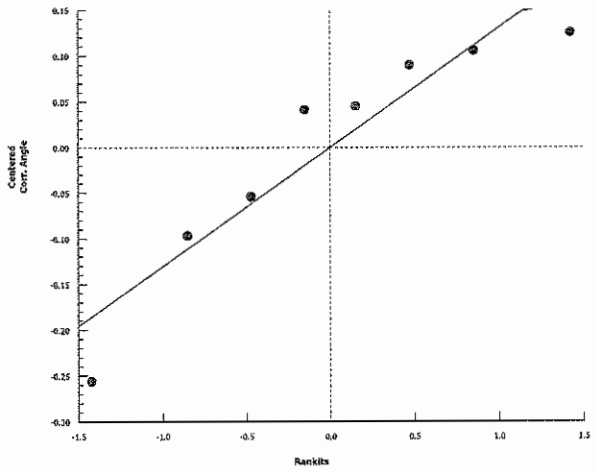
July 24/15

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID:	02-6261-7664	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:32	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





July 24/15

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	17-1183-4756	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:45	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	11-3405-4903	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
GH_FR1	04-0342-2568	28 Apr-15 08:40	29 Apr-15 07:20	31h (7 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
GH_FR1	Water Sample	Teck Coal	GH_FR1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	16.6%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control-GHER1		GH_FR1	0.9512	1.943	0.17	6	0.1891	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01377931	0.01377931	1	0.9048	0.3782	Non-Significant Effect
Error	0.09137621	0.01522937	6			
Total	0.1051555		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.209	47.47	0.8797	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.96	0.6451	0.8105	Normal Distribution

Proportion Normal Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.8183	0.671	0.9655	0.8139	0.7097	0.9355	0.04626	11.31%	0.0%
GH_FR1	4	0.7549	0.5878	0.9219	0.7931	0.6	0.8333	0.05249	13.91%	7.75%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.141	0.9359	1.347	1.125	1.002	1.314	0.06456	11.31%	0.0%
GH_FR1	4	1.058	0.8715	1.245	1.099	0.8861	1.15	0.05871	11.09%	7.27%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.9355	0.8214	0.7097	0.8065
GH_FR1	0.8333	0.7931	0.6	0.7931

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1.314	1.135	1.002	1.115
GH_FR1	1.15	1.099	0.8861	1.099

Proportion Normal Binomials

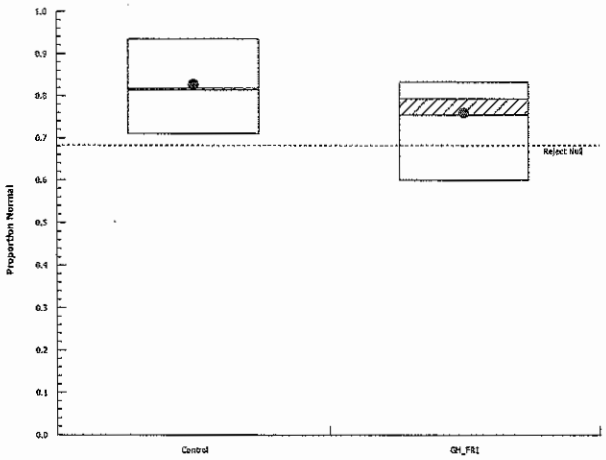
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	29/31	23/28	22/31	25/31
GH_FR1	25/30	23/29	18/30	23/29

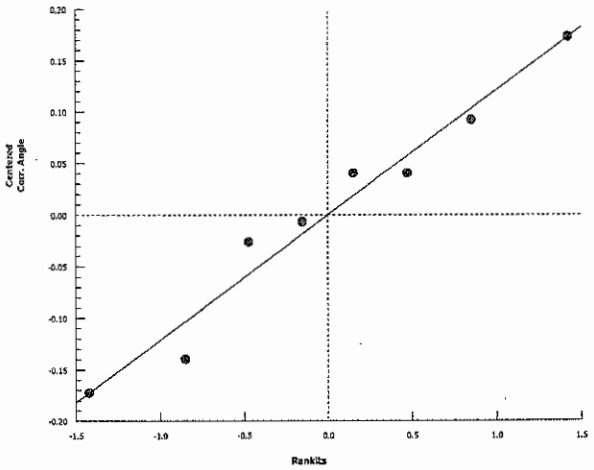
July 24/15

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID:	17-1183-4756	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:45	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





July 24/15

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	19-2808-2456	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:56	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	20-0373-2907	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 11:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
GH_ERC	05-7162-3210	28 Apr-15 07:40	29 Apr-15 07:20	32h (7 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
GH_ERC	Water Sample	Teck Coal	GH_ERC		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	16.0%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control~~-GH ERC~~		GH_ERC	3.515	1.943	0.16	6	0.0063	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1669163	0.1669163	1	12.35	0.0126	Significant Effect
Error	0.08107811	0.01351302	6			
Total	0.2479944		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.128	47.47	0.5511	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9323	0.6451	0.5369	Normal Distribution

Proportion Normal Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.8217	0.7076	0.9359	0.8331	0.7241	0.8966	0.03588	8.73%	0.0%
GH_ERC	4	0.5631	0.3563	0.7698	0.5178	0.4667	0.75	0.06496	23.07%	31.48%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.14	0.9924	1.288	1.15	1.018	1.243	0.04648	8.15%	0.0%
GH_ERC	4	0.8514	0.6357	1.067	0.8032	0.752	1.047	0.0678	15.93%	25.33%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.8387	0.7241	0.8276	0.8966
GH_ERC	0.5517	0.75	0.4667	0.4839

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1.158	1.018	1.143	1.243
GH_ERC	0.8372	1.047	0.752	0.7693

Proportion Normal Binomials

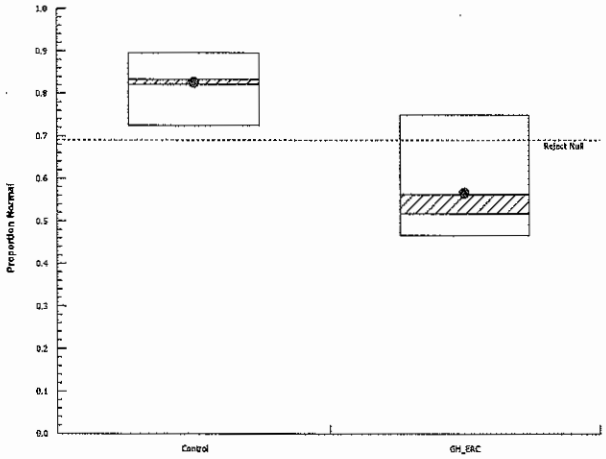
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	26/31	21/29	24/29	26/29
GH_ERC	16/29	21/28	14/30	15/31

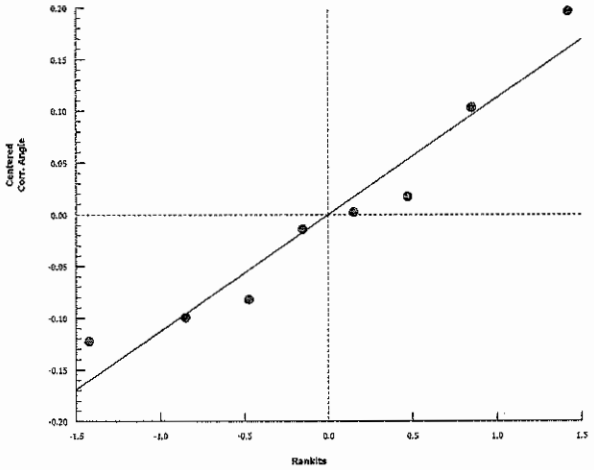
July 22/15

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID:	19-2808-2456	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:56	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





July 24/15

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	02-1507-2700	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	16-1248-1807	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 12:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 21h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
EV_MC2	06-5856-0786	28 Apr-15 12:05	29 Apr-15 07:20	28h (6.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
EV_MC2	Water Sample	Teck Coal	EV_MC2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	11.9%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control~~EV_MC2~~		EV_MC2	-0.5966	1.943	0.120	6	0.7137	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.002728029	0.002728029	1	0.356	0.5726	Non-Significant Effect
Error	0.04598035	0.007663392	6			
Total	0.04870838		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	7.63	47.47	0.1292	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9593	0.6451	0.8029	Normal Distribution

Proportion Normal Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.8278	0.7785	0.877	0.82	0.8	0.871	0.01547	3.74%	0.0%
EV_MC2	4	0.8483	0.7206	0.976	0.8429	0.7742	0.9333	0.04012	9.46%	-2.48%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.144	1.077	1.211	1.133	1.107	1.203	0.02107	3.68%	0.0%
EV_MC2	4	1.181	0.9957	1.366	1.169	1.076	1.31	0.0582	9.86%	-3.23%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.8125	0.8276	0.871	0.8
EV_MC2	0.9333	0.7742	0.9	0.7857

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1.123	1.143	1.203	1.107
EV_MC2	1.31	1.076	1.249	1.09

Proportion Normal Binomials

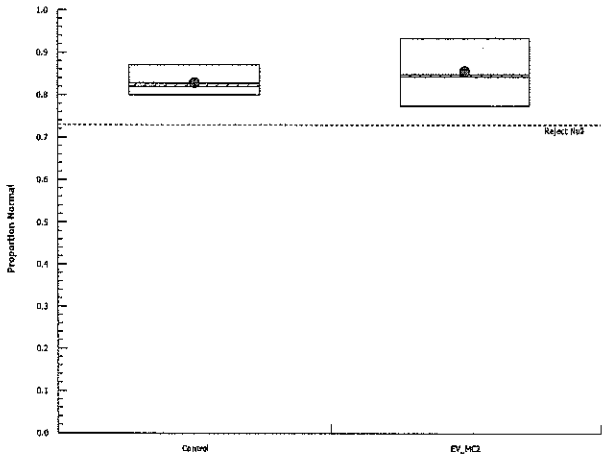
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	26/32	24/29	27/31	24/30
EV_MC2	28/30	24/31	27/30	22/28

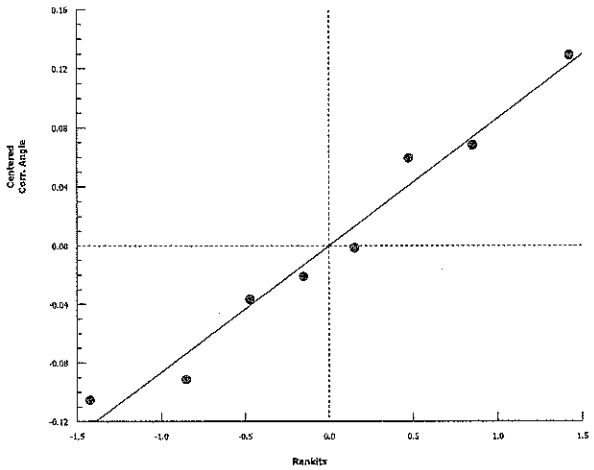
July 24/15

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID:	02-1507-2700	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





July 24/15

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	09-8881-0236	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:18	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	00-3768-9217	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 13:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
EV_HC1	17-6997-4694	28 Apr-15 08:40	29 Apr-15 07:20	31h (6.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
EV_HC1	Water Sample	Teck Coal	EV_HC1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	15.3%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control ~~EV_HC1~~		EV_HC1	2.724	1.943	0.203	6	0.0172	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1619453	0.1619453	1	7.42	0.0345	Significant Effect
Error	0.1309608	0.0218268	6			
Total	0.292906		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	4.55	47.47	0.2452	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9422	0.6451	0.6329	Normal Distribution

Proportion Normal Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.9092	0.8343	0.9842	0.9018	0.8667	0.9667	0.02355	5.18%	0.0%
EV_HC1	4	0.6858	0.4307	0.9408	0.6548	0.5333	0.9	0.08014	23.37%	24.58%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.273	1.132	1.415	1.255	1.197	1.387	0.04435	6.96%	0.0%
EV_HC1	4	0.9889	0.6879	1.29	0.9439	0.8188	1.249	0.09459	19.13%	22.35%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.875	0.9667	0.9286	0.8667
EV_HC1	0.9	0.7097	0.6	0.5333

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1.209	1.387	1.3	1.197
EV_HC1	1.249	1.002	0.8861	0.8188

Proportion Normal Binomials

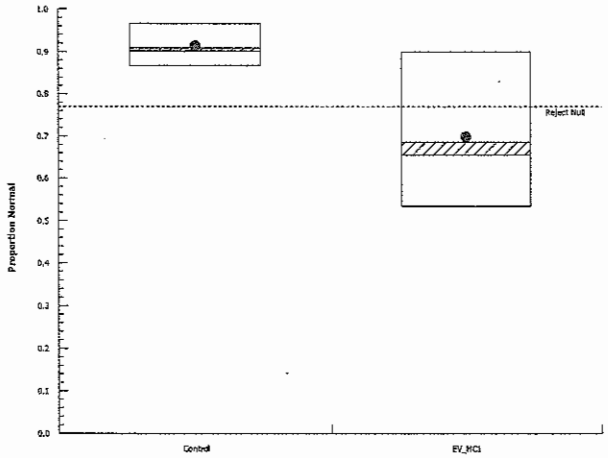
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	28/32	29/30	26/28	26/30
EV_HC1	27/30	22/31	18/30	16/30

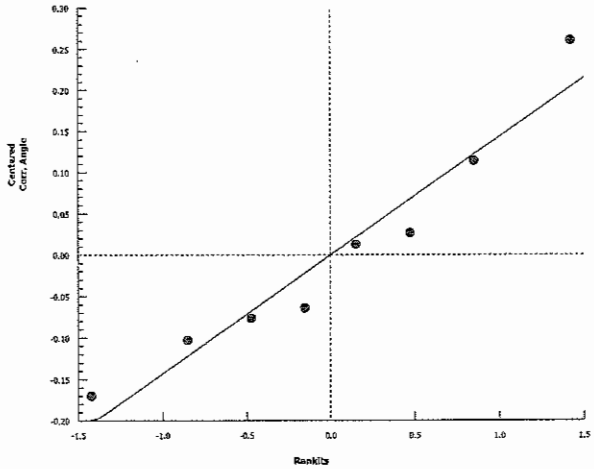
July 24/15

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID:	09-8881-0236	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:18	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





July 24/15

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	21-3647-7386	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:29	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	09-0090-0573	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 14:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
CM_MC2	15-7434-2364	28 Apr-15 09:20	29 Apr-15 07:20	30h (5.8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
CM_MC2	Water Sample	Teck Coal	CM_MC2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	11.0%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control-~~CM_MC2~~		CM_MC2	2.945	1.943	0.123	6	0.0129	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.06949058	0.06949058	1	8.674	0.0258	Significant Effect
Error	0.04806712	0.008011186	6			
Total	0.1175577		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.191	47.47	0.5360	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9164	0.6451	0.4013	Normal Distribution

Proportion Normal Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.8392	0.7272	0.9513	0.8274	0.7667	0.9355	0.03522	8.39%	0.0%
CM_MC2	4	0.6882	0.5859	0.7905	0.6726	0.6333	0.7742	0.03214	9.34%	18.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.166	0.9995	1.333	1.142	1.067	1.314	0.05244	8.99%	0.0%
CM_MC2	4	0.98	0.8672	1.093	0.9619	0.9204	1.076	0.03543	7.23%	15.98%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.7667	0.8333	0.8214	0.9355
CM_MC2	0.6452	0.7	0.7742	0.6333

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1.067	1.15	1.135	1.314
CM_MC2	0.9327	0.9912	1.076	0.9204

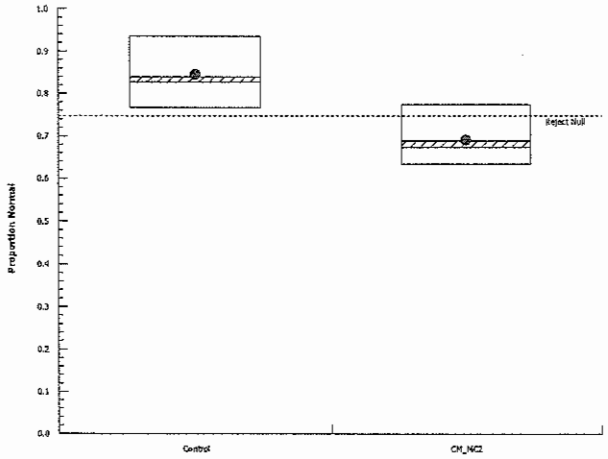
Proportion Normal Binomials

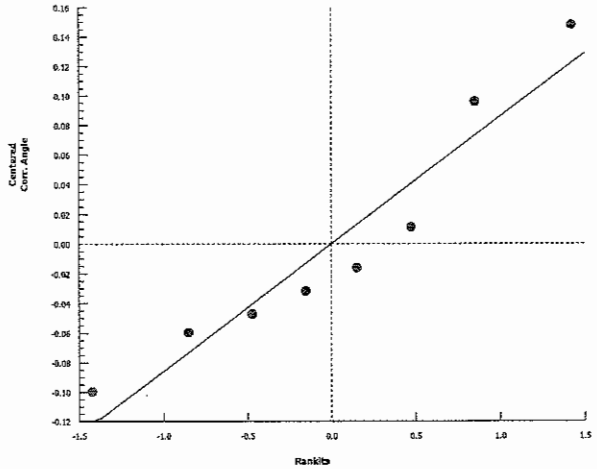
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	23/30	25/30	23/28	29/31
CM_MC2	20/31	21/30	24/31	19/30

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	21-3647-7386	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:29	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





7/24/15

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	10-9619-9665	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-3350-5051	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 14:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 23h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
LC_LCDSSLCC	14-0968-3826	28 Apr-15 10:27	29 Apr-15 07:20	29h (8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	13.5%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control~~LC_LCDSSLCC~~		LC_LCDSSLCC	-0.1139	1.943	0.113	6	0.5435	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.718162E-05	8.718162E-05	1	0.01297	0.9130	Non-Significant Effect
Error	0.04032421	0.006720703	6			
Total	0.0404114		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	4.831	47.47	0.2283	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8539	0.6451	0.1044	Normal Distribution

Proportion Normal Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	0.7417	0.5893	0.894	0.7833	0.6	0.8	0.04787	12.91%	0.0%
LC_LCDSSLCC	4	0.7501	0.6843	0.816	0.7503	0.7	0.8	0.02069	5.52%	-1.14%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	1.042	0.8738	1.21	1.087	0.8861	1.107	0.05276	10.13%	0.0%
LC_LCDSSLCC	4	1.048	0.972	1.125	1.048	0.9912	1.107	0.02401	4.58%	-0.63%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.6	0.8	0.7667	0.8
LC_LCDSSLCC	0.7	0.8	0.7419	0.7586

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.8861	1.107	1.067	1.107
LC_LCDSSLCC	0.9912	1.107	1.038	1.057

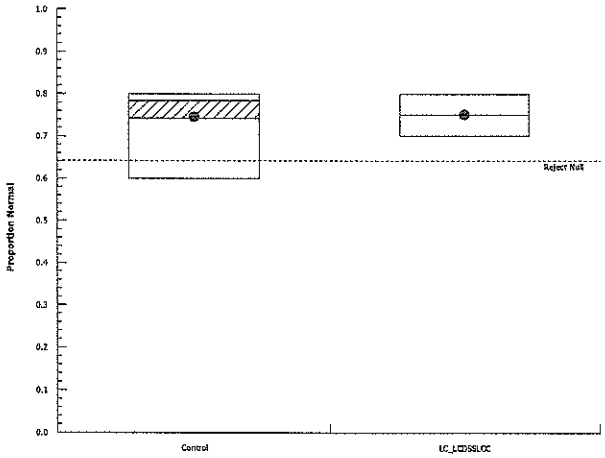
Proportion Normal Binomials

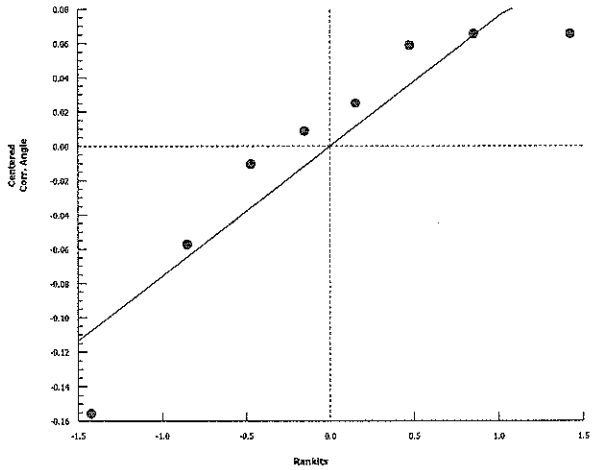
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	18/30	24/30	23/30	24/30
LC_LCDSSLCC	21/30	24/30	23/31	22/29

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID:	10-9619-9665	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	01-9416-1282	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Jul-15 9:07	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	01-5521-3113	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 18h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	02-2324-3825	28 Apr-15 09:02	29 Apr-15 07:20	31h (8.5 °C)	Teck Coal	
GH_ER2	01-6818-1046	28 Apr-15	29 Apr-15 07:20	40h (7 °C)		
FR_FRCP1	05-6493-7701	28 Apr-15 10:30	29 Apr-15 07:20	29h (8.5 °C)		
GH_FR1	04-0342-2568	28 Apr-15 08:40	29 Apr-15 07:20	31h (7 °C)		
GH_ERC	05-7162-3210	28 Apr-15 07:40	29 Apr-15 07:20	32h (7 °C)		
EV_HC1	17-6997-4694	28 Apr-15 08:40	29 Apr-15 07:20	31h (6.5 °C)		
EV_MC2	06-5856-0786	28 Apr-15 12:05	29 Apr-15 07:20	28h (6.5 °C)		
CM_MC2	15-7434-2364	28 Apr-15 09:20	29 Apr-15 07:20	30h (5.8 °C)		
LC_LCDSSLCC	14-0968-3826	28 Apr-15 10:27	29 Apr-15 07:20	29h (8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1		
GH_ER2	Water Sample	Teck Coal	GH_ER2		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
GH_ERC	Water Sample	Teck Coal	GH_ERC		
EV_HC1	Water Sample	Teck Coal	EV_HC1		
EV_MC2	Water Sample	Teck Coal	EV_MC2		
CM_MC2	Water Sample	Teck Coal	CM_MC2		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	32.2%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_ER2	2.037	2.511	0.249	6	0.1235	CDF	Non-Significant Effect
		FR_FRCP1	0.006053	2.511	0.249	6	0.8875	CDF	Non-Significant Effect
		GH_FR1	-0.3275	2.511	0.249	6	0.9473	CDF	Non-Significant Effect
		GH_ERC	1.764	2.511	0.249	6	0.1942	CDF	Non-Significant Effect
		EV_HC1	0.3744	2.511	0.249	6	0.7774	CDF	Non-Significant Effect
		EV_MC2	-1.566	2.511	0.249	6	0.9989	CDF	Non-Significant Effect
		CM_MC2	0.4649	2.511	0.249	6	0.7432	CDF	Non-Significant Effect
		LC_LCDSSLCC	-0.2264	2.511	0.249	6	0.9327	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.3729019	0.04661273	8	2.38	0.0439	Significant Effect
Error	0.5288049	0.01958537	27			
Total	0.9017068		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	7.16	20.09	0.5194	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9868	0.9166	0.9373	Normal Distribution

FR_UFR1 is on site control

July 24/15

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID: 01-9416-1282 **Endpoint:** Proportion Normal **CETIS Version:** CETISv1.8.7
Analyzed: 23 Jul-15 9:07 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Proportion Normal Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	0.7261	0.5412	0.9111	0.7522	0.5667	0.8333	0.05811	16.01%	0.0%
GH_ER2	4	0.5362	0.2264	0.846	0.5263	0.3333	0.7586	0.09735	36.31%	26.16%
FR_FRCP1	4	0.7226	0.4656	0.9795	0.7866	0.4839	0.8333	0.08074	22.35%	0.49%
GH_FR1	4	0.7549	0.5878	0.9219	0.7931	0.6	0.8333	0.05249	13.91%	-3.96%
GH_ERC	4	0.5631	0.3563	0.7698	0.5178	0.4667	0.75	0.06496	23.07%	22.46%
EV_HC1	4	0.6858	0.4307	0.9408	0.6548	0.5333	0.9	0.08014	23.37%	5.56%
EV_MC2	4	0.8483	0.7206	0.976	0.8429	0.7742	0.9333	0.04012	9.46%	-16.83%
CM_MC2	4	0.6882	0.5859	0.7905	0.6726	0.6333	0.7742	0.03214	9.34%	5.23%
LC_LCDSSLCC	4	0.7501	0.6843	0.816	0.7503	0.7	0.8	0.02069	5.52%	-3.31%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	1.026	0.8208	1.231	1.051	0.8523	1.15	0.06446	12.57%	0.0%
GH_ER2	4	0.8244	0.5042	1.145	0.8124	0.6155	1.057	0.1006	24.41%	19.65%
FR_FRCP1	4	1.025	0.7483	1.302	1.091	0.7693	1.15	0.08707	16.98%	0.06%
GH_FR1	4	1.058	0.8715	1.245	1.099	0.8861	1.15	0.05871	11.09%	-3.16%
GH_ERC	4	0.8514	0.6357	1.067	0.8032	0.752	1.047	0.0678	15.93%	17.01%
EV_HC1	4	0.9889	0.6879	1.29	0.9439	0.8188	1.249	0.09459	19.13%	3.61%
EV_MC2	4	1.181	0.9957	1.366	1.169	1.076	1.31	0.0582	9.86%	-15.11%
CM_MC2	4	0.98	0.8672	1.093	0.9619	0.9204	1.076	0.03543	7.23%	4.48%
LC_LCDSSLCC	4	1.048	0.972	1.125	1.048	0.9912	1.107	0.02401	4.58%	-2.18%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	0.7857	0.5667	0.8333	0.7188
GH_ER2	0.6333	0.7586	0.3333	0.4194
FR_FRCP1	0.4839	0.8333	0.7667	0.8065
GH_FR1	0.8333	0.7931	0.6	0.7931
GH_ERC	0.5517	0.75	0.4667	0.4839
EV_HC1	0.9	0.7097	0.6	0.5333
EV_MC2	0.9333	0.7742	0.9	0.7857
CM_MC2	0.6452	0.7	0.7742	0.6333
LC_LCDSSLCC	0.7	0.8	0.7419	0.7586

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	1.09	0.8523	1.15	1.012
GH_ER2	0.9204	1.057	0.6155	0.7044
FR_FRCP1	0.7693	1.15	1.067	1.115
GH_FR1	1.15	1.099	0.8861	1.099
GH_ERC	0.8372	1.047	0.752	0.7693
EV_HC1	1.249	1.002	0.8861	0.8188
EV_MC2	1.31	1.076	1.249	1.09
CM_MC2	0.9327	0.9912	1.076	0.9204
LC_LCDSSLCC	0.9912	1.107	1.038	1.057

FR_UFR1 is a site control

July 24/15

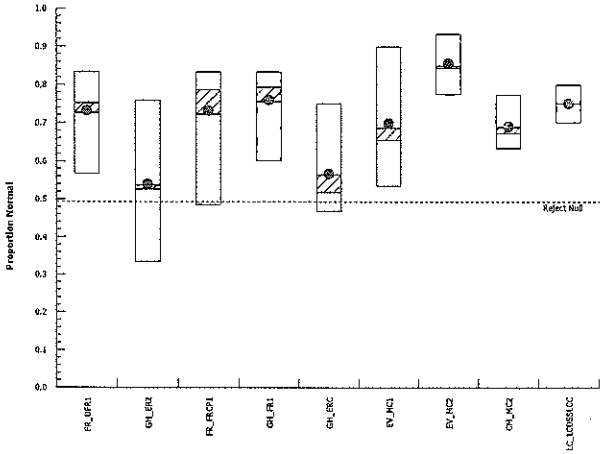
Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

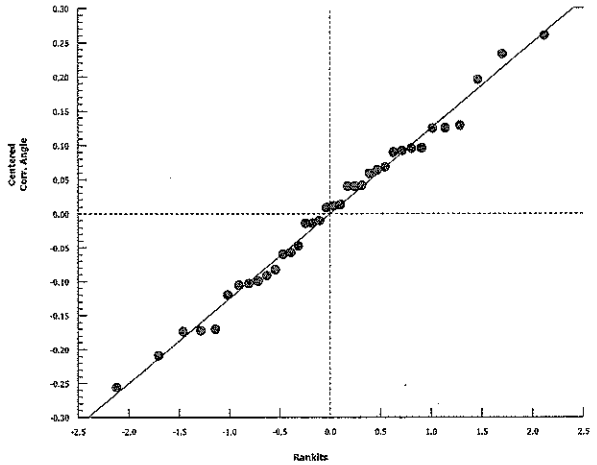
Analysis ID:	01-9416-1282	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Jul-15 9:07	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Proportion Normal Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	22/28	17/30	25/30	23/32
GH_ER2	19/30	22/29	10/30	13/31
FR_FRCP1	15/31	25/30	23/30	25/31
GH_FR1	25/30	23/29	18/30	23/29
GH_ERC	16/29	21/28	14/30	15/31
EV_HC1	27/30	22/31	18/30	16/30
EV_MC2	28/30	24/31	27/30	22/28
CM_MC2	20/31	21/30	24/31	19/30
LC_LCDSSLCC	21/30	24/30	23/31	22/29

Graphics





FR-UFR1 is a site control

July 24/15

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	12-5416-3804	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 Jul-15 15:24	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	16-8111-1466	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 18h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
GH_ER2	01-6818-1046	28 Apr-15	29 Apr-15 07:20	40h (7 °C)	Teck Coal	
FR_UFR1	02-2324-3825	28 Apr-15 09:02	29 Apr-15 07:20	31h (8.5 °C)		
FR_FRCP1	05-6493-7701	28 Apr-15 10:30	29 Apr-15 07:20	29h (8.5 °C)		
GH_FR1	04-0342-2568	28 Apr-15 08:40	29 Apr-15 07:20	31h (7 °C)		
GH_ERC	05-7162-3210	28 Apr-15 07:40	29 Apr-15 07:20	32h (7 °C)		
EV_HC1	17-6997-4694	28 Apr-15 08:40	29 Apr-15 07:20	31h (6.5 °C)		
EV_MC2	06-5856-0786	28 Apr-15 12:05	29 Apr-15 07:20	28h (6.5 °C)		
CM_MC2	15-7434-2364	28 Apr-15 09:20	29 Apr-15 07:20	30h (5.8 °C)		
LC_LCDSSLCC	14-0968-3826	28 Apr-15 10:27	29 Apr-15 07:20	29h (8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
GH_ER2	Water Sample	Teck Coal	GH_ER2		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
GH_ERC	Water Sample	Teck Coal	GH_ERC		
EV_HC1	Water Sample	Teck Coal	EV_HC1		
EV_MC2	Water Sample	Teck Coal	EV_MC2		
CM_MC2	Water Sample	Teck Coal	CM_MC2		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	44.7%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
GH_ER2		FR_UFR1	-2.037	2.511	0.249	6	0.9998	CDF	Non-Significant Effect
		FR_FRCP1	-2.031	2.511	0.249	6	0.9998	CDF	Non-Significant Effect
		GH_FR1	-2.365	2.511	0.249	6	0.9999	CDF	Non-Significant Effect
		GH_ERC	-0.2735	2.511	0.249	6	0.9399	CDF	Non-Significant Effect
		EV_HC1	-1.663	2.511	0.249	6	0.9992	CDF	Non-Significant Effect
		EV_MC2	-3.603	2.511	0.249	6	1.0000	CDF	Non-Significant Effect
		CM_MC2	-1.572	2.511	0.249	6	0.9989	CDF	Non-Significant Effect
		LC_LCDSSLCC	-2.264	2.511	0.249	6	0.9999	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.3729019	0.04661273	8	2.38	0.0439	Significant Effect
Error	0.5288049	0.01958537	27			
Total	0.9017068		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	7.16	20.09	0.5194	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9868	0.9166	0.9373	Normal Distribution

GH-ER2 is a site control

July 24/15

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID: 12-5416-3804 **Endpoint:** Proportion Normal **CETIS Version:** CETISv1.8.7
Analyzed: 22 Jul-15 15:24 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Proportion Normal Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
GH_ER2	4	0.5362	0.2264	0.846	0.5263	0.3333	0.7586	0.09735	36.31%	0.0%
FR_UFR1	4	0.7261	0.5412	0.9111	0.7522	0.5667	0.8333	0.05811	16.01%	-35.43%
FR_FRCP1	4	0.7226	0.4656	0.9795	0.7866	0.4839	0.8333	0.08074	22.35%	-34.77%
GH_FR1	4	0.7549	0.5878	0.9219	0.7931	0.6	0.8333	0.05249	13.91%	-40.79%
GH_ERC	4	0.5631	0.3563	0.7698	0.5178	0.4667	0.75	0.06496	23.07%	-5.02%
EV_HC1	4	0.6858	0.4307	0.9408	0.6548	0.5333	0.9	0.08014	23.37%	-27.9%
EV_MC2	4	0.8483	0.7206	0.976	0.8429	0.7742	0.9333	0.04012	9.46%	-58.22%
CM_MC2	4	0.6882	0.5859	0.7905	0.6726	0.6333	0.7742	0.03214	9.34%	-28.35%
LC_LCDSSLCC	4	0.7501	0.6843	0.816	0.7503	0.7	0.8	0.02069	5.52%	-39.91%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
GH_ER2	4	0.8244	0.5042	1.145	0.8124	0.6155	1.057	0.1006	24.41%	0.0%
FR_UFR1	4	1.026	0.8208	1.231	1.051	0.8523	1.15	0.06446	12.57%	-24.46%
FR_FRCP1	4	1.025	0.7483	1.302	1.091	0.7693	1.15	0.08707	16.98%	-24.38%
GH_FR1	4	1.058	0.8715	1.245	1.099	0.8861	1.15	0.05871	11.09%	-28.39%
GH_ERC	4	0.8514	0.6357	1.067	0.8032	0.752	1.047	0.0678	15.93%	-3.28%
EV_HC1	4	0.9889	0.6879	1.29	0.9439	0.8188	1.249	0.09459	19.13%	-19.96%
EV_MC2	4	1.181	0.9957	1.366	1.169	1.076	1.31	0.0582	9.86%	-43.26%
CM_MC2	4	0.98	0.8672	1.093	0.9619	0.9204	1.076	0.03543	7.23%	-18.87%
LC_LCDSSLCC	4	1.048	0.972	1.125	1.048	0.9912	1.107	0.02401	4.58%	-27.17%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_ER2	0.6333	0.7586	0.3333	0.4194
FR_UFR1	0.7857	0.5667	0.8333	0.7188
FR_FRCP1	0.4839	0.8333	0.7667	0.8065
GH_FR1	0.8333	0.7931	0.6	0.7931
GH_ERC	0.5517	0.75	0.4667	0.4839
EV_HC1	0.9	0.7097	0.6	0.5333
EV_MC2	0.9333	0.7742	0.9	0.7857
CM_MC2	0.6452	0.7	0.7742	0.6333
LC_LCDSSLCC	0.7	0.8	0.7419	0.7586

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_ER2	0.9204	1.057	0.6155	0.7044
FR_UFR1	1.09	0.8523	1.15	1.012
FR_FRCP1	0.7693	1.15	1.067	1.115
GH_FR1	1.15	1.099	0.8861	1.099
GH_ERC	0.8372	1.047	0.752	0.7693
EV_HC1	1.249	1.002	0.8861	0.8188
EV_MC2	1.31	1.076	1.249	1.09
CM_MC2	0.9327	0.9912	1.076	0.9204
LC_LCDSSLCC	0.9912	1.107	1.038	1.057

GH_ER2 is a site control

July 24/15

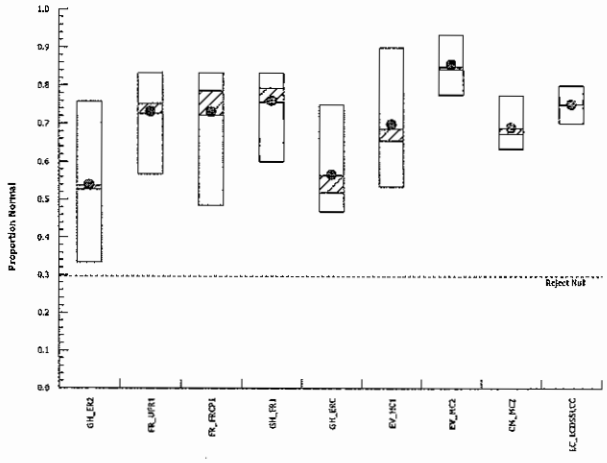
Salmonid Embryo-Alevin Survival and Development Test | **Nautilus Environmental**

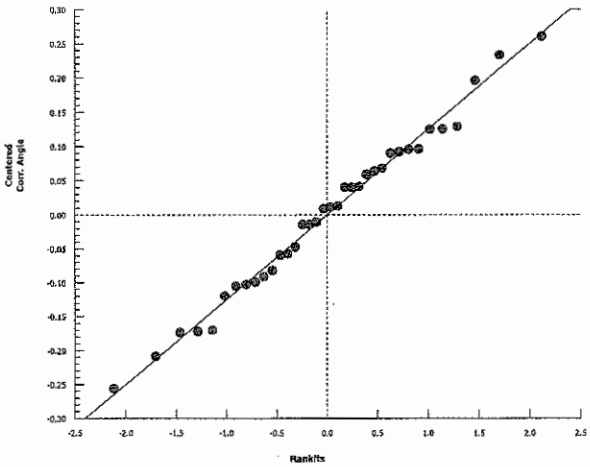
Analysis ID:	12-5416-3804	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 Jul-15 15:24	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Proportion Normal Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_ER2	19/30	22/29	10/30	13/31
FR_UFR1	22/28	17/30	25/30	23/32
FR_FRCP1	15/31	25/30	23/30	25/31
GH_FR1	25/30	23/29	18/30	23/29
GH_ERC	16/29	21/28	14/30	15/31
EV_HC1	27/30	22/31	18/30	16/30
EV_MC2	28/30	24/31	27/30	22/28
CM_MC2	20/31	21/30	24/31	19/30
LC_LCDSSLCC	21/30	24/30	23/31	22/29

Graphics





GH-ER2 is a STE control

July 29/15

CETIS Summary Report

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Batch ID:	13-7648-5271	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 18h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	02-2324-3825	28 Apr-15 09:02	29 Apr-15 07:20	31h (8.5 °C)	Teck Coal	
GH_ER2	01-6818-1046	28 Apr-15	29 Apr-15 07:20	40h (7 °C)		
FR_FRCP1	05-6493-7701	28 Apr-15 10:30	29 Apr-15 07:20	29h (8.5 °C)		
GH_FR1	04-0342-2568	28 Apr-15 08:40	29 Apr-15 07:20	31h (7 °C)		
GH_ERC	05-7162-3210	28 Apr-15 07:40	29 Apr-15 07:20	32h (7 °C)		
EV_HC1	17-6997-4694	28 Apr-15 08:40	29 Apr-15 07:20	31h (6.5 °C)		
EV_MC2	06-5856-0786	28 Apr-15 12:05	29 Apr-15 07:20	28h (6.5 °C)		
CM_MC2	15-7434-2364	28 Apr-15 09:20	29 Apr-15 07:20	30h (5.8 °C)		
LC_LCDSSLCC	14-0968-3826	28 Apr-15 10:27	29 Apr-15 07:20	29h (8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1		
GH_ER2	Water Sample	Teck Coal	GH_ER2		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
GH_ERC	Water Sample	Teck Coal	GH_ERC		
EV_HC1	Water Sample	Teck Coal	EV_HC1		
EV_MC2	Water Sample	Teck Coal	EV_MC2		
CM_MC2	Water Sample	Teck Coal	CM_MC2		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC		

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
FR_UFR1	4	18.72	16.46	20.99	16.9	20	0.7122	1.424	7.61%	0.0%
GH_ER2	4	17.95	16.91	18.99	17.3	18.8	0.3279	0.6557	3.65%	4.14%
FR_FRCP1	4	20	19.87	20.13	19.9	20.1	0.04081	0.08163	0.41%	-6.81%
GH_FR1	4	18.8	17.61	19.99	17.8	19.6	0.3742	0.7483	3.98%	-0.4%
GH_ERC	4	17.5	16.82	18.18	17.1	18	0.2121	0.4243	2.42%	6.54%
EV_HC1	4	18	17.15	18.85	17.3	18.6	0.2677	0.5354	2.98%	3.87%
EV_MC2	4	20.3	19.65	20.95	19.9	20.7	0.2041	0.4082	2.01%	-8.41%
CM_MC2	4	20.4	18.63	22.17	18.8	21.2	0.5553	1.111	5.44%	-8.95%
LC_LCDSSLCC	4	19.78	18.43	21.12	19	20.6	0.4211	0.8421	4.26%	-5.61%

Length-mm Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	19.7	16.9	20	18.3
GH_ER2	18.1	17.3	18.8	17.6
FR_FRCP1	20	20.1	19.9	20
GH_FR1	18.8	19	17.8	19.6
GH_ERC	17.7	18	17.2	17.1
EV_HC1	18.1	18.6	17.3	18
EV_MC2	20	20.6	20.7	19.9
CM_MC2	21.1	20.5	18.8	21.2
LC_LCDSSLCC	19.1	19	20.4	20.6

FR_UFR1 is a site control

July 24/15

CETIS Analytical Report

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	16-3101-6727	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 18:09	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	14-7944-9410	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 18h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
FR_UFR1	02-2324-3825	28 Apr-15 09:02	29 Apr-15 07:20	31h (8.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	7.84%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control ~~FR_UFR1~~		FR_UFR1	0.4226	1.943	1.494	6	0.3437	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.2112498	0.2112498	1	0.1786	0.6873	Non-Significant Effect
Error	7.097503	1.182917	6			
Total	7.308753		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	6.027	47.47	0.1743	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.92	0.6451	0.4299	Normal Distribution

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	19.05	18.13	19.97	18.85	18.6	19.9	0.2901	3.05%	0.0%
FR_UFR1	4	18.72	16.46	20.99	19	16.9	20	0.7122	7.61%	1.71%

Length-mm Detail

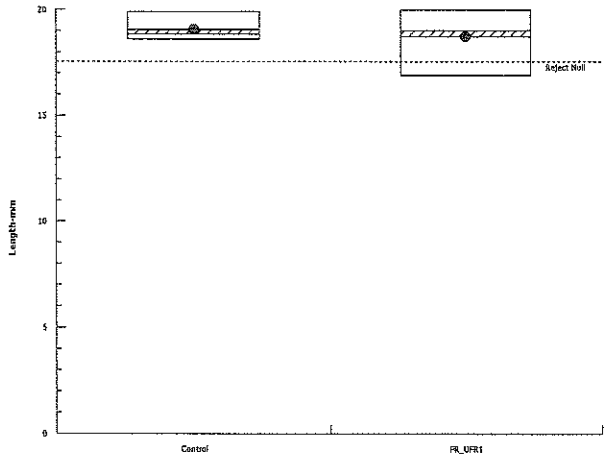
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	19.9	18.8	18.6	18.9
FR_UFR1	19.7	16.9	20	18.3

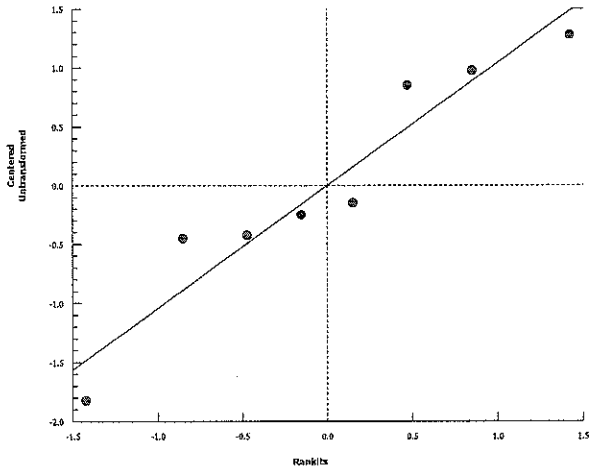
EC July 29/15

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	16-3101-6727	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 18:09	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	11-7326-2874	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 18:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	06-1709-9808	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 12:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
GH_ER2	01-6818-1046	28 Apr-15	29 Apr-15 07:20	40h (7 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
GH_ER2	Water Sample	Teck Coal	GH_ER2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	4.12%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control-GH_ER2		GH_ER2	-0.9382	1.943	0.725	6	0.8078	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.2449999	0.2449999	1	0.8802	0.3843	Non-Significant Effect
Error	1.669999	0.2783331	6			
Total	1.914999		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.395	47.47	0.3423	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9546	0.6451	0.7572	Normal Distribution

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	17.6	17.03	18.17	17.65	17.2	17.9	0.1779	2.02%	0.0%
GH_ER2	4	17.95	16.91	18.99	17.85	17.3	18.8	0.3279	3.65%	-1.99%

Length-mm Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	17.4	17.2	17.9	17.9
GH_ER2	18.1	17.3	18.8	17.6

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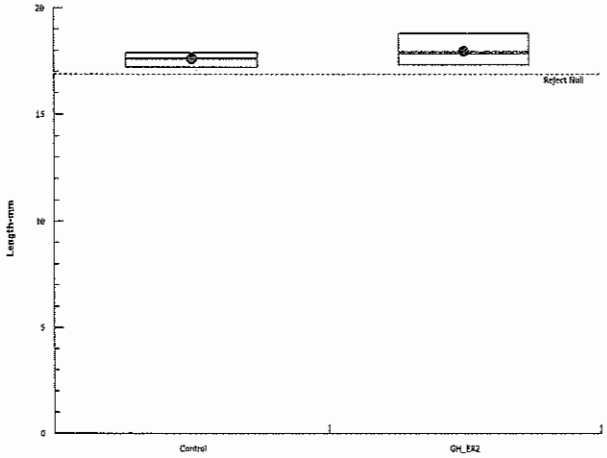
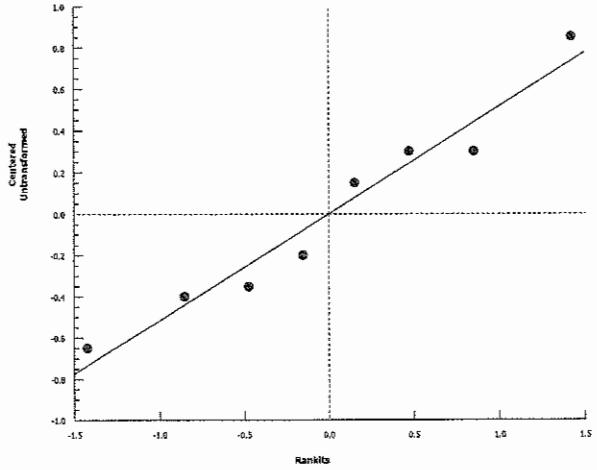
Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	11-7326-2874	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 18:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





July 24/15

CETIS Analytical Report

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	17-7169-5716	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	20-7414-7254	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 10:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
FR_FRCP1	05-6493-7701	28 Apr-15 10:30	29 Apr-15 07:20	29h (8.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	2.74%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control-~~FR_FRCP1~~		FR_FRCP1	-3.735	1.943	0.520	6	0.9952	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.999998	1.999998	1	13.95	0.0097	Significant Effect
Error	0.8600008	0.1433335	6			
Total	2.859999		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	42	47.47	0.0120	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9161	0.6451	0.3992	Normal Distribution

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	19	18.16	19.84	18.9	18.5	19.7	0.2646	2.79%	0.0%
FR_FRCP1	4	20	19.87	20.13	20	19.9	20.1	0.04081	0.41%	-5.26%

Length-mm Detail

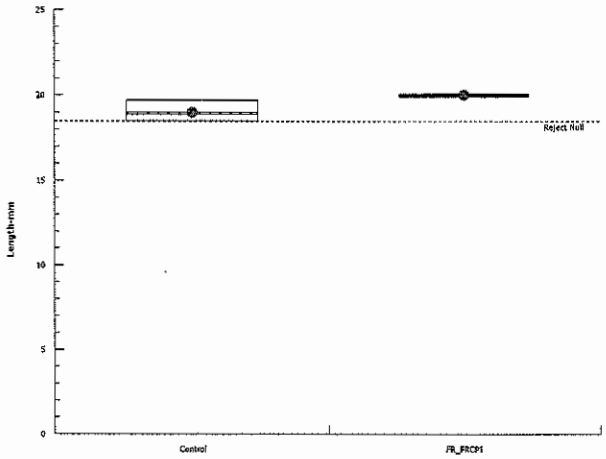
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	18.5	19.1	18.7	19.7
FR_FRCP1	20	20.1	19.9	20

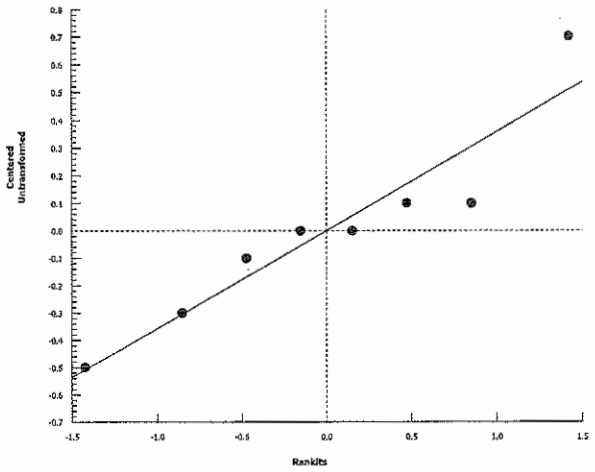
July 24/15

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	17-7169-5716	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





July 24/15

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	12-8912-0720	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	07-7912-9666	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
GH_FR1	04-0342-2568	28 Apr-15 08:40	29 Apr-15 07:20	31h (7 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
GH_FR1	Water Sample	Teck Coal	GH_FR1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	4.35%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control-GH_FR1		GH_FR1	-1.034	1.943	0.799	6	0.8295	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.3612495	0.3612495	1	1.069	0.3410	Non-Significant Effect
Error	2.027501	0.3379169	6			
Total	2.388751		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	4.835	47.47	0.2281	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9678	0.6451	0.8798	Normal Distribution

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	18.38	17.83	18.92	18.3	18.1	18.8	0.1702	1.85%	0.0%
GH_FR1	4	18.8	17.61	19.99	18.9	17.8	19.6	0.3742	3.98%	-2.31%

Length-mm Detail

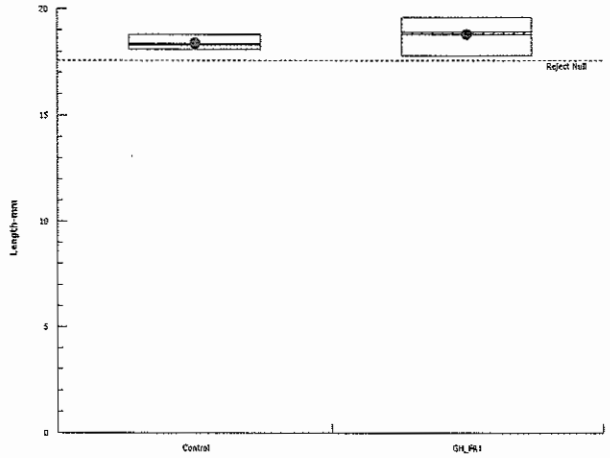
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	18.1	18.8	18.5	18.1
GH_FR1	18.8	19	17.8	19.6

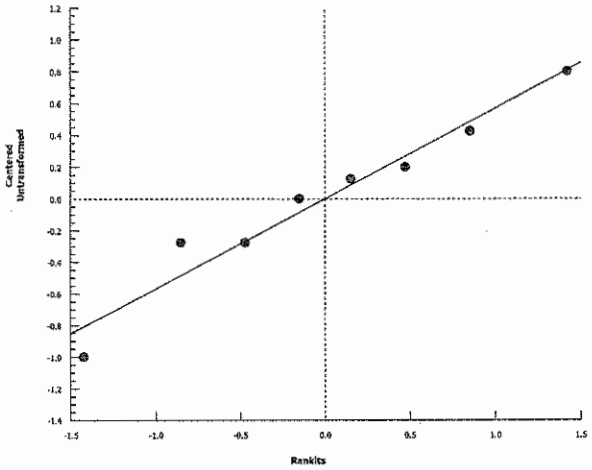
July 24/15

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	12-8912-0720	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:39	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





July 24/15

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	16-9869-3151	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	01-4482-7214	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 11:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
GH_ERC	05-7162-3210	28 Apr-15 07:40	29 Apr-15 07:20	32h (7 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
GH_ERC	Water Sample	Teck Coal	GH_ERC		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	4.04%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control GH-ERL		GH_ERC	-0.6266	1.943	0.698	6	0.7230	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1012508	0.1012508	1	0.3926	0.5540	Non-Significant Effect
Error	1.547499	0.2579165	6			
Total	1.64875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.866	47.47	0.6213	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9696	0.6451	0.8952	Normal Distribution

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	17.27	16.35	18.2	17.35	16.5	17.9	0.2898	3.36%	0.0%
GH_ERC	4	17.5	16.82	18.18	17.45	17.1	18	0.2121	2.42%	-1.3%

Length-mm Detail

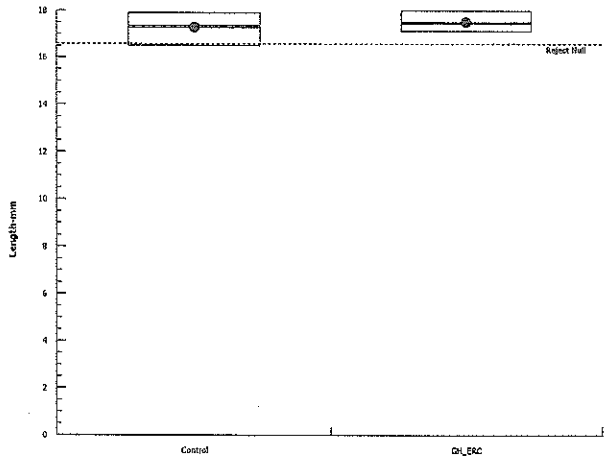
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	17.9	17.4	17.3	16.5
GH_ERC	17.7	18	17.2	17.1

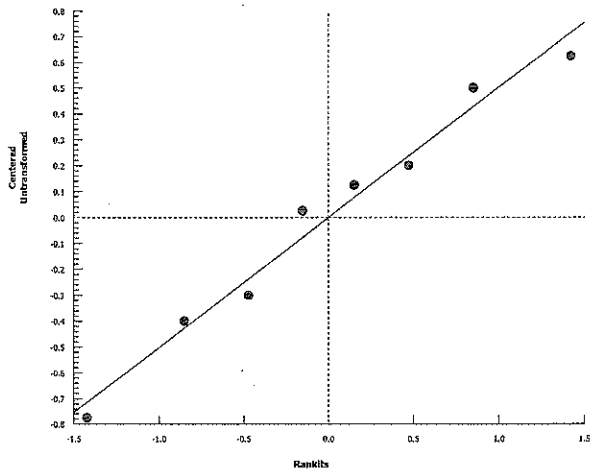
July 24/15

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	16-9869-3151	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Analyst:_____ QA: July 24/15

CETIS Analytical Report

Report Date: 20 Jul-15 20:02 (p 1 of 2)
Test Code: 15359-EV_MC2b | 03-8317-7964

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	10-4866-1351	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	16-4738-7759	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 12:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 21h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
EV_MC2	06-5856-0786	28 Apr-15 12:05	29 Apr-15 07:20	28h (6.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
EV_MC2	Water Sample	Teck Coal	EV_MC2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	2.86%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control	EV_MC2	EV_MC2	-2.876	1.943	0.557	6	0.9859	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.361251	1.361251	1	8.271	0.0282	Significant Effect
Error	0.9875014	0.1645836	6			
Total	2.348752		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.026	47.47	0.9839	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8669	0.6451	0.1407	Normal Distribution

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	19.47	18.83	20.12	19.5	19	19.9	0.2016	2.07%	0.0%
EV_MC2	4	20.3	19.65	20.95	20.3	19.9	20.7	0.2041	2.01%	-4.24%

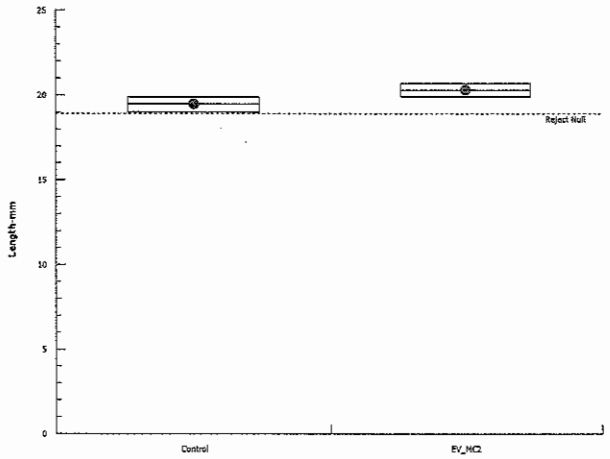
Length-mm Detail

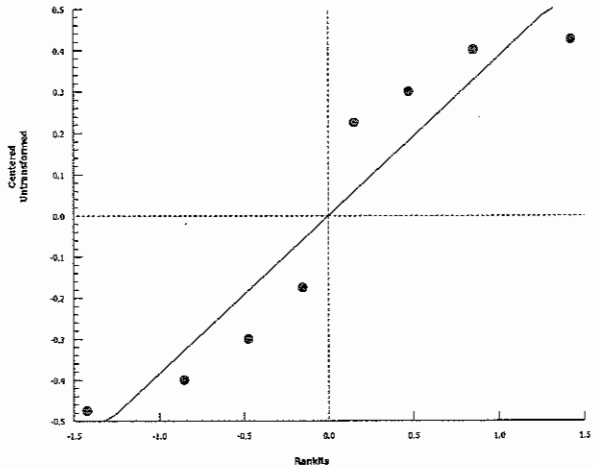
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	19.7	19	19.3	19.9
EV_MC2	20	20.6	20.7	19.9

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	10-4866-1351	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	08-2037-1690	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	20-3335-5091	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 13:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
EV_HC1	17-6997-4694	28 Apr-15 08:40	29 Apr-15 07:20	31h (6.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
EV_HC1	Water Sample	Teck Coal	EV_HC1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	3.53%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		EV_HC1	0.07632	1.943	0.637	6	0.4708	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00125001	0.00125001	1	0.005825	0.9416	Non-Significant Effect
Error	1.287501	0.2145836	6			
Total	1.288751		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.012	47.47	0.5805	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9207	0.6451	0.4356	Normal Distribution

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	18.03	17.42	18.63	18.1	17.5	18.4	0.1887	2.09%	0.0%
EV_HC1	4	18	17.15	18.85	18.05	17.3	18.6	0.2677	2.98%	0.14%

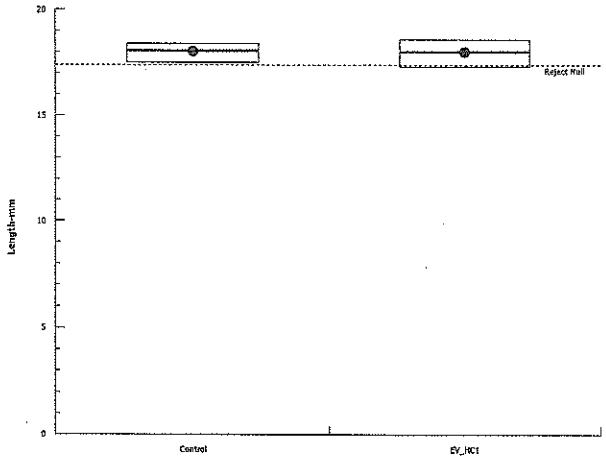
Length-mm Detail

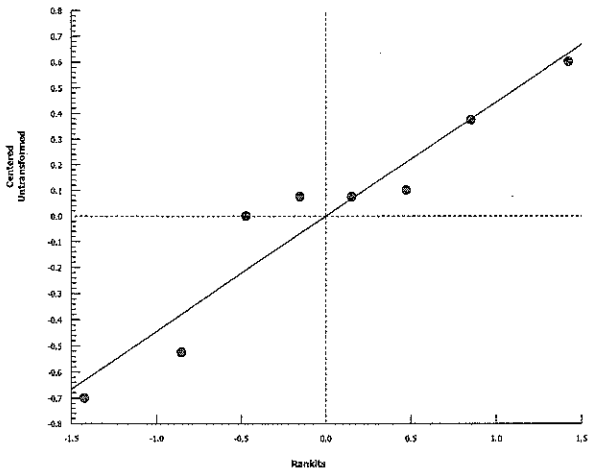
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	18.1	17.5	18.1	18.4
EV_HC1	18.1	18.6	17.3	18

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	08-2037-1690	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Analyst:_____ QA: July 24/15

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	03-5729-5249	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:25	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	20-1103-5729	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 14:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
CM_MC2	15-7434-2364	28 Apr-15 09:20	29 Apr-15 07:20	30h (5.8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
CM_MC2	Water Sample	Teck Coal	CM_MC2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	6.58%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control~~-CM_MC2~~		CM_MC2	-0.8566	1.943	1.304	6	0.7877	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.6612496	0.6612496	1	0.7337	0.4246	Non-Significant Effect
Error	5.407503	0.9012504	6			
Total	6.068752		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.167	47.47	0.5417	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8161	0.6451	0.0424	Normal Distribution

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	19.83	18.62	21.03	20.15	18.7	20.3	0.3772	3.81%	0.0%
CM_MC2	4	20.4	18.63	22.17	20.8	18.8	21.2	0.5553	5.44%	-2.9%

Length-mm Detail

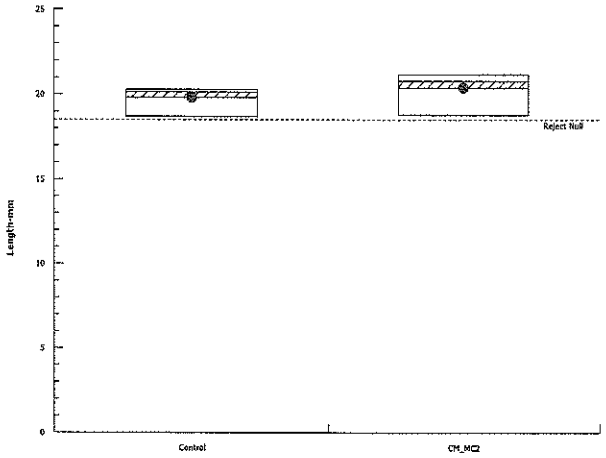
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	18.7	20.3	20.2	20.1
CM_MC2	21.1	20.5	18.8	21.2

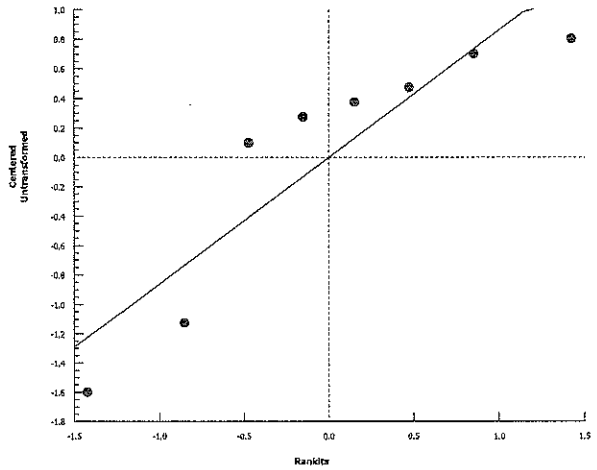
July 24/15

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	03-5729-5249	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:25	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





July 24/15

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	18-1996-3607	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-8594-8705	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 14:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 23h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
LC_LCDSSLCC	14-0968-3826	28 Apr-15 10:27	29 Apr-15 07:20	29h (8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	5.98%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		LC_LCDSSLCC	-0.3742	1.943	1.168	6	0.6395	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1012499	0.1012499	1	0.1401	0.7211	Non-Significant Effect
Error	4.337499	0.7229165	6			
Total	4.438749		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.039	47.47	0.9758	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8357	0.6451	0.0681	Normal Distribution

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	19.55	18.18	20.92	19.7	18.5	20.3	0.4291	4.39%	0.0%
LC_LCDSSLCC	4	19.78	18.43	21.12	19.75	19	20.6	0.4211	4.26%	-1.15%

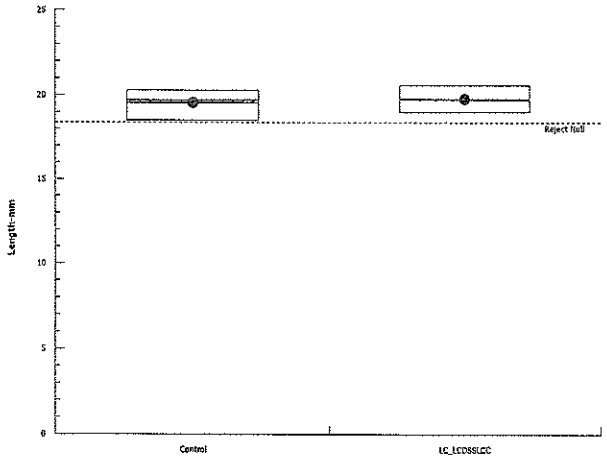
Length-mm Detail

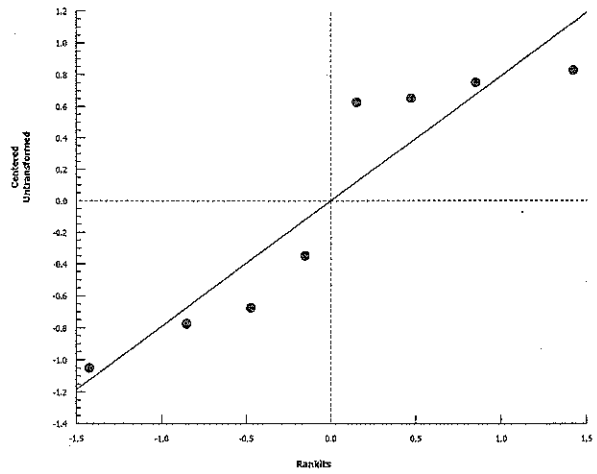
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	18.5	20.3	20.2	19.2
LC_LCDSSLCC	19.1	19	20.4	20.6

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	18-1996-3607	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Analyst:_____ QA: July 24/15

CETIS Analytical Report

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	18-7571-5640	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Jul-15 9:10	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	13-7648-5271	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 18h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	02-2324-3825	28 Apr-15 09:02	29 Apr-15 07:20	31h (8.5 °C)	Teck Coal	
GH_ER2	01-6818-1046	28 Apr-15	29 Apr-15 07:20	40h (7 °C)		
FR_FRCP1	05-6493-7701	28 Apr-15 10:30	29 Apr-15 07:20	29h (8.5 °C)		
GH_FR1	04-0342-2568	28 Apr-15 08:40	29 Apr-15 07:20	31h (7 °C)		
GH_ERC	05-7162-3210	28 Apr-15 07:40	29 Apr-15 07:20	32h (7 °C)		
EV_HC1	17-6997-4694	28 Apr-15 08:40	29 Apr-15 07:20	31h (6.5 °C)		
EV_MC2	06-5856-0786	28 Apr-15 12:05	29 Apr-15 07:20	28h (6.5 °C)		
CM_MC2	15-7434-2364	28 Apr-15 09:20	29 Apr-15 07:20	30h (5.8 °C)		
LC_LCDSSLCC	14-0968-3826	28 Apr-15 10:27	29 Apr-15 07:20	29h (8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1		
GH_ER2	Water Sample	Teck Coal	GH_ER2		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
GH_ERC	Water Sample	Teck Coal	GH_ERC		
EV_HC1	Water Sample	Teck Coal	EV_HC1		
EV_MC2	Water Sample	Teck Coal	EV_MC2		
CM_MC2	Water Sample	Teck Coal	CM_MC2		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	7.48%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_ER2	1.389	2.511	1.401	6	0.3291	CDF	Non-Significant Effect
		FR_FRCP1	-2.286	2.511	1.401	6	0.9999	CDF	Non-Significant Effect
		GH_FR1	-0.1344	2.511	1.401	6	0.9169	CDF	Non-Significant Effect
		GH_ERC	2.196	2.511	1.401	6	0.0927	CDF	Non-Significant Effect
		EV_HC1	1.3	2.511	1.401	6	0.3671	CDF	Non-Significant Effect
		EV_MC2	-2.823	2.511	1.401	6	1.0000	CDF	Non-Significant Effect
		CM_MC2	-3.003	2.511	1.401	6	1.0000	CDF	Non-Significant Effect
		LC_LCDSSLCC	-1.882	2.511	1.401	6	0.9996	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	38.785	4.848125	8	7.789	<0.0001	Significant Effect
Error	16.80501	0.6224079	27			
Total	55.59001		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	16.95	20.09	0.0306	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9668	0.9166	0.3441	Normal Distribution

FR_UFR1 is a site control

July 24/15

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	18-7571-5640	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Jul-15 9:10	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

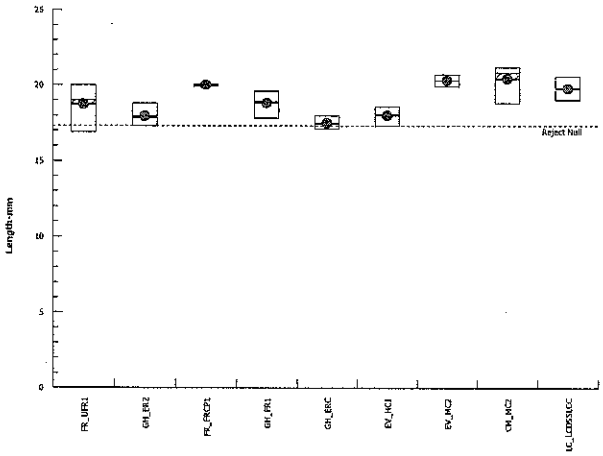
Length-mm Summary

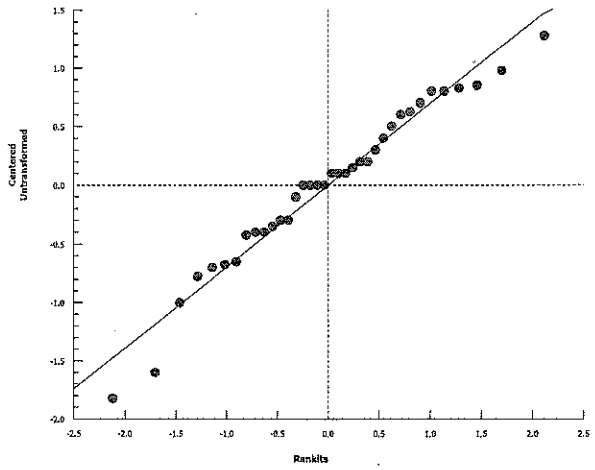
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	18.72	16.46	20.99	19	16.9	20	0.7122	7.61%	0.0%
GH_ER2	4	17.95	16.91	18.99	17.85	17.3	18.8	0.3279	3.65%	4.14%
FR_FRCP1	4	20	19.87	20.13	20	19.9	20.1	0.04081	0.41%	-6.81%
GH_FR1	4	18.8	17.61	19.99	18.9	17.8	19.6	0.3742	3.98%	-0.4%
GH_ERC	4	17.5	16.82	18.18	17.45	17.1	18	0.2121	2.42%	6.54%
EV_HC1	4	18	17.15	18.85	18.05	17.3	18.6	0.2677	2.98%	3.87%
EV_MC2	4	20.3	19.65	20.95	20.3	19.9	20.7	0.2041	2.01%	-8.41%
CM_MC2	4	20.4	18.63	22.17	20.8	18.8	21.2	0.5553	5.44%	-8.95%
LC_LCDSSLCC	4	19.78	18.43	21.12	19.75	19	20.6	0.4211	4.26%	-5.61%

Length-mm Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	19.7	16.9	20	18.3
GH_ER2	18.1	17.3	18.8	17.6
FR_FRCP1	20	20.1	19.9	20
GH_FR1	18.8	19	17.8	19.6
GH_ERC	17.7	18	17.2	17.1
EV_HC1	18.1	18.6	17.3	18
EV_MC2	20	20.6	20.7	19.9
CM_MC2	21.1	20.5	18.8	21.2
LC_LCDSSLCC	19.1	19	20.4	20.6

Graphics





FR.UFR1 is a std control

July 24/15

CETIS Analytical Report

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	00-1359-3118	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 Jul-15 15:19	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	14-9254-5008	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 18h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
GH_ER2	01-6818-1046	28 Apr-15	29 Apr-15 07:20	40h (7 °C)	Teck Coal	
FR_UFR1	02-2324-3825	28 Apr-15 09:02	29 Apr-15 07:20	31h (8.5 °C)		
FR_FRCP1	05-6493-7701	28 Apr-15 10:30	29 Apr-15 07:20	29h (8.5 °C)		
GH_FR1	04-0342-2568	28 Apr-15 08:40	29 Apr-15 07:20	31h (7 °C)		
GH_ERC	05-7162-3210	28 Apr-15 07:40	29 Apr-15 07:20	32h (7 °C)		
EV_HC1	17-6997-4694	28 Apr-15 08:40	29 Apr-15 07:20	31h (6.5 °C)		
EV_MC2	06-5856-0786	28 Apr-15 12:05	29 Apr-15 07:20	28h (6.5 °C)		
CM_MC2	15-7434-2364	28 Apr-15 09:20	29 Apr-15 07:20	30h (5.8 °C)		
LC_LCDSSLCC	14-0968-3826	28 Apr-15 10:27	29 Apr-15 07:20	29h (8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
GH_ER2	Water Sample	Teck Coal	GH_ER2		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
GH_ERC	Water Sample	Teck Coal	GH_ERC		
EV_HC1	Water Sample	Teck Coal	EV_HC1		
EV_MC2	Water Sample	Teck Coal	EV_MC2		
CM_MC2	Water Sample	Teck Coal	CM_MC2		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	7.8%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
GH_ER2		FR_UFR1	-1.389	2.511	1.401	6	0.9979	CDF	Non-Significant Effect
		FR_FRCP1	-3.675	2.511	1.401	6	1.0000	CDF	Non-Significant Effect
		GH_FR1	-1.524	2.511	1.401	6	0.9987	CDF	Non-Significant Effect
		GH_ERC	0.8067	2.511	1.401	6	0.5951	CDF	Non-Significant Effect
		EV_HC1	-0.08963	2.511	1.401	6	0.9082	CDF	Non-Significant Effect
		EV_MC2	-4.213	2.511	1.401	6	1.0000	CDF	Non-Significant Effect
		CM_MC2	-4.392	2.511	1.401	6	1.0000	CDF	Non-Significant Effect
		LC_LCDSSLCC	-3.271	2.511	1.401	6	1.0000	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	38.785	4.848125	8	7.789	<0.0001	Significant Effect
Error	16.80501	0.6224079	27			
Total	55.59001		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	16.95	20.09	0.0306	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9668	0.9166	0.3441	Normal Distribution

GH_ER2 is a site control

July 24/15

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID: 00-1359-3118 **Endpoint:** Length-mm **CETIS Version:** CETISv1.8.7
Analyzed: 22 Jul-15 15:19 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

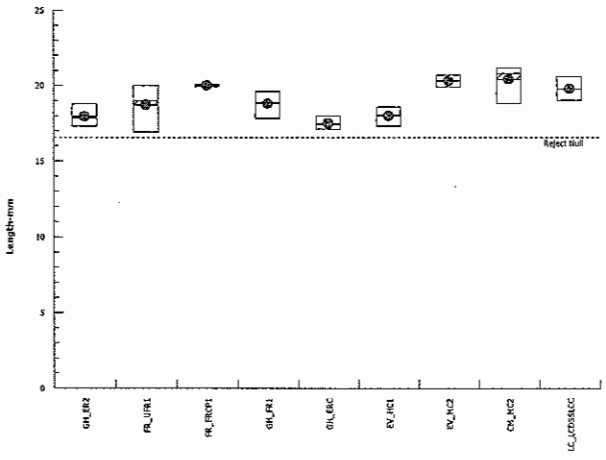
Length-mm Summary

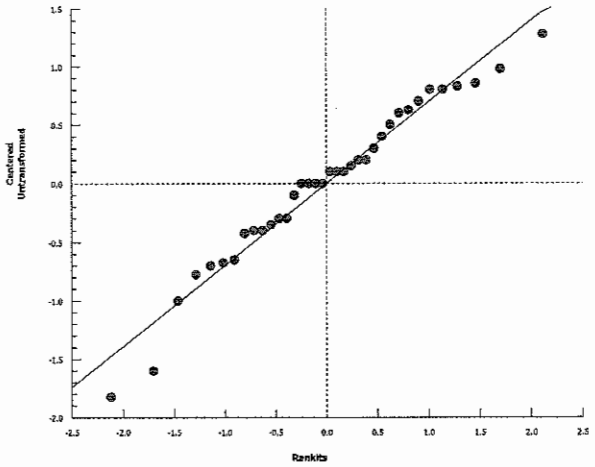
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
GH_ER2	4	17.95	16.91	18.99	17.85	17.3	18.8	0.3279	3.65%	0.0%
FR_UFR1	4	18.72	16.46	20.99	19	16.9	20	0.7122	7.61%	-4.32%
FR_FRCP1	4	20	19.87	20.13	20	19.9	20.1	0.04081	0.41%	-11.42%
GH_FR1	4	18.8	17.61	19.99	18.9	17.8	19.6	0.3742	3.98%	-4.74%
GH_ERC	4	17.5	16.82	18.18	17.45	17.1	18	0.2121	2.42%	2.51%
EV_HC1	4	18	17.15	18.85	18.05	17.3	18.6	0.2677	2.98%	-0.28%
EV_MC2	4	20.3	19.65	20.95	20.3	19.9	20.7	0.2041	2.01%	-13.09%
CM_MC2	4	20.4	18.63	22.17	20.8	18.8	21.2	0.5553	5.44%	-13.65%
LC_LCDSSLCC	4	19.78	18.43	21.12	19.75	19	20.6	0.4211	4.26%	-10.17%

Length-mm Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_ER2	18.1	17.3	18.8	17.6
FR_UFR1	19.7	16.9	20	18.3
FR_FRCP1	20	20.1	19.9	20
GH_FR1	18.8	19	17.8	19.6
GH_ERC	17.7	18	17.2	17.1
EV_HC1	18.1	18.6	17.3	18
EV_MC2	20	20.6	20.7	19.9
CM_MC2	21.1	20.5	18.8	21.2
LC_LCDSSLCC	19.1	19	20.4	20.6

Graphics





GH-ER2 is a site control

July 24/15

CETIS Summary Report

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Batch ID:	13-7648-5271	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 18h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	02-2324-3825	28 Apr-15 09:02	29 Apr-15 07:20	31h (8.5 °C)	Teck Coal	
GH_ER2	01-6818-1046	28 Apr-15	29 Apr-15 07:20	40h (7 °C)		
FR_FRCP1	05-6493-7701	28 Apr-15 10:30	29 Apr-15 07:20	29h (8.5 °C)		
GH_FR1	04-0342-2568	28 Apr-15 08:40	29 Apr-15 07:20	31h (7 °C)		
GH_ERC	05-7162-3210	28 Apr-15 07:40	29 Apr-15 07:20	32h (7 °C)		
EV_HC1	17-6997-4694	28 Apr-15 08:40	29 Apr-15 07:20	31h (6.5 °C)		
EV_MC2	06-5856-0786	28 Apr-15 12:05	29 Apr-15 07:20	28h (6.5 °C)		
CM_MC2	15-7434-2364	28 Apr-15 09:20	29 Apr-15 07:20	30h (5.8 °C)		
LC_LCDSSLCC	14-0968-3826	28 Apr-15 10:27	29 Apr-15 07:20	29h (8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1		
GH_ER2	Water Sample	Teck Coal	GH_ER2		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
GH_ERC	Water Sample	Teck Coal	GH_ERC		
EV_HC1	Water Sample	Teck Coal	EV_HC1		
EV_MC2	Water Sample	Teck Coal	EV_MC2		
CM_MC2	Water Sample	Teck Coal	CM_MC2		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC		

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
FR_UFR1	4	97.68	90.78	104.6	93.6	102.6	2.169	4.337	4.44%	0.0%
GH_ER2	4	91.27	83.33	99.21	83.85	94.55	2.494	4.989	5.47%	6.56%
FR_FRCP1	4	106.2	100.1	112.2	102	111.3	1.91	3.821	3.6%	-8.69%
GH_FR1	4	94.71	89.28	100.1	91.67	99.13	1.708	3.417	3.61%	3.04%
GH_ERC	4	91.01	84.66	97.35	87.33	96.25	1.993	3.986	4.38%	6.83%
EV_HC1	4	88.21	87.13	89.29	87.5	88.93	0.3402	0.6804	0.77%	9.69%
EV_MC2	4	100.6	93.67	107.6	98.21	107.2	2.192	4.383	4.36%	-3.03%
CM_MC2	4	99.03	86.5	111.6	89.17	105.5	3.938	7.875	7.95%	-1.39%
LC_LCDSSLCC	4	99.67	91.07	108.3	92.08	104.1	2.703	5.405	5.42%	-2.04%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	102.6	94.5	100	93.6
GH_ER2	93.68	94.55	93	83.85
FR_FRCP1	111.3	106	105.4	102
GH_FR1	92.4	95.65	91.67	99.13
GH_ERC	91.88	88.57	96.25	87.33
EV_HC1	88.93	88.64	87.78	87.5
EV_MC2	98.21	107.2	98.89	98.26
CM_MC2	105.5	96.19	89.17	105.3
LC_LCDSSLCC	99.58	92.08	102.9	104.1

FR_UFR1 is a site control

July 24/15

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	08-2171-7482	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 18:09	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	14-7944-9410	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 18h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
FR_UFR1	02-2324-3825	28 Apr-15 09:02	29 Apr-15 07:20	31h (8.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	8.5%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control	FR_UFR1	FR_UFR1	-0.00887	1.943	8.302	6	0.5034	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.002871515	0.002871515	1	7.87E-05	0.9932	Non-Significant Effect
Error	219.0623	36.51039	6			
Total	219.0652		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.882	47.47	0.4079	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9568	0.6451	0.7789	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	97.64	85.92	109.4	99.14	87.69	104.6	3.681	7.54%	0.0%
FR_UFR1	4	97.68	90.78	104.6	97.25	93.6	102.6	2.169	4.44%	-0.04%

Mean Dry Weight-mg Detail

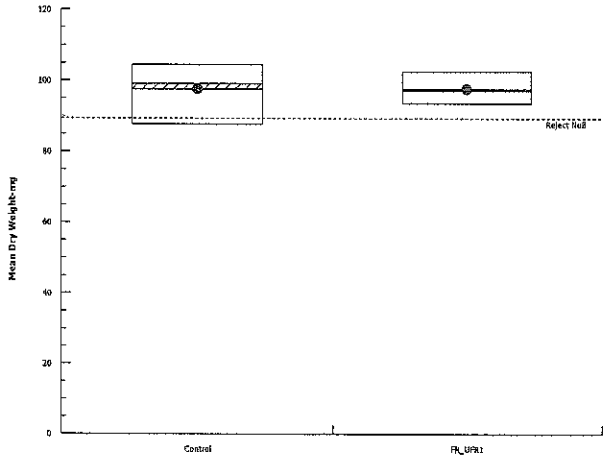
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	101.5	96.8	87.69	104.6
FR_UFR1	102.6	94.5	100	93.6

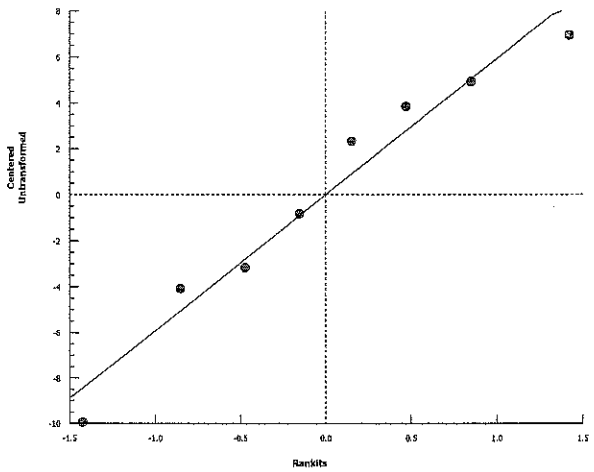
July 24/15

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	08-2171-7482	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 18:09	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





July 24/15

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	19-4557-9083	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 18:26	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	06-1709-9808	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 12:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
GH_ER2	01-6818-1046	28 Apr-15	29 Apr-15 07:20	40h (7 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
GH_ER2	Water Sample	Teck Coal	GH_ER2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	5.81%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control - GH_ER2		GH_ER2	-1.868	1.943	5.024	6	0.9445	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	46.65909	46.65909	1	3.49	0.1110	Non-Significant Effect
Error	80.21045	13.36841	6			
Total	126.8695		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	13.46	47.47	0.0605	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8282	0.6451	0.0569	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	86.44	84.28	88.6	86.58	85	87.6	0.6799	1.57%	0.0%
GH_ER2	4	91.27	83.33	99.21	93.34	83.85	94.55	2.494	5.47%	-5.59%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	87.6	85.56	87.6	85
GH_ER2	93.68	94.55	93	83.85

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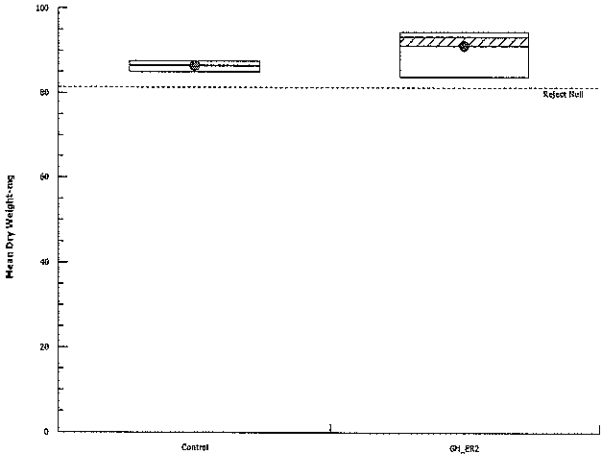
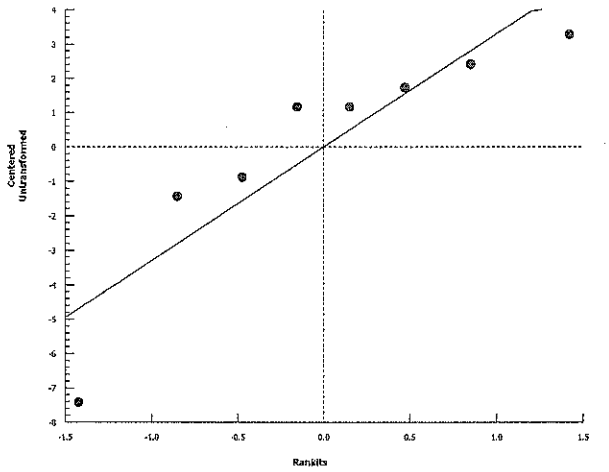
Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	19-4557-9083	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 18:26	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	01-7008-5510	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	20-7414-7254	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 10:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
FR_FRCP1	05-6493-7701	28 Apr-15 10:30	29 Apr-15 07:20	29h (8.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	4.82%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control-FRFRCP1		FR_FRCP1	-3.94	1.943	4.658	6	0.9962	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	178.4	178.4	1	15.52	0.0076	Significant Effect
Error	68.96666	11.49444	6			
Total	247.3667		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.739	47.47	0.6605	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9675	0.6451	0.8774	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	96.72	92.11	101.3	97.04	93.21	99.6	1.448	3.0%	0.0%
FR_FRCP1	4	106.2	100.1	112.2	105.7	102	111.3	1.91	3.6%	-9.77%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	93.21	99.6	95.56	98.52
FR_FRCP1	111.3	106	105.4	102

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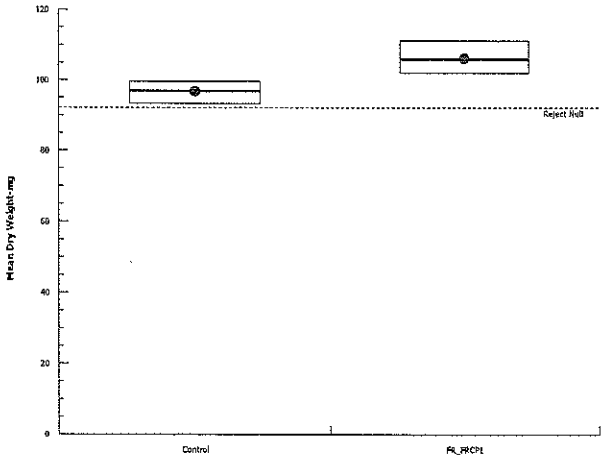
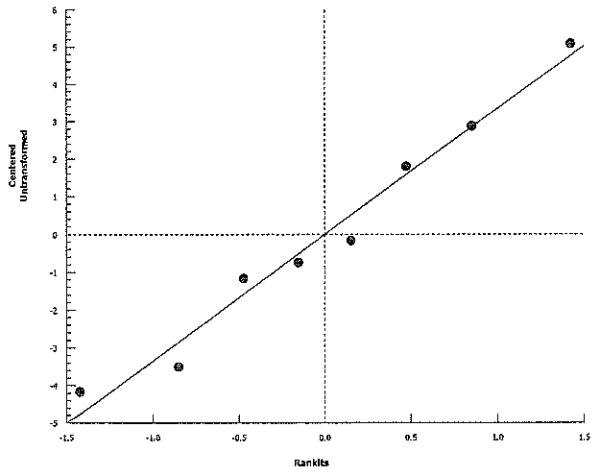
Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	01-7008-5510	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





July 24/15

CETIS Analytical Report

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	17-6964-7973	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	07-7912-9666	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
GH_FR1	04-0342-2568	28 Apr-15 08:40	29 Apr-15 07:20	31h (7 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
GH_FR1	Water Sample	Teck Coal	GH_FR1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	4.19%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control ~~GH_FR1~~		GH_FR1	0.7188	1.943	4.028	6	0.2496	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.44112	4.44112	1	0.5167	0.4993	Non-Significant Effect
Error	51.5706	8.595099	6			
Total	56.01172		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.117	47.47	0.5537	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9126	0.6451	0.3724	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	96.2	92.47	99.94	95.43	94.35	99.6	1.174	2.44%	0.0%
GH_FR1	4	94.71	89.28	100.1	94.03	91.67	99.13	1.708	3.61%	1.55%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	95.86	94.35	99.6	95
GH_FR1	92.4	95.65	91.67	99.13

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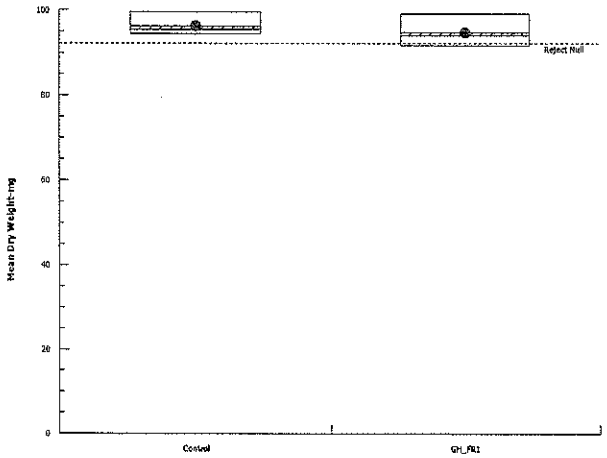
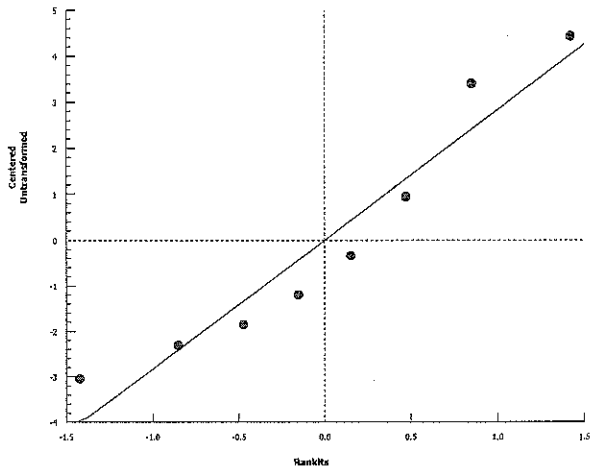
Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	17-6964-7973	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





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CETIS Analytical Report

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	20-8143-1790	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	01-4482-7214	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 11:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
GH_ERC	05-7162-3210	28 Apr-15 07:40	29 Apr-15 07:20	32h (7 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
GH_ERC	Water Sample	Teck Coal	GH_ERC		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	5.81%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control	vs	GH_ERC	-1.986	1.943	4.994	6	0.9529	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	52.08142	52.08142	1	3.942	0.0943	Non-Significant Effect
Error	79.26511	13.21085	6			
Total	131.3465		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.509	47.47	0.7436	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8995	0.6451	0.2859	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	85.9	80.74	91.07	85.33	82.59	90.37	1.623	3.78%	0.0%
GH_ERC	4	91.01	84.66	97.35	90.22	87.33	96.25	1.993	4.38%	-5.94%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	90.37	85.24	85.42	82.59
GH_ERC	91.88	88.57	96.25	87.33

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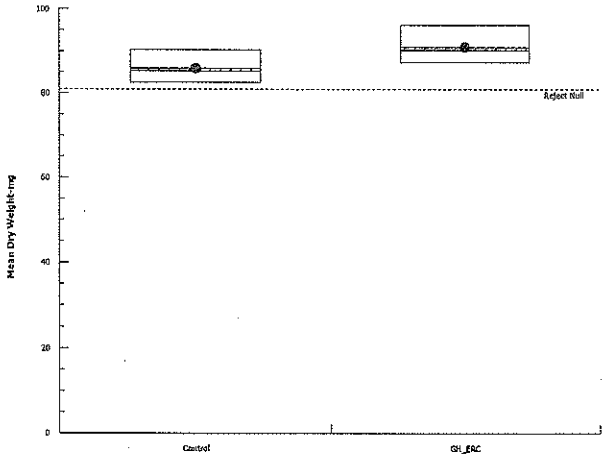
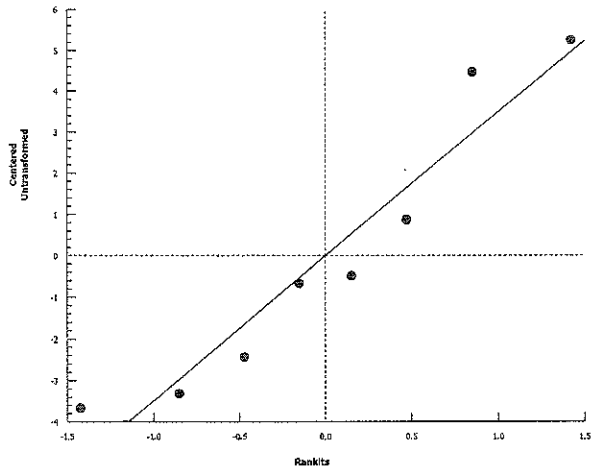
Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	20-8143-1790	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 19:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	13-1829-4619	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	16-4738-7759	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 12:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 21h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
EV_MC2	06-5856-0786	28 Apr-15 12:05	29 Apr-15 07:20	28h (6.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
EV_MC2	Water Sample	Teck Coal	EV_MC2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	5.12%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		EV_MC2	-1.711	1.943	4.933	6	0.9311	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	37.75307	37.75307	1	2.929	0.1379	Non-Significant Effect
Error	77.34594	12.89099	6			
Total	115.099		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.926	47.47	0.4014	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.7644	0.6451	0.0118	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	96.3	92.22	100.4	95.51	94.17	100	1.281	2.66%	0.0%
EV_MC2	4	100.6	93.67	107.6	98.57	98.21	107.2	2.192	4.36%	-4.51%

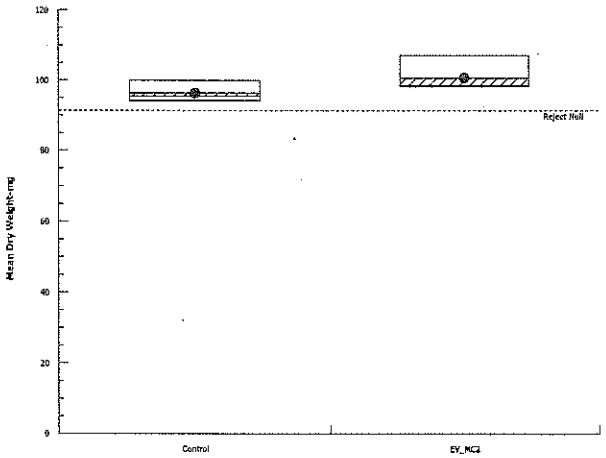
Mean Dry Weight-mg Detail

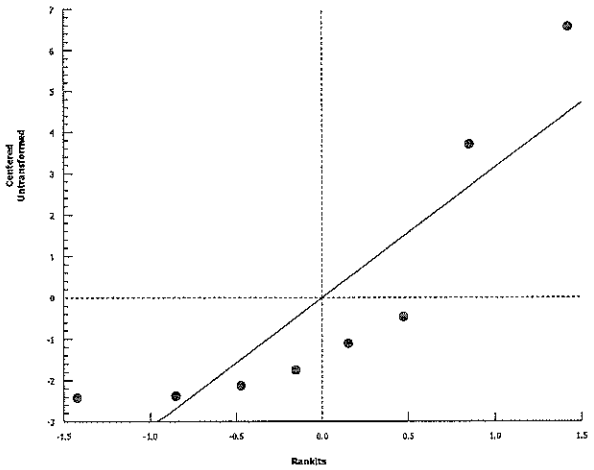
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	100	94.17	95.19	95.83
EV_MC2	98.21	107.2	98.89	98.26

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	13-1829-4619	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





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CETIS Analytical Report

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	01-0586-0693	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	20-3335-5091	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 13:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
EV_HC1	17-6997-4694	28 Apr-15 08:40	29 Apr-15 07:20	31h (6.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
EV_HC1	Water Sample	Teck Coal	EV_HC1		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	2.91%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control-EV_HC1		EV_HC1	1.445	1.943	2.621	6	0.0993	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	7.594937	7.594937	1	2.087	0.1987	Non-Significant Effect
Error	21.83274	3.63879	6			
Total	29.42768		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	14.72	47.47	0.0534	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9498	0.6451	0.7090	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	90.16	86.01	94.31	90.5	86.79	92.86	1.305	2.9%	0.0%
EV_HC1	4	88.21	87.13	89.29	88.21	87.5	88.93	0.3402	0.77%	2.16%

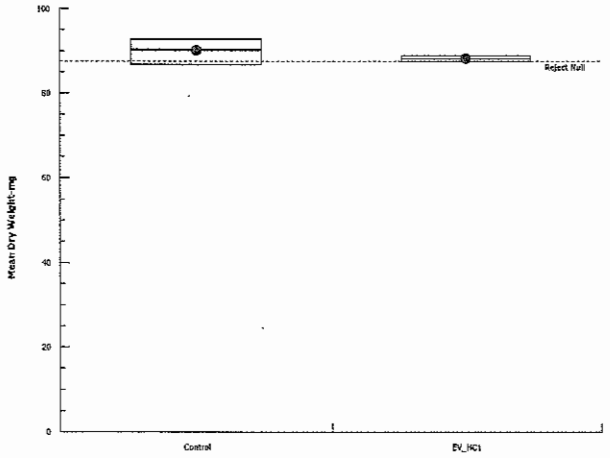
Mean Dry Weight-mg Detail

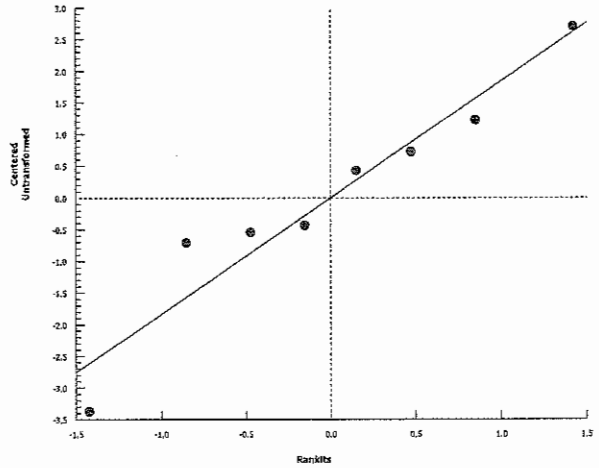
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	86.79	91.38	89.62	92.86
EV_HC1	88.93	88.64	87.78	87.5

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	01-0586-0693	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	12-2853-4787	**Endpoint:**	Mean ~~Dry~~ Wet Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:25	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	20-1103-5729	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 14:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
CM_MC2	15-7434-2364	28 Apr-15 09:20	29 Apr-15 07:20	30h (5.8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
CM_MC2	Water Sample	Teck Coal	CM_MC2		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	7.98%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control ~~CM_MC2~~		CM_MC2	-0.227	1.943	7.829	6	0.5860	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.673106	1.673106	1	0.05153	0.8280	Non-Significant Effect
Error	194.7957	32.46594	6			
Total	196.4688		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	21.3	47.47	0.0318	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9305	0.6451	0.5210	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	98.12	95.4	100.8	98.23	96.4	99.6	0.8532	1.74%	0.0%
CM_MC2	4	99.03	86.5	111.6	100.7	89.17	105.5	3.938	7.95%	-0.93%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	99.6	96.4	99.57	96.9
CM_MC2	105.5	96.19	89.17	105.3

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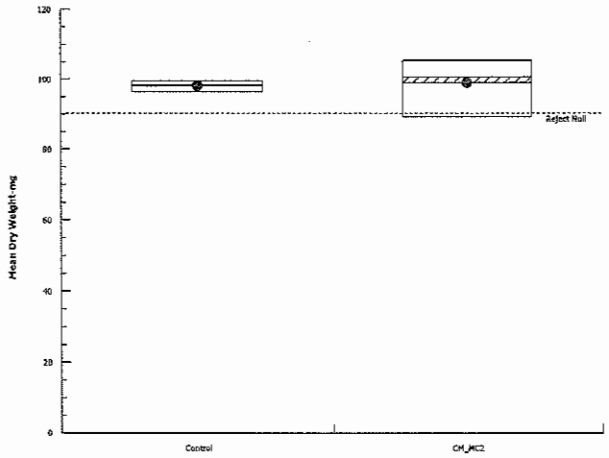
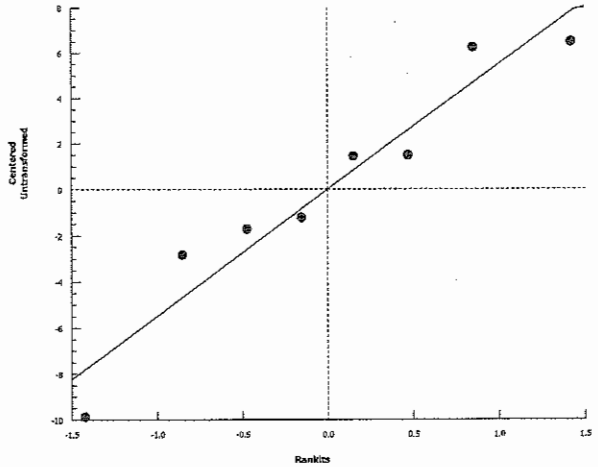
Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	12-2853-4787	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:25	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





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Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	09-0611-6086	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-8594-8705	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 14:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 23h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-5737-4597	29 Apr-15	29 Apr-15	16h	Teck Coal	
LC_LCDSSLCC	14-0968-3826	28 Apr-15 10:27	29 Apr-15 07:20	29h (8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	5.55%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		LC_LCDSSLCC	-0.441	1.943	5.463	6	0.6627	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.073997	3.073997	1	0.1945	0.6747	Non-Significant Effect
Error	94.83717	15.8062	6			
Total	97.91117		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	12.2	47.47	0.0692	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9037	0.6451	0.3121	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	98.43	95.97	100.9	98.95	96.25	99.57	0.7739	1.57%	0.0%
LC_LCDSSLCC	4	99.67	91.07	108.3	101.3	92.08	104.1	2.703	5.42%	-1.26%

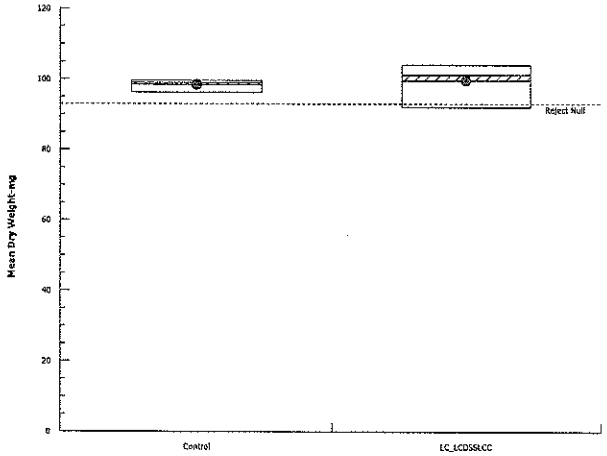
Mean Dry Weight-mg Detail

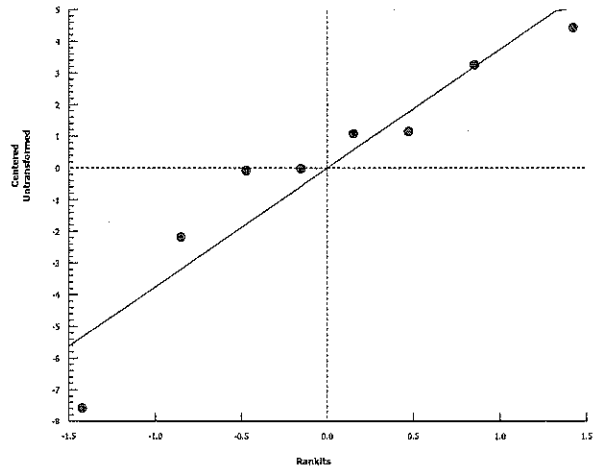
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	99.5	96.25	99.57	98.4
LC_LCDSSLCC	99.58	92.08	102.9	104.1

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	09-0611-6086	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 Jul-15 20:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	01-8563-9889	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Jul-15 9:09	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	13-7648-5271	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 18h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	02-2324-3825	28 Apr-15 09:02	29 Apr-15 07:20	31h (8.5 °C)	Teck Coal	
GH_ER2	01-6818-1046	28 Apr-15	29 Apr-15 07:20	40h (7 °C)		
FR_FRCP1	05-6493-7701	28 Apr-15 10:30	29 Apr-15 07:20	29h (8.5 °C)		
GH_FR1	04-0342-2568	28 Apr-15 08:40	29 Apr-15 07:20	31h (7 °C)		
GH_ERC	05-7162-3210	28 Apr-15 07:40	29 Apr-15 07:20	32h (7 °C)		
EV_HC1	17-6997-4694	28 Apr-15 08:40	29 Apr-15 07:20	31h (6.5 °C)		
EV_MC2	06-5856-0786	28 Apr-15 12:05	29 Apr-15 07:20	28h (6.5 °C)		
CM_MC2	15-7434-2364	28 Apr-15 09:20	29 Apr-15 07:20	30h (5.8 °C)		
LC_LCDSSLCC	14-0968-3826	28 Apr-15 10:27	29 Apr-15 07:20	29h (8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1		
GH_ER2	Water Sample	Teck Coal	GH_ER2		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
GH_ERC	Water Sample	Teck Coal	GH_ERC		
EV_HC1	Water Sample	Teck Coal	EV_HC1		
EV_MC2	Water Sample	Teck Coal	EV_MC2		
CM_MC2	Water Sample	Teck Coal	CM_MC2		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	8.5%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_ER2	1.938	2.511	8.303	6	0.1464	CDF	Non-Significant Effect
		FR_FRCP1	-2.568	2.511	8.303	6	1.0000	CDF	Non-Significant Effect
		GH_FR1	0.8967	2.511	8.303	6	0.5530	CDF	Non-Significant Effect
		GH_ERC	2.017	2.511	8.303	6	0.1279	CDF	Non-Significant Effect
		EV_HC1	2.863	2.511	8.303	6	0.0235	CDF	Significant Effect
		EV_MC2	-0.8964	2.511	8.303	6	0.9892	CDF	Non-Significant Effect
		CM_MC2	-0.4092	2.511	8.303	6	0.9571	CDF	Non-Significant Effect
		LC_LCDSSLCC	-0.6023	2.511	8.303	6	0.9744	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1031.433	128.9292	8	5.897	0.0002	Significant Effect
Error	590.3296	21.86406	27			
Total	1621.763		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	10.74	20.09	0.2167	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9687	0.9166	0.3924	Normal Distribution

FR_UFR1 is a site control

July 24/15

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	01-8563-9889	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Jul-15 9:09	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

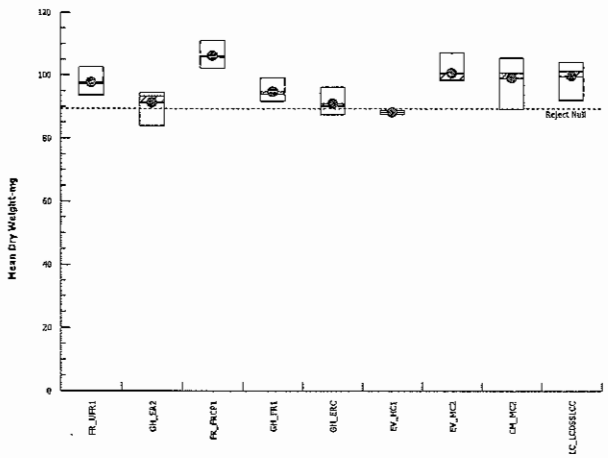
Mean Dry Weight-mg Summary

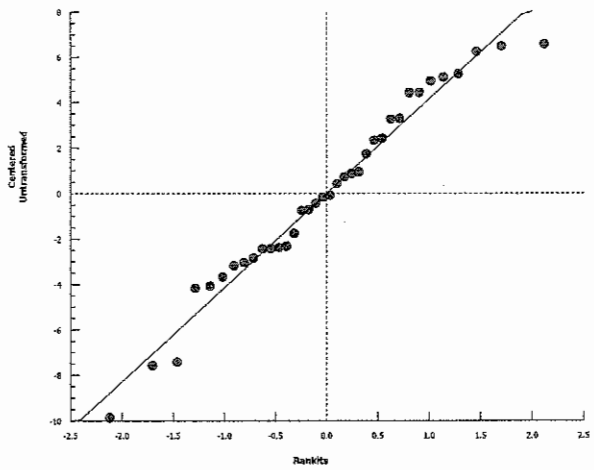
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	97.68	90.78	104.6	97.25	93.6	102.6	2.169	4.44%	0.0%
GH_ER2	4	91.27	83.33	99.21	93.34	83.85	94.55	2.494	5.47%	6.56%
FR_FRCP1	4	106.2	100.1	112.2	105.7	102	111.3	1.91	3.6%	-8.69%
GH_FR1	4	94.71	89.28	100.1	94.03	91.67	99.13	1.708	3.61%	3.04%
GH_ERC	4	91.01	84.66	97.35	90.22	87.33	96.25	1.993	4.38%	6.83%
EV_HC1	4	88.21	87.13	89.29	88.21	87.5	88.93	0.3402	0.77%	9.69%
EV_MC2	4	100.6	93.67	107.6	98.57	98.21	107.2	2.192	4.36%	-3.03%
CM_MC2	4	99.03	86.5	111.6	100.7	89.17	105.5	3.938	7.95%	-1.39%
LC_LCDSSLCC	4	99.67	91.07	108.3	101.3	92.08	104.1	2.703	5.42%	-2.04%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	102.6	94.5	100	93.6
GH_ER2	93.68	94.55	93	83.85
FR_FRCP1	111.3	106	105.4	102
GH_FR1	92.4	95.65	91.67	99.13
GH_ERC	91.88	88.57	96.25	87.33
EV_HC1	88.93	88.64	87.78	87.5
EV_MC2	98.21	107.2	98.89	98.26
CM_MC2	105.5	96.19	89.17	105.3
LC_LCDSSLCC	99.58	92.08	102.9	104.1

Graphics





FR_UFR1 is a site control

July 24/15

CETIS Analytical Report

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	17-1320-8087	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 Jul-15 15:19	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	14-9254-5008	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	29 May-15 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	29d 18h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
GH_ER2	01-6818-1046	28 Apr-15	29 Apr-15 07:20	40h (7 °C)	Teck Coal	
FR_UFR1	02-2324-3825	28 Apr-15 09:02	29 Apr-15 07:20	31h (8.5 °C)		
FR_FRCP1	05-6493-7701	28 Apr-15 10:30	29 Apr-15 07:20	29h (8.5 °C)		
GH_FR1	04-0342-2568	28 Apr-15 08:40	29 Apr-15 07:20	31h (7 °C)		
GH_ERC	05-7162-3210	28 Apr-15 07:40	29 Apr-15 07:20	32h (7 °C)		
EV_HC1	17-6997-4694	28 Apr-15 08:40	29 Apr-15 07:20	31h (6.5 °C)		
EV_MC2	06-5856-0786	28 Apr-15 12:05	29 Apr-15 07:20	28h (6.5 °C)		
CM_MC2	15-7434-2364	28 Apr-15 09:20	29 Apr-15 07:20	30h (5.8 °C)		
LC_LCDSSLCC	14-0968-3826	28 Apr-15 10:27	29 Apr-15 07:20	29h (8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
GH_ER2	Water Sample	Teck Coal	GH_ER2		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
GH_ERC	Water Sample	Teck Coal	GH_ERC		
EV_HC1	Water Sample	Teck Coal	EV_HC1		
EV_MC2	Water Sample	Teck Coal	EV_MC2		
CM_MC2	Water Sample	Teck Coal	CM_MC2		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	9.1%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
GH_ER2		FR_UFR1	-1.938	2.511	8.303	6	0.9997	CDF	Non-Significant Effect
		FR_FRCP1	-4.506	2.511	8.303	6	1.0000	CDF	Non-Significant Effect
		GH_FR1	-1.041	2.511	8.303	6	0.9931	CDF	Non-Significant Effect
		GH_ERC	0.07909	2.511	8.303	6	0.8695	CDF	Non-Significant Effect
		EV_HC1	0.925	2.511	8.303	6	0.5396	CDF	Non-Significant Effect
		EV_MC2	-2.835	2.511	8.303	6	1.0000	CDF	Non-Significant Effect
		CM_MC2	-2.347	2.511	8.303	6	0.9999	CDF	Non-Significant Effect
		LC_LCDSSLCC	-2.54	2.511	8.303	6	1.0000	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1031.433	128.9292	8	5.897	0.0002	Significant Effect
Error	590.3296	21.86406	27			
Total	1621.763		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	10.74	20.09	0.2167	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9687	0.9166	0.3924	Normal Distribution

GH-ER2 is a site control

July 24/15

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	17-1320-8087	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 Jul-15 15:19	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

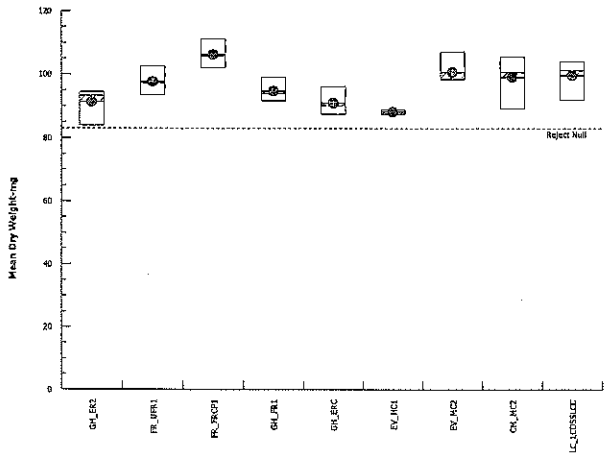
Mean Dry Weight-mg Summary

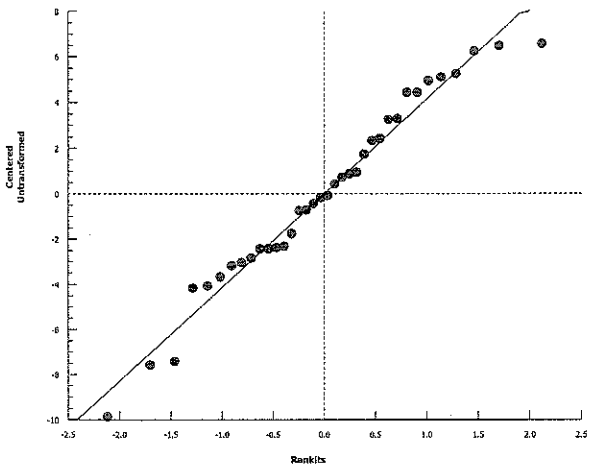
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
GH_ER2	4	91.27	83.33	99.21	93.34	83.85	94.55	2.494	5.47%	0.0%
FR_UFR1	4	97.68	90.78	104.6	97.25	93.6	102.6	2.169	4.44%	-7.02%
FR_FRCP1	4	106.2	100.1	112.2	105.7	102	111.3	1.91	3.6%	-16.32%
GH_FR1	4	94.71	89.28	100.1	94.03	91.67	99.13	1.708	3.61%	-3.77%
GH_ERC	4	91.01	84.66	97.35	90.22	87.33	96.25	1.993	4.38%	0.29%
EV_HC1	4	88.21	87.13	89.29	88.21	87.5	88.93	0.3402	0.77%	3.35%
EV_MC2	4	100.6	93.67	107.6	98.57	98.21	107.2	2.192	4.36%	-10.27%
CM_MC2	4	99.03	86.5	111.6	100.7	89.17	105.5	3.938	7.95%	-8.5%
LC_LCDSSLCC	4	99.67	91.07	108.3	101.3	92.08	104.1	2.703	5.42%	-9.2%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_ER2	93.68	94.55	93	83.85
FR_UFR1	102.6	94.5	100	93.6
FR_FRCP1	111.3	106	105.4	102
GH_FR1	92.4	95.65	91.67	99.13
GH_ERC	91.88	88.57	96.25	87.33
EV_HC1	88.93	88.64	87.78	87.5
EV_MC2	98.21	107.2	98.89	98.26
CM_MC2	105.5	96.19	89.17	105.3
LC_LCDSSLCC	99.58	92.08	102.9	104.1

Graphics





GH_ER2 is a site control

July 24/15

APPENDIX F – Analytical Chemistry

APPENDIX G – Chain-of-Custody Forms

COC ID:	20150428-1137	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Eamil Invoice To	
Contact Name				Lab Contact	Krysta Pearcy			Invoice Reports	
Address	PO Box 100			Email	krysta@nautilusenvironmental.com			Email Report To	
City	Elkford	State	BC	Address	8664 Commerce Court			Email Reports	
Postal Code	V0B 1H0	Country	Canada		Imperial Square Lake City			Shipping Company	
Phone Number	1-250-865-5289			City	Burnaby	State	BC	Tracking Number	
Email EDD To	lee.wilm@teck.com			Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Email EDD To	neil.macdonald@teck.com			Phone Number				Cooler Description	
Email EDD To	aita.bezzola@teck.com			Quote Number				Sampler 2	
PO Number				PO Number				Sampler 3	

SAMPLE DETAILS									ANALYSIS REQUESTED											
Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30 d Rainbow Trout Pass/Fail											Temp (°C)
FR_FRCP1_W_30032015_N				WS	4/28/2015	10:30		3	X											8.5
FR_UFR1_W_30032015_N				WS	4/28/2015	9:02		3	X											8.5

WO# 153260

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Teck PO Aita Bezzola	4-28-15 12:00	Krysta Pearcy Nautilus Environmental	Apr 29 15 @ 07:30h

Sampler's Name	Aita Bezzola	Mobile #	
Sampler's Signature		Date/Time	4-28-15 12:00

Recd 6 x 20L VAP

Nautilus

Chain Of Custody Record

COC ID: February_2015_Monthly_West

Page: 1 of 1

Turnaround Time: Rush:

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Greenhills Operation	Lab Name	Nautilus Environmental	Send Invoice To	
Project Number		Contact Name	Kryst pearcy	Address	
Contact Name	Zahir Jina	Address	Burnaby BC		
Address	P.O. BOX 5000			City	State
		City	Burnaby State BC	Postal Code	Country
City	Elkford State BC	Postal Code	Country Canada	Task Code	
Postal Code	V0B1H0 Country Canada	Phone Number	604-420-8773	Shipping Company	
Phone Number	250-865-3316	Email Address	kysta@nautilusenvironmental.com	Tracking Number	
Email EDD To	Zahir.Jina@teck.com	Quote Number		CC Hardcopy To	
Email Report To	Zahir.Jina@teck.com			CC Hardcopy To	

SAMPLE DETAILS / ANALYSIS REQUESTED / ADDITIONAL INFORMATION

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. / ANALYSIS	30 day early life stage RT pass fail (30d EA test P/F)	7day RT development ~~dilution series~~ pass fail (confirmed by client)							Temp (C)	ADDITIONAL INFORMATION
GH_~~ER1~~ER2_WS_2015-04-28_N	WS	2015/04/28		G	6		X	X							7.0	6x 20L carboy over 4 coolers.
							WO#15362	WO#15363								60L for 30day 60L for 7day 6x20L rec'd cup

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
Station EMS# 0200389 (Elk River reference)	V. Mercer	Apr 28/15	1700	Kysta Pearcy Nautilus Environmental	Apr 29/15	0720	7.0	Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Vance Mercer	Mobile #	604-803-7486
Sampler's Signature	V vmercer@golder.com	Date/Time	Apr 28/15

Temp in °C | Samples on ice | Sample intact? | Trip Blank?

Chain Of Custody Record

COC ID: Bi-Yearly Tox | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Project Number				Contact Name	Krysta Pearcy			Address			
Contact Name	Zahir Jina			Address	8664 Commerce Court						
Address	P.O. BOX 5000							City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number	604.420.8773			Shipping Company			
Phone Number	250-865-3301			Email Address	krysta@nautilusenvironmental.com			Tracking Number			
Email EDD To				Quote Number				CC Hardcopy To			
Email Report To								CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED									ADDITIONAL INFORMATION
						PRESERV.									
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30-day O. mykiss, Pass/Fail EA							Temp(C)	PASS/FAIL
GH_FR1_WS_2015-04-28_N	WS	2015/04/28	8:40	G	3		X							7.0	Total 6 x 20L Carboys
GH_ERC_WS_2015-04-28_N	WS	2015/04/28	7:40	G	3		X							7.0	3 coolers
								WO #153361							
															6 x 20L rec'd KP.

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	Kevin Little	Apr 28,15	14:12	Krysta Pearcy Nautilus Environmental	Apr 29/15	0720	7.0	(Y) / N	(Y) / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name		Mobile #		Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature		Date/Time					

Nautilus Environmental
8664 Commerce Court
Imperial Square Lake City
Burnaby BC, V5A 4N7

COC # 28042015

Page 1 of 1

Report to:		Report Format / Distribution		Service Requested: (rush - subject to availability)
Company:	TECK COAL LTD (ELKVIEW)	☑ Standard ☐ Other		◉ Regular (Default)
Contact:	Michael Moore	☑ PDF ☑ Excel ☑ Digital ☐ Fax		○ Priority (2-3 Business Days) - 50% Surcharge
Address:	RR1 HWY 3	Email 1:	michael.moore@teck.com	○ Emergency (1 Business Day) - 100% Surcharge
Sparwood, BC, V0B 2G1, Canada		Email 2:	james.boldt@teck.com	○ For Emergency < 1 Day, ASAP or Weekend - Contact ALS
Phone:	250-425-8868 Fax:	Email 3:	casandra.knooihuizen@teck.com	**Analysis Request**
Invoice To:	Same as Report ? ◉ Yes ○ No	Email 4:	leigh.stickney@teck.com	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:	Send all invoices to: dlteckcoalaccountspayable@teck.com	**Client / Project Information:**		
Contact:	Attn: Accounting	Job #:	Elkview Semi-Annual Toxicity Testing	
Address:	Same as above	PO / AFE:		
		Legal Site Description:		
Phone:	Fax:	Quote #:		
Lab Work Order # (lab use only)		**Nautilus Contact:** Krysta Pearcy	**Sampler:** JB / CM	

Sample	Sample Identification	Date (mmm-dd-yy)	Time (hh:mm)	Matrix	TECKCOAL-MONTHLY-VA	Toxcitity 7day/72 hr	T-Se (CCMS)	T-Metal(TECKCOAL-MET-T-VA)	D-Metal(TECKCOAL-MET-D-VA)	EPH	TSS	TURBIDITY	PAH - low level detection	True Color	Toxicity 30-Day EA pif	BOD	Number of Containers
	EV_HC1_WS_2015-04-28_N	28-Apr-15	8:40	WS											X		3
	EV_MC2_WS_2015-04-28_N	28-Apr-15	12:05	WS											X		3
																	6

WO#1535

Special Instructions / Regulations / Hazardous Details

Toxicity 30-Day= Rainbow trout embyro-alevin pass/fail

6x20L rec'd KLP

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)					SHIPMENT VERIFICATION (lab use only)		
Released by: James Boldt	Date & Time: 28/4/2015 12:30	Received by: Krysta Pearcy	Date: Apr 29/15	Time: 0720		Temperature: 6.5°C	Verified by: KLP	Date & Time: Apr 29/15 @ 0720	Observations: Yes / No If Yes attach SIF

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

GENF 18.00 Front

Chain Of Custody Record

COC ID: 20140902-1509 | Page: 1 of 2

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Coal Mountain Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Contact Name	Don Sacino			Contact Name				Address			
Address	2261 Corbin Rd.			Address	8664 commerce Court						
City	Sparwood	Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada	City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425 7377			Postal Code	V5A 4N7	Country	Canada	Task Code			
Email EDD To	Rick.Magliocco@teck.com			Phone Number				Shipping Company			
	Don.Sacino@teck.com			Email Address				Tracking Number			
	Carla.Romero@teck.com			PO Number				CC Hardcopy To			
								CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia	72 h P. subcapitata	30 d fathead minnow	28 d H. Azteca	30-d O.mykiss embryo-alevin Pass/Fail			
CM_MC2_WKLY_WS_20150428_N	WS	4/28/2015		G	5								x	WO#153580		

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	Carla Romero	4/28/2015		Nautilus Environmental Krysta Pearcy	Apr 29/15	0720	5.8°C	(Y) N	(Y) N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Carla Romero	Mobile #	2504257350	Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature		Date/Time	04-28-2015 9:20hr				

5x20L recd rel

Nautilus

Chain Of Custody Record

COC ID: February_2015_Monthly_West | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	~~Greenhills Operation~~ Line Creek			Lab Name	Nautilus Environmental			Send Invoice To			
Project Number				Contact Name	Kryst pearcy			Address			
Contact Name	~~Zahir Jina~~			Address	Burnaby BC						
Address	P.O. BOX ~~3000~~ 2003							City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	~~Elkford~~ Sparwood	State	BC	Postal Code		Country	Canada	Task Code			
V0S 2G0 Postal Code	~~V0B 1H0~~	Country	Canada	Phone Number	604-420-8773			Shipping Company			
Phone Number	~~250-865-3316~~ 250-425-6111			Email Address	krystal@nautilusenvironmental.com			Tracking Number			
Email EDD To	~~Zahir.jina@teck.com~~			Quote Number				CC Hardcopy To			
Email Report To	~~Zahir.Jina@teck.com~~ jenny.hutchinson@teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 day early life stage RT pass fail	7day RT development dilution series								
~~GH_ERI_WS_2015-04-28_N~~	~~WS~~	~~2015/04/28~~		~~C~~	~~6~~		X	X								
LC_DCI_WS_2015-04-28_N	WS		0949	C	3			X								3x20L 3x20L reed kept
LC_DCS_WS_2015-04-28_N			0910		3			X								3x20L 3x20L reed kept
LC_FRDSDC_WS_2015-04-28_N			0919		3			X								3x20L 3x20L reed kept
LC_LC3_2015-04-28_N			1506		3			X								3x20L 3x20L reed kept
LC_LCS_2015-04-28_N			1024		3			X								3x20L 3x20L reed kept
LC_LCDSSLCC_WS_2015-28_N			1027		8		X	X								8x20L 8x20L reed kept

WO# 15364 WO# 15365

Mix each sample 40L extra

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
* Contact V. Mercer for EMS number comparison. to close sample IDs *	V. Mercer	Apr 28/15	1800	Krysta Pearcy Nautilus Environmental	Apr 29/15	0900	8.0	(Y) / N	(Y) / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Tyler Phillips	Mobile #	1250 919 0965	Temp in °C	Samples on ice? / Sample intact? / Trip Blank?
Sampler's Signature		Date/Time	Apr 28, 15		

COC ID:	20150505-1200	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Eamil Invoice To	
Contact Name	-			Lab Contact	Krysta Pearcy			Invoice Reports	
Address	PO Box 100			Email	krysta@nautilusenvironmental.com			Email Report To	
City	Elkford	State	BC	Address	8664 Commerce Court			Email Reports	
Postal Code	V0B 1H0	Country	Canada		Imperial Square Lake City			Shipping Company	
Phone Number	1-250-865-5289			City	Burnaby	State	BC	Tracking Number	
Email EDD To	lee.wilm@teck.com			Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Email EDD To	neil.macdonald@teck.com			Phone Number				Cooler Description	
Email EDD To	aita.bezzola@teck.com			Quote Number				Sampler 2	
PO Number				PO Number				Sampler 3	

SAMPLE DETAILS									ANALYSIS REQUESTED								
Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30 d Rainbow Trout Pass/Fail	28 d H. azteca P/F	7-d C. Dubia P/F	72 Hr P Subcapitata P/F					Temp
FR_FRCP1_M_04052015_N				WS	2015/05/05	11:20	N	4	X	X	X	X					9.5
FR_UFRI_M_04052015_N				WS	2015/05/05	09:20	N	4	X	X	X	X					8.6
									153600	15379	15380	15381					

30 ml

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	N MacDonald Teck.	May 5 2015		

Sampler's Name	N MacDonald.	Mobile #	250 865 5204.
Sampler's Signature		Date/Time	May 5 2015

N. Macdonald - courier

Received by Nautilus NY - Nan Yamamoto - May 06/15 @ 08:34

COC ID:	20150505-1200	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	HydroQual Laboratories.			Email Invoice To	
Contact Name				Lab Contact	Jacklyn Pool			Invoice Reports	
Address	PO Box 100			Email				Email Report To	
City	Elkford	State	BC	Address	#4, 6125-12th Street S.E.			Email Reports	
Postal Code	V0B 1H0	Country	Canada					Shipping Company	
Phone Number	1-250-865-5289			City	Calgary	State	AB	~~Tracking Number~~	
Email EDD To	lee.wilm@teck.com			Postal Code	T2H 2K1	Country	Canada	Cooler Count	
Email EDD To	neil.macdonald@teck.com			Phone Number	(403) 253-7121			Cooler Description	
Email EDD To	aita.bezzola@teck.com			Quote Number				Sampler 2	
PO Number				PO Number				Sampler 3	

SAMPLE DETAILS								ANALYSIS REQUESTED											
15-0486 Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30-d fathead minnow (Pass/Fail)										
FR_FRCP1_M_04052015_N				WS	2015/05/05	11:20		2	X										
FR_UFR1_M_04052015_N				WS	2015/05/05	09:20		2	X										
15-0487																			

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	N MACDONALD	May 5 2015		

Sampler's Name	N MACDONALD	Mobile #	250 865 5209
Sampler's Signature		Date/Time	May 5 2015

WO#15570

2015/05/06 0830 #11 4v20L manitoulin NaSR

Chain Of Custody Record

COC ID: February_2015_Monthly_West | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Project Number				Contact Name	Kryst pearcy			Address			
Contact Name	Zahir Jina			Address	Burnaby BC						
Address	P.O. BOX 5000							City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code		Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number	604-420-8773			Shipping Company			
Phone Number	250-865-3316			Email Address				Tracking Number			
Email EDD To	Zahir.Jina@teck.com			Quote Number				CC Hardcopy To			
Email Report To	Zahir.Jina@teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED									ADDITIONAL INFORMATION
						PRESERV.					FHD				
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 day early life stage RT pass fail	7day RT development dilution series	7day C.dubia pass/fail	72h. P subcapitata pH				Temp	
~~GH_ER2_WS_2015-04-28_N~~	WS	2015/05/05		G	~~4~~ 4		X		X	X				7.0	4 Carboys 80L total
GH_ER2_WS_2015-05-05_N															Greenhills Op. Reference site
						WO #	153620		153745	153755					

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
EMS# 200389	Kevin Little	May 5, 2015	11:09					Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name		Mobile #		Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature		Date/Time					

Received by Nautilus MY May 6/15

Chain Of Custody Record

COC ID: Bi-Yearly Tox, Re-Fresh 1 | Page: 1 of 1

Turnaround Time: **Rush:**

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Greenhills Operation	Lab Name	Nautilus Environmental	Send Invoice To	
Project Number		Contact Name	Krysta Pearcy	Address	
Contact Name	Zahir Jina	Address	8664 Commerce Court		
Address	P.O. BOX 5000			City	State
		City	Burnaby State BC	Postal Code	Country
City	Elkford State BC	Postal Code	V5A 4N7 Country Canada	Task Code	
Postal Code	V0B1H0 Country Canada	Phone Number	604.420.8773	Shipping Company	
Phone Number	250-865-3301	Email Address	krysta@nautilusenvironmental.com	Tracking Number	
Email EDD To		Quote Number		CC Hardcopy To	
Email Report To				CC Hardcopy To	

SAMPLE DETAILS / **ANALYSIS REQUESTED** / **ADDITIONAL INFORMATION**

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. / ANALYSIS	30-day O. mykiss, Pass/Fail	7-d c. dubia P/F	72h p. subcapitata P/F	28-d h. azteca P/F	~~30d p. promelas~~					Temp	PASS/FAIL	
GH_FR1_WS_2015-05-04_N	WS	2015/05/05	9:20	G	5		X	X	X	X	X					7.5		5X20L
GH_ERC_WS_2015-05-05_N	WS	2015/05/05	8:00	G	4		X	X	X							6.4		4X20L
						WO #	15361 ①	15374	15375	15382								

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
PASS/FAIL	J. Evans	5-May-15	10:50					Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Jeremy Evans	Mobile #	
Sampler's Signature		Date/Time	

Temp in °C | Samples on ice? | Sample intact? | Trip Blank?

Chain Of Custody Record

COC ID: Bi-Annual

Page: 1 of 1

Turnaround Time:

Rush:

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Greenhills Operation	Lab Name	HydroQual Laboratories Ltd.	Send Invoice To	
Project Number		Contact Name		Address	
Contact Name	Zahir Jina	Address	#4, 6125 - 12th Street S.E		
Address	P.O. BOX 5000			City	State
		City	Calgary State AB	Postal Code	Country
City	Elkford State BC	Postal Code	T2H2K1 Country Canada	Task Code	
Postal Code	V0B1H0 Country Canada	Phone Number	403.253.7121	Shipping Company	
Phone Number	250-865-3301	Email Address		Tracking Number	
Email EDD To	Zahir.Jina@teck.com	Quote Number		CC Hardcopy To	
Email Report To	Zahir.Jina@teck.com			CC Hardcopy To	

SAMPLE DETAILS / ANALYSIS REQUESTED / ADDITIONAL INFORMATION

	Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. / ANALYSIS	30 d early life stage, fathead minnow	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail					ADDITIONAL INFORMATION Initial - PASS/FAIL
15-0484	GH_FR1_WS_2015-05-04_N	WS	5/5/2015	9:20	G	2		X										40 L total
	~~GH_ERC_WS_2015-05-05_N~~	~~WS~~	~~5/5/2015~~		~~G~~	~~2~~		~~X~~										

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	J. Enns	5 May 15	10:50					Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	~~Zahir Jina~~ J. Enns	Mobile #		Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature		Date/Time					

2015/05/06 0830 AH 11 2x20L Manitoulin No SIT

Nautilus Environmental
8664 Commerce Court
Imperial Square Lake City
Burnaby BC, V5A 4N7

COC # 5052015

Page 1 of 1

Report to:		Report Format / Distribution		Service Requested: (rush - subject to availability)
Company:	TECK COAL LTD (ELKVIEW)	☑ Standard ☐ Other		◉ Regular (Default)
Contact:	Michael Moore	☑ PDF ☑ Excel ☑ Digital ☐ Fax		○ Priority (2-3 Business Days) - 50% Surcharge
Address:	RR1 HWY 3	Email 1:	michael.moore@teck.com	○ Emergency (1 Business Day) - 100% Surcharge
Sparwood, BC, V0B 2G1, Canada		Email 2:	james.boldt@teck.com	○ For Emergency < 1 Day, ASAP or Weekend - Contact ALS
Phone:	250-425-8868 Fax:	Email 3:	casandra.knooihuizen@teck.com	**Analysis Request**
Invoice To:	Same as Report ? ◉ Yes ○ No	Email 4:	leigh.stickney@teck.com	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:	Send all invoices to: dlteckcoalaccountspayable@teck.com	Client / Project Information:		
Contact:	Attn: Accounting	Job #:	Elkview Semi-Annual Toxicity Testing	
Address:	Same as above	PO / AFE:		
		Legal Site Description:		
Phone:	Fax:	Quote #:		
Lab Work Order # (lab use only)		Nautilus Contact: Krysta Pearcy	Sampler: JB, RD	

Sample	Sample Identification	Date (mmm-dd-yy)	Time (hh:mm)	Matrix	TECKCOAL-MONTHLY-VA	Toxcitity 7day/72 hr	T-Se (CCMS)	T-Metal(TECKCOAL-MET-T-VA)	D-Metal(TECKCOAL-MET-D-VA)	EPH	TSS	TURBIDITY	~~PAH - low level detection~~ 72 H P. Subcapitata #F	Toxicity 7-Day/~~72-Hr Pass/Fail~~ Cerus VF	Toxicity 30-Day Pass/Fail	BOD	Number of Containers	Temp
	EV_HC1_WS_2015-05-05_N	5-May-15	10:00	WS									X	X	X		4	5.5
	EV_MC2_WS_2015-05-05_N	5-May-15	7:30	WS									X	X	X		4	5.6
												WO #	15369	15370	① 15359			
																	8	

Special Instructions / Regulations / Hazardous Details

Toxicity 30-Day Pass/Fail= Rainbow trout embyro-alevin
Toxicity 7-Day/72-Hr Pass/ Fail =7 d C. dubia and 72 h P. subcapitata

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)					SHIPMENT VERIFICATION (lab use only)		
Released by: James Boldt	Date & Time: 13:00 5/5/2015 ~~0:00~~	Received by:	Date:	Time:		Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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GENF 18.00 Front

① refresh sample

Received by Nautilus - NY - Nari Yamamoto
May 06/15 @ 08:34

2x4x20L

Chain Of Custody Record

COC ID: 20140902-1509

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Coal Mountain Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Contact Name	Don Sacino			Contact Name				Address			
Address	2261 Corbin Rd.			Address	8664 commerce Court						
City	Sparwood	Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada	City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425 7377			Postal Code	V5A 4N7	Country	Canada	Task Code			
Email EDD To	Rick.Magliocco@teck.com			Phone Number				Shipping Company			
	Don.Sacino@teck.com			Email Address				Tracking Number			
	Carla.Romero@teck.com			PO Number				CC Hardcopy To			
								CC Hardcopy To			

SAMPLE DETAILS / ANALYSIS REQUESTED / ADDITIONAL INFORMATION

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. / ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia Pass/Fail	72 h P. subcapitata Pass/Fail	30 d fathead minnow Pass/Fail	28 d H. Azteca Pass/Fail	30-d O.mykiss embryo-alevin Pass/Fail			Temp	ADDITIONAL INFORMATION
							30 #		15371	15372		15373	15358 ①				
CM_MC2_WKLY_WS_20150505_N	WS	5/5/2015	14:40	G	6				X	X		X	X			6.0	
	(3	COOLERS)															

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
							Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Sampler's Name	Don Sacino/Rick Magliocco	Mobile #	
Sampler's Signature	[signature]	Date/Time	05-05-2015 16:00 hr

① [illegible] sample

Received by Nautilus - NY - Nair Yamamoto

Chain Of Custody Record

COC ID: 20140902-1509 | Page: 1 of 2

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Coal Mountain Operation			Lab Name	Hydroqual Laboratories			Send Invoice To			
Contact Name	Don Sacino			Contact Name	Jacklyn Pool			Address			
Address	2261 Corbin Rd.			Address	#4, 6125-12th Street S.E.			City		State	
City	Sparwood	Prov.	BC	City	Calgary	State	AB	Postal Code		Country	
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada	Task Code			
Phone Number	250 425 7377			Phone Number	403-253-7121			Shipping Company			
Email EDD To	Rick.Magliocco@teck.com			Email Address				Tracking Number			
	Don.Sacino@teck.com			PO Number				CC Hardcopy To			
	Carla.Romero@teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. / ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia	72 h P. subcapitata	30 d fathead minnow (Pass/Fail)	28 d H. Azteca	30-d O.mykiss embryo-alevin Pass/Fail			
CM_MC2_WKLY_WS_20150505_N	WS	5/5/2015	14:40	G	3						X					
15-0485	(2 coolers)															

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Don Sacino/Rick Magliocco	Mobile #		Temp in °C	Samples on ice?
Sampler's Signature		Date/Time	05-05-2015 16:05 hr		Sample intact?
					Trip Blank?

2015/05/06 0830 #11 3+2nd m. st. l. NoSF

Chain Of Custody Record

COC ID:

Page: 1 of 2

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Line Creek Operations			Lab Name	Nautilus Environmental			Send Invoice To			
Contact Name	Jay Jones			Contact Name	Krysta			Address			
Address	Box 2003			Address	8664 commerce Court						
City	Sparwood	Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada	City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425-6111			Postal Code	V5A 4N7	Country	Canada	Task Code			
Email EDD To	jay.jones@teck.com			Phone Number				Shipping Company			
				Email Address				Tracking Number			
				PO Number				CC Hardcopy To			
								CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						# of containers	96 hr (EA test 3005) Rainbow Trout P/F	48 hr Daphnia Pass/Fail	7 d C. dubia	72 h P. subcapitata	30 d fathead minnow	28 d H. Azteca	7 d. Minor plant growth (dilution series)			
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	96 hr Rainbow Trout P/F	48 hr Daphnia Pass/Fail	7 d C. dubia	72 h P. subcapitata	30 d fathead minnow	28 d H. Azteca	7 d. Minor plant growth (dilution series)			Temp
LC_DC1_WS_2015-05-05_N	WS	May 5, 2015	11:41	G	1				✓	✓			✓			6.3
LC_LC5_WS_2015-05-06_N	WS	"	14:02	G	1				✓	✓			✓			6.8
LC_DCDS_WS_2015-05-05_N	WS	"	11:14	G	1				✓	✓			✓			7.8
LC_FRDSDC_WS_2015-05-05_N	WS	"	13:32	G	1				✓	✓			✓			6.0
LC_LCDSSLCC_WS_2015-05-06_N	WS	"	14:34	G	4		✓		✓	✓			✓			7.0
LC_LC3_WS_2015-05-06_N	WS	"	14:49	G	1				✓	✓			✓			6.8

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	T. Phillips/Nupqu							Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

					Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Name	Tyler Phillips	Mobile #	250-919-0965					
Sampler's Signature		Date/Time						

4x20L

Received - NY - Nan Yamamoto - Nautilus

COC ID:	20150512-1111	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 28 Day H. azteca Pass/Fail (28DAHA)	30 Day Rainbow trout embryo alevin Pass/Fail (EPS1RM28)			Temp.							
FR_FRCP1_Q_11052015_N				WS	2015/05/12	09:21	G	~~1~~ 2	~~3~~ x	x			8.8							
FR_UFR1_Q_11052015_N				WS	2015/05/12	09:00	G	~~1~~ 2	~~3~~ x	x			8.0							
FR_FRCP1_SA_11052015_N				WS	2015/05/12	09:21	G	~~1~~ 2	x	x ~~3~~			8.8							
FR_UFR1_SA_11052015_N				WS	2015/05/12	09:00	G	~~1~~ 2	x	x ~~3~~			8.0							
									WO # 15379	15360										

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
= refresh sample =	FRCP Tech Coal Arts Bezzola	May 12 2015 12:00	K. Little	May 12, 2015 12:34
	K Little Golder	May 12, 2015 12:35		

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Arts Bezzola	Mobile #	
	Sampler's Signature	[signature]	Date/Time	May 12 2015 12:00

Received by Nautilus - NY - Nair Y.

COC ID:	20150512-1131	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Hydroqual			Email Invoice To	
Project Number				Lab Contact	Elisabeth Henson			Invoice Reports	
Department				Email	elisabeth_henson@golder.com			Email Report To	
Address	PO Box 100			Address				Email Reports	
								Shipping Company	
City	Elkford	State	BC	City		State		Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code		Country		Cooler Count	
Phone Number	1-250-865-5289			Phone Number	403-253-7121			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

15-0486

Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 Day Fathead Minnow											
FR_FRCP1_Q_11052015_N				WS	2015/05/12	09:21	G	2		2	40 L										CQ 2015/05/13 0830
FR_UFR1_Q_11052015_N				WS	2015/05/12	09:00	G	2		2	40 L										No SE
15-0487																					4 x 20L carboys
																					K&K
																					5°C

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Tak FRO Ata Bezzola	May 12 2015 12:40	K. Little Golder	May 12, 2015 12:35
	K Little Golder	May 12, 15 12:37		

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Ata Bezzola	Mobile #	
	Sampler's Signature	[signature]	Date/Time	May 12 2015 12:00

Chain Of Custody Record

COC ID: February_2015_Monthly_West | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Project Number				Contact Name	Kryst pearcy			Address			
Contact Name	Zahir Jina			Address	Burnaby BC						
Address	P.O. BOX 5000							City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code		Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number	604-420-8773			Shipping Company			
Phone Number	250-865-3316			Email Address	[redacted]			Tracking Number			
Email EDD To	Zahir.Jina@teck.com			Quote Number				CC Hardcopy To			
Email Report To	Zahir.Jina@teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										WO # 15362 = refresh sample =
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 day early life stage RT pass fail refressh								Temp	
GH_ER2_WS_2015-05-12_N	WS	2015/05/12		G	3		X								7.5	Total 60L 2 coolers

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time
	Kevin Little	May 12, 15	11:18			

Sample Receipt Conditions			
	Y / N	Y / N	Y / N
	Y / N	Y / N	Y / N
	Y / N	Y / N	Y / N
	Y / N	Y / N	Y / N

Sampler's Name	Kevin Little	Mobile #	250-687-4187	Temp in °C	Samples on ice?
Sampler's Signature	[signature]	Date/Time	May 12, 2015 11:18	Sample intact?	Trip Blank?

Chain Of Custody Record

COC ID: Bi-Yearly Tox, Re-Fresh 3 | Page: 1 of 1

Turnaround Time: | **Rush:**

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Project Number				Contact Name	Krysta Pearcy			Address			
Contact Name	Zahir Jina			Address	8664 Commerce Court						
Address	P.O. BOX 5000							City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number	604.420.8773			Shipping Company			
Phone Number	250-865-3301			Email Address	krysta@nautilusenvironmental.com			Tracking Number			
Email EDD To				Quote Number				CC Hardcopy To			
Email Report To								CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										WO # 15361 / 15382 = refresh sample =
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30-day O. mykiss, Pass/Fail refresh			28-d h. azteca P/F					Temp.	PASS/FAIL
GH_FRI_WS_2015-05-11_N	WS	2015/05/12		G	4		X			X					8.5	80 L Total
GH_ERC_WS_2015-05-12_N	WS	2015/05/12		G	3		X								8.1	60 L Total
						WO #	15361			15382						

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
PASS/FAIL	M. Canavese/NAUTILUS							Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Mariana Canavese	Mobile #		Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature		Date/Time					

Received by Nautilus - M. Canavese

Chain Of Custody Record

COC ID: Bi-Annual, Refresh 1 | Page: 1 of 1

Turnaround Time: | **Rush:**

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Greenhills Operation	Lab Name	HydroQual Laboratories Ltd.	Send Invoice To	
Project Number		Contact Name		Address	
Contact Name	Zahir Jina	Address	#4, 6125 - 12th Street S.E		
Address	P.O. BOX 5000			City	State
		City	Calgary State AB	Postal Code	Country
City	Elkford State BC	Postal Code	T2H2K1 Country Canada	Task Code	
Postal Code	V0B1H0 Country Canada	Phone Number	403.253.7121	Shipping Company	
Phone Number	250-865-3301	Email Address		Tracking Number	
Email EDD To	Zahir.Jina@teck.com	Quote Number		CC Hardcopy To	
Email Report To	Zahir.Jina@teck.com			CC Hardcopy To	

15-0484

SAMPLE DETAILS / **ANALYSIS REQUESTED** / **ADDITIONAL INFORMATION**

Initial - PASS/FAIL

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS PRESERV.	30 d early life stage, fathead minnow	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail					
GH_FR1_WS_2015-05-11_N	WS	5/12/2015		G	2		X										
																	CQ
																	2015/05/03
																	0830
																	No S/I
																	2x20L
																	K & V
																	5°C

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	M. Calabrese / Nupqu	May	10:30					Y / N	Y / N	Y / N
		12/15	am					Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Zahir Jina	Mobile #	
Sampler's Signature		Date/Time	

Temp in °C | Samples on ice? | Sample intact? | Trip Blank?

Nautilus Environmental
8664 Commerce Court
Imperial Square Lake City
Burnaby BC, V5A 4N7

COC # 12052015

Page 1 of 1

Report to:		Report Format / Distribution				Service Requested: (rush - subject to availability)
Company:	TECK COAL LTD (ELKVIEW)	☑ Standard	☐ Other			◉ Regular (Default)
Contact:	Michael Moore	☑ PDF	☑ Excel	☑ Digital	☐ Fax	○ Priority (2-3 Business Days) - 50% Surcharge
Address:	RR1 HWY 3	Email 1:	michael.moore@teck.com			○ Emergency (1 Business Day) - 100% Surcharge
Sparwood, BC, V0B 2G1, Canada		Email 2:	james.boldt@teck.com			○ For Emergency < 1 Day, ASAP or Weekend - Contact ALS
Phone:	250-425-8868 Fax:	Email 3:	casandra.knooihuizen@teck.com			Analysis Request
Invoice To:	Same as Report ? ◉ Yes ○ No	Email 4:	leigh.stickney@teck.com			Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:	Send all invoices to: dlteckcoalaccountspayable@teck.com	Client / Project Information:				
Contact:	Attn: Accounting	Job #:	Elkview Semi-Annual Toxicity Testing			
Address:	Same as above	PO / AFE:	107517			
		Legal Site Description:				
Phone:	Fax:	Quote #:				
Lab Work Order # (lab use only)		Nautilus Contact: Krysta Pearcy		Sampler:	JB, MW	

Sample	Sample Identification	Date (mmm-dd-yy)	Time (hh:mm)	Matrix	TECKCOAL-MONTHLY-VA	Toxicity 7day/72 hr	T-Se (CCMS)	T-Metal(TECKCOAL-MET-T-VA)	D-Metal(TECKCOAL-MET-D-VA)	EPH	TSS	TURBIDITY	PAH - low level detection	True Color	Toxicity 30-Day RT refresh	BOD	Number of Containers
	EV_HC1_WS_2015-05-12_N	12-May-15	9:05	WS											X		3
	EV_MC2_WS_2015-05-12_N	12-May-15	12:50	WS											X		3
																	6

Temp 9.0 9.0

WO# 153553

(2) 6

Special Instructions / Regulations / Hazardous Details

Toxcitit 30-Day= Rainbow trout embyro-alevin P/F

= refresh sample =

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)					SHIPMENT VERIFICATION (lab use only)		
Released by:	Date & Time:	Received by:	Date:	Time:		Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF
James Boldt	12/5/2015 0:00								

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION — WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY — GENF 18.00 Front

Checked by KL May 12, 2015 15:47

Chain Of Custody Record

COC ID: 20140902-1509

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Coal Mountain Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Contact Name	Don Sacino			Contact Name				Address			
Address	2261 Corbin Rd.			Address	8664 commerce Court						
City	Sparwood	Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada	City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425 7377			Postal Code	V5A 4N7	Country	Canada	Task Code			
Email EDD To	Rick.Magliocco@teck.com			Phone Number				Shipping Company			
	Don.Sacino@teck.com			Email Address				Tracking Number			
	Carla.Romero@teck.com			PO Number				CC Hardcopy To			
								CC Hardcopy To			

SAMPLE DETAILS / ANALYSIS REQUESTED / ADDITIONAL INFORMATION

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. / ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia Pass/Fail	72 h P. subcapitata Pass/Fail	30 d fathead minnow Pass/Fail	28 d H. Azteca Pass/Fail refresh	30-d O.mykiss embryo-alevin Pass/Fail refresh			Temp	ADDITIONAL INFORMATION
											WO #	15373	15358				
CM_MC2_WKLY_WS_20150512_N	WS	12/5/2015	13:30	G	6				[illegible]	[illegible]		X	X			8.5	

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time
3 coolers	K Little Golder	May 12, 15	15:11			
= refresh sample =						

Sample Receipt Conditions			
	Y / N	Y / N	Y / N
	Y / N	Y / N	Y / N
	Y / N	Y / N	Y / N
	Y / N	Y / N	Y / N
Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Sampler's Name	Don Sacino/Rick Magliocco	Mobile #	
Sampler's Signature	[signature]	Date/Time	12-05-2015 13:30 hr

Received by Nautilus - NY - Nan Y.

Chain Of Custody Record

COC ID: 20140902-1509 | Page: 1 of 2

Turnaround Time:

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Coal Mountain Operation	Lab Name	Hydroqual Laboratories	Send Invoice To	
Contact Name	Don Sacino	Contact Name	Jacklyn Pool	Address	
Address	2261 Corbin Rd.	Address	#4, 6125-12th Street S.E.		
City	Sparwood Prov. BC			City	State
Postal Code	V0B 2G0 Country Canada	City	Calgary State AB	Postal Code	Country
Phone Number	250 425 7377	Postal Code	T2H 2K1 Country Canada	Task Code	
Email EDD To	Rick.Magliocco@teck.com	Phone Number	403-253-7121	Shipping Company	
	Don.Sacino@teck.com	Email Address		Tracking Number	
	Carla.Romero@teck.com	PO Number		CC Hardcopy To	
				CC Hardcopy To	

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia	72 h P. subcapitata	30 d fathead minnow (Pass/Fail)	28 d H. Azteca	30-d O.mykiss embryo-alevin Pass/Fail			
																CO
																2015/05/13
																0830
150485																No SIL
																3 x 20L carboys
CM_MC2_WKLY_WS_20150512_N	WS	12/5/2015	13:30	G	3						X					K & K
																5°C

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
2 coolers	K Little Golder	May 12, 15	15:01					Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Don Sacino/Rick Magliocco	Mobile #		Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature		Date/Time	12-05-2015 13:30 hr				

COC ID:	20141208-0815	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Line Creek Operation			Lab Name	[redacted] Nautilus			Eamil Invoice To	jay.jones@teck.com
Project Number				Lab Contact	[redacted] Krysta			Invoice Reports	
Department				Email	[redacted] Krysta@Nautilusenvironmental.com			Email Report To	jay.jones@teck.com
Address	Box 2003			Address	[redacted] 8664			Email Reports	
	15km North Hwy 43				Commerce Court			Shipping Company	
City	Sparwood	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 2G0	Country	Canada	Postal Code	[redacted]	Country	Canada	Cooler Count	
Phone Number	250-425-6111			Phone Number	[redacted]			Cooler Description	
Project Manager	Jay Jones			Quote Number				Sampler 2	
Email Address	jay.jones@teck.com			PO Number	[redacted]			Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	30d. 0 mykiss embryo-alevin pit refresh	Temp.
LC_LCDSSLCC_WS_2015-05-12_N				WS	May 12, 2015	10:25	G	3											X	6.5
				WS			G													
				WS			G													
				WS			G													
				WS			G													
				WS			G													
				WS			G													
				WS			G													
				WS			G													
				WS			G													

WO #15364

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Refresh samples	T. Phillips / Nupqu	May 12, 2015	K. Little Golder	May 12, 2015 14:00
	K. Little Golder	May 12, 2015 14:05		

NB OF BOTTLES RETURNED/DESCRIPTION

Sampler's Name	Tyler Phillips	Mobile #	(250) 919-0965
Sampler's Signature	[signature]	Date/Time	May 12, 2015 / 1200

Received by Nautilus - NY - Nair Yamamoto

COC ID:	20150519-1317	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS									ANALYSIS REQUESTED										
Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	28 Day H. azteca Pass/Fail (28DAHA)	30 Day Rainbow trout embryo alevin Pass/Fail (EPS1RM28)									Temp °C
FR_FRCP1_Q_18052015_N				WS	2015/05/19	11:09	G	2	2										11.8
FR_UFR1_Q_18052015_N				WS	2015/05/19	10:47	G	2	2										9.5
FR_FRCP1_SA_18052015_N				WS	2015/05/19	11:09	G	2		2									
FR_UFR1_SA_18052015_N				WS	2015/05/19	10:47	G	2		2									

Lot #
15379
15360

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
refresh sample "Q" and "SA" are same samples	Tak FRC A.Bozzek	May 19 2015 1330	Nautilus NY - Nan Yamamoto	May 20/15 - 07:30

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Ark Bozzek	Mobile #	
	Sampler's Signature		Date/Time	May 19 2015 13:30

COC ID:	20150519-1322	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Hydroqual			Email Invoice To	
Project Number				Lab Contact	Elisabeth Henson			Invoice Reports	
Department				Email	elisabeth_henson@golder.com			Email Report To	
Address	PO Box 100			Address				Email Reports	
								Shipping Company	
City	Elkford	State	BC	City		State		Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code		Country		Cooler Count	
Phone Number	1-250-865-5289			Phone Number	403-253-7121			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30 Day Fathead Minnow
FR_FRCP1_Q_18052015_N 15-0486				WS	2015/05/19	11:09	G	2	2
FR_UFR1_Q_18052015_N 15-0487				WS	2015/05/19	10:47	G	2	2

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Tek FRO A. Bezzola	May 14 2015 13:30		

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Ante Bezzola	Mobile #	
	Sampler's Signature	[signature]	Date/Time	May 14 2015 13:30

Chain Of Custody Record

COC ID: February_2015_Monthly_West | Page: 1 of 3

Turnaround Time: | Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Project Number				Contact Name	Kryst pearcy			Address			
Contact Name	Zahir Jina			Address	Burnaby BC						
Address	P.O. BOX 5000							City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code		Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number	604-420-8773			Shipping Company			
Phone Number	250-865-3316			Email Address	krysm@nautilusenvironmental.com			Tracking Number			
Email EDD To	Zahir.Jina@teck.com			Quote Number				CC Hardcopy To			
Email Report To	Zahir.Jina@teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED									ADDITIONAL INFORMATION
						PRESERV	Ext T24 pH			HNO3					
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 day early life stage RT Refresh							Temp.	
GH_ER2_WS_2015-05-19_NP	WS	2015/05/19		G	3		X							8.5	
						WO #	15362								

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
refresh sample	K. Little / Golder	May 19, 15	10:53	Nautilus	May 20/15	09:30		Y / N	Y / N	Y / N
				NY - Nan Yamamoto				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

				Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Name	Kevin Little	Mobile #	250-687-4187				
Sampler's Signature	Kevin Little	Date/Time	May 19, 2015				

Chain Of Custody Record

COC ID: Bi-Yearly Tox, Re-Fresh 4

Page: 1 of 1

Turnaround Time: Rush:

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Greenhills Operation	Lab Name	Nautilus Environmental	Send Invoice To	
Project Number		Contact Name	Krysta Pearcy	Address	
Contact Name	Zahir Jina	Address	8664 Commerce Court		
Address	P.O. BOX 5000			City	State
		City	Burnaby State BC	Postal Code	Country
City	Elkford State BC	Postal Code	V5A 4N7 Country Canada	Task Code	
Postal Code	V0B1H0 Country Canada	Phone Number	604.420.8773	Shipping Company	
Phone Number	250-865-3301	Email Address	krysta@nautilusenvironmental.com	Tracking Number	
Email EDD To		Quote Number		CC Hardcopy To	
Email Report To				CC Hardcopy To	

SAMPLE DETAILS / ANALYSIS REQUESTED / ADDITIONAL INFORMATION

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. ANALYSIS	30-day O. mykiss, Pass/Fail	7-d c. dubia	72h p. subcapitata	28-d h. azteca P/F	30-d p. promelas					Temp.	PASS/FAIL
GH_FR1_WS_2015-05-18_N	WS	2015/05/19	09:15	G	4		X			X	X					7.7	
GH_ERC_WS_2015-05-19_N	WS	2015/05/19	08:00	G	3		X									8.6	
						WO #	15361			15382							

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
PASS/FAIL	Jevin Wolchuk	May 19/15	09:15	Nautilus	May 20/15	07:30		Y / N	Y / N	Y / N
refresh sample				NY - Nari Yamamoto				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Jeremy Evans	Mobile #	
Sampler's Signature	[signature]	Date/Time	

Temp in °C | Samples on ice? | Sample intact? | Trip Blank?

Chain Of Custody Record

COC ID: Bi-Annual, Refresh 2 | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	HydroQual Laboratories Ltd.			Send Invoice To			
Project Number				Contact Name	Jacklyn Pool			Address			
Contact Name	Zahir Jina			Address	#4, 6125 - 12th Street S.E						
Address	P.O. BOX 5000							City		State	
				City	Calgary	State	AB	Postal Code		Country	
~~City~~	~~Elkford~~	~~State~~	~~BC~~	Postal Code	T2H2K1	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number	403.253.7121			Shipping Company			
Phone Number	250-865-3301			Email Address				Tracking Number			
Email EDD To	Zahir.Jina@teck.com			Quote Number				CC Hardcopy To			
Email Report To	Zahir.Jina@teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail				
GH_FR1_WS_2015-05-18_N	WS	5/19/2015		G	2		X									

15-0484

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	Zahir Jina	May 19/15	16:30					Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	~~Zahir Jina~~ J. Ennis	Mobile #		Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature		Date/Time					

Nautilus Environmental
8664 Commerce Court
Imperial Square Lake City
Burnaby BC, V5A 4N7

COC # 19052015

Page 1 of 1

Report to:		Report Format / Distribution		Service Requested: (rush - subject to availability)
Company:	TECK COAL LTD (ELKVIEW)	☑ Standard ☐ Other		◉ Regular (Default)
Contact:	Michael Moore	☑ PDF ☑ Excel ☑ Digital ☐ Fax		○ Priority (2-3 Business Days) - 50% Surcharge
Address:	RR1 HWY 3	Email 1:	michael.moore@teck.com	○ Emergency (1 Business Day) - 100% Surcharge
Sparwood, BC, V0B 2G1, Canada		Email 2:	james.boldt@teck.com	○ For Emergency < 1 Day, ASAP or Weekend - Contact ALS
Phone:	250-425-8868 Fax:	Email 3:	casandra.knooihuizen@teck.com	**Analysis Request**
Invoice To:	Same as Report ? ◉ Yes ○ No	Email 4:	leigh.stickney@teck.com	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:	Send all invoices to: diteckcoalaccountspayable@teck.com	**Client / Project Information:**		
Contact:	Attn: Accounting	Job #:	Elkview Semi-Annual Toxicity Testing	
Address:	Same as above	PO / AFE:	107517	
		Legal Site Description:		
Phone:	Fax:	Quote #:		
Lab Work Order # (lab use only)		**Nautilus Contact:** Krysta Pearcy	**Sampler:** JB, MW	

Sample	Sample Identification	Date (mmm-dd-yy)	Time (hh:mm)	Matrix	TECKCOAL-MONTHLY-VA	Toxcitity 7day/72 hr	T-Se (CCMS)	T-Metal(TECKCOAL-MET-T-VA)	D-Metal(TECKCOAL-MET-D-VA)	EPH	TSS	TURBIDITY	PAH - low level detection	True Color	Toxicity 30-Day EATest P/F	BOD	Number of Containers	Temp
	EV_HC1_WS_2015-05-19_N	19-May-15	10:00	WS											X		3	8.5
	EV_MC2_WS_2015-05-19_N	19-May-15	12:40	WS											X		3	9.0
																	6	

WO # 15359

Special Instructions / Regulations / Hazardous Details

Toxcitit 30-Day= Rainbow trout embyro-alevin

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)					SHIPMENT VERIFICATION (lab use only)		
Released by: James Boldt	Date & Time: 19/5/2015 14:00	Received by: Nautilus NY Alan Yamamoto.	Date: May 20/15	Time: 07:30		Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY GENF 18.00 Front

Chain Of Custody Record

COC ID: 20140902-1509 | Page: 1 of 2

Turnaround Time:

PROJECT/CLIENT INFO					LABORATORY					OTHER INFO			
Facility Name	Coal Mountain Operation				Lab Name	Nautilus Environmental				Send Invoice To			
Contact Name	Don Sacino				Contact Name					Address			
Address	2261 Corbin Rd.				Address	8664 commerce Court							
City	Sparwood	Prov.	BC							City		State	
Postal Code	V0B 2G0	Country	Canada		City	Burnaby	State	BC		Postal Code		Country	
Phone Number	250 425 7377				Postal Code	V5A 4N7	Country	Canada		Task Code			
Email EDD To	Rick.Magliocco@teck.com				Phone Number					Shipping Company			
	Don.Sacino@teck.com				Email Address					Tracking Number			
	Carla.Romero@teck.com				PO Number					CC Hardcopy To			
										CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
					PRESERV.											
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia Pass/Fail	72 h P. subcapitata Pass/Fail	30 d fathead minuow Pass/Fail	28 d H. Azteca Pass/Fail	30-d O.mykiss embryo-alevin Pass/Fail			Temp °C	
											WO #	153473	153558				
CM_MC2_WKLY_WS_20150519_N	WS	19/5/2015	13:30	G	5				X	X		X	X			10.5	

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
3 coolers refresh sample				Nautilus VY - Wan Yamamoto	May 20/15	07:30		Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Don Sacino/Rick Magliocco	Mobile #		Temp in °C	Samples on ice?
Sampler's Signature		Date/Time	19-05-2015 1:30 hr pm		Sample intact?
					Trip Blank?

Cartons not labelled w/ sample ID - notified client. KLP.

Chain Of Custody Record

COC ID: 20140902-1509 | Page: 1 of 2

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Coal Mountain Operation			Lab Name	Hydroqual Laboratories			Send Invoice To			
Contact Name	Don Sacino			Contact Name	Jacklyn Pool			Address			
Address	2261 Corbin Rd.			Address	#4, 6125-12th Street S.E.			City		State	
City	Sparwood	Prov.	BC	City	Calgary	State	AB	Postal Code		Country	
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada	Task Code			
Phone Number	250 425 7377			Phone Number	403-253-7121			Shipping Company			
Email EDD To	Rick.Magliocco@teck.com			Email Address				Tracking Number			
	Don.Sacino@teck.com			PO Number				CC Hardcopy To			
	Carla.Romero@teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. / ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia	72 h P. subcapitata	30 d fathead minnow (Pass/Fail)	28 d H. Azteca	30-d O.mykiss embryo-alevin Pass/Fail			
15-0485																
CM_MC2_WKLY_WS_20150519_N	WS	19/5/2015	15:4	G	3						X					

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
2 coolers								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Don Sacino/Rick Magliocco	Mobile #		Temp in °C	Samples on ice?
Sampler's Signature		Date/Time	19-05-2015 4 hr PM		Sample intact?
					Trip Blank?

COC ID:	20141208-0815	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Line Creek Operation			Lab Name	[redacted] Nautilus environmental			Eamil Invoice To	jay.jones@teck.com
Project Number				Lab Contact	[redacted] Krysta Peercy			Invoice Reports	
Department				Email	[redacted] Krysta@NautilusEnvironmetal.com			Email Report To	jay.jones@teck.com
Address	Box 2003			Address	[redacted] 8664 Commerce Court			Email Reports	
	15km North Hwy 43							Shipping Company	
City	Sparwood	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 2G0	Country	Canada	Postal Code	[redacted] V5A4N7	Country	Canada	Cooler Count	
Phone Number	250-425-6111			Phone Number	[redacted]			Cooler Description	
Project Manager	Jay Jones			Quote Number				Sampler 2	
Email Address	jay.jones@teck.com			PO Number	[redacted]			Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS											
LC_LCDSSLCC_WS_2015-05-19_N				WS	May 19, 2015	08:15	G	4	[redacted]										X 30d EA Test P/F	
				WS			G													
				WS			G													
				WS			G													
				WS			G													
				WS			G													
				WS			G													
				WS			G													
				WS			G													
				WS			G													

30 # 15364

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Refresh volume for Tox.	T. Phillips / Nupqu	09:30 May 19 2015	Nautilus	May 20/15
			NY + Nari Yamamoto	07:30

NB OF BOTTLES RETURNED/DESCRIPTION

Sampler's Name	Tyler Phillips	Mobile #	[redacted] (250) 919-0965
Sampler's Signature	[signature]	Date/Time	May 19, 2015 09:30

COC ID:	20150526-1048	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 28 Day H. azteca Pass/Fail (28DAHA)	30 Day Rainbow trout embryo alevin Pass/Fail (EPS1RM28)	Temp.
FR_FRCP1_Q_25052015_N				WS	2015/05/26	08:44	G	2	2		8.7
FR_UFR1_Q_25052015_N				WS	2015/05/26	10:02	G	2	2		8.6
FR_FRCP1_SA_25052015_N				WS	2015/05/26	08:44	G	2		2	8.7
FR_UFR1_SA_25052015_N				WS	2015/05/26	10:02	G	2		2	8.6

WO # 15379 15360

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	TAKFR0 Ada Bezzola	2015 11:30	Nautilus NY - Nan Yamamoto	May 27/15 - 08:00
			8x20L	

NB OF BOTTLES RETURNED/DESCRIPTION

= fresh sample =

Sampler's Name	Ada Bezzola	Mobile #	
Sampler's Signature		Date/Time	May 26 2015 11:30

COC ID:	20150526-1051	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Hydroqual			Email Invoice To	
Project Number				Lab Contact	Elisabeth Henson			Invoice Reports	
Department				Email	elisabeth_henson@golder.com			Email Report To	
Address	PO Box 100			Address				Email Reports	
								Shipping Company	
City	Elkford	State	BC	City		State		Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code		Country		Cooler Count	
Phone Number	1-250-865-5289			Phone Number	403-253-7121			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30 Day Fathead Minnow
FR_FRCP1_Q_25052015_N 15-0486				WS	2015/05/26	08:44	G	2	2
FR_UFR1_Q_25052015_N 15-0487				WS	2015/05/26	10:02	G	2	2

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Tek FPO Ada Bozzolo	5-26-15 11:30		

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Ada Bozzolo	Mobile #	
	Sampler's Signature	[signature]	Date/Time	May 26 2015 11:30

2015/05/27 0830 #94x20L Manitoulin NOSLI

Chain Of Custody Record

COC ID: February_2015_Monthly_West | Page: 1 of 3

Turnaround Time: | Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Project Number				Contact Name	Kryst pearcy			Address			
Contact Name	Zahir Jina			Address	Burnaby BC						
Address	P.O. BOX 5000							City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code		Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number	604-420-8773			Shipping Company			
Phone Number	250-865-3316			Email Address	krystr@nautilusenvironmental.com			Tracking Number			
Email EDD To	Zahir.Jina@teck.com			Quote Number				CC Hardcopy To			
Email Report To	Zahir.Jina@teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.					HNO3					
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 day early life stage RT Refresh	30d EA Test 9/F							Temp °C	
GH_ER2_WS_2015-05-26_NP	WS	2015/05/26		G	3		X								6.3	
						WO #	15362									

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	Kevin Little / Golder	May 26, 15	11:00	Nautilus	May 27/15	08:00		Y / N	Y / N	Y / N
				NY - Nan Yamamoto				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
= Refresh sample =				3x20L				Y / N	Y / N	Y / N

				Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Name	Kevin Little	Mobile #	250-687-4187				
Sampler's Signature	Kevin Little	Date/Time	May 26, 15 11:00				

Chain Of Custody Record

COC ID: Bi-Yearly Tox, Re-Fresh 5 | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Project Number				Contact Name	Krysta Pearcy			Address			
Contact Name	Zahir Jina			Address	8664 Commerce Court						
Address	P.O. BOX 5000							City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number	604.420.8773			Shipping Company			
Phone Number	250-865-3301			Email Address	krysta@nautilusenvironmental.com			Tracking Number			
Email EDD To				Quote Number				CC Hardcopy To			
Email Report To								CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30-day O. mykiss, Pass/Fail	7-d c. dubia	72h p. subcapitata	28-d h. azteca	30-d p. promelas				Temp °C	PASS/FAIL
GH_FR1_WS_2015-05-25_N	WS	2015/05/26	9:15	G	4		X			X					9.0	
GH_ERC_WS_2015-05-26_N	WS	2015/05/26	8:00	G	3		X								8.7	
						VO #	153361			153382						

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
PASS/FAIL	Jeremy Enns	May 26	10:00	Nautilus	May 27/15	08:05		Y / N	Y / N	Y / N
				NY - Nair Yamamoto				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
= refresh sample =				7x20L				Y / N	Y / N	Y / N

Sampler's Name	J. Enns	Mobile #		Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature		Date/Time					

Chain Of Custody Record

COC ID: Bi-Annual, Refresh 3 | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Greenhills Operation	Lab Name	HydroQual Laboratories Ltd.	Send Invoice To	
Project Number		Contact Name	Jacklyn Pool	Address	
Contact Name	Zahir Jina	Address	#4, 6125 - 12th Street S.E		
Address	P.O. BOX 5000			City / State	
		City / State	Calgary / AB	Postal Code / Country	
~~City~~	~~Elkford~~ ~~State~~ ~~BC~~	~~Postal Code~~ / ~~Country~~	~~T2H2K1~~ ~~Canada~~	~~Task Code~~	
Postal Code / Country	V0B1H0 Canada	Phone Number	403.253.7121	Shipping Company	
Phone Number	250-865-3301	Email Address		Tracking Number	
Email EDD To	Zahir.Jina@teck.com	Quote Number		CC Hardcopy To	
Email Report To	Zahir.Jina@teck.com			CC Hardcopy To	

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail				
GH_FR1_WS_2015-05-25_N	WS	5/26/2015	9:15	G	2		X									
15-0484																

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	J. Enns (Nuplex)	26-May-15	10:00					Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	~~Zahir Jina~~ J. Enns	Mobile #	919-4387	Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature		Date/Time					

2015/05/27 0830 AA 9 2x2L manitoulin NOSH

Nautilus Environmental
8664 Commerce Court
Imperial Square Lake City
Burnaby BC, V5A 4N7

COC # 26052015

Page 1 of 1

Report to:		**Report Format / Distribution**				**Service Requested:** (rush - subject to availability)
Company:	TECK COAL LTD (ELKVIEW)	☑ Standard	☐ Other			◉ Regular (Default)
Contact:	Michael Moore	☑ PDF	☑ Excel	☑ Digital	☐ Fax	○ Priority (2-3 Business Days) - 50% Surcharge
Address:	RR1 HWY 3	Email 1:	michael.moore@teck.com			○ Emergency (1 Business Day) - 100% Surcharge
Sparwood, BC, V0B 2G1, Canada		Email 2:	james.boldt@teck.com			○ For Emergency < 1 Day, ASAP or Weekend - Contact ALS
Phone:	250-425-8868 Fax:	Email 3:	casandra.knooihuizen@teck.com			**Analysis Request**
Invoice To:	Same as Report ? ◉ Yes ○ No	Email 4:	leigh.stickney@teck.com			Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:	**Send all invoices to: dlteckcoalaccountspayable@teck.com**	**Client / Project Information:**				
Contact:	Attn: Accounting	Job #:	Elkview Semi-Annual Toxicity Testing			
Address:	Same as above	PO / AFE:	107517			
		Legal Site Description:				
Phone:	Fax:	Quote #:				
Lab Work Order # (lab use only)		**Nautilus Contact:** Krysta Pearcy	**Sampler:** JB, MW			

Sample	Sample Identification	Date (mmm-dd-yy)	Time (hh:mm)	Matrix	TECKCOAL-MONTHLY-VA	Toxcitity 7day/72 hr	T-Se (CCMS)	T-Metal(TECKCOAL-MET-T-VA)	D-Metal(TECKCOAL-MET-D-VA)	EPH	TSS	TURBIDITY	PAH - low level detection	True Color	Toxicity 30-Day EA Test P/F	BOD	Number of Containers
	EV_HC1_WS_2015-05-26_N	26-May-15	9:45	WS											X		3
	EV_MC2_WS_2015-05-26_N	26-May-15	12:05	WS											X		3
																	6

Temp
9.9
8.7

Special Instructions / Regulations / Hazardous Details

Toxcitit 30-Day= Rainbow trout embyro-alevin

30 # 15359

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)		
Released by:	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF
James Boldt JBT	26/5/2015 13:20	NY - Nain Yammouni	May 27/15	08:00				

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

GENF 18.00 Front

2 × 3 × 20L — refresh sample.

Chain Of Custody Record

COC ID: 20140902-1509 | Page: 1 of 2

Turnaround Time:

PROJECT/CLIENT INFO					LABORATORY					OTHER INFO			
Facility Name	Coal Mountain Operation				Lab Name	Nautilus Environmental				Send Invoice To			
Contact Name	Don Sacino				Contact Name					Address			
Address	2261 Corbin Rd.				Address	8664 commerce Court							
City	Sparwood	Prov.	BC							City		State	
Postal Code	V0B 2G0	Country	Canada		City	Burnaby	State	BC		Postal Code		Country	
Phone Number	250 425 7377				Postal Code	V5A 4N7	Country	Canada		Task Code			
Email EDD To	Rick.Magliocco@teck.com				Phone Number					Shipping Company			
	Don.Sacino@teck.com				Email Address					Tracking Number			
	Carla.Romero@teck.com				PO Number					CC Hardcopy To			
										CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
					PRESERV.											3 coolers
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia Pass/Fail	72 h P. subcapitata Pass/Fail	30 d fathead minnow Pass/Fail	28 d H. Azteca Pass/Fail	30-d O.mykiss embryo-alevin Pass/Fail			Temp °	
											WO#	15373	15358				
CM_MC2_WKLY_WS_20150526_N	WS	26/5/2015	N.S.	G	6							X	X			7.0	

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
Only Azteca + MyKiss = refresh sample				Nautilus NY - Nan Yamamoto	May 27/15	08:00		Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				6x20L				Y / N	Y / N	Y / N

Sampler's Name	Don Sacino/Carla Romero/Kennedy Allen	Mobile #					
Sampler's Signature		Date/Time	26-05-2015 14:30 hr	Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Chain Of Custody Record

COC ID: 20140902-1509

Turnaround Time:

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Coal Mountain Operation	Lab Name	Hydroqual Laboratories	Send Invoice To	
Contact Name	Don Sacino	Contact Name	Jacklyn Pool	Address	
Address	226 1 Corbin Rd.	Address	#4, 6125-12th Street S.E.		
City	Sparwood Prov. BC			City	State
Postal Code	V0B 2G0 Country Canada	City	Calgary State AB	Postal Code	Country
Phone Number	250 425 7377	Postal Code	T2H 2K1 Country Canada	Task Code	
Email EDD To	Rick.Magliocco@teck.com	Phone Number	403-253-7121	Shipping Company	
	Don.Sacino@teck.com	Email Address		Tracking Number	
	Carla.Romero@teck.com	PO Number		CC Hardcopy To	
				CC Hardcopy To	

SAMPLE DETAILS / ANALYSIS REQUESTED / ADDITIONAL INFORMATION

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV / ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia	72 h P. subcapitata	30 d fathead minnow (Pass/Fail)	28 d H. Azteca	30-d O.mykiss embryo-alevin Pass/Fail				ADDITIONAL INFORMATION
CM_MC2_WKLY_WS_20150526_N	WS	26/5/2015	14:40	G	3						X						
15-0485																	

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
2 coolers								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
							Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Sampler's Name	Don Sacino/Carla Romero/Kennedy Allen	Mobile #	
Sampler's Signature	[signature]	Date/Time	26-05-2015 2:[illegible] pm

2015/05/27 0830 AH 9 3x20L manitoulin NoSII

Chain Of Custody Record

COC ID:

Turnaround Time:

PROJECT/CLIENT INFO					LABORATORY					OTHER INFO			
Facility Name	Line Creek Operations				Lab Name	Nautilus Environmental				Send Invoice To			
Contact Name	Jay Jones				Contact Name	Krysta				Address			
Address	Box 2003				Address	8664 commerce Court							
City	Sparwood	Prov.	BC							City		State	
Postal Code	V0B 2G0	Country	Canada		City	Burnaby	State	BC		Postal Code		Country	
Phone Number	250 425-6111				Postal Code	V5A 4N7	Country	Canada		Task Code			
Email EDD To	jay.jones@teck.com				Phone Number					Shipping Company			
					Email Address	[redacted]				Tracking Number			
					PO Number					CC Hardcopy To			
										CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV										
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia	72 h P. subcapitata	30 d fathead minnow	28 d H. Azteca	30d Rbt EA Test PF			Temp.
LC_LCDSSLCC_WS_2015-05-26_N	WS	May 26, 2015	13:13	G	3								X			8.4
													WO# 153641			

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
=refresh sample=	T. Phillips/Nupqu	5/26/2015	16:30	Nautilus	May 27/15	08:00		Y / N	Y / N	Y / N
				NY - Nau Yamamoto				Y / N	Y / N	Y / N
				3x20L				Y / N	Y / N	Y / N

Sampler's Name	Tyler Phillips	Mobile #	250-919-0965	Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature	[signature]	Date/Time					

COC ID:	20150602-1208	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Hydroqual			Email Invoice To	
Project Number				Lab Contact	Elisabeth Henson			Invoice Reports	
Department				Email	elisabeth_henson@golder.com			Email Report To	
Address	PO Box 100			Address				Email Reports	
								Shipping Company	
City	Elkford	State	BC	City		State		Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code		Country		Cooler Count	
Phone Number	1-250-865-5289			Phone Number	403-253-7121			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

5-0486 Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30 Day Fathead Minnow
FR_FRCP1_Q_01062015_N				WS	2015/06/02	11:30	G		X
FR_UFR1_Q_01062015_N				WS	2015/06/02	09:11	G		X
15-0487									

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Teck FRO	June 2 2015 12:30		

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Ata Bezzola	Mobile #	
	Sampler's Signature	[signature]	Date/Time	June 2 2015 12:30

2015/06/03 0910 Att 8 2420L NOSFI Manitoulin

Chain Of Custody Record

COC ID: Bi-Annual, Refresh 4 - Final

Page: 1 of 1

Turnaround Time: Rush:

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Greenhills Operation	Lab Name	HydroQual Laboratories Ltd.	Send Invoice To	
Project Number		Contact Name	Jacklyn Pool	Address	
Contact Name	Zahir Jina	Address	#4, 6125 - 12th Street S.E		
Address	P.O. BOX 5000			City	State
		City	Calgary State AB	Postal Code	Country
City	Elkford State BC	Postal Code	T2H2K1 Country Canada	Task Code	
Postal Code	V0B1H0 Country Canada	Phone Number	403.253.7121	Shipping Company	
Phone Number	250-865-3301	Email Address		Tracking Number	
Email EDD To	Zahir.Jina@teck.com	Quote Number		CC Hardcopy To	
Email Report To	Zahir.Jina@teck.com			CC Hardcopy To	

SAMPLE DETAILS / ANALYSIS REQUESTED / ADDITIONAL INFORMATION

15-0484

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. / ANALYSIS	30-d P. promelas (pass/fail) - Refresh	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail					ADDITIONAL INFORMATION PASS/FAIL
GH_FR1_WS_2015_06_01_N	WS	6/02/2015		G	2		X										

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	Jeremy Enns	06/02/2015	8:30					Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Zahir Jina	Mobile #	
Sampler's Signature		Date/Time	

Temp in °C | Samples on ice? | Sample intact? | Trip Blank?

2015/06/03 0910 AB 2x20L No SLI manitowlin

Chain Of Custody Record

COC ID: 20140902-1509 | Page: 1 of 2

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Coal Mountain Operation			Lab Name	Hydroqual Laboratories			Send Invoice To			
Contact Name	Don Sacino			Contact Name	Jacklyn Pool			Address			
Address	2261 Corbin Rd.			Address	#4, 6125-12th Street S.E.						
City	Sparwood	Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada	City	Calgary	State	AB	Postal Code		Country	
Phone Number	250 425 7377			Postal Code	T2H 2K1	Country	Canada	Task Code			
Email EDD To	Rick.Maglocco@teck.com			Phone Number	403-253-7121			Shipping Company			
	Don.Sacino@teck.com			Email Address				Tracking Number			
	Carla.Romero@teck.com			PO Number				CC Hardcopy To			
								CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
					PRESERV.											
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia	72 h P. subcapitata	30 d fathead minnow (Pass/Fail)	28 d H. Azteca	30-d O.mykiss embryo-alevin Pass/Fail				
CM_MC2_WKLY_WS_20150602_N	WS	2/6/2015	1420	G	3					X						
15-0485																

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time
2 coolers						

Sample Receipt Conditions				
	Y / N	Y / N	Y / N	
	Y / N	Y / N	Y / N	
	Y / N	Y / N	Y / N	
	Y / N	Y / N	Y / N	
Temp in °C	Samples on ice?	Sample intact?	Trip Blank?	

Sampler's Name	Don Sacino/ Carla Romero/ Kennedy Allen	Mobile #	
Sampler's Signature	Kennedy Allen	Date/Time	02-06-2015 2.20 hr pm

2015/06/03 0910 #1 8 3+20L NoSH Manitoulin

Section B-3: 3rd Quarter 2015 Results

Nautilus Environmental

Toxicity testing on Elk Valley samples with *Ceriodaphnia dubia, Pseudokirchneriella subcapitata, Hyalella azteca* and *Pimephales promelas*

3rd Quarter 2015 Results

Final Report

Report date:
January 29, 2016

Submitted to:

Teck Coal Ltd.
Sparwood, BC

8664 Commerce Court
Burnaby, BC
V5A 4N7

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APPENDIX F – Chain-of-Custody Forms

SIGNATURE PAGE

Krystal Pearcy, B.Sc.
Testing Manager

James Elphick, R.P.Bio.
Senior Reviewer

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

1.0 INTRODUCTION

Nautilus Environmental conducted toxicity tests for Teck Coal Ltd. on samples collected from various locations in the Elk Valley as part of a quarterly chronic toxicity testing program required under BC Ministry of Environment permit number 107517. Test species included a cladoceran (*Ceriodaphnia dubia*), a unicellular green alga (*Pseudokirchneriella subcapitata*), an amphipod (*Hyalella azteca*) and the fathead minnow (*Pimephales promelas*).

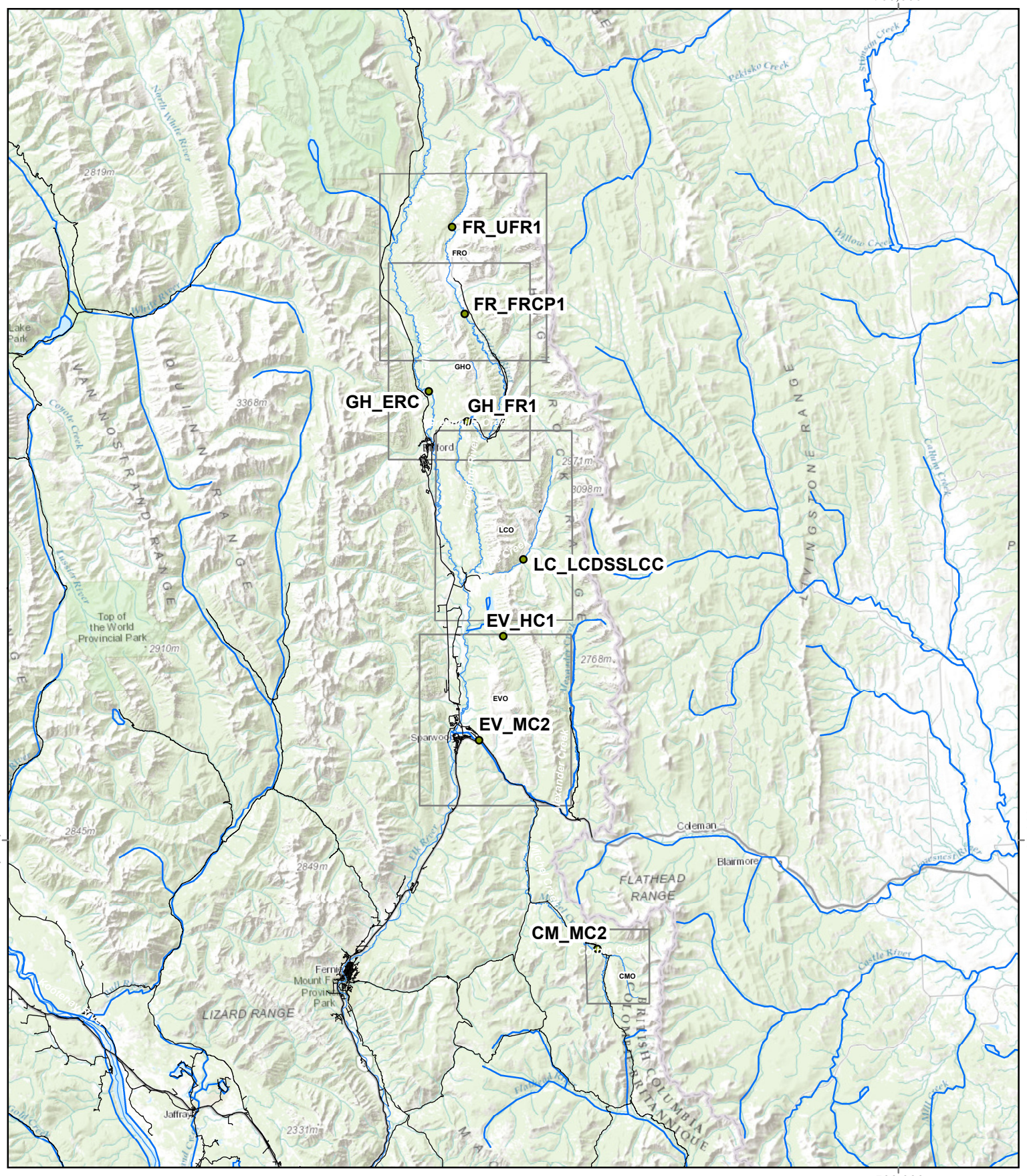
Samples were transported in 20-L plastic containers in coolers containing ice packs. Samples were received at temperatures ranging from 10.0 to 18.9°C and were stored in the dark at 4 ± 2°C prior to testing. Table 1 outlines the toxicity tests that were conducted on each sample as well as sample collection dates. The *C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas* tests were initiated on July 23 and 24, 2015 using samples collected July 21 and 22, 2015. Due to high mortality in one of the *H. azteca* control replicates, the acceptability criteria for control survival was not achieved. The *H. azteca* test was initiated again on August 6, 2015 using sample collected August 5, 2015. Refresh samples were collected weekly on the dates shown in Table 1 for the duration of the *H. azteca* and *P. promelas* tests. The *P. promelas* test was conducted at the Nautilus Environmental laboratory in Calgary, AB (HydroQual); the other toxicity tests were conducted at the Burnaby, BC location.

This report describes the results of the toxicity tests. Copies of laboratory data sheets and printouts of statistical analyses are provided in Appendices A to D. Results of analytical chemistry that was performed on the samples tested in this program are provided in Appendix E. These samples were collected by Teck personnel at the same time the samples were collected for toxicity testing. The chain-of-custody forms are provided in Appendix F.

Table 1. Summary of toxicity testing program.

Sample ID	EMS Location ID	Species Tested	Sample Collection Dates
FR_UFR1 *	E216777	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	July 22, July 29, August 5, August 12, August 19 and August 26, 2015
FR_FRCP1	E300071	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	July 22, July 29, August 5, August 12, August 19 and August 26, 2015
GH_FR1	0200378	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	July 21, July 28, August 5, August 12, August 19 and August 26, 2015
GH_ERC	E300090	*C. dubia* and *P. subcapitata*	July 21, 2015
EV_MC2	E300091	*C. dubia* and *P. subcapitata*	July 22, 2015
EV_HC1	E102682	*C. dubia* and *P. subcapitata*	July 22, 2015
CM_MC2	E258937	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	July 21, July 29, August 5, August 12, August 19 and August 26, 2015
LC_LCDSSLCC	E297110	*C. dubia* and *P. subcapitata*	July 21, 2015

* Site water control



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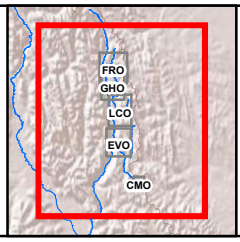

Chronic Toxicity Monitoring Locations

- Roads
- Rivers
- Monitoring Locations

N

0 4,000 8,000 16,000 Meters

DATE:	MINE OPERATION:
7/24/2015	Elk Valley
SCALE:	COORDINATE SYSTEM:
1:550,000	NAD 1983 UTM Zone 11N

Document Path: \\teckcominco.loc\CGO\Groups\TCGIS\Data\Operations\SPO\Dan_Vasiga\BaseLandscape_letter.mxd

2.0 METHODS

Methods for the toxicity tests using *C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas* are summarized in Tables 2 through 5. Laboratory control water was 20% Perrier water prepared with deionized water for *C. dubia*; moderately hard water prepared by addition of reagent grade salts to dechlorinated municipal tap water for *P. promelas* according to a recipe provided by ASTM (1980); and moderately hard water prepared by addition of reagent grade salts to dechlorinated municipal tap water for *H. azteca* according to a recipe provided in Environment Canada (2013).

For the *H. azteca* tests, all of the site waters were supplemented with 25 mg/L chloride and 0.02 mg/L bromide using NaCl and NaBr, respectively, according to recommendations of the *Hyalella* Advisory Group (chaired by Chris Ingersoll, USGS) (Norberg-King et al., 2014), since low concentrations of these halides are known to impair growth of this species. The laboratory control water contained approximately 75 mg/L chloride and 0.8 mg/L bromide, respectively.

Statistical analyses were performed using CETIS (Tidepool Scientific Software, 2013), and involved comparison of results to both the laboratory and site water controls.

Table 2. Summary of test conditions: *Ceriodaphnia dubia* survival and reproduction test.

Test organism	*Ceriodaphnia dubia*
Test organism source	In-house culture
Test organism age	<24 h old neonates produced within 12 h
Test type	Static-renewal
Test duration	7 ± 1 day
Test vessel	20-mL test tube
Test volume	15 mL
Test replicates	10 test replicates per treatment
Number of organisms	1 per replicate
Control water	20% Perrier water
Test solution renewal	Daily
Test temperature	25 ± 1°C
Feeding	*Pseudokirchneriella subcapitata* and YCT
Light intensity	100 to 600 lux at water surface
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test protocol	Environment Canada (2007a)
Statistical software	CETIS
Test endpoint	Survival and reproduction
Test acceptability criteria for controls	≥80% survival; ≥15 young per surviving control producing three broods; ≥60% of controls producing three or more broods
Reference toxicant	Sodium chloride

Table 3. Summary of test conditions: *Pseudokirchneriella subcapitata* growth inhibition test.

Test organism	*Pseudokirchneriella subcapitata*, strain CPCC #37
Test organism source	In-house axenic culture, obtained from Canadian Phycological Culture Centre, and originally isolated from Nitelva River, Norway.
Test organism age	3-to 7-day old culture in logarithmic growth phase
Test type	Static
Test duration	72 hours
Test vessel	Microplate
Test volume	220 µL
Test replicates	4 replicates per treatment; 8 replicates for control
Number of organisms	10, 000 cells/mL
Control water	Deionized water with nutrients added
Test solution renewal	None
Test temperature	24 ± 2°C
Feeding	None
Light intensity	3600 to 4400 lux
Photoperiod	24 hours light
Sample filtration	Through a preconditioned membrane filter of 0.45 µm using a vacuum pump
Aeration	None
pH adjustment	None
Test protocol	Environment Canada (2007b)
Statistical software	CETIS
Test endpoint	Algal cell growth inhibition
Test acceptability criteria for controls	>16-fold increase in number of algal cells; CV ≤20%; no trend when analyzed using Mann-Kendall test
Reference toxicant	Zinc

Table 4. Summary of test conditions: *Hyalella azteca* survival and growth test.

Test organism	*Hyalella azteca*
Test organism source	Aquatic Research Organisms, NH
Test organism age	7-8 days old
Test type	Static-renewal
Test duration	28 days
Test vessel	375-mL glass container
Test volume	300 mL of water
Test replicates	5 test replicates per treatment
Number of organisms	10 per replicate
Control water	Moderately-hard water (hardness 80-100 mg/L $CaCO_3$) containing ~75 mg/L Cl and supplemented with 0.8 mg/L Br. Samples also supplemented with 25 mg/L Cl and 0.02 mg/L Br.
Test solution renewal	Twice daily
Test temperature	23 ± 1°C
Feeding	1 mL of YCT daily to each container. Tetramin daily, with amounts increasing weekly: Week 1: 0.5 mg, Week 2: 0.75 mg, Week 3: 1 mg, Week 4: 1.5 mg in each test container.
Light intensity	500 to 1000 lux at water surface
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test protocol	Modified from US EPA (2000), as described in Norberg-King et al. (2014)
Statistical software	CETIS
Test endpoint	Survival and dry weight
Test acceptability criteria for controls	Mean control survival of ≥80% survival
Reference toxicant	Sodium chloride

Table 5. Summary of test conditions: *Pimephales promelas* survival and growth test.

Test organism	*Pimephales promelas*
Test organism source	Aquatox, Hot Springs, AR
Test organism age	<24 hours
Test type	Static renewal
Test duration	28 days post hatch
Test vessel	1-L plastic container
Test volume	1 L
Test replicates	4 test replicates per treatment
Number of organisms	10 per replicate
Control water	Moderately-hard water (hardness 80-100 mg/L $CaCO_3$)
Test solution renewal	Daily
Test temperature	25 ± 1°C
Feeding	Twice a day, after hatch, with newly hatched brine shrimp *(Artemia nauplii)*
Light intensity	100 – 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	Provided post hatch (<100 bubbles/min)
Test protocol	US EPA (1996) and ASTM (2013)
Statistical software	CETIS
Test endpoint	Hatch, survival, length, biomass, normal development (which assesses incidence of deformities)
Test acceptability criteria for controls	>66% hatch; ≥70% post-hatch survival
Reference toxicant	Sodium chloride

3.0 RESULTS

Results of the toxicity tests using *C. dubia* are provided in Table 6. The site water and laboratory water controls performed similarly for this species, indicating that there was no adverse or stimulatory effect associated with the upstream Fording River station. No adverse effects on survival or reproduction of *C. dubia* were observed in the samples compared to the site water and laboratory water controls.

Results of the toxicity tests using *P. subcapitata* are provided in Table 7. In these tests, the site water control produced 3.0-fold greater growth than the laboratory water control. This finding is not unusual, since the higher ionic strength associated with the site water control would be expected to stimulate cell growth of this species relative to the very low ionic strength associated with the laboratory control water. Similarly, the samples exhibited a stimulation of cell growth relative to the laboratory water control; none of the samples exhibited a statistically significant reduction in cell growth relative to the laboratory water control. Compared to the site water control, a statistically significant reduction in cell yield was observed for four samples (GH_FR1, EV_MC2, CM_MC2 and LC_LCDSSLCC); percent reduction compared to the site control ranged from 12 to 20% in the four samples.

Results of the toxicity tests using *H. azteca* are provided in Table 8. Percent survival in the site water and laboratory water controls were similar for this species; however, dry weight was statistically significantly reduced (by approximately 30%) in the site water control relative to the laboratory water control. Survival was reduced in all samples compared to the laboratory water and site water controls; however, only the reduced survival in CM_MC2 (~30% reduction compared to both controls) was statistically significant. Dry weight was statistically significantly reduced in all samples compared to the laboratory water control; percent reduction was 40, 65 and 23% in GH_FR1, CM_MC2 and FR_FRCP1, respectively. Relative to the site water control, dry weight was statistically significantly reduced in sample CM_MC2 (50% reduction).

Results of the toxicity tests using *P. promelas* are provided in Table 9. Hatch, length and normal development were similar in the site water and laboratory water control for *P. promelas*; however, survival and biomass were reduced in the site water control. Survival in the site water control was reduced by 74% but was not statistically significant as a result of high between replicate variability; biomass was statistically significantly reduced by 75% in the site water control. Survival of *P. promelas* was statistically significantly reduced in all samples compared to

the laboratory control; percent reduction in survival was 86, 44 and 75% for FR_FRCP1, GH_FR1 and CM_MC2, respectively. Biomass was statistically significantly reduced by 78% in one sample (FR_FRCP1) compared to the laboratory control. There were no adverse effects on hatch, length or normal development (i.e., incidence of deformities) in the samples compared to the laboratory water controls. There were no adverse effects on any of the test endpoints when compared to the site water control.

The effects that were observed on fathead minnows were restricted to mortalities, and occurred predominantly between days 6 and 12 of the tests (note that the effects that were observed on biomass occurred as a result of mortality, and were not associated with reduced growth. Fathead minnows are known to be susceptible to adverse effects caused by fungi and microbes in laboratory toxicity testing (Grothe and Johnson, 1996; Ksoz et al., 2997; Downey et al. 2000). These effects have been termed "sporadic mortality phenomenon", and are associated with mortalities that generally occur beginning on day 4 of the 7-day test with this species (Downey et al. 2000); this age is equivalent to day 6 of the 32-day test, which starts with an earlier life-stage. Effects associated with this phenomenon are generally associated with a high degree of between-replicate variability, as was in these 32-day tests. Thus, the pattern of effects observed with laboratory testing of the samples from the Elk Valley is consistent with effects caused by sporadic mortality phenomenon.

Table 6. Results: *Ceriodaphnia dubia* survival and reproduction test.

Sample ID	Survival (%)	Reproduction (Mean ± SD)
Laboratory Control	90	18.9 ± 5.3
FR_UFR1 (Site Control)	100	20.1 ± 4.8
FR_FRCP1	100	22.5 ± 7.3
GH_FR1	100	21.5 ± 5.1
GH_ERC	100	18.9 ± 3.9
EV_MC2	100	21.5 ± 3.8
EV_HC1	100	23.3 ± 1.8
CM_MC2	100	19.6 ± 3.1
LC_LCDSSLCC	100	20.2 ± 3.8

SD = Standard Deviation

Table 7. Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Sample ID	Cell Yield (x 10^4 cells/mL) (Mean ± SD)	Stimulation relative to laboratory control (%)
Laboratory Control	42.5 ± 3.6	-
FR_UFR1 (Site Control)	125.9 ± 9.4	196.2
FR_FRCP1	126.8 ± 7.0	198.2
GH_FR1	107.0 ± 5.8 [α]	151.8
GH_ERC	129.3 ± 7.2	204.1
EV_MC2	110.3 ± 5.2 [α]	159.4
EV_HC1	133.8 ± 5.5	214.7
CM_MC2	109.3 ± 4.8 [α]	157.1
LC_LCDSSLCC	101.3 ± 4.3 [α]	138.2

SD = Standard Deviation
[α] Result was significantly lower than the site control FR_UFR1

Table 8. Results: *Hyalella azteca* survival and growth test.

Sample ID	Survival (%) (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Laboratory Control	98.0 ± 4.5	0.84 ± 0.10
Site Control (FR_UFR1)	94.0 ± 8.9	0.59 ± 0.15 *
FR_FRCP1	86.0 ± 20.7	0.65 ± 0.08 *
GH_FR1	68.0 ± 43.2	0.51 ± 0.22 *
CM_MC2	66.0 ± 21.9 * α	0.29 ± 0.21 * α

SD = Standard Deviation
* Result was significantly lower than the laboratory control
α Result was significantly lower than the site control FR_UFR1

Table 9. Results: *Pimephales promelas* survival and growth test.

Sample ID	Hatch (%) (Mean ± SD)	Survival (%) (Mean ± SD)	Biomass (mg) (Mean ± SD)	Length (mm) (Mean ± SD)	Normal development (%) (Mean ± SD)
Laboratory Control	96.7 ± 3.8	95.0 ± 3.3	3.0 ± 0.1	11.4 ± 0.4	100.0 ± 0.0
Site Control (FR_UFR1)	85.0 ± 22.0	25.0 ± 50.0	0.8 ± 1.5 *	10.9 ± 0.0	100.0 ± 0.0
FR_FRCP1	96.7 ± 3.8	13.3 ± 26.7 *	0.6 ± 1.3 *	12.6 ± 0.0	100.0 ± 0.0
GH_FR1	98.3 ± 3.3	53.3 ± 14.4 *	3.0 ± 0.1	12.7 ± 0.6	100.0 ± 0.0
CM_MC2	95.0 ± 3.3	23.3 ± 20.7 *	2.3 ± 1.5	15.1 ± 2.2	100.0 ± 0.0

SD = Standard Deviation
* Result was significantly lower than the laboratory control

4.0 QA/QC

The health histories of the test organisms used in the exposures were acceptable and met the requirements of the protocols. Tests using *H. azteca* that were initiated with the samples collected on July 21 and 22, 2015, were terminated prior to completion because the control exposures associated with these tests failed to meet performance criteria. Consequently, these tests were re-started using the samples collected on August 5, 2015, and the results from this second test are reported here. All of the tests reported here met the control acceptability criteria associated with the tests and water quality parameters remained within ranges specified in the protocols throughout the tests. There were no deviations from the test methodologies. Uncertainty associated with these tests is best described by the standard deviations around the means.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 10. Results for these tests fell within the acceptable range for organism performance of mean and two standard deviations, based on historical results obtained by the laboratory with these tests. Thus, the sensitivity of the organisms used in these tests was appropriate.

Table 10. Reference toxicant test results.

Test Species	Endpoint	Historical Mean (2 SD Range)	CV (%)	Test Date
C. dubia	Survival (LC50): 2.0 g/L NaCl	2.0 (1.8–2.2)	5	July 21, 2015
	Reproduction (IC50): 1.2 g/L NaCl	1.5 (1.2–1.9)	12	
P. subcapitata	Growth (IC50): 36.0 µg/L Zn	27.3 (14.5–51.7)	38	July 21, 2015
H. azteca	Survival (LC50): 5.7 g/L NaCl	5.1 (4.2–6.2)	11	August 6, 2015
P. promelas	Survival (LC50): 0.7 g/L NaCl	0.9 (0.5–1.7)	20	July 28, 2015

SD = Standard Deviation, CV = Coefficient of Variation, LC = Lethal Concentration, IC = Inhibition Concentration

5.0 REFERENCES

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6.0 END OF REPORT

APPENDIX A – *Ceriodaphnia dubia* Toxicity Test Data

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal Start Date/Time: July 23/15 @ 1100h
Work Order No.: 15552, 15554, 15558, 15564, 15568 Set up by: Emm

Sample Information:

Sample ID: various- see results table for IDs
Sample Date: July 21-22/15
Date Received: July 23/15
Sample Volume: various

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 071515A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 20
Mortality (%) in previous 7 d: Ø
Individual female # used ≥8 young on test day 1, 2, 4, 5, 6, 8, 9, 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd132
Stock Solution ID: 15NaCl02
Date Initiated: July 21/15

7-d LC50 (95% CL): 2.0 (1.7-2.3) g/L NaCl
7-d IC50 (95% CL): 1.2 (1.0-1.4) g/L NaCl

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCl CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-1.9) g/L NaCl CV (%): 12

Test Results:

		Survival (%) (Mean ± SD)	Reproduction (Mean ± SD)
lab control	② Negative Control	90 ± ~~0.3~~ 31.6 (mc)	18.9 ± 5.3
site control ①	FR_UFRI_Q_06072015_N	100 ± 0.0	20.1 ± 4.8
	FR_FRCPI_Q_06072015_N	100 ± 0.0	22.5 ± 7.3
	GH_FRI_WS_2015_07_20_N	100 ± 0.0	21.5 ± 5.1
	GH_ERC_WS_2015_07_21_N	100 ± 0.0	18.9 ± 3.9
	EV_MC2_WS_2015-07-22_N	100 ± 0.0	21.5 ± 3.8
	EV_HCI_WS_2015-07-22_N	100 ± 0.0	23.3 ± 1.8
	LC_LEPSSLCC_WS_2015-07-21_N	100 ± 0.0	20.2 ± 3.8
	CM_MC2_WKLY_WS_20150721_N	100 ± 0.0	19.6 ± 3.1

Reviewed by: Date reviewed: Aug 11/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: various
Work Order #: 15552, 15554, 15558, 15564, 15568

Start Date & Time: July 28/15 @ 1100h
Stop Date & Time: July 29/15 @ 1100h
Test Species: *Ceriodaphnia dubia*

20% Perrier Concentration lab control	Days													
	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.5	24.0	24.0	25.0	24.0	
DO (mg/L)	8.1	7.8	8.0	7.3	8.1	7.4	8.1	8.0	8.0	7.7	8.0	7.6	8.0	
pH	7.9	7.9	7.9	7.8	8.1	7.7	8.0	8.0	7.9	7.8	8.0	8.0	7.9	
Cond. (µS/cm)	212	213		221		221		222		223		223		
Initials	EMM	EMM						JW		EMM		EMM		

emm

100% (v/v) Concentration FR_UFR1	Days													
	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	
DO (mg/L)	8.2	7.9	8.2	7.4	8.1	7.5	8.2	8.1	8.3	7.7	8.3	7.6	8.2	
pH	7.9	8.0	8.0	7.9	8.1	8.0	8.1	8.1	8.1	8.1	8.1	8.1	8.1	
Cond. (µS/cm)	328	342		334		340		330		342		343		
Initials	EMM	EMM						JW		EMM		EMM		

emm

100% (v/v) Concentration FR_FRCP1	Days													
	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	
DO (mg/L)	8.2	7.9	8.2	7.5	8.2	7.4	8.2	8.1	8.4	7.6	8.3	7.5	8.2	
pH	7.9	8.1	7.9	7.9	8.1	8.0	8.1	8.2	8.1	8.2	8.0	8.2	8.0	
Cond. (µS/cm)	781	800		784		789		771		798		778		
Initials	EMM	EMM						JW		EMM		EMM		

emm

100% (v/v) Concentration GH_FR1	Days													
	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	
DO (mg/L)	8.2	7.9	8.2	7.4	8.2	7.4	8.1	8.1	8.4	7.7	8.3	7.6	8.1	
pH	7.9	8.1	7.9	8.0	8.1	8.0	8.1	8.1	8.0	8.2	8.0	8.1	8.0	
Cond. (µS/cm)	651	674		660		665		648		662		669		
Initials	EMM	EMM						JW		EMM		EMM		

emm

	20% Perrier Control	FR_UFR1	FR_FRCP1	GH_FR1
Hardness*	100	184	460	310
Alkalinity*	98	162	210	186

* mg/L as CaCO3

Analysts: EMM, AWD, MT, JW
Reviewed by: [signature]
Date reviewed: Aug 11/15

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L) ; pH = 6 to 8.5

Sample Description: all samples appear clear

Comments: **Broodboard Used:** 071515A (#1, 2, 4, 5, 6, 8, 9, 10)

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Cacl
Sample ID: various
Work Order #: 15552, 15554, 15558, 15564, 15568
Start Date & Time: July 23/15 @1100h
Stop Date & Time: July 29/15 @1100h
Test Species: *Ceriodaphnia dubia*

100% (v/v) Concentration: GH_ERC

Days	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	
DO (mg/L)	8.2	7.9	8.1	7.5	8.1	7.4	8.2	8.1	8.1	7.7	8.2	7.6	8.2	
pH	7.8	8.0	7.9	8.0	8.1	8.0	8.1	8.0	7.9	8.0	7.9	8.0	7.9	
Cond. (µS/cm)	283	296		302		301		282		291		294		
Initials	EMM	EMM		M		M		JW		EMM		EMM		

100% (v/v) Concentration: EV_MC2

Days	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	
DO (mg/L)	8.2	7.9	8.1	7.3	8.1	7.4	8.0	8.1	8.4	7.7	8.3	7.6	8.4	
pH	8.0	8.1	7.9	8.1	8.1	8.0	8.1	8.1	8.0	8.1	7.9	8.1	7.9	
Cond. (µS/cm)	586	654		638		641		623		650		642		
Initials	EMM	EMM		M		M		JW		EMM		EMM		

100% (v/v) Concentration: EV_HC1

Days	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	
DO (mg/L)	8.2	8.0	8.2	7.4	8.2	7.4	8.1	8.0	8.4	7.7	8.3	7.6	8.2	
pH	8.1	8.2	8.1	8.2	8.1	8.1	8.1	8.2	8.1	8.2	8.1	8.2	8.1	
Cond. (µS/cm)	623	642		628		631		618		630		630		
Initials	EMM	EMM		M		M		JW		EMM		EMM		

100% (v/v) Concentration: EDTA_LC50s

Days	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	
DO (mg/L)	8.2	8.0	8.2	7.3	8.1	7.4	8.0	8.2	8.4	7.6	8.2	7.5	8.3	
pH	7.9	8.1	7.9	8.0	8.0	8.0	8.0	8.1	8.1	8.2	8.1	8.1	8.1	
Cond. (µS/cm)	634	658		641		645		660		640		649		
Initials	EMM	EMM		M		M		JW		EMM		EMM		

	Control			
Hardness*	100	GHERC	EVMC2	EVHC1
Alkalinity*	98	138	190	208
* mg/L as CaCO3	Hardness:	168	362	354

Analysts: EMM, AWD, MCT, JW
Reviewed by:
Date reviewed: Aug 11/15

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L) ; pH = 6 to 8.5
Sample Description: all samples appear clear

Comments: **Broodboard Used:** 071515A (#1, 2, 4, 5, 6, 8, 9, 10)

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck COCD
Sample ID: Vanow
Work Order #: 15552, 15554, 15558, 15564, 15568
Start Date & Time: July 23/15 @ 11:00h
Stop Date & Time: July 29/15 @ 11:00h
Test Species: *Ceriodaphnia dubia*

100% (v/v) Concentration CM_MC2	Days													
	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	
DO (mg/L)	8.2	8.0	8.1	7.4	8.1	7.4	8.1	7.9	8.1	7.7	8.2	7.6	8.1	
pH	8.1	8.2	8.1	8.1	8.1	8.1	8.0	8.1	8.1	8.1	8.1	8.1	8.1	
Cond. (µS/cm)	776	801		779		782		795		785		786		
Initials	EMM	EMM		A		A		JW		EMM		EMM		

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

MCT

	Control	LC100/IC25 CM_MC2		
Hardness*	100	354	~~mg/L~~ 440	
Alkalinity*	98	190	206	

Analysts: EMM/AWP, MCT, JW
Reviewed by:
Date reviewed: Aug. 11/15

* mg/L as CaCO3

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L) ; pH = 6 to 8.5

Sample Description: all samples appear clear

Comments: **Broodboard Used:** 071515A (#1, 2, 4, 5, 6, 8, 9, 10)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck
Sample ID: Vancas
Work Order: 15552, 15554, 15558, 15564, 15568

Start Date & Time: July 23/15 @ 1120h
Stop Date & Time: July 29/15 @ 1100h
Set up by: EMM

repeat 100%(v/v)

Concentration: 20% control lab

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	AD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AD
4	4	4	4	4	✓	4	2	4	4	4	JW
5	8	7	6	8	4	7	6	8	7	6	MG
6	12	8	10	10	7	9	X	12	10	10	EMM
7							↓				
8											
Total	24	19	20	22	11	20	8X	24	21	20	EMM

Concentration: FR_UFR1

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AD
4	4	3	3	4	4	4	4	4	4	4	JW
5	✓	10	8	7	7	7	8	✓	✓	✓	MG
6	12	13	12	12	12	11	13	11	10	10	EMM
7											
8											
Total	16	26	23	23	23	22	25	15	14	14	EMM

Concentration: FR_FRCP1

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AD
4	6	3	4	4	2	4	3	4	4	✓	JW
5	✓	9	10	10	7	9	9	9	10	4	MG
6	12	12	13	13	11	12	12	15	14	✓	EMM
7											
8											
Total	18	24	27	27	20	25	24	28	28	4	EMM

Concentration: GH_FR

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AD
4	4	3	3	4	2	4	6	✓	3	✓	JW
5	8	9	7	9	8	10	✓	4	9	4	MG
6	14	12	12	12	14	14	10	11	10	9	EMM
7											
8											
Total	26	24	22	25	24	28	16	15	22	13	EMM

Concentration: GHFRC

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AD
4	5	4	4	6	5	4	1	6	2	5	JW
5	✓	9	✓	✓	✓	9	6	✓	8	✓	MG
6	12	10	10	13	10	13	12	11	13	11	EMM
7											
8											
Total	17	23	14	19	15	26	19	17	13	16	EMM

Concentration: FV_MC2

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AD
4	5	4	3	4	5	3	3	2	3	3	JW
5	✓	10	8	9	10	8	9	9	10	8	MG
6	10	13	11	10	✓	13	11	12	10	9	EMM
7											
8											
Total	15	27	22	23	15	24	23	23	23	20	EMM

Concentration: FV_HC1

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AD
4	4	4	4	4	4	3	5	3	4	4	JW
5	7	9	8	9	8	8	8	8	9	8	MG
6	12	11	11	13	12	12	11	12	6	12	EMM
7											
8											
Total	23	24	23	26	24	23	24	23	19	24	EMM

Concentration: LC_LCDSSLCC

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AD
4	4	2	3	4	3	3	3	3	5	3	JW
5	9	9	7	8	✓	6	8	7	✓	6	MG
6	11	12	11	13	10	12	10	11	10	9	EMM
7											
8											
Total	24	23	21	25	13	21	21	21	15	18	EMM

Concentration: CM_MC2

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AD
4	4	3	4	2	4	4	3	2	2	3	JW
5	6	8	8	5	✓	7	5	9	6	8	MG
6	11	10	10	9	9	11	12	9	10	12	EMM
7											
8											
Total	21	21	22	16	13	22	20	20	18	23	EMM

Notes: X = mortality.

Sample Description: all samples appear clear
Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]
Date reviewed: Aug 11/15

CETIS Summary Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Batch ID:	18-5728-2977	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	23 Jul-15 11:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	29 Jul-15 11:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	16-9674-5444	23 Jul-15	23 Jul-15	11h	Teck Coal	
FR_UFR1 (site)	07-9078-6561	22 Jul-15 08:46	23 Jul-15 07:00	26h (10 °C)		
FR_FRCP1	15-9893-0345	22 Jul-15 09:14	23 Jul-15 07:00	26h (10 °C)		
GH_FR1	02-6250-8370	21 Jul-15 08:20	23 Jul-15 07:00	51h (10 °C)		
GH_ERC	20-1043-7997	21 Jul-15 07:15	23 Jul-15 07:00	52h (10 °C)		
EV_MC2	17-4378-1447	22 Jul-15 10:15	23 Jul-15 07:00	25h (10 °C)		
EV_HC1	13-3531-9832	22 Jul-15 08:40	23 Jul-15 07:00	26h (10 °C)		
LC_LCDSSLCC	19-3928-1982	21 Jul-15 14:22	23 Jul-15 07:00	45h (10 °C)		
CM_MC2	05-3650-8332	21 Jul-15 14:00	23 Jul-15 07:00	45h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control (20% perrier)		
FR_UFR1 (site)	Water Sample	Teck Coal	FR_UFR1_Q_06072015_N (site c		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_06072015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_07_20_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_07_21_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-07-22_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-07-22_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-07-21		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150721_		

site control

6d Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	10	0.9	0.6738	1	0	1	0.1	0.3162	35.14%	0.0%
FR_UFR1 (site)	10	1	1	1	1	1	0	0	0.0%	-11.11%
FR_FRCP1	10	1	1	1	1	1	0	0	0.0%	-11.11%
GH_FR1	10	1	1	1	1	1	0	0	0.0%	-11.11%
GH_ERC	10	1	1	1	1	1	0	0	0.0%	-11.11%
EV_MC2	10	1	1	1	1	1	0	0	0.0%	-11.11%
EV_HC1	10	1	1	1	1	1	0	0	0.0%	-11.11%
LC_LCDSSLCC	10	1	1	1	1	1	0	0	0.0%	-11.11%
CM_MC2	10	1	1	1	1	1	0	0	0.0%	-11.11%

6d Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1	1	1	1	1	1	0	1	1	1
FR_UFR1 (site)	1	1	1	1	1	1	1	1	1	1
FR_FRCP1	1	1	1	1	1	1	1	1	1	1
GH_FR1	1	1	1	1	1	1	1	1	1	1
GH_ERC	1	1	1	1	1	1	1	1	1	1
EV_MC2	1	1	1	1	1	1	1	1	1	1
EV_HC1	1	1	1	1	1	1	1	1	1	1
LC_LCDSSLCC	1	1	1	1	1	1	1	1	1	1
CM_MC2	1	1	1	1	1	1	1	1	1	1

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Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

6d Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
FR_UFR1 (site)	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_MC2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLCC	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

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CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	17-0073-5881	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Aug-15 15:22	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes
Batch ID:	18-5728-2977	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	23 Jul-15 11:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	29 Jul-15 11:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	16-9674-5444	23 Jul-15	23 Jul-15	11h	Teck Coal	
FR_UFR1 (site)	07-9078-6561	22 Jul-15 08:46	23 Jul-15 07:00	26h (10 °C)		
FR_FRCP1	15-9893-0345	22 Jul-15 09:14	23 Jul-15 07:00	26h (10 °C)		
GH_FR1	02-6250-8370	21 Jul-15 08:20	23 Jul-15 07:00	51h (10 °C)		
GH_ERC	20-1043-7997	21 Jul-15 07:15	23 Jul-15 07:00	52h (10 °C)		
EV_MC2	17-4378-1447	22 Jul-15 10:15	23 Jul-15 07:00	25h (10 °C)		
EV_HC1	13-3531-9832	22 Jul-15 08:40	23 Jul-15 07:00	26h (10 °C)		
LC_LCDSSLCC	19-3928-1982	21 Jul-15 14:22	23 Jul-15 07:00	45h (10 °C)		
CM_MC2	05-3650-8332	21 Jul-15 14:00	23 Jul-15 07:00	45h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control (20% perrier)		
① FR_UFR1 (site)	Water Sample	Teck Coal	① FR_UFR1_Q_06072015_N (site c		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_06072015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_07_20_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_07_21_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-07-22_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-07-22_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-07-21		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150721_		

① site control

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C <> T	NA	NA	

Fisher Exact/Bonferroni-Holm Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFR1 (site)	1	1.0000	Exact	Non-Significant Effect
Lab Control		FR_FRCP1	1	1.0000	Exact	Non-Significant Effect
Lab Control		GH_FR1	1	1.0000	Exact	Non-Significant Effect
Lab Control		GH_ERC	1	1.0000	Exact	Non-Significant Effect
Lab Control		EV_MC2	1	1.0000	Exact	Non-Significant Effect
Lab Control		EV_HC1	1	1.0000	Exact	Non-Significant Effect
Lab Control		LC_LCDSSLCC	1	1.0000	Exact	Non-Significant Effect
Lab Control		CM_MC2	1	1.0000	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
Lab Control	Negative Contr	9	1	10	0.9	0.1	0.0%
FR_UFR1 (site)		10	0	10	1	0	-11.11%
FR_FRCP1		10	0	10	1	0	-11.11%
GH_FR1		10	0	10	1	0	-11.11%
GH_ERC		10	0	10	1	0	-11.11%
EV_MC2		10	0	10	1	0	-11.11%
EV_HC1		10	0	10	1	0	-11.11%
LC_LCDSSLCC		10	0	10	1	0	-11.11%
CM_MC2		10	0	10	1	0	-11.11%

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Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	17-0073-5881	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Aug-15 15:22	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes

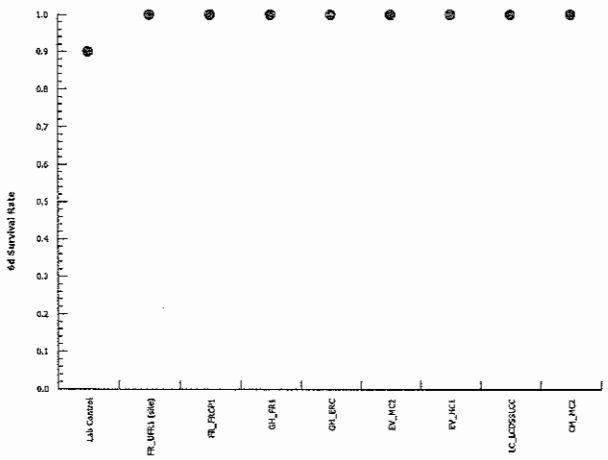
6d Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1	1	1	1	1	1	0	1	1	1
FR_UFR1 (site)	1	1	1	1	1	1	1	1	1	1
FR_FRCP1	1	1	1	1	1	1	1	1	1	1
GH_FR1	1	1	1	1	1	1	1	1	1	1
GH_ERC	1	1	1	1	1	1	1	1	1	1
EV_MC2	1	1	1	1	1	1	1	1	1	1
EV_HC1	1	1	1	1	1	1	1	1	1	1
LC_LCDSSLCC	1	1	1	1	1	1	1	1	1	1
CM_MC2	1	1	1	1	1	1	1	1	1	1

6d Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
FR_UFR1 (site)	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_MC2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLCC	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



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Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	20-0473-6731	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Aug-15 15:24	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes
Batch ID:	18-5728-2977	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	23 Jul-15 11:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	29 Jul-15 11:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1 (site)	07-9078-6561	22 Jul-15 08:46	23 Jul-15 07:00	26h (10 °C)	Teck Coal	
FR_FRCP1	15-9893-0345	22 Jul-15 09:14	23 Jul-15 07:00	26h (10 °C)		
GH_FR1	02-6250-8370	21 Jul-15 08:20	23 Jul-15 07:00	51h (10 °C)		
GH_ERC	20-1043-7997	21 Jul-15 07:15	23 Jul-15 07:00	52h (10 °C)		
EV_MC2	17-4378-1447	22 Jul-15 10:15	23 Jul-15 07:00	25h (10 °C)		
EV_HC1	13-3531-9832	22 Jul-15 08:40	23 Jul-15 07:00	26h (10 °C)		
LC_LCDSSLCC	19-3928-1982	21 Jul-15 14:22	23 Jul-15 07:00	45h (10 °C)		
CM_MC2	05-3650-8332	21 Jul-15 14:00	23 Jul-15 07:00	45h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
① FR_UFR1 (site)	Water Sample	Teck Coal	① FR_UFR1_Q_06072015_N (site c	① site control	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_06072015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_07_20_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_07_21_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-07-22_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-07-22_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-07-21		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150721_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact/Bonferroni-Holm Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
FR_UFR1 (site)		FR_FRCP1	1	1.0000	Exact	Non-Significant Effect
FR_UFR1 (site)		GH_FR1	1	1.0000	Exact	Non-Significant Effect
FR_UFR1 (site)		GH_ERC	1	1.0000	Exact	Non-Significant Effect
FR_UFR1 (site)		EV_MC2	1	1.0000	Exact	Non-Significant Effect
FR_UFR1 (site)		EV_HC1	1	1.0000	Exact	Non-Significant Effect
FR_UFR1 (site)		LC_LCDSSLCC	1	1.0000	Exact	Non-Significant Effect
FR_UFR1 (site)		CM_MC2	1	1.0000	Exact	Non-Significant Effect

Data Summary

Sample Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1 (site)Upstream Contr	10	0	10	1	0	0.0%
FR_FRCP1	10	0	10	1	0	0.0%
GH_FR1	10	0	10	1	0	0.0%
GH_ERC	10	0	10	1	0	0.0%
EV_MC2	10	0	10	1	0	0.0%
EV_HC1	10	0	10	1	0	0.0%
LC_LCDSSLCC	10	0	10	1	0	0.0%
CM_MC2	10	0	10	1	0	0.0%

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Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	20-0473-6731	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Aug-15 15:24	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes

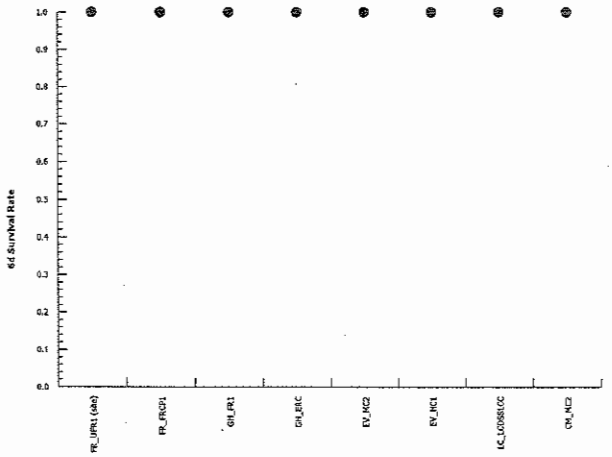
6d Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1 (site)	1	1	1	1	1	1	1	1	1	1
FR_FRCP1	1	1	1	1	1	1	1	1	1	1
GH_FR1	1	1	1	1	1	1	1	1	1	1
GH_ERC	1	1	1	1	1	1	1	1	1	1
EV_MC2	1	1	1	1	1	1	1	1	1	1
EV_HC1	1	1	1	1	1	1	1	1	1	1
LC_LCDSSLCC	1	1	1	1	1	1	1	1	1	1
CM_MC2	1	1	1	1	1	1	1	1	1	1

6d Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1 (site)	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_MC2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLCC	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Aug 11/15

CETIS Summary Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Batch ID:	18-5728-2977	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	23 Jul-15 11:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	29 Jul-15 11:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	16-9674-5444	23 Jul-15	23 Jul-15	11h	Teck Coal	
FR_UFR1 (site)	07-9078-6561	22 Jul-15 08:46	23 Jul-15 07:00	26h (10 °C)		
FR_FRCP1	15-9893-0345	22 Jul-15 09:14	23 Jul-15 07:00	26h (10 °C)		
GH_FR1	02-6250-8370	21 Jul-15 08:20	23 Jul-15 07:00	51h (10 °C)		
GH_ERC	20-1043-7997	21 Jul-15 07:15	23 Jul-15 07:00	52h (10 °C)		
EV_MC2	17-4378-1447	22 Jul-15 10:15	23 Jul-15 07:00	25h (10 °C)		
EV_HC1	13-3531-9832	22 Jul-15 08:40	23 Jul-15 07:00	26h (10 °C)		
LC_LCDSSLCC	19-3928-1982	21 Jul-15 14:22	23 Jul-15 07:00	45h (10 °C)		
CM_MC2	05-3650-8332	21 Jul-15 14:00	23 Jul-15 07:00	45h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control (20% perrier)		
ⓘ FR_UFR1 (site)	Water Sample	Teck Coal	ⓘ FR_UFR1_Q_06072015_N (site c	ⓘ site control	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_06072015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_07_20_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_07_21_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-07-22_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-07-22_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-07-21		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150721_		

Reproduction Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	10	18.9	15.12	22.68	8	24	1.67	5.28	27.94%	0.0%
FR_UFR1 (site)	10	20.1	16.69	23.51	14	26	1.509	4.771	23.74%	-6.35%
FR_FRCP1	10	22.5	17.27	27.73	4	28	2.311	7.307	32.47%	-19.05%
GH_FR1	10	21.5	17.86	25.14	13	28	1.607	5.083	23.64%	-13.76%
GH_ERC	10	18.9	16.09	21.71	14	26	1.242	3.929	20.79%	0.0%
EV_MC2	10	21.5	18.76	24.24	15	27	1.213	3.837	17.85%	-13.76%
EV_HC1	10	23.3	22.04	24.56	19	26	0.5588	1.767	7.58%	-23.28%
LC_LCDSSLCC	10	20.2	17.46	22.94	13	25	1.209	3.824	18.93%	-6.88%
CM_MC2	10	19.6	17.38	21.82	13	23	0.9798	3.098	15.81%	-3.7%

Reproduction Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	24	19	20	22	11	20	8	24	21	20
FR_UFR1 (site)	16	26	23	23	23	22	25	15	14	14
FR_FRCP1	18	24	27	27	20	25	24	28	28	4
GH_FR1	26	24	22	25	24	28	16	15	22	13
GH_ERC	17	23	14	19	15	26	19	17	23	16
EV_MC2	15	27	22	23	15	24	23	23	23	20
EV_HC1	23	24	23	26	24	23	24	23	19	24
LC_LCDSSLCC	24	23	21	25	13	21	21	21	15	18
CM_MC2	21	21	22	16	13	22	20	20	18	23

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CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	04-0153-7646	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Aug-15 15:23	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	18-5728-2977	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	23 Jul-15 11:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	29 Jul-15 11:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	16-9674-5444	23 Jul-15	23 Jul-15	11h	Teck Coal	
FR_UFR1 (site)	07-9078-6561	22 Jul-15 08:46	23 Jul-15 07:00	26h (10 °C)		
FR_FRCP1	15-9893-0345	22 Jul-15 09:14	23 Jul-15 07:00	26h (10 °C)		
GH_FR1	02-6250-8370	21 Jul-15 08:20	23 Jul-15 07:00	51h (10 °C)		
GH_ERC	20-1043-7997	21 Jul-15 07:15	23 Jul-15 07:00	52h (10 °C)		
EV_MC2	17-4378-1447	22 Jul-15 10:15	23 Jul-15 07:00	25h (10 °C)		
EV_HC1	13-3531-9832	22 Jul-15 08:40	23 Jul-15 07:00	26h (10 °C)		
LC_LCDSSLCC	19-3928-1982	21 Jul-15 14:22	23 Jul-15 07:00	45h (10 °C)		
CM_MC2	05-3650-8332	21 Jul-15 14:00	23 Jul-15 07:00	45h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control (20% perrier)		
① FR_UFR1 (site)	Water Sample	Teck Coal	① FR_UFR1_Q_06072015_N (site c	① site control	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_06072015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_07_20_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_07_21_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-07-22_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-07-22_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-07-21		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150721_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C < T	NA	NA	26.2%	

Steel Many-One Rank Sum Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFR1 (site)	95.5	73	1	18	0.6335	Asymp	Non-Significant Effect
		FR_FRCP1	80.5	73	3	18	0.1535	Asymp	Non-Significant Effect
		GH_FR1	86	73	3	18	0.2994	Asymp	Non-Significant Effect
		GH_ERC	114	73	1	18	0.9804	Asymp	Non-Significant Effect
		EV_MC2	88	73	4	18	0.3652	Asymp	Non-Significant Effect
		EV_HC1	74.5	73	3	18	0.0598	Asymp	Non-Significant Effect
		LC_LCDSSLCC	96	73	3	18	0.6507	Asymp	Non-Significant Effect
		CM_MC2	104	73	3	18	0.8702	Asymp	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend		1.96	0.5844	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	195.7556	24.46944	8	1.175	0.3241	Non-Significant Effect
Error	1686.3	20.81852	81			
Total	1882.056		89			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	18.42	20.09	0.0183	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9143	0.962	<0.0001	Non-normal Distribution

Aug 11/15

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	04-0153-7646	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Aug-15 15:23	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

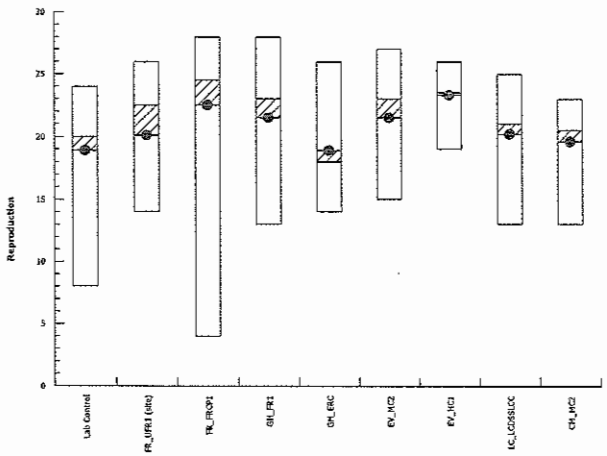
Reproduction Summary

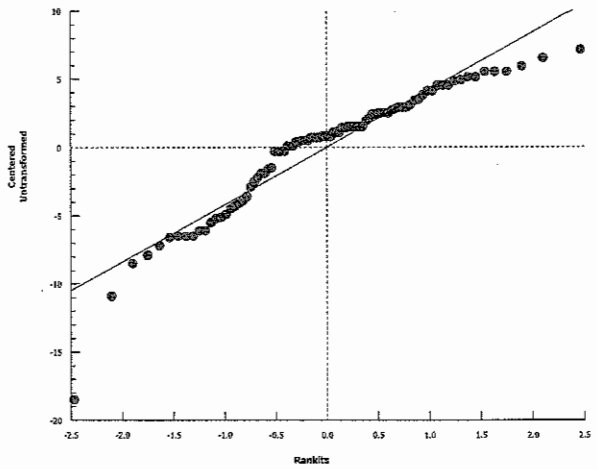
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	10	18.9	15.12	22.68	20	8	24	1.67	27.94%	0.0%
FR_UFR1 (site)	10	20.1	16.69	23.51	22.5	14	26	1.509	23.74%	-6.35%
FR_FRCP1	10	22.5	17.27	27.73	24.5	4	28	2.311	32.47%	-19.05%
GH_FR1	10	21.5	17.86	25.14	23	13	28	1.607	23.64%	-13.76%
GH_ERC	10	18.9	16.09	21.71	18	14	26	1.242	20.79%	0.0%
EV_MC2	10	21.5	18.76	24.24	23	15	27	1.213	17.85%	-13.76%
EV_HC1	10	23.3	22.04	24.56	23.5	19	26	0.5588	7.58%	-23.28%
LC_LCDSSLCC	10	20.2	17.46	22.94	21	13	25	1.209	18.93%	-6.88%
CM_MC2	10	19.6	17.38	21.82	20.5	13	23	0.9798	15.81%	-3.7%

Reproduction Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	24	19	20	22	11	20	8	24	21	20
FR_UFR1 (site)	16	26	23	23	23	22	25	15	14	14
FR_FRCP1	18	24	27	27	20	25	24	28	28	4
GH_FR1	26	24	22	25	24	28	16	15	22	13
GH_ERC	17	23	14	19	15	26	19	17	23	16
EV_MC2	15	27	22	23	15	24	23	23	23	20
EV_HC1	23	24	23	26	24	23	24	23	19	24
LC_LCDSSLCC	24	23	21	25	13	21	21	21	15	18
CM_MC2	21	21	22	16	13	22	20	20	18	23

Graphics





Aug 11/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	11-6965-8232	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Aug-15 15:24	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	18-5728-2977	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	23 Jul-15 11:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	
Ending Date:	29 Jul-15 11:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1 (site)	07-9078-6561	22 Jul-15 08:46	23 Jul-15 07:00	26h (10 °C)	Teck Coal	
FR_FRCP1	15-9893-0345	22 Jul-15 09:14	23 Jul-15 07:00	26h (10 °C)		
GH_FR1	02-6250-8370	21 Jul-15 08:20	23 Jul-15 07:00	51h (10 °C)		
GH_ERC	20-1043-7997	21 Jul-15 07:15	23 Jul-15 07:00	52h (10 °C)		
EV_MC2	17-4378-1447	22 Jul-15 10:15	23 Jul-15 07:00	25h (10 °C)		
EV_HC1	13-3531-9832	22 Jul-15 08:40	23 Jul-15 07:00	26h (10 °C)		
LC_LCDSSLCC	19-3928-1982	21 Jul-15 14:22	23 Jul-15 07:00	45h (10 °C)		
CM_MC2	05-3650-8332	21 Jul-15 14:00	23 Jul-15 07:00	45h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
① FR_UFR1 (site)	Water Sample	Teck Coal	① FR_UFR1_Q_06072015_N (site c	① site control	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_06072015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_07_20_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_07_21_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-07-22_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-07-22_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-07-21		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150721_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	23.7%	

Steel Many-One Rank Sum Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1 (site)		FR_FRCP1	127.5	74	1	18	0.9994	Asymp	Non-Significant Effect
		GH_FR1	114	74	5	18	0.9765	Asymp	Non-Significant Effect
		GH_ERC	100.5	74	5	18	0.7690	Asymp	Non-Significant Effect
		EV_MC2	112.5	74	3	18	0.9676	Asymp	Non-Significant Effect
		EV_HC1	126.5	74	2	18	0.9992	Asymp	Non-Significant Effect
		LC_LCDSSLCC	100.5	74	3	18	0.7690	Asymp	Non-Significant Effect
		CM_MC2	94	74	3	18	0.5561	Asymp	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend		1.96	0.0287	Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	158.4	22.62857	7	1.135	0.3511	Non-Significant Effect
Error	1435.4	19.93611	72			
Total	1593.8		79			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	17.94	18.48	0.0122	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9156	0.9579	<0.0001	Non-normal Distribution

Aug. 11/15

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	11-6965-8232	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Aug-15 15:24	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

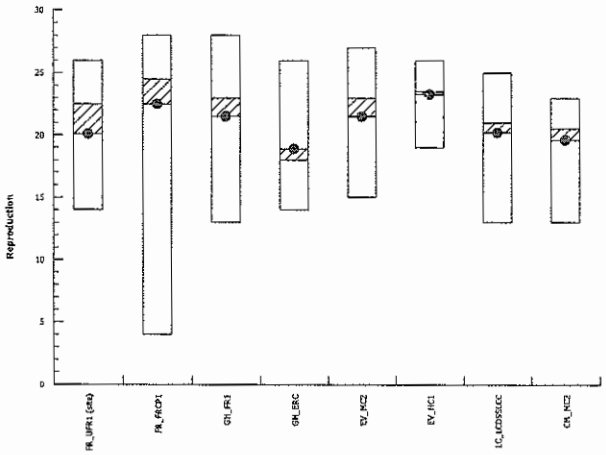
Reproduction Summary

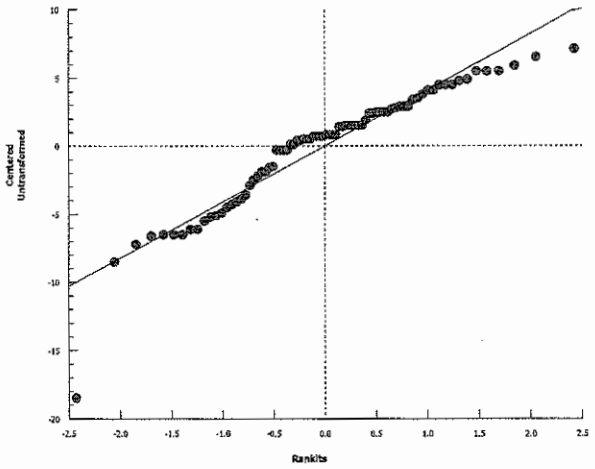
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1 (site)	10	20.1	16.69	23.51	22.5	14	26	1.509	23.74%	0.0%
FR_FRCP1	10	22.5	17.27	27.73	24.5	4	28	2.311	32.47%	-11.94%
GH_FR1	10	21.5	17.86	25.14	23	13	28	1.607	23.64%	-6.97%
GH_ERC	10	18.9	16.09	21.71	18	14	26	1.242	20.79%	5.97%
EV_MC2	10	21.5	18.76	24.24	23	15	27	1.213	17.85%	-6.97%
EV_HC1	10	23.3	22.04	24.56	23.5	19	26	0.5588	7.58%	-15.92%
LC_LCDSSLCC	10	20.2	17.46	22.94	21	13	25	1.209	18.93%	-0.5%
CM_MC2	10	19.6	17.38	21.82	20.5	13	23	0.9798	15.81%	2.49%

Reproduction Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1 (site)	16	26	23	23	23	22	25	15	14	14
FR_FRCP1	18	24	27	27	20	25	24	28	28	4
GH_FR1	26	24	22	25	24	28	16	15	22	13
GH_ERC	17	23	14	19	15	26	19	17	23	16
EV_MC2	15	27	22	23	15	24	23	23	23	20
EV_HC1	23	24	23	26	24	23	24	23	19	24
LC_LCDSSLCC	24	23	21	25	13	21	21	21	15	18
CM_MC2	21	21	22	16	13	22	20	20	18	23

Graphics





Aug 11/15

Client: Teck Coal

W.O.#: 15552, 15554, 15558, 15564, 15568

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
GH_ERC	July 23/15	50	7.0	7.1	128		50	8.4	168	KS
GH_FR1	↓	↓	9.5	9.7	186		↓	15.5	310	↓
FR_UFR1			8.3	8.5	162		↓	9.2	184	
FR_FRCP1			10.7	10.9	210		100 ①	4.6	460	
CM_MC2			10.5	10.7	206		100 ①	4.4	440	
EV_HC1			10.5	10.6	208		50	17.7	354	
LC_LCDSSLCC			9.7	9.9	190		50	17.7	354	
EV_MC2	↓	↓	9.7	9.9	190		50	18.1	362	↓
20% Perrier water (control)	July 23/15	50	5.0	5.1	98		50	5.0	100	MLT

Notes: ① diluted to 100 mL with D.I. water.

Reviewed by: [signature]

Date Reviewed: Aug 11/15

APPENDIX B – *Pseudokirchneriella subcapitata* Toxicity Test Data

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15553, 15555, 15559, 15565, 15569
Start Date: July 24/15
Set up by: MLT/EMN

Sample Information:

Sample ID: various - see results table for IDs
Sample Date: July 21-22/15
Date Received: July 23/15
Sample Volume: various

Test Organism Information:

Culture Date: July 17/15
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC131
Stock Solution ID: 15Zn03
Date Initiated: July 21/15

72-h IC50 (95% CL): 36.0 (33.1 - 39.2) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 27.3 (14.5 - 51.7) ug/L Zn CV (%): 38

Test Results:

② lab control
① Site control

	Cell Yield (Mean ± SD)
② Negative Control	42.5 ± 3.6
① FR-UFR1-Q-06072015-N	125.9 ± 9.4 (a)
FR-FRCP1-Q-06072015-N	126.8 ± 7.0 (a)
GH-FR1-WS-2015-07-20-N	107.0 ± 5.8 (a) (b)
GH-ERC-WS-2015-07-21-N	129.3 ± 7.2 (a)
EV-MC2-WS-2015-07-22-N	110.3 ± 5.2 (a) (b)
EV-HC1-WS-2015-07-22-N	133.8 ± 5.5 (a)
LC-LCDSSLCC-WS-2015-07-21-N	101.3 ± 4.3 (a) (b)
CM-MC2-WKLY-WS-20150721-N	109.3 ± 4.8 (a) (b)

(a) cell yield is significantly higher than lab control (b) cell yield is significantly lower than the site contr

Reviewed by: [signature]
Date reviewed: Aug 11/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal Setup by: MLT / Emm

Sample ID: Various Test Date/Time: July 24/15 @ 0700h

Work Order No.: 15553, 15555, 15559, 15565, 15569 Test Species: *Pseudokirchneriella subcapitata*

Culture Date: July 17/15 Age of Culture: 7d Culture Health: Good

Culture Count: 1 5235 2 445 Average: 485 Culture Cell Density (c1): 485x10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 485 x10⁴ cells/ml = 4.5mL

Time Zero Counts: 1 20 2 21 Average: 20.5

No. of Cells/mL: 20.5 x10⁴ Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9318 cells/mL

Concentration %(v/v) 100	Water Quality pH	Water Quality Temp (°C)	Incubator Temperature (°C)				Microplates rotated 2X per day?			
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control 0.1 w/ nutrients	6.8	23.5	25.0	25.5	25.5	25.0	✓	/	/	✓
FR_UFR1	8.0	23.5	↓	↓	↓	↓	✓	/	/	✓
FR_FRCP1	7.9	23.5					✓	/	/	✓
GH_FR1	7.9	23.0					✓	/	/	✓
GH_FRC	8.0	23.0					✓	/	/	✓
EK_MC2	8.0	23.0					✓	/	/	✓
EK_HC1	8.1	23.0					✓	/	/	✓
LC_LCDSSLC	8.0	23.0					✓	/	/	✓
CM_MC2	8.0	23.0	↓	↓	↓	↓	✓	/	/	✓
Initials	MLT	MLT	MLT	~	~	MLT	MLT	~	~	MLT

Initial control pH: Well 1: 6.8 Well 2: 6.8

Final control pH: Well 1: 6.7 Well 2: 6.7

Light intensity (lux): 3970 Date measured: July 24/15

Instruments: Thermometer 2 pH meter 2 Light meter 1

Sample Description: all samples appear clear

Comments:

Reviewed: [signature] Date reviewed: Aug. 10/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: TECK Coal Start Date/Time: July 24/15 @ 0700h

Work Order #: 15553, 15555, 15559, Termination Date: July 27/15 @ 0700h

Sample ID: various 15565, 15569 Test set up by: MET / EMM

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	40					MET
lab control (CO.1 + nutrients)	B	47					
	C	41					
	D	48					
	E	45					
	F	47					
	G	39					
	H	41					
100% (v/v) FR_UFR1 (site control)	A	115					
	B	136					
	C	134					
	D	133					
MET	E	117					
	F	138					
	G	116					
	H	136					
100% (v/v) FR_FRCP1	A	120					
	B	137					
	C	127					
	D	127					
100% (v/v) GH_FR1	A	109					
	B	109					
	C	100					
	D	114					
100% (v/v) GH_ERC	A	121					
	B	129					
	C	138					
	D	133					
100% (v/v) EV_MC2	A	109					
	B	105					
	C	116					
	D	115					
100% (v/v) EV_HC1	A	127					
	B	136					
	C	140					
	D	136					

Comments:

Reviewed by: Date Reviewed: Aug 10/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal — Start Date/Time: July 24/15 @ 0700h

Work Order #: 15553, 15555, 15559, 15569 — Termination Date: July 27/15 @ 0700h

Sample ID: various 15569 — Test set up by: MLT/EMM

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control MLT.	A						
	B						
	C						
	D						
	E						
	F						
	G						
	H						
100% (v/v) LC-LCDSSLCC	A	103					MLT
	B	98					
	C	100					
	D	108					
100% (v/v) CM-MC2	A	108					
	B	116					
	C	105					
	D	112					
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						

Comments:

Reviewed by: — Date Reviewed: Aug 10/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	24-Jul-15 @ 0700h
WO#:	15553, 15555, 15559, 15565, 15569	Termination Date:	27-Jul-15 @ 0700h
Sample ID:	Teck Coal samples pass/fail		
		Initial Cell Density:	9318 cell/mL

									205000
									0.22
									0.01
Concentration	Rep	Count 1 ($\times 10^4$)	Count 2 ($\times 10^4$)	Count 3 ($\times 10^4$)	Count 4 ($\times 10^4$)	Mean ($\times 10^4$)	Cell Yield ($\times 10^4$) cell/mL		9318.182
Control	A	40				40	39.1	mean	42.6
Lab Water	B	47				47	46.1	SD	3.625308
	C	41				41	40.1	CV	8.516473
	D	48				48	47.1		
	E	45				45	44.1		
	F	47				47	46.1		
	G	39				39	38.1		
	H	41				41	40.1		
Control	A	115				115	114.1	mean	125.9
Site Water	B	136				136	135.1	SD	9.357007
(FR_UFRI)	C	134				134	133.1	CV	7.429546
100% (v/v)	D	133				133	132.1		
	E	117				117	116.1		
	F	128				128	127.1		
	G	116				116	115.1		
	H	136				136	135.1		
FR_FRCPI	A	120				120	119.1		
100% (v/v)	B	137				137	136.1		
	C	127				127	126.1		
	D	127				127	126.1		
GH_FRI	A	109				109	108.1		
100% (v/v)	B	109				109	108.1		
	C	100				100	99.1		
	D	114				114	113.1		
GH_ERC	A	121				121	120.1		
100% (v/v)	B	129				129	128.1		
	C	138				138	137.1		
	D	133				133	132.1		
EV_MC2	A	109				109	108.1		
100% (v/v)	B	105				105	104.1		
	C	116				116	115.1		
	D	115				115	114.1		
EV_HC1	A	127				127	126.1		
100% (v/v)	B	136				136	135.1		
	C	140				140	139.1		
	D	136				136	135.1		
LC_LCDSSLCC	A	103				103	102.1		
100% (v/v)	B	98				98	97.1		
	C	100				100	99.1		
	D	108				108	107.1		
CM_MC2	A	108				108	107.1		
100% (v/v)	B	116				116	115.1		
	C	105				105	104.1		
	D	112				112	111.1		

Aug 10/15

CETIS Summary Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Batch ID:	19-8168-4051	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	24 Jul-15 07:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	27 Jul-15 07:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	13-6408-3280	24 Jul-15	24 Jul-15	7h	Teck Coal	
FR_UFR1 (site)	07-9078-6561	22 Jul-15 08:46	23 Jul-15 07:00	46h (10 °C)		
FR_FRCP1	15-9893-0345	22 Jul-15 09:14	23 Jul-15 07:00	46h (10 °C)		
GH_FR1	02-6250-8370	21 Jul-15 08:20	23 Jul-15 07:00	71h (10 °C)		
GH_ERC	20-1043-7997	21 Jul-15 07:15	23 Jul-15 07:00	72h (10 °C)		
EV_MC2	17-4378-1447	22 Jul-15 10:15	23 Jul-15 07:00	45h (10 °C)		
EV_HC1	13-3531-9832	22 Jul-15 08:40	23 Jul-15 07:00	46h (10 °C)		
LC_LCDSSLCC	19-3928-1982	21 Jul-15 14:22	23 Jul-15 07:00	65h (10 °C)		
CM_MC2	05-3650-8332	21 Jul-15 14:00	23 Jul-15 07:00	65h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control (DI w/ nutrients)		
② FR_UFR1 (site)	Water Sample	Teck Coal	① FR_UFR1_Q_06072015_N (site c	① site control	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_06072015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_07_20_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_07_21_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-07-22_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-07-22_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-07-21		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150721_		

Cell Yield Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	8	42.5	39.47	45.53	38	47	1.282	3.625	8.53%	0.0%
FR_UFR1 (site)	8	125.9	118.1	133.7	114	135	3.308	9.357	7.43%	-196.2%
FR_FRCP1	4	126.8	115.6	137.9	119	136	3.497	6.994	5.52%	-198.2%
GH_FR1	4	107	97.72	116.3	99	113	2.915	5.831	5.45%	-151.8%
GH_ERC	4	129.3	117.8	140.7	120	137	3.591	7.182	5.56%	-204.1%
EV_MC2	4	110.3	102	118.5	104	115	2.594	5.188	4.71%	-159.4%
EV_HC1	4	133.8	125	142.5	126	139	2.75	5.5	4.11%	-214.7%
LC_LCDSSLCC	4	101.3	94.33	108.2	97	107	2.175	4.349	4.3%	-138.2%
CM_MC2	4	109.3	101.6	116.9	104	115	2.394	4.787	4.38%	-157.1%

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	39	46	40	47	44	46	38	40
FR_UFR1 (site)	114	135	133	132	116	127	115	135
FR_FRCP1	119	136	126	126				
GH_FR1	108	108	99	113				
GH_ERC	120	128	137	132				
EV_MC2	108	104	115	114				
EV_HC1	126	135	139	135				
LC_LCDSSLCC	102	97	99	107				
CM_MC2	107	115	104	111				

Aug 11/15

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	12-8105-7640	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Aug-15 14:58	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	19-8168-4051	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	24 Jul-15 07:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	27 Jul-15 07:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1 (site)	07-9078-6561	22 Jul-15 08:46	23 Jul-15 07:00	46h (10 °C)	Teck Coal	
FR_FRCP1	15-9893-0345	22 Jul-15 09:14	23 Jul-15 07:00	46h (10 °C)		
GH_FR1	02-6250-8370	21 Jul-15 08:20	23 Jul-15 07:00	71h (10 °C)		
GH_ERC	20-1043-7997	21 Jul-15 07:15	23 Jul-15 07:00	72h (10 °C)		
EV_MC2	17-4378-1447	22 Jul-15 10:15	23 Jul-15 07:00	45h (10 °C)		
EV_HC1	13-3531-9832	22 Jul-15 08:40	23 Jul-15 07:00	46h (10 °C)		
LC_LCDSSLCC	19-3928-1982	21 Jul-15 14:22	23 Jul-15 07:00	65h (10 °C)		
CM_MC2	05-3650-8332	21 Jul-15 14:00	23 Jul-15 07:00	65h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
① FR_UFR1 (site)	Water Sample	Teck Coal	① FR_UFR1_Q_06072015_N (site c	① site control	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_06072015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_07_20_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_07_21_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-07-22_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-07-22_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-07-21		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150721_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	8.42%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
⑥ FR_UFR1 (site)		FR_FRCP1	-0.2086	2.526	10.6	10	0.9585	CDF	Non-Significant Effect
		GH_FR1	4.5	2.526	10.6	10	0.0004	CDF	Significant Effect
		GH_ERC	-0.8047	2.526	10.6	10	0.9941	CDF	Non-Significant Effect
		EV_MC2	3.726	2.526	10.6	10	0.0028	CDF	Significant Effect
		EV_HC1	-1.878	2.526	10.6	10	1.0000	CDF	Non-Significant Effect
		LC_LCDSSLCC	5.871	2.526	10.6	10	<0.0001	CDF	Significant Effect
		CM_MC2	3.964	2.526	10.6	10	0.0015	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9049	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4430.264	632.8948	7	13.49	<0.0001	Significant Effect
Error	1313.375	46.90625	28			
Total	5743.639		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.62	18.48	0.8223	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9534	0.9166	0.1336	Normal Distribution

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EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	12-8105-7640	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Aug-15 14:58	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

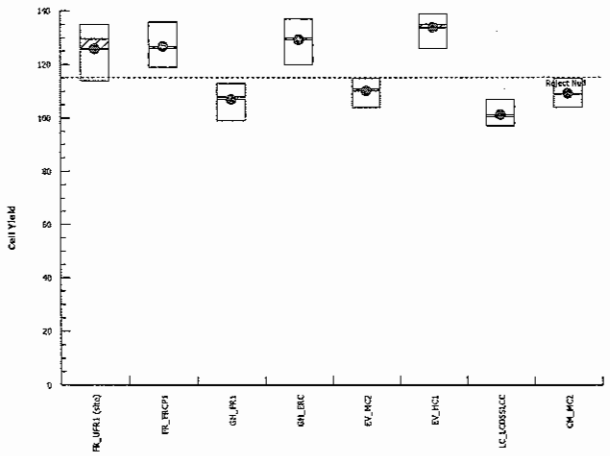
Cell Yield Summary

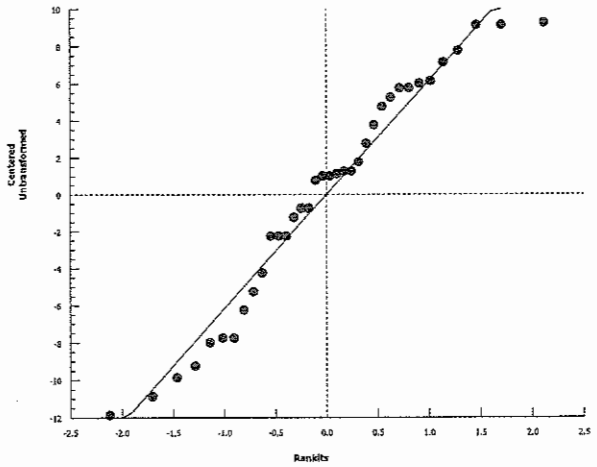
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1 (site)	8	125.9	118.1	133.7	129.5	114	135	3.308	7.43%	0.0%
FR_FRCP1	4	126.8	115.6	137.9	126	119	136	3.497	5.52%	-0.7%
GH_FR1	4	107	97.72	116.3	108	99	113	2.915	5.45%	15.0%
GH_ERC	4	129.3	117.8	140.7	130	120	137	3.591	5.56%	-2.68%
EV_MC2	4	110.3	102	118.5	111	104	115	2.594	4.71%	12.41%
EV_HC1	4	133.8	125	142.5	135	126	139	2.75	4.11%	-6.26%
LC_LCDSSLCC	4	101.3	94.33	108.2	100.5	97	107	2.175	4.3%	19.56%
CM_MC2	4	109.3	101.6	116.9	109	104	115	2.394	4.38%	13.21%

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1 (site)	114	135	133	132	116	127	115	135
FR_FRCP1	119	136	126	126				
GH_FR1	108	108	99	113				
GH_ERC	120	128	137	132				
EV_MC2	108	104	115	114				
EV_HC1	126	135	139	135				
LC_LCDSSLCC	102	97	99	107				
CM_MC2	107	115	104	111				

Graphics





Aug 11/15

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-8912-0704	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Aug-15 14:49	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	19-8168-4051	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	24 Jul-15 07:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	27 Jul-15 07:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	13-6408-3280	24 Jul-15	24 Jul-15	7h	Teck Coal	
FR_UFR1 (site)	07-9078-6561	22 Jul-15 08:46	23 Jul-15 07:00	46h (10 °C)		
FR_FRCP1	15-9893-0345	22 Jul-15 09:14	23 Jul-15 07:00	46h (10 °C)		
GH_FR1	02-6250-8370	21 Jul-15 08:20	23 Jul-15 07:00	71h (10 °C)		
GH_ERC	20-1043-7997	21 Jul-15 07:15	23 Jul-15 07:00	72h (10 °C)		
EV_MC2	17-4378-1447	22 Jul-15 10:15	23 Jul-15 07:00	45h (10 °C)		
EV_HC1	13-3531-9832	22 Jul-15 08:40	23 Jul-15 07:00	46h (10 °C)		
LC_LCDSSLCC	19-3928-1982	21 Jul-15 14:22	23 Jul-15 07:00	65h (10 °C)		
CM_MC2	05-3650-8332	21 Jul-15 14:00	23 Jul-15 07:00	65h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control (DI w/ nutrients)		
① FR_UFR1 (site)	Water Sample	Teck Coal	① FR_UFR1_Q_06072015_N (site c		① site control
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_06072015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_07_20_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_07_21_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-07-22_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-07-22_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-07-21		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150721_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C < T	NA	NA	23.2%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFR1 (site)	26.32	2.541	8.052	14	<0.0001	CDF	Significant Effect
		FR_FRCP1	21.71	2.541	9.862	10	<0.0001	CDF	Significant Effect
		GH_FR1	16.62	2.541	9.862	10	<0.0001	CDF	Significant Effect
		GH_ERC	22.36	2.541	9.862	10	<0.0001	CDF	Significant Effect
		EV_MC2	17.46	2.541	9.862	10	<0.0001	CDF	Significant Effect
		EV_HC1	23.52	2.541	9.862	10	<0.0001	CDF	Significant Effect
		LC_LCDSSLCC	15.14	2.541	9.862	10	<0.0001	CDF	Significant Effect
		CM_MC2	17.2	2.541	9.862	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7232	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	42541.42	5317.678	8	132.4	<0.0001	Significant Effect
Error	1405.375	40.15357	35			
Total	43946.8		43			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.775	20.09	0.5611	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9679	0.9295	0.2556	Normal Distribution

Aug 11/15

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 00-8912-0704 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 04 Aug-15 14:49 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

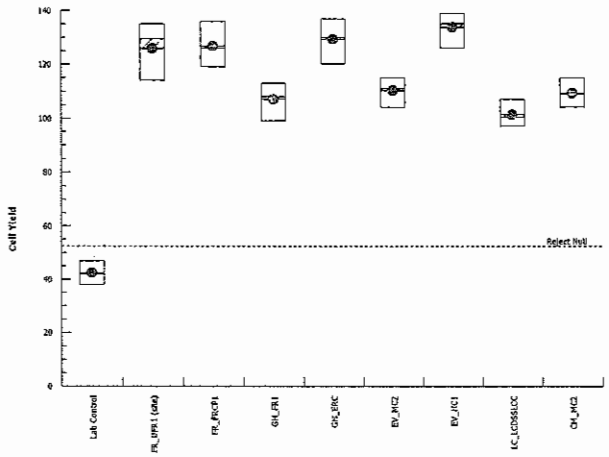
Cell Yield Summary

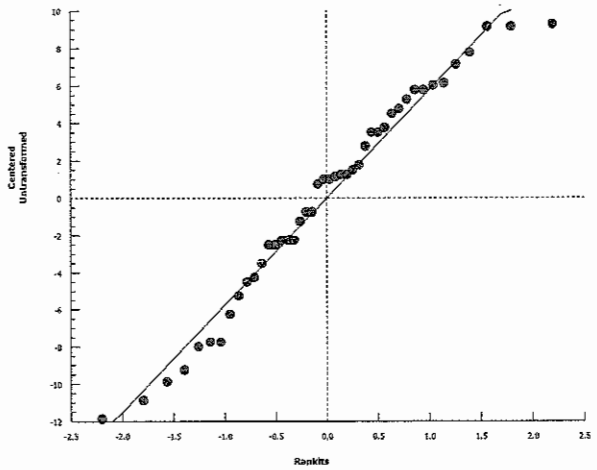
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	8	42.5	39.47	45.53	42	38	47	1.282	8.53%	0.0%
FR_UFR1 (site)	8	125.9	118.1	133.7	129.5	114	135	3.308	7.43%	-196.2%
FR_FRCP1	4	126.8	115.6	137.9	126	119	136	3.497	5.52%	-198.2%
GH_FR1	4	107	97.72	116.3	108	99	113	2.915	5.45%	-151.8%
GH_ERC	4	129.3	117.8	140.7	130	120	137	3.591	5.56%	-204.1%
EV_MC2	4	110.3	102	118.5	111	104	115	2.594	4.71%	-159.4%
EV_HC1	4	133.8	125	142.5	135	126	139	2.75	4.11%	-214.7%
LC_LCDSSLCC	4	101.3	94.33	108.2	100.5	97	107	2.175	4.3%	-138.2%
CM_MC2	4	109.3	101.6	116.9	109	104	115	2.394	4.38%	-157.1%

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	39	46	40	47	44	46	38	40
FR_UFR1 (site)	114	135	133	132	116	127	115	135
FR_FRCP1	119	136	126	126				
GH_FR1	108	108	99	113				
GH_ERC	120	128	137	132				
EV_MC2	108	104	115	114				
EV_HC1	126	135	139	135				
LC_LCDSSLCC	102	97	99	107				
CM_MC2	107	115	104	111				

Graphics





Aug 11/15

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	05-7269-1465	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Aug-15 14:58	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	19-8168-4051	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	24 Jul-15 07:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	27 Jul-15 07:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1 (site)	07-9078-6561	22 Jul-15 08:46	23 Jul-15 07:00	46h (10 °C)	Teck Coal	
FR_FRCP1	15-9893-0345	22 Jul-15 09:14	23 Jul-15 07:00	46h (10 °C)		
GH_FR1	02-6250-8370	21 Jul-15 08:20	23 Jul-15 07:00	71h (10 °C)		
GH_ERC	20-1043-7997	21 Jul-15 07:15	23 Jul-15 07:00	72h (10 °C)		
EV_MC2	17-4378-1447	22 Jul-15 10:15	23 Jul-15 07:00	45h (10 °C)		
EV_HC1	13-3531-9832	22 Jul-15 08:40	23 Jul-15 07:00	46h (10 °C)		
LC_LCDSSLCC	19-3928-1982	21 Jul-15 14:22	23 Jul-15 07:00	65h (10 °C)		
CM_MC2	05-3650-8332	21 Jul-15 14:00	23 Jul-15 07:00	65h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1 (site)	Water Sample	Teck Coal	FR_UFR1_Q_06072015_N (site c		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_06072015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_07_20_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_07_21_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-07-22_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-07-22_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-07-21		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150721_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C < T	NA	NA	8.42%	

Dunnett Multiple Comparison Test

Sample Code vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1 (site)	FR_FRCP1	0.2086	2.526	10.6	10	0.8795	CDF	Non-Significant Effect
	GH_FR1	-4.5	2.526	10.6	10	1.0000	CDF	Non-Significant Effect
	GH_ERC	0.8047	2.526	10.6	10	0.6485	CDF	Non-Significant Effect
	EV_MC2	-3.726	2.526	10.6	10	1.0000	CDF	Non-Significant Effect
	EV_HC1	1.878	2.526	10.6	10	0.1740	CDF	Non-Significant Effect
	LC_LCDSSLCC	-5.871	2.526	10.6	10	1.0000	CDF	Non-Significant Effect
	CM_MC2	-3.964	2.526	10.6	10	1.0000	CDF	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9049	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4430.264	632.8948	7	13.49	<0.0001	Significant Effect
Error	1313.375	46.90625	28			
Total	5743.639		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.62	18.48	0.8223	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9534	0.9166	0.1336	Normal Distribution

① site control

Aug 11/15

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 05-7269-1465 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 04 Aug-15 14:58 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

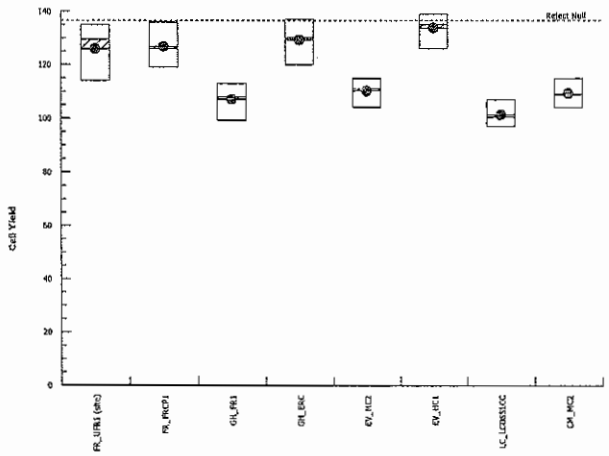
Cell Yield Summary

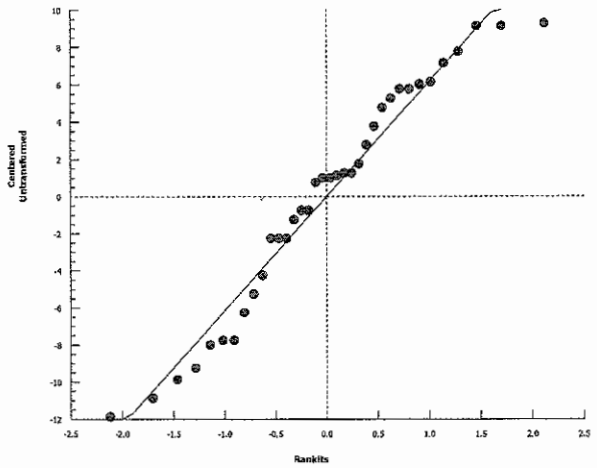
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1 (site)	8	125.9	118.1	133.7	129.5	114	135	3.308	7.43%	0.0%
FR_FRCP1	4	126.8	115.6	137.9	126	119	136	3.497	5.52%	-0.7%
GH_FR1	4	107	97.72	116.3	108	99	113	2.915	5.45%	15.0%
GH_ERC	4	129.3	117.8	140.7	130	120	137	3.591	5.56%	-2.68%
EV_MC2	4	110.3	102	118.5	111	104	115	2.594	4.71%	12.41%
EV_HC1	4	133.8	125	142.5	135	126	139	2.75	4.11%	-6.26%
LC_LCDSSLCC	4	101.3	94.33	108.2	100.5	97	107	2.175	4.3%	19.56%
CM_MC2	4	109.3	101.6	116.9	109	104	115	2.394	4.38%	13.21%

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1 (site)	114	135	133	132	116	127	115	135
FR_FRCP1	119	136	126	126				
GH_FR1	108	108	99	113				
GH_ERC	120	128	137	132				
EV_MC2	108	104	115	114				
EV_HC1	126	135	139	135				
LC_LCDSSLCC	102	97	99	107				
CM_MC2	107	115	104	111				

Graphics





APPENDIX C – *Hyalella azteca* Toxicity Test Data

Hyalella azteca 28-d Toxicity Test Summary Sheet

Client: Teck
Work Order No.: 15566

Start Date: 06-Aug-15
Set up by: KJL

Sample Information:

Sample ID: Various - See below
Sample Date: Aug 5, 11, 12, 19, 26, 2015
Date Received: Aug 6, 13, 20, 27, 2015
Sample Volume: 1-2x 20L per refresh

Test Organism Information:

Species: *Hyalella azteca*
Supplier: Aquatic Research Organisms, NH
Date received: 06-Aug-15
Age or size (Day 0): 8-days

NaCl Reference Toxicant Results:

Reference Toxicant ID: HA100
Stock Solution ID: n/a
Date Initiated: 06-Aug-15

96-h LC50 (95% CL): 5.7 (4.0 - 8.0) g/L NaCl

96-h LC50 Reference Toxicant Mean and Range: 5.1 (4.2 - 6.2) g/L NaCl CV (%): 11

Test Results:

Sample ID	Survival ± SD (%)	Average Dry Wt. ± SD (mg)
Control	98.0 ± 4.5	0.84 ± 0.10
FR_UFR1	94.0 ± 8.9	0.59 ± 0.15*
GH_FR1	68.0 ± 43.2	0.51 ± 0.22*
CM_MC2	66.0 ± 21.9*,1	0.29 ± 0.21*,1
FR_FRCP1	86.0 ± 20.7	0.65 ± 0.08*

* Samples that are significantly different from Control.

[1] Samples that are significantly different from site control FR_UFR1.

Reviewed by: JKL Date reviewed: Nov. 6/15

Chronic *H. azteca* Sediment Toxicity Test Data Sheet

Freshwater Sediment Water Quality

Client: Teck
WO #: 15566
Sample ID: See below

Start Date: 06-Aug-15
Termination Date: 03-Sep-15
Test Organism: *H. azteca*

Temperature (°C)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control	22.0	22.5	23.0	23.0	23.0	23.0	22.5	22.0	23.0	23.0	23.0	23.0	23.0	23.0	22.5
FR-UFR1	22.5	22.5	23.0	23.0	23.0	23.0	22.5	22.0	23.0	23.0	23.0	23.0	23.0	23.0	22.5
GH-FR1	22.5	22.5	23.0	23.0	23.0	23.0	22.5	22.0	23.0	23.0	23.0	23.0	23.0	23.0	22.5
CM_MC2	22.0	22.5	23.0	23.0	23.0	23.0	22.5	22.0	23.0	23.0	23.0	23.0	23.0	23.0	22.5
FR_CP1	22.5	22.5	23.0	23.0	23.0	23.0	22.5	22.0	23.0	23.0	23.0	23.0	23.0	23.0	22.5
Technician Initials	KL	JW	A	MW	JW	JW	JW	KJL	KJL	A	A	JW	JW	KJL	JW

KL
~~Temperature (°C)~~ Conductivity (µS)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control	361	360	367	373	385	379	403	387	399	396	414	411	429	405	396
FR_UFR1	431	433	439	434	443	444	446	447	449	449	452	467	446	448	442
GH_FR1	764	761	779	770	770	768	772	768	774	789	797	791	778	788	774
CM_MC2	944	927	954	939	947	942	935	937	941	955	953	939	942	940	917
FR_CP1	1022	1021	1037	1020	1028	1032	1032	1033	1057	1130	1148	1190	1147	1148	1145
Technician Initials	KL	JW	A	MW	JW	JW	JW	KJL	KJL	A	A	JW	JW	KJL	JW

Dissolved oxygen (mg/L)

Sample ID	Day															① ii
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Control	8.2	6.3	6.8	6.9	6.3	6.4	6.1	6.0	5.5	5.7	6.0	4.7	6.1	6.7	5.7	5.9
FR-UFR1	8.5	5.7	6.7	6.5	6.5	6.3	6.2	5.9	5.5	5.6	5.9	4.9	6.5	6.4	5.7	6.0
GH_FR1	8.6	5.7	6.7	6.5	6.5	6.2	6.6	6.0	5.8	5.7	5.8	4.1	6.4	6.6	5.7	6.0
CM_MC2	8.6	4.3	6.5	6.6	6.9	6.3	6.1	6.1	5.5	5.7	5.8	4.9	6.7	6.4	5.8	6.3
FR_CP1	8.6	5.3	6.5	6.2	6.5	6.4	6.1	6.1	5.4	5.7	5.8	4.6	6.5	6.3	5.2	5.9
Technician Initials	KL	JW	A	MW	JW	JW	JW	KJL	KJL	A	A	JW	JW	KJL	JW	JW

① JW

pH

Sample ID	Day															② ii
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Control	7.8	7.3	7.7	7.9	7.3	7.4	7.3	7.1	7.0	7.2	7.1	7.1	7.4	7.5	7.4	7.3
FR_UFR1	8.2	8.0	8.1	8.2	8.1	8.0	8.0	7.9	7.9	7.9	7.9	7.7	7.9	7.9	7.9	8.0
GH_FR1	8.1	8.0	8.0	8.2	8.2	8.1	8.3	8.1	7.9	8.0	8.0	7.8	8.0	8.1	7.9	8.0
CM_MC2	8.3	8.1	8.1	8.2	8.2	8.1	8.1	7.9	8.0	8.1	8.0	7.9	8.1	8.1	8.0	8.1
FR_CP1	8.2	8.1	8.1	8.1	8.2	8.1	8.1	7.9	8.0	8.0	8.1	7.8	8.1	8.1	7.9	8.1
Technician Initials	KL	JW	A	MW	JW	JW	JW	KJL	KJL	A	A	JW	JW	KJL	JW	JW

② JW

Comments:

Reviewed by: JOL

Date Reviewed: Oct. 1/15

Chronic *H. azteca* Sediment Toxicity Test Data Sheet

Freshwater Sediment Water Quality

Client: Teck
WO #: 15566
Sample ID: See below

Start Date: 06-Aug-15
Termination Date: 03-Sep-15
Test Organism: *H. azteca*

Temperature (°C)

Sample ID	Day													
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Control	23.0	23.0	23.0	22.5	23.0	22.0	22.0	22.5	23.0	23.0	22.0	22.0	22.0	22.0
FR_UFR1	23.0	23.0	23.0	22.5	23.0	22.0	22.0	22.5	23.0	23.5	22.0	22.0	22.0	22.0
CAL_FR1	23.0	23.0	23.0	22.5	23.0	22.0	22.0	22.5	23.0	23.5	22.0	22.0	22.0	22.0
CAL_MC2	23.0	23.0	23.0	22.5	23.0	22.0	22.0	22.5	23.0	23.5	22.0	22.0	22.0	22.0
FR_CP1	23.0	23.0	23.0	22.5	23.0	22.0	22.0	22.5	23.0	23.5	22.0	22.0	22.0	22.0
Technician Initials	JW				JW	JW	KJL	KJL			KJL	KJL	KJL	KJL

~~Temperature (°C)~~ Conductivity (µS)

Sample ID	Day													
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Control	395	397	402	415	395	393	396	412	416	417	418	418	410	415
FR_UFR1	433	430	440	447	434	439	439	441	435	434	441	446	427	431
CAL_FR1	783	801	795	788	786	790	796	801	785	800	772	769	765	770
CAL_MC2 ①	1067	1117	1119	1096	1125	1128	1124	1864	965	975	965	972	960	971
FR_CP1 ①	921	856	858	846	841	842	841	886	916	922	911	905	900	903
Technician Initials	JW				JW	JW	KJL	KJL			KJL	KJL	KJL	KJL

Dissolved oxygen (mg/L)

Sample ID	Day													
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Control	6.2	6.1	6.2	5.6	5.9	6.1	6.2	6.2	6.0	5.9	6.1	6.1	6.0	6.4
FR_UFR1	6.0	6.0	6.0	5.8	6.1	6.1	6.1	6.0	6.1	5.8	6.3	6.3	6.1	6.3
CAL_FR1	6.0	6.2	6.1	5.5	5.9	5.5	6.0	6.3	6.2	5.8	6.2	6.2	6.2	6.3
CAL_MC2	6.2	6.1	6.0	5.8	5.8	5.9	6.1	6.3	6.1	5.7	6.3	6.3	6.1	6.4
FR_CP1	5.8	6.0	6.1	5.3	5.8	5.5	6.1	6.2	6.2	5.8	6.3	6.3	6.1	6.3
Technician Initials	JW				JW	JW	KJL	KJL			KJL	KJL	KJL	KJL

pH

Sample ID	Day													
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Control	7.5	7.3	7.4	7.3	7.2	7.3	7.3	7.2	7.1	7.3	7.1	7.1	7.0	7.0
FR_UFR1	7.9	7.9	7.9	8.0	7.8	7.9	7.9	7.8	7.9	7.9	7.6	7.6	7.5	7.6
CAL_FR1	8.0	8.0	8.0	8.0	7.9	7.9	7.8	7.8	8.0	8.0	7.7	7.8	7.7	7.7
CAL_MC2	8.1	8.0	8.0	8.1	7.9	8.0	7.9	8.0	8.1	8.0	7.8	7.8	7.7	7.7
FR_CP1	8.0	8.1	8.0	8.0	7.9	7.8	7.8	7.9	8.0	8.1	7.7	7.8	7.7	7.6
Technician Initials	JW				JW	JW	KJL	KJL			KJL	KJL	KJL	KJL

Comments: ① Labels on carboys and conductivities are double checked to make sure the sample ID's are correct and not switched. (Day 15)

Reviewed by: JCM

Date Reviewed: Oct-1/15

Nautilus Environmental

H. azteca Toxicity Test Data Sheet

Freshwater 28-d Survival and Weight

Client: Teck
Work Order No: 15566
Sample ID: See below

Start Date: 06-Aug-15
Termination Date: 03-Sep-15
Test Organism: *Hyalella azteca*

Sample ID	24 Pan No. orange	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
Control	1	A	9	0	1	KJL	986.98	994.13	9	KL / JW
	2	B	10	0	0		989.89	997.75	10	
	3	C	10	0	0		994.29	1003.87	10	
	4	D	10(1)	0	0		1003.53	1010.69	10	
	5	E	10(1)	0	0		1006.31	1015.56	10	
FR-UFR1	6	A	10	0	0	KJL	979.79	985.95	10	
	7	B	10	0	0		977.12	982.82	10	
	8	C	8	1	1		994.88	997.65	8	
	9	D	10	0	0		995.70	1002.53	10	
	10	E	9	0	1		1001.74	1008.29	9	
GH-FR1	11	A	9	0	1	KJL	985.83 4/5	991.48	9	
	12	B	0(5)	10	0		990.60	-	0	
	13	C	10	0	0		979.85	986.09	10	
	14	D	10	0	0		996.66	1002.61	10	
	15	E	5(3)(4)	0	5		993.52	994.41	5	
CM-MCZ	16	A	9	0	1	KJL	983.43	989.37	9	
	17	B	7(2)(3)	0	3		1000.98	1002.81	7	
	18	C	3(3)(3)	0	7		994.09	994.66	3	
	19	D	7(3)(3)	0	3		980.10	981.21	6(4)	
	20	E	7(3)(5)	0	3		989.90	991.09	7	

Comments: (1) young present (2) organisms are very small (3) checked by JW (4) 1 organism lost in transfer
Reweighed pans: 4- 1010.67 13-986.07 22- 1006.89
(5) Seeded but organisms all died on August 12. Full water quality and ammonia measurements in log book

Reviewed by: JW
Date Reviewed: Oct-5/15

H. azteca Toxicity Test Data Sheet
Freshwater 28-d Survival and Weight

Client: Teck
Work Order No: 15566
Sample ID: See below

Start Date: 06-Aug-15
Termination Date: 03-Sep-15
Test Organism: *Hyalella azteca*

Sample ID	Pan No. (24 orange)	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
FR-CP1	21	A	5 ①	0	5	KJL	990.84 KL 3	993.60	5	KL / JW
	22	B	10	0	0	↓	1000.65	1006.90	10	↓
	23	C	9	0	1	↓	981.46	987.38	9	↓
	24	D	10	0	0	↓	990.64	998.44	10	↓
	25	E	9	0	1	↓	982.42	987.97	9	↓
		A								
		B								
		C								
		D								
		E								
		A								
		B								
		C								
		D								
		E								
		A								
		B								
		C								
		D								
		E								

Comments: ① checked by JW

Reviewed by: JGL

Date Reviewed: Oct. 1/15

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Batch ID:	03-7710-1376	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	06 Aug-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	03 Sep-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	13-3557-1625	06 Aug-15	06 Aug-15	NA	Teck Coal	
FR_UFR1	10-2451-8280	05 Aug-15 09:55	06 Aug-15 06:30	14h		
GH_FR1	17-4148-1335	05 Aug-15 08:30	06 Aug-15 06:30	16h		
CM_MC2	14-6230-7745	05 Aug-15	06 Aug-15 06:30	24h		
FR_FRCP1	20-7156-3351	05 Aug-15 10:40	06 Aug-15 06:30	13h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_20072015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_08_03_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150805_		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_20072015_N		

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
10-7029-9155	Survival Rate	Control Resp	0.98	0.8 - NL	Yes	Passes Acceptability Criteria

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	5	0.8359	0.7095	0.9623	0.716	0.958	0.04552	0.1018	12.18%	0.0%
FR_UFR1	5	0.5886	0.4043	0.7729	0.3463	0.7278	0.06637	0.1484	25.22%	29.58%
GH_FR1	4	0.5056	0.1573	0.8539	0.178	0.6256	0.1094	0.2189	43.29%	39.51%
CM_MC2	5	0.2933	0.03499	0.5516	0.17	0.66	0.09303	0.208	70.93%	64.91%
FR_FRCP1	5	0.6467	0.5431	0.7503	0.554	0.78	0.03732	0.08346	12.91%	22.63%

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	5	0.98	0.9245	1	0.9	1	0.02	0.04472	4.56%	0.0%
FR_UFR1	5	0.94	0.8289	1	0.8	1	0.04	0.08944	9.52%	4.08%
GH_FR1	5	0.68	0.1431	1	0	1	0.1934	0.4324	63.59%	30.61%
CM_MC2	5	0.66	0.388	0.932	0.3	0.9	0.09798	0.2191	33.2%	32.65%
FR_FRCP1	5	0.86	0.6025	1	0.5	1	0.09274	0.2074	24.11%	12.24%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	0.7944	0.786	0.958	0.716	0.925
FR_UFR1	0.616	0.57	0.3463	0.683	0.7278
GH_FR1	0.6256		0.624	0.595	0.178
CM_MC2	0.66	0.2614	0.19	0.185	0.17
FR_FRCP1	0.554	0.625	0.6578	0.78	0.6167

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	0.9	1	1	1	1
FR_UFR1	1	1	0.8	1	0.9
GH_FR1	0.9	0	1	1	0.5
CM_MC2	0.9	0.7	0.3	0.7	0.7
FR_FRCP1	0.5	1	0.9	1	0.9

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	9/10	10/10	10/10	10/10	10/10
FR_UFR1	10/10	10/10	8/10	10/10	9/10
GH_FR1	9/10	0/10	10/10	10/10	5/10
CM_MC2	9/10	7/10	3/10	7/10	7/10
FR_FRCP1	5/10	10/10	9/10	10/10	9/10

Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	08-5824-4407	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	05 Oct-15 12:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	03-7710-1376	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	06 Aug-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	03 Sep-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	13-3557-1625	06 Aug-15	06 Aug-15	NA	Teck Coal	
FR_UFR1	10-2451-8280	05 Aug-15 09:55	06 Aug-15 06:30	14h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_20072015_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	8.11%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		FR_UFR1	0.8756	1.86	0.13	8	0.2034	CDF	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.98	0.8 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.009294413	0.009294413	1	0.7667	0.4068	Non-Significant Effect
Error	0.0969765	0.01212206	8			
Total	0.1062709		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.564	23.15	0.2460	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8288	0.7411	0.0324	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	5	0.98	0.9245	1	1	0.9	1	0.02	4.56%	0.0%
FR_UFR1	5	0.94	0.8289	1	1	0.8	1	0.04	9.52%	4.08%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	5	1.379	1.289	1.47	1.412	1.249	1.412	0.03259	5.28%	0.0%
FR_UFR1	5	1.318	1.148	1.489	1.412	1.107	1.412	0.06153	10.44%	4.42%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	0.9	1	1	1	1
FR_UFR1	1	1	0.8	1	0.9

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	1.249	1.412	1.412	1.412	1.412
FR_UFR1	1.412	1.412	1.107	1.412	1.249

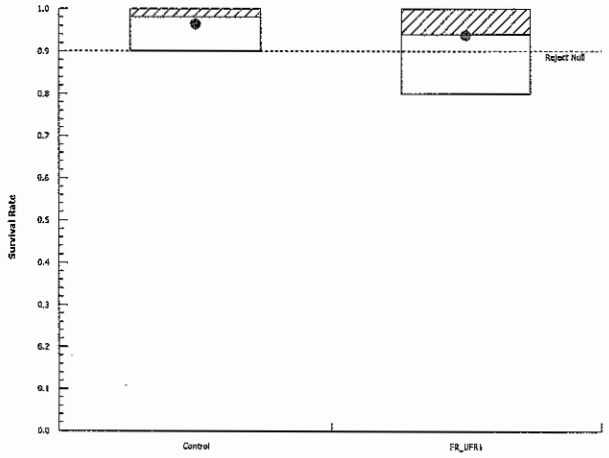
Hyalella 28-d Survival and Growth Sediment Test | **Nautilus Environmental**

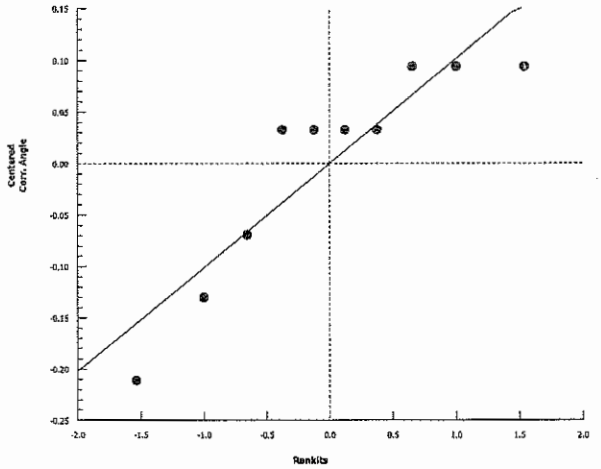
Analysis ID:	08-5824-4407	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	05 Oct-15 12:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	9/10	10/10	10/10	10/10	10/10
FR_UFR1	10/10	10/10	8/10	10/10	9/10

Graphics





Analyst:_____ QA: JGe Oct-5/15

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	10-7029-9155	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Sep-15 11:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	03-7710-1376	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	06 Aug-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	03 Sep-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	13-3557-1625	06 Aug-15	06 Aug-15	NA	Teck Coal	
GH_FR1	17-4148-1335	05 Aug-15 08:30	06 Aug-15 06:30	16h		
CM_MC2	14-6230-7745	05 Aug-15	06 Aug-15 06:30	24h		
FR_FRCP1	20-7156-3351	05 Aug-15 10:40	06 Aug-15 06:30	13h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_08_03_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150805_		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_20072015_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	14.4%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		GH_FR1	1.55	1.86	0.451	8	0.0798	CDF	Non-Significant Effect
		CM_MC2	3.73	1.86	0.209	8	0.0029	CDF	Significant Effect
		FR_FRCP1	1.322	1.86	0.222	8	0.1114	CDF	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.98	0.8 - NL	Yes	Passes Acceptability Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.5742533	0.1914178	3	1.832	0.1820	Non-Significant Effect
Error	1.671859	0.1044912	16			
Total	2.246112		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	10.92	11.34	0.0122	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8748	0.866	0.0143	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	5	0.98	0.9245	1	1	0.9	1	0.02	4.56%	0.0%
GH_FR1	5	0.68	0.1431	1	0.9	0	1	0.1934	63.59%	30.61%
CM_MC2	5	0.66	0.388	0.932	0.7	0.3	0.9	0.09798	33.2%	32.65%
FR_FRCP1	5	0.86	0.6025	1	0.9	0.5	1	0.09274	24.11%	12.24%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	5	1.379	1.289	1.47	1.412	1.249	1.412	0.03259	5.28%	0.0%
GH_FR1	5	1.003	0.3362	1.671	1.249	0.1588	1.412	0.2403	53.55%	27.26%
CM_MC2	5	0.9604	0.662	1.259	0.9912	0.5796	1.249	0.1075	25.03%	30.37%
FR_FRCP1	5	1.222	0.9023	1.541	1.249	0.7854	1.412	0.115	21.04%	11.45%

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	10-7029-9155	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Sep-15 11:48	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	0.9	1	1	1	1
GH_FR1	0.9	0	1	1	0.5
CM_MC2	0.9	0.7	0.3	0.7	0.7
FR_FRCP1	0.5	1	0.9	1	0.9

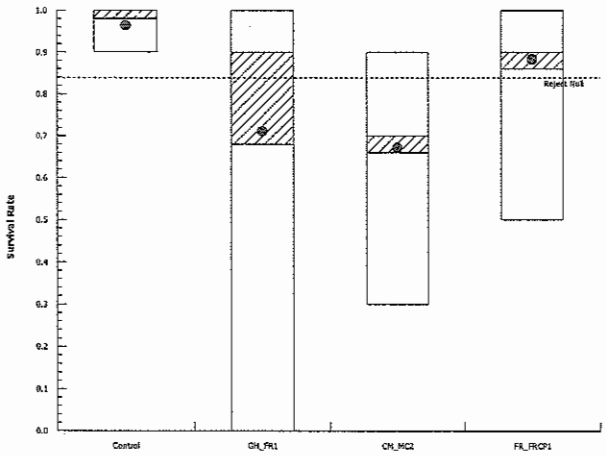
Angular (Corrected) Transformed Detail

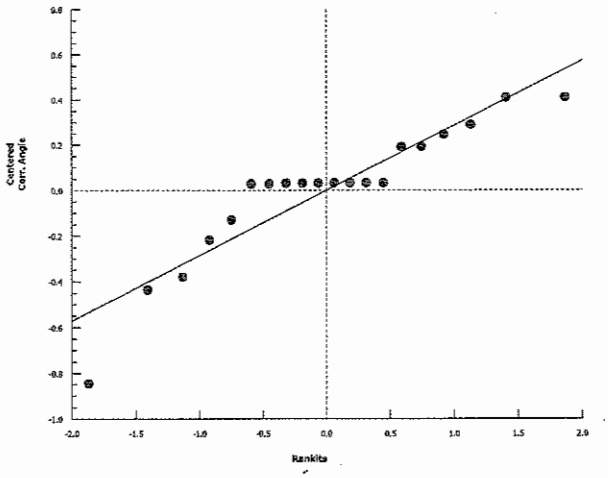
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	1.249	1.412	1.412	1.412	1.412
GH_FR1	1.249	0.1588	1.412	1.412	0.7854
CM_MC2	1.249	0.9912	0.5796	0.9912	0.9912
FR_FRCP1	0.7854	1.412	1.249	1.412	1.249

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	9/10	10/10	10/10	10/10	10/10
GH_FR1	9/10	0/10	10/10	10/10	5/10
CM_MC2	9/10	7/10	3/10	7/10	7/10
FR_FRCP1	5/10	10/10	9/10	10/10	9/10

Graphics





Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	02-9844-2283	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Sep-15 11:49	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	03-7710-1376	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	06 Aug-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	03 Sep-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	10-2451-8280	05 Aug-15 09:55	06 Aug-15 06:30	14h	Teck Coal	
GH_FR1	17-4148-1335	05 Aug-15 08:30	06 Aug-15 06:30	16h		
CM_MC2	14-6230-7745	05 Aug-15	06 Aug-15 06:30	24h		
FR_FRCP1	20-7156-3351	05 Aug-15 10:40	06 Aug-15 06:30	13h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_20072015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_08_03_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150805_		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_20072015_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	17.6%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_FR1	1.27	1.86	0.461	8	0.1199	CDF	Non-Significant Effect
		CM_MC2	2.89	1.86	0.230	8	0.0101	CDF	Significant Effect
		FR_FRCP1	0.7435	1.86	0.243	8	0.2392	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.442944	0.147648	3	1.368	0.2882	Non-Significant Effect
Error	1.72634	0.1078963	16			
Total	2.169284		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.777	11.34	0.0794	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.904	0.866	0.0491	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	5	0.94	0.8289	1	1	0.8	1	0.04	9.52%	0.0%
GH_FR1	5	0.68	0.1431	1	0.9	0	1	0.1934	63.59%	27.66%
CM_MC2	5	0.66	0.388	0.932	0.7	0.3	0.9	0.09798	33.2%	29.79%
FR_FRCP1	5	0.86	0.6025	1	0.9	0.5	1	0.09274	24.11%	8.51%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	5	1.318	1.148	1.489	1.412	1.107	1.412	0.06153	10.44%	0.0%
GH_FR1	5	1.003	0.3362	1.671	1.249	0.1588	1.412	0.2403	53.55%	23.89%
CM_MC2	5	0.9604	0.662	1.259	0.9912	0.5796	1.249	0.1075	25.03%	27.15%
FR_FRCP1	5	1.222	0.9023	1.541	1.249	0.7854	1.412	0.115	21.04%	7.35%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1	1	1	0.8	1	0.9
GH_FR1	0.9	0	1	1	0.5
CM_MC2	0.9	0.7	0.3	0.7	0.7
FR_FRCP1	0.5	1	0.9	1	0.9

Hyalella 28-d Survival and Growth Sediment Test | **Nautilus Environmental**

Analysis ID:	02-9844-2283	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Sep-15 11:49	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

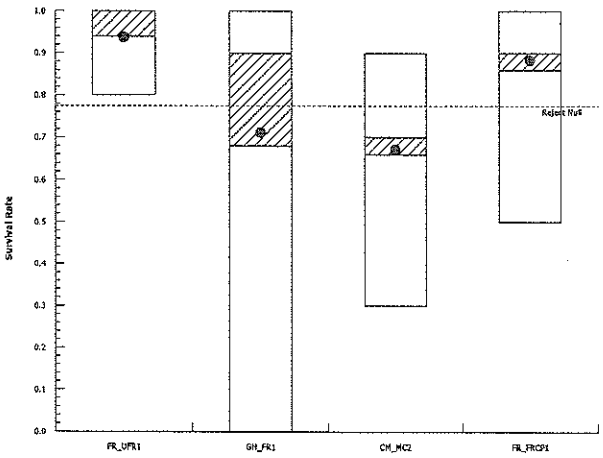
Angular (Corrected) Transformed Detail

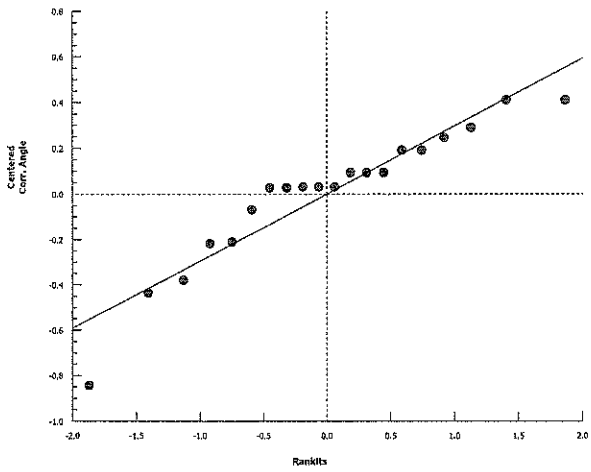
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1	1.412	1.412	1.107	1.412	1.249
GH_FR1	1.249	0.1588	1.412	1.412	0.7854
CM_MC2	1.249	0.9912	0.5796	0.9912	0.9912
FR_FRCP1	0.7854	1.412	1.249	1.412	1.249

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1	10/10	10/10	8/10	10/10	9/10
GH_FR1	9/10	0/10	10/10	10/10	5/10
CM_MC2	9/10	7/10	3/10	7/10	7/10
FR_FRCP1	5/10	10/10	9/10	10/10	9/10

Graphics





Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	12-2500-6382	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	05 Oct-15 12:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	03-7710-1376	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	06 Aug-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	03 Sep-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	13-3557-1625	06 Aug-15	06 Aug-15	NA	Teck Coal	
FR_UFR1	10-2451-8280	05 Aug-15 09:55	06 Aug-15 06:30	14h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_20072015_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	17.9%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		FR_UFR1	3.073	1.86	0.15	8	0.0076	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1528709	0.1528709	1	9.441	0.0153	Significant Effect
Error	0.1295437	0.01619297	8			
Total	0.2824146		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.127	23.15	0.4829	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9311	0.7411	0.4587	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	5	0.8359	0.7095	0.9623	0.7944	0.716	0.958	0.04552	12.18%	0.0%
FR_UFR1	5	0.5886	0.4043	0.7729	0.616	0.3463	0.7278	0.06637	25.22%	29.58%

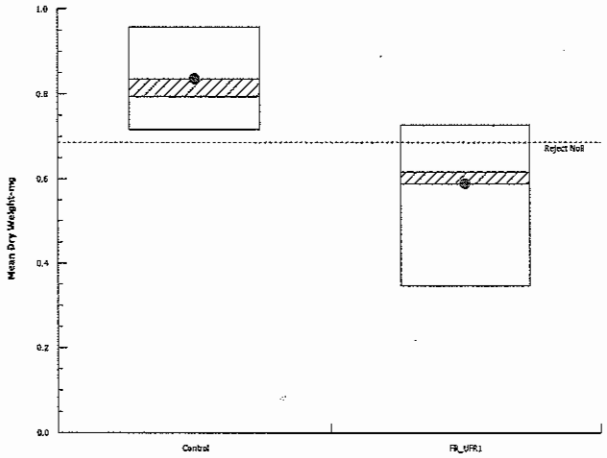
Mean Dry Weight-mg Detail

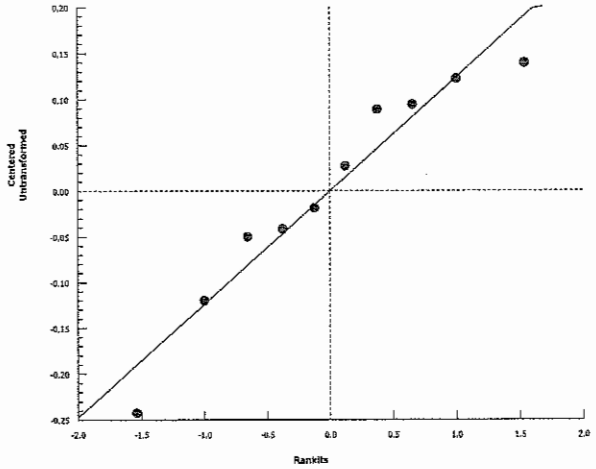
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	0.7944	0.786	0.958	0.716	0.925
FR_UFR1	0.616	0.57	0.3463	0.683	0.7278

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	12-2500-6382	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	05 Oct-15 12:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





APPENDIX D – *Pimephales promelas* Toxicity Test Data

HydroQual Laboratories Ltd.

ATTN: Krysta Pearcy
Nautilus Environmental Company Inc.
8664 Commerce Court
Burnaby, BC
Canada

Received: various dates
Report Date: 2015/09/02
Version: FINAL

HydroQual Test Report

Client: NAU104
Reference: 15-0843, 15-0844, 15-0845, 15-0846
Client Reference: GH_FR1_WS_N
CM_MC2_WKLY_WS_N
FR_FRCP1_Q_N
FR_UFR1_Q_N
Billing: not given

Senior Verifier

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference GH_FR1_WS_N
15-0843

Test Log

Date	Day	Time	Technicians	Chem. Cart Used	Fed		Feeding Rate	Bench Sheet Review	
					AM	PM		First	Second
2015/07/24	0	1600	JP/BS	2	-	-	-	JP	BS
2015/07/25	1	1000	NM	2	-	-	-	NM	-
2015/07/26	2	1110	ML	2	-	-	-	ML	-
2015/07/27	3	1040	ML	2	-	-	-	ML	DS
2015/07/28	4	1030	NM	2	✓	✓	1mL	NM	ML
2015/07/29	5	1010	DS	2	✓	✓	1mL	DS	JP
2015/07/30	6	1455	DS	2	✓	✓	1mL	DS	CQ
2015/07/31	7	1500	DS	2	✓	✓	1mL	DS	HKS
2015/08/01	8	1040	DS	2	✓	✓	1mL	DS	HKS
2015/08/02	9	1015	ML	2	✓	✓	1mL	ML	JK
2015/08/03	10	915	DS	2	✓	✓	1mL	DS	CQ
2015/08/04	11	1300	CQ	2	✓	✓	1mL	CQ	JP
2015/08/05	12	1000	CQ	2	✓	✓	1mL	CQ	JP
2015/08/06	13	925	ML	2	✓	✓	1mL	ML	HKS
2015/08/07	14	1215	CQ	2	✓	✓	1mL	CQ	ML
2015/08/08	15	1200	CQ	2	✓	✓	1mL	CQ	ML
2015/08/09	16	1135	ML	2	✓	✓	1mL	ML	HKS
2015/08/10	17	1400	CQ	2	✓	✓	2 mL	CQ	HKS
2015/08/11	18	1030	DS	2	✓	✓	2 mL	DS	ML
2015/08/12	19	1045	CQ	2	✓	✓	2 mL	CQ	HKS
2015/08/13	20	1145	ML	2	✓	✓	2 mL	ML	DS
2015/08/14	21	1045	ML	2	✓	✓	2 mL	ML	JP
2015/08/15	22	1130	ML	2	✓	✓	2 mL	DS	ML
2015/08/16	23	1015	NM	2	✓	✓	2 mL	NM	DS
2015/08/17	24	1410	NM	2	✓	✓	2 mL	NM	JP
2015/08/18	25	1045	ML	2	✓	✓	2 mL	ML	NM
2015/08/19	26	1430	CQ	2	✓	✓	2 mL	CQ	ML
2015/08/20	27	1040	ML	2	✓	✓	2 mL	ML	CQ
2015/08/21	28	1530	DS	2	✓	✓	2 mL	DS	ML
2015/08/22	29	1130	DS	2	✓	✓	2 mL	DS	ML
2015/08/23	30	1030	MN	2	✓	✓	2 mL	NM	HKS
2015/08/24	31	1200	CQ	2	✓	✓	2 mL	CQ	JP
2015/08/25	32	1030	NM/ML	2	-	-	-	NM	ML

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference GH_FR1_WS_N
15-0843

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

	Day 1		Day 2			Day 3		Day 4		Day 5	Day 6	Day 7	Day 8
replicate	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	15	0	15	0	15	9	6	0	14	14	13	11	11
b	15	0	15	0	15	9	6	4	11	15	13	13	11
c	15	0	15	0	15	5	10	0	15	15	11	9	9
d	15	0	15	0	15	1	14	0	15	15	14	14	11
e	30	0	30	0									
f	30	0	30	0									

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2

Number of Alive Organisms

replicate	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16
a	11	11	11	10	10	10	10	10
b	9	8	8	8	8	8	8	8
c	9	9	9	9	9	9	9	9
d	8	5	5	5	5	5	5	5

replicate	Day 17	Day 18	Day 19	Day 20	Day 21	Day 22	Day 23	Day 24
a	10	10	10	10	10	10	10	10
b	8	8	8	8	8	8	8	8
c	9	9	9	9	9	9	9	9
d	5	5	5	5	5	5	5	5

replicate	Day 25	Day 26	Day 27	Day 28	Day 29	Day 30	Day 31	Day 32
a	10	10	10	10	10	10	10	10
b	8	8	8	8	8	8	8	8
c	9	9	9	9	9	9	9	9
d	5	5	5	5	5	5	5	5

Comments/Observations: None

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	93%	71%	67%	13	4.37	0%
b	100%	53%	53%	13	5.79	0%
c	100%	60%	60%	12	5.04	0%
d	100%	33%	33%	13	8.70	0%
Average	**98%**	**55%**	**53%**	**13**	**5.97**	**0%**

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference GH_FR1_WS_N
15-0843

Chemistries

	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	-	8.4	8.3	8.2	8.2	8.3	8.1	8.4	8.2	8.3	8.0	8.2	8.0	8.1	7.9
EC (µS/cm)	690	-	682	692	665	683	654	656	684	676	666	651	683	659	696	697
DO (mg/L)	7.3	-	7.3	7.3	7.4	7.4	7.3	7.3	7.3	7.2	7.3	7.3	7.3	6.2	7.3	5.9
Temp. (°C)	24	-	24	24	24	25	24	24	24	24	24	24	24	24	24	24

	Day 8		Day 9		Day 10		Day 11		Day 12		Day 13		Day 14		Day 15	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	8.2	8.0	8.0	8.1	8.1	8.2	8.0	8.2	8.1	8.2	8.2	8.2	8.1	8.2	8.1
EC (µS/cm)	716	721	692	716	715	728	688	731	684	708	690	703	706	697	700	687
DO (mg/L)	7.3	6.7	7.3	6.0	7.3	6.1	7.3	6.5	7.4	7.3	7.3	7.1	7.4	7.3	7.3	7.3
Temp. (°C)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24

	Day 16		Day 17		Day 18		Day 19		Day 20		Day 21		Day 22		Day 23	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	8.1	8.2	8.0	8.1	8.0	8.1	8.0	8.2	8.0	8.2	8.0	8.2	8.0	8.3	8.2
EC (µS/cm)	729	708	700	708	730	715	704	715	746	748	774	735	749	729	766	752
DO (mg/L)	7.3	7.0	7.3	7.2	7.3	7.2	7.4	7.3	7.3	6.9	7.3	6.6	7.3	7.3	7.3	7.2
Temp. (°C)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24

	Day 24		Day 25		Day 26		Day 27		Day 28		Day 29		Day 30		Day 31	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.3	8.1	8.1	7.9	8.1	7.9	8.1	7.9	8.3	8.1	8.2	7.9	8.3	8.1	8.2	8.2
EC (µS/cm)	767	752	743	735	707	699	706	682	726	659	718	693	724	705	704	701
DO (mg/L)	7.3	7.1	7.3	7.1	7.2	7.1	7.3	6.8	7.3	7.1	7.3	6.9	7.2	6.9	7.3	7.1
Temp. (°C)	24	24	24	24	24	24	24	24	24	24	24	24	25	24	24	24

	Day 32	
	New	Old
pH	-	7.8
EC (µS/cm)	-	684
DO (mg/L)	-	6.7
Temp. (°C)	-	24

	New Solutions		
	AVERAGE	SD	CV
pH	8.2	0.09	1.1
EC (µS/cm)	710	30	4.2
DO	7.3	0.04	0.6
Temp. (°C)	24	0.18	2.4

	Old Solutions		
	AVERAGE	SD	CV
pH	8.1	0.12	1.4
EC (µS/cm)	704	27	3.9
DO	7.0	0.42	6.0
Temp. (°C)	24	0.18	0.7

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference GH_FR1_WS_N
15-0843

Test Termination

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Replicate A

Fish	Length (mm)	Normal/ Abnormal
1	12	Normal
2	12	Normal
3	13	Normal
4	14	Normal
5	13	Normal
6	13	Normal
7	12	Normal
8	13	Normal
9	13	Normal
10	14	Normal
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**4.37**
Avg. length (mm)	**13**

Replicate B

Fish	Length (mm)	Normal/ Abnormal
1	15	Normal
2	14	Normal
3	14	Normal
4	12	Normal
5	12	Normal
6	15	Normal
7	12	Normal
8	12	Normal
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**5.79**
Avg. length (mm	**13**

Replicate C

Fish	Length (mm)	Normal/ Abnormal
1	14	Normal
2	11	Normal
3	11	Normal
4	12	Normal
5	11	Normal
6	12	Normal
7	12	Normal
8	12	Normal
9	11	Normal
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**5.04**
Avg. length (mm)	**12**

Replicate D

Fish	Length (mm)	Normal/ Abnormal
1	14	Normal
2	13	Normal
3	14	Normal
4	13	Normal
5	11	Normal
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**8.70**
Avg. length (mm	**13**

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Referenc FR_FRCP1_Q_N
15-0844

Test Log

Date	Day	Time	Technicians	Chem. Cart Used	Fed		Feeding Rate	Bench Sheet Review	
					AM	PM		First	Second
2015/07/24	0	1600	JP/BS	2	-	-	-	JP	BS
2015/07/25	1	1015	NM	2	-	-	-	NM	-
2015/07/26	2	1115	ML	2	-	-	-	ML	JK
2015/07/27	3	1030	ML	2	-	-	1mL	ML	DS
2015/07/28	4	1030	NM	2	✓	✓	1mL	NM	ML
2015/07/29	5	1005	DS	2	✓	✓	1mL	DS	JP
2015/07/30	6	1500	DS	2	✓	✓	1mL	DS	CQ
2015/07/31	7	1500	DS	2	✓	✓	1mL	DS	HKS
2015/08/01	8	1040	DS	2	✓	✓	1mL	DS	HKS
2015/08/02	9	1020	ML	2	✓	✓	1mL	ML	JK
2015/08/03	10	920	DS	2	✓	✓	1mL	DS	CQ
2015/08/04	11	1300	CQ	2	✓	✓	1mL	CQ	JP
2015/08/05	12	1000	CQ	2	✓	✓	1mL	CQ	JP
2015/08/06	13	930	ML	2	✓	✓	1mL	ML	HKS
2015/08/07	14	1215	CQ	2	✓	✓	1mL	CQ	ML
2015/08/08	15	1200	CQ	2	✓	✓	1mL	CQ	ML
2015/08/09	16	1130	ML	2	✓	✓	2 mL	ML	HKS
2015/08/10	17	1400	CQ	2	✓	✓	2 mL	CQ	HKS
2015/08/11	18	1030	DS	2	✓	✓	2 mL	DS	ML
2015/08/12	19	1045	CQ	2	✓	✓	2 mL	CQ	HKS
2015/08/13	20	1145	ML	2	✓	✓	2 mL	ML	DS
2015/08/14	21	1045	ML	2	✓	✓	2 mL	ML	JP
2015/08/15	22	1130	ML	2	✓	✓	2 mL	ML	DS
2015/08/16	23	1020	NM	2	✓	✓	2 mL	NM	DS
2015/08/17	24	1410	NM	2	✓	✓	2 mL	NM	JP
2015/08/18	25	1040	ML	2	✓	✓	2 mL	ML	NM
2015/08/19	26	1430	CQ	2	✓	✓	2 mL	CQ	ML
2015/08/20	27	1035	ML	2	✓	✓	2 mL	ML	CQ
2015/08/21	28	1530	DS	2	✓	✓	2 mL	DS	ML
2015/08/22	29	1130	DS	2	✓	✓	2 mL	DS	ML
2015/08/23	30	1030	MN	2	✓	✓	2 mL	NM	HKS
2015/08/24	31	1200	CQ	2	✓	✓	2 mL	CQ	JP
2015/08/25	32	1030	NM/ML	2	-	-	-	NM	ML

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference FR_FRCP1_Q_N
15-0844

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

	Day 1		Day 2			Day 3		Day 4		Day 5	Day 6	Day 7	Day 8
replicate	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	15	0	15	0	15	5	9	0	14	14	14	13	8
b	14	1	14	0	15	8	7	0	14	14	11	10	8
c	15	0	15	0	15	6	9	0	15	15	15	15	15
d	15	0	15	0	15	6	9	0	15	15	15	15	15
e	30	0	30	0									
f	30	0	30	0									

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2

Number of Alive Organisms

replicate	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16
a	0	0	0	0	0	0	0	0
b	8	8	8	8	8	8	8	8
c	15	14	13	0	0	0	0	0
d	12	10	10	0	0	0	0	0

replicate	Day 17	Day 18	Day 19	Day 20	Day 21	Day 22	Day 23	Day 24
a	0	0	0	0	0	0	0	0
b	8	8	8	8	8	8	8	8
c	0	0	0	0	0	0	0	0
d	0	0	0	0	0	0	0	0

replicate	Day 25	Day 26	Day 27	Day 28	Day 29	Day 30	Day 31	Day 32
a	0	0	0	0	0	0	0	0
b	8	8	8	8	8	8	8	8
c	0	0	0	0	0	0	0	0
d	0	0	0	0	0	0	0	0

Comments/Observations: None

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	93%	0%	0%	-	-	0%
b	93%	57%	53%	13	4.87	0%
c	100%	0%	0%	-	-	0%
d	100%	0%	0%	-	-	0%
Average	**97%**	**14%**	**13%**	**13**	**4.87**	**0%**

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference FR_FRCP1_Q_N

Chemistries

	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	-	8.3	8.2	8.2	8.1	8.3	8.1	8.3	8.1	8.3	7.9	8.1	8.0	8.0	7.9
EC (µS/cm)	829	-	822	815	805	811	769	781	812	804	791	775	822	807	869	831
DO (mg/L)	7.2	-	7.3	7.2	7.5	7.4	7.2	7.3	7.3	7.2	7.3	7.2	7.3	6.1	7.2	5.9
Temp. (°C)	25	-	24	24	24	24	25	24	24	24	24	24	24	24	25	24

	Day 8		Day 9		Day 10		Day 11		Day 12		Day 13		Day 14		Day 15	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	8.2	7.9	7.9	8.0	8.0	8.0	7.9	8.1	8.1	8.1	8.1	8.2	8.1	8.2	8.0
EC (µS/cm)	893	880	885	892	873	881	863	889	856	876	846	853	929	863	923	944
DO (mg/L)	7.3	6.5	7.3	6.5	7.3	6.2	7.3	6.9	7.4	7.3	7.3	7.2	7.4	7.1	7.3	6.9
Temp. (°C)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24

	Day 16		Day 17		Day 18		Day 19		Day 20		Day 21		Day 22		Day 23	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	8.2	8.1	7.9	8.0	8.1	8.1	8.1	8.2	8.1	8.1	8.0	8.1	8.2	8.2	8.2
EC (µS/cm)	945	938	943	958	922	929	935	917	947	967	1146	956	1122	1032	1124	1097
DO (mg/L)	7.3	7.2	7.4	6.0	7.3	7.3	7.4	7.4	7.3	7.3	7.3	6.1	7.2	7.3	7.3	7.3
Temp. (°C)	24	24	24	24	24	24	24	24	24	24	24	24	25	24	24	24

	Day 24		Day 25		Day 26		Day 27		Day 28		Day 29		Day 30		Day 31	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	8.1	8.0	7.9	8.0	7.9	8.1	7.8	8.3	8.1	8.2	7.9	8.3	8.0	8.2	8.0
EC (µS/cm)	1147	1110	1106	1090	1037	1050	1042	1043	737	844	735	812	741	779	717	748
DO (mg/L)	7.3	7.3	7.3	7.2	7.3	7.2	7.3	6.1	7.3	7.0	7.3	6.8	7.1	6.9	7.4	7.1
Temp. (°C)	24	24	24	24	24	24	24	24	24	24	24	24	25	24	24	24

	Day 32	
	New	Old
pH	-	7.8
EC (µS/cm)	-	716
DO (mg/L)	-	6.8
Temp. (°C)	-	24

	New Solutions		
	AVERAGE	SD	CV
pH	8.1	0.11	1.4
EC (µS/cm)	904	126	14.0
DO	7.3	0.07	1.0
Temp. (°C)	24	0.37	5.1

	Old Solutions		
	AVERAGE	SD	CV
pH	8.0	0.12	1.5
EC (µS/cm)	897	106	11.8
DO	6.9	0.47	6.8
Temp. (°C)	24	0.00	0.0

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Referenc FR_FRCP1_Q_N
15-0844

Test Termination

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Replicate A		
Fish	Length (mm)	Normal/ Abnormal
1	-	-
2	-	-
3	-	-
4	-	-
5	-	-
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	-
Avg. length (mm)	-

Replicate B		
Fish	Length (mm)	Normal/ Abnormal
1	10	Normal
2	13	Normal
3	13	Normal
4	14	Normal
5	15	Normal
6	12	Normal
7	13	Normal
8	11	Normal
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**4.87**
Avg. length (mm)	**13**

Replicate C		
Fish	Length (mm)	Normal/ Abnormal
1	-	-
2	-	-
3	-	-
4	-	-
5	-	-
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	-
Avg. length (mm)	-

Replicate D		
Fish	Length (mm)	Normal/ Abnormal
1	-	-
2	-	-
3	-	-
4	-	-
5	-	-
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	-
Avg. length (mm)	-

HydroQual Laboratories Ltd.

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Referenc FR_UFR1_Q_N
15-0845

Test Log

Date	Day	Time	Technicians	Chem. Cart Used	Fed		Feeding Rate	Bench Sheet Review	
					AM	PM		First	Second
2015/07/24	0	1600	JP/BS	2	-	-	-	JP	BS
2015/07/25	1	1030	NM	2	-	-	-	NM	-
2015/07/26	2	1045	ML	2	-	-	-	ML	-
2015/07/27	3	1045	ML	2	-	-	1mL	ML	DS
2015/07/28	4	1015	NM	2	✓	✓	1mL	NM	ML
2015/07/29	5	1015	DS	2	✓	✓	1mL	DS	JP
2015/07/30	6	1445	DS	2	✓	✓	1mL	DS	CQ
2015/07/31	7	1500	DS	2	✓	✓	1mL	DS	HKS
2015/08/01	8	1030	DS	2	✓	✓	1mL	DS	HKS
2015/08/02	9	1005	ML	2	✓	✓	1mL	ML	JK
2015/08/03	10	905	DS	2	✓	✓	1mL	DS	CQ
2015/08/04	11	1300	CQ	2	✓	✓	1mL	CQ	JP
2015/08/05	12	1000	CQ	2	✓	✓	1mL	CQ	JP
2015/08/06	13	930	ML	2	✓	✓	1mL	ML	HKS
2015/08/07	14	1215	CQ	2	✓	✓	1mL	CQ	ML
2015/08/08	15	1300	CQ	2	✓	✓	1mL	CQ	ML
2015/08/09	16	1135	ML	2	✓	✓	1mL	ML	HKS
2015/08/10	17	1400	CQ	2	✓	✓	2 mL	CQ	HKS
2015/08/11	18	1015	DS	2	✓	✓	2 mL	DS	ML
2015/08/12	19	1045	CQ	2	✓	✓	2 mL	CQ	HKS
2015/08/13	20	1145	ML	2	✓	✓	2 mL	ML	DS
2015/08/14	21	1050	ML	2	✓	✓	2 mL	ML	JP
2015/08/15	22	1125	ML	2	✓	✓	2 mL	ML	DS
2015/08/16	23	1020	NM	2	✓	✓	2 mL	NM	DS
2015/08/17	24	1410	NM	2	✓	✓	2 mL	NM	JP
2015/08/18	25	1035	ML	2	✓	✓	2 mL	ML	NM
2015/08/19	26	1430	CQ	2	✓	✓	2 mL	CQ	ML
2015/08/20	27	1045	ML	2	✓	✓	2 mL	ML	CQ
2015/08/21	28	1530	DS	2	✓	✓	2 mL	DS	ML
2015/08/22	29	1130	DS	2	✓	✓	2 mL	DS	ML
2015/08/23	30	1030	NM	2	✓	✓	2 mL	NM	HKS
2015/08/24	31	1200	CQ	2	✓	✓	2 mL	CQ	JP
2015/08/25	32	1045	NM/ML	2	-	-	-	NM	ML

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference FR_UFR1_Q_N
15-0845

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

	Day 1		Day 2			Day 3		Day 4		Day 5	Day 6	Day 7	Day 8
replicate	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	15	0	15	0	15	13	2	3	12	15	14	13	13 (1)
b	15	0	15	0	15	10	5	0	15	15	15	15	15
c	15	0	15	0	15	9	4	2	6	8	8	7	7
d	15	0	15	0	15	8	6	2	11	13	13	9	9
e	30	0	30	0									
f	29	1	28	1									

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2
Notes: Brackets denote fish displaying atypical swimming behavior.

Number of Alive Organisms

replicate	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16
a	11	11	11 (1)	0	0	0	0	0
b	15	15	15	15	15	15	15	15
c	7	0	0	0	0	0	0	0
d	0	0	0	0	0	0	0	0

replicate	Day 17	Day 18	Day 19	Day 20	Day 21	Day 22	Day 23	Day 24
a	0	0	0	0	0	0	0	0
b	15	15	15	15	15	15	15	15
c	0	0	0	0	0	0	0	0
d	0	0	0	0	0	0	0	0

replicate	Day 25	Day 26	Day 27	Day 28	Day 29	Day 30	Day 31	Day 32
a	0	0	0	0	0	0	0	0
b	15	15	15	15	15	15	15	15
c	0	0	0	0	0	0	0	0
d	0	0	0	0	0	0	0	0

Comments/Observations: None

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	100%	0%	0%	-	-	0%
b	100%	100%	100%	11	3.07	0%
c	53%	0%	0%	-	-	0%
d	87%	0%	0%	-	-	0%
Average	**85%**	**25%**	**25%**	**11**	**3.07**	**0%**

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference FR_UFR1_Q_N

Chemistries

	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.0	-	8.3	8.3	8.1	8.2	8.3	8.3	8.3	8.4	8..3	8.2	8.2	8.0	8.1	8.0
EC (µS/cm)	369	-	362	365	351	362	352	352	359	365	360	351	383	375	403	491
DO (mg/L)	7.3	-	7.3	7.3	7.5	7.4	7.2	7.3	7.3	7.3	7.3	7.3	7.3	6.1	7.2	6.0
Temp. (°C)	24	-	24	24	24	24	25	24	24	24	24	24	24	24	24	24

	Day 8		Day 9		Day 10		Day 11		Day 12		Day 13		Day 14		Day 15	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	8.2	8.0	7.9	8.1	7.9	8.2	8.1	8.1	8.1	8.3	8.3	8.2	8.3	8.2	8.2
EC (µS/cm)	370	526	358	403	372	378	354	386	357	376	369	373	369	376	360	377
DO (mg/L)	7.3	6.2	7.3	6.4	7.3	6.2	7.2	6.4	7.3	7.4	7.3	7.2	7.3	7.4	7.3	7.3
Temp. (°C)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24

	Day 16		Day 17		Day 18		Day 19		Day 20		Day 21		Day 22		Day 23	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.3	8.4	8.2	8.2	8.3	8.2	8.2	8.0	8.3	8.2	8.3	8.3	8.3	7.9	8.4	8.4
EC (µS/cm)	371	386	366	385	381	387	368	386	379	405	401	379	389	410	390	403
DO (mg/L)	7.3	7.3	7.3	7.3	7.3	7.2	7.3	7.1	7.3	7.2	7.3	7.3	7.2	6.0	7.3	7.3
Temp. (°C)	24	24	24	24	24	24	24	24	24	24	24	24	25	24	24	24

	Day 24		Day 25		Day 26		Day 27		Day 28		Day 29		Day 30		Day 31	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	8.2	8.2	8.1	8.2	8.1	8.3	7.9	8.3	8.2	8.3	8.1	8.3	8.1	8.3	8.0
EC (µS/cm)	398	409	390	394	357	381	364	380	355	398	412	430	368	380	362	380
DO (mg/L)	7.3	7.3	7.3	7.3	7.3	7.2	7.3	6.3	7.3	7.1	7.3	6.9	7.2	7.0	7.3	6.4
Temp. (°C)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24

	Day 32			New Solutions				Old Solutions		
	New	Old		AVERAGE	SD	CV		AVERAGE	SD	CV
pH	-	8.0	pH	8.2	0.10	1.2	pH	8.1	0.15	1.8
EC (µS/cm)	-	373	EC (µS/cm)	372	16	4.4	EC (µS/cm)	391	35	9.0
DO (mg/L)	-	7.0	DO	7.3	0.05	0.6	DO	7.0	0.48	7.0
Temp. (°C)	-	24	Temp. (°C)	24	0.25	3.4	Temp. (°C)	24	0.00	0.0

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Referenc FR_UFR1_Q_N
15-0845

Test Termination

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Replicate A		
Fish	Length (mm)	Normal/ Abnormal
1	-	-
2	-	-
3	-	-
4	-	-
5	-	-
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	-
Avg. length (mm)	-

Replicate B		
Fish	Length (mm)	Normal/ Abnormal
1	12	Normal
2	11	Normal
3	11	Normal
4	9	Normal
5	13	Normal
6	12	Normal
7	9	Normal
8	9	Normal
9	11	Normal
10	12	Normal
11	11	Normal
12	11	Normal
13	11	Normal
14	11	Normal
15	11	Normal

Dry Weight(mg) per fish	**3.07**
Avg. length (mm)	**11**

Replicate C		
Fish	Length (mm)	Normal/ Abnormal
1	-	-
2	-	-
3	-	-
4	-	-
5	-	-
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	-
Avg. length (mm)	-

Replicate D		
Fish	Length (mm)	Normal/ Abnormal
1	-	-
2	-	-
3	-	-
4	-	-
5	-	-
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	-
Avg. length (mm)	-

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Referenc CM_MC2_WKLY_WS_N
15-0846

Test Log

Date	Day	Time	Technicians	Chem. Cart Used	Fed		Feeding Rate	Bench Sheet Review	
					AM	PM		First	Second
2015/07/24	0	1600	JP/BS	2	-	-	-	JP	BS
2015/07/25	1	1030	NM	2	-	-	-	NM	-
2015/07/26	2	1045	ML	2	-	-	-	ML	-
2015/07/27	3	1055	ML	2	-	-	1mL	ML	DS
2015/07/28	4	1020	NM	2	✓	✓	1mL	NM	ML
2015/07/29	5	1025	DS	2	✓	✓	1mL	DS	JP
2015/07/30	6	1445	DS	2	✓	✓	1mL	DS	CQ
2015/07/31	7	1500	DS	2	✓	✓	1mL	DS	HKS
2015/08/01	8	1050	DS	2	✓	✓	1mL	DS	HKS
2015/08/02	9	1010	ML	2	✓	✓	1mL	ML	JK
2015/08/03	10	905	DS	2	✓	✓	1mL	DS	CQ
2015/08/04	11	1300	CQ	2	✓	✓	1mL	CQ	JP
2015/08/05	12	1000	CQ	2	✓	✓	1mL	CQ	JP
2015/08/06	13	925	ML	2	✓	✓	1mL	ML	HKS
2015/08/07	14	1215	CQ	2	✓	✓	1mL	CQ	ML
2015/08/08	15	1200	CQ	2	✓	✓	1mL	CQ	ML
2015/08/09	16	1135	ML	2	✓	✓	1mL	ML	HKS
2015/08/10	17	1400	CQ	2	✓	✓	2 mL	CQ	HKS
2015/08/11	18	1030	DS	2	✓	✓	2 mL	DS	ML
2015/08/12	19	1045	CQ	2	✓	✓	2 mL	CQ	HKS
2015/08/13	20	1145	ML	2	✓	✓	2 mL	ML	DS
2015/08/14	21	1050	ML	2	✓	✓	2 mL	ML	JP
2015/08/15	22	1125	ML	2	✓	✓	2 mL	ML	DS
2015/08/16	23	1020	NM	2	✓	✓	2 mL	NM	DS
2015/08/17	24	1420	NM	2	✓	✓	2 mL	NM	JP
2015/08/18	25	1040	ML	2	✓	✓	2 mL	ML	NM
2015/08/19	26	1430	CQ	2	✓	✓	2 mL	CQ	ML
2015/08/20	27	1045	ML	2	✓	✓	2 mL	ML	CQ
2015/08/21	28	1530	DS	2	✓	✓	2 mL	DS	ML
2015/08/22	29	1130	DS	2	✓	✓	2 mL	DS	ML
2015/08/23	30	1030	MN	2	✓	✓	2 mL	NM	HKS
2015/08/24	31	1200	CQ	2	✓	✓	2 mL	CQ	JP
2015/08/25	32	1030	NM/ML	2	-	-	-	NM	ML

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference CM_MC2_WKLY_WS_N
15-0846

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

	Day 1		Day 2			Day 3		Day 4		Day 5	Day 6	Day 7	Day 8
replicate	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	15	0	15	0	15	7	8	2	12	14	12	11	10
b	15	0	15	0	15	5	10	0	14	14 (1)	13	0	0
c	15	0	15	0	15	8	7	3	12	15	15	12	11
d	15	0	15	0	15	12	3	1	13	14	14	3	2
e	29	1	29	0									
f	28	2	28	0									

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2
Notes: Brackets denote fish displaying atypical swimming behaviour.

Number of Alive Organisms

replicate	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16
a	9	6	5	5	5	5	5	5
b	0	0	0	0	0	0	0	0
c	9	7	7	7	7	7	7	7
d	2	2	2	2	2	2	2	2

replicate	Day 17	Day 18	Day 19	Day 20	Day 21	Day 22	Day 23	Day 24
a	5	5	5	5	5	5	5	5
b	0	0	0	0	0	0	0	0
c	7	7	7	7	7	7	7	7
d	2	2	2	2	2	2	2	2

replicate	Day 25	Day 26	Day 27	Day 28	Day 29	Day 30	Day 31	Day 32
a	5	5	5	5	5	5	5	5
b	0	0	0	0	0	0	0	0
c	7	7	7	7	7	7	7	7
d	2	2	2	2	2	2	2	2

Comments/Observations: None

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	93%	36%	33%	15	9.41	0%
b	93%	0%	0%	-	-	0%
c	100%	47%	47%	13	7.01	0%
d	93%	14%	13%	18	19.59	0%
Average	**95%**	**24%**	**23%**	**15**	**12.01**	**0%**

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference CM_MC2_WKLY_WS_N

Chemistries

	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.1	-	8.3	8.2	8.2	8.1	8.2	8.0	8.3	8.1	8.3	8.0	8.2	7.9	8.1	7.9
EC (µS/cm)	823	-	818	807	792	800	803	783	808	799	795	801	784	796	872	829
DO (mg/L)	7.3	-	7.3	7.2	7.4	7.4	7.2	7.3	7.3	7.3	7.3	7.2	7.3	5.7	7.2	6.0
Temp. (°C)	24	-	24	24	24	24	24	24	24	24	24	24	24	24	25	24

	Day 8		Day 9		Day 10		Day 11		Day 12		Day 13		Day 14		Day 15	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	8.1	7.9	7.9	8.0	7.9	8.0	8.0	8.0	8.0	8.1	8.2	8.1	8.2	8.0	8.1
EC (µS/cm)	883	795	875	882	882	862	851	894	850	877	870	869	866	856	880	845
DO (mg/L)	7.3	7.0	7.3	6.2	7.3	6.1	7.3	6.4	7.3	7.4	7.3	7.2	7.4	7.3	7.4	7.3
Temp. (°C)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24

	Day 16		Day 17		Day 18		Day 19		Day 20		Day 21		Day 22		Day 23	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.1	8.2	8.0	7.9	8.0	8.1	8.0	8.0	8.1	8.1	8.0	8.1	8.0	8.0	8.2	8.3
EC (µS/cm)	878	869	862	893	872	883	875	860	902	927	919	918	898	899	901	876
DO (mg/L)	7.3	7.0	7.3	7.1	7.3	7.2	7.3	7.3	7.3	7.3	7.3	7.2	7.3	7.0	7.3	7.3
Temp. (°C)	24	23	24	24	24	24	24	24	24	24	24	24	24	24	24	24

	Day 24		Day 25		Day 26		Day 27		Day 28		Day 29		Day 30		Day 31	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	8.1	8.1	8.0	8.0	8.0	8.0	8.0	8.2	8.0	8.3	8.1	8.1	8.1	8.1	8.1
EC (µS/cm)	934	880	928	854	853	836	845	834	1021	1023	925	915	1041	974	1001	999
DO (mg/L)	7.3	7.2	7.3	7.3	7.3	7.3	7.3	7.0	7.3	7.0	7.3	7.3	7.3	7.0	7.1	7.2
Temp. (°C)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24

	Day 32			New Solutions				Old Solutions		
	New	Old		AVERAGE	SD	CV		AVERAGE	SD	CV
pH	-	7.9	pH	8.1	0.11	1.4	pH	8.1	0.10	1.3
EC (µS/cm)	-	961	EC (µS/cm)	878	62	7.0	EC (µS/cm)	872	60	6.9
DO (mg/L)	-	7.1	DO	7.3	0.05	0.7	DO	7.0	0.44	6.3
Temp. (°C)	-	24	Temp. (°C)	24	0.18	2.4	Temp. (°C)	24	0.18	0.7

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Referenc CM_MC2_WKLY_WS_N
15-0846

Test Termination

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Replicate A		
Fish	Length (mm)	Normal/ Abnormal
1	17	Normal
2	14	Normal
3	13	Normal
4	13	Normal
5	16	Normal
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**9.41**
Avg. length (mm)	**15**

Replicate B		
Fish	Length (mm)	Normal/ Abnormal
1	-	-
2	-	-
3	-	-
4	-	-
5	-	-
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**-**
Avg. length (mm)	**-**

Replicate C		
Fish	Length (mm)	Normal/ Abnormal
1	13	Normal
2	14	Normal
3	15	Normal
4	14	Normal
5	14	Normal
6	11	Normal
7	11	Normal
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**7.01**
Avg. length (mm)	**13**

Replicate D		
Fish	Length (mm)	Normal/ Abnormal
1	18	Normal
2	17	Normal
3	-	-
4	-	-
5	-	-
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**19.59**
Avg. length (mm)	**18**

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Referenc CONTROL
SP15-008

Test Log

Date	Day	Time	Technicians	Chem. Cart Used	Fed		Feeding Rate	Bench Sheet Review	
					AM	PM		First	Second
2015/07/24	0	1540	JP/DS/BS	2	-	-	-	JP	BS
2015/07/25	1	1000	NM	2	-	-	-	NM	-
2015/07/26	2	1120	ML	2	-	-	-	ML	-
2015/07/27	3	1035	ML	2	-	-	-	ML	DS
2015/07/28	4	1040	NM	2	✓	✓	1 mL	NM	ML
2015/07/29	5	1000	DS	2	✓	✓	1 mL	DS	JP
2015/07/30	6	1500	DS	2	✓	✓	1 mL	DS	CQ
2015/07/31	7	1500	DS/HKS	2	✓	✓	1 mL	DS	HKS
2015/08/01	8	1030	DS	2	✓	✓	1 mL	DS	HKS
2015/08/02	9	1015	ML	2	✓	✓	1 mL	ML	JK
2015/08/03	10	920	DS	2	✓	✓	1 mL	DS	CQ
2015/08/04	11	1300	CQ	2	✓	✓	1 mL	CQ	JP
2015/08/05	12	1000	CQ	2	✓	✓	1 mL	CQ	JP
2015/08/06	13	930	ML	2	✓	✓	1 mL	ML	HKS
2015/08/07	14	1215	CQ	2	✓	✓	1 mL	CQ	ML
2015/08/08	15	1200	CQ	2	✓	✓	1 mL	CQ	ML
2015/08/09	16	1130	ML	2	✓	✓	1 mL	ML	HKS
2015/08/10	17	1400	CQ	2	✓	✓	2 mL	CQ	HKS
2015/08/11	18	1025	DS	2	✓	✓	2 mL	DS	ML
2015/08/12	19	1045	CQ	2	✓	✓	2 mL	CQ	HKS
2015/08/13	20	1145	ML	2	✓	✓	2 mL	ML	DS
2015/08/14	21	1045	ML	2	✓	✓	2 mL	ML	JP
2015/08/15	22	1130	ML	2	✓	✓	2 mL	ML	DS
2015/08/16	23	1015	NM	2	✓	✓	2 mL	NM	DS
2015/08/17	24	1415	NM	2	✓	✓	2 mL	NM	JP
2015/08/18	25	1045	ML	2	✓	✓	2 mL	ML	NM
2015/08/19	26	1430	CQ	2	✓	✓	2 mL	CQ	NM
2015/08/20	27	1035	ML	2	✓	✓	2 mL	ML	CQ
2015/08/21	28	1530	DS	2	✓	✓	2 mL	DS	ML
2015/08/22	29	1130	DS	2	✓	✓	2 mL	DS	ML
2015/08/23	30	1030	NM	2	✓	✓	2 mL	NM	HKS
2015/08/24	31	1200	CQ	2	✓	✓	2 mL	CQ	JP
2015/08/25	32	945	NM/ML	2	-	-	-	NM	ML

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference CONTROL
SP15-008

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

	Day 1		Day 2			Day 3		Day 4		Day 5	Day 6	Day 7	Day 8
replicate	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	15	0	15	0	15	2	13	0	15	14	14	14	14
b	15	0	15	0	15	14	1	0	14	14(1)	14(1)	14(1)	14(1)
c	15	0	15	0	15	7	8	0	15	15	15	15	15
d	15	0	15	0	15	11	3	0	14	14	14	14	14
e	30	0	30	0									
f	30	0	30	0									

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2.
Notes: brackets denote fish displaying atypical simming behavior

Number of Alive Organisms

replicate	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16
a	14	14	14	14	14	14	14	14
b	14	14	14	14	14	14	14	14
c	15	15	15	15	15	15	15	15
d	14	14	14	14	14	14	14	14

replicate	Day 17	Day 18	Day 19	Day 20	Day 21	Day 22	Day 23	Day 24
a	14	14	14	14	14	14	14	14
b	14	14	14	14	14	14	14	14
c	15	15	15	15	15	15	15	15
d	14	14	14	14	14	14	14	14

replicate	Day 25	Day 26	Day 27	Day 28	Day 29	Day 30	Day 31	Day 32
a	14	14	14	14	14	14	14	14
b	14	14	14	14	14	14	14	14
c	15	15	15	15	15	15	15	15
d	14	14	14	14	14	14	14	14

Comments/Observations: None

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	100%	93%	93%	11	3.16	0%
b	93%	100%	93%	12	3.35	0%
c	100%	100%	100%	11	3.05	0%
d	93%	100%	93%	11	3.10	0%
Average	**97%**	**98%**	**95%**	**11**	**3.16**	**0%**

HydroQual Laboratories Ltd.

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference CONTROL

Chemistries

	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.1	-	8.1	8.2	7.9	7.9	7.8	8.0	7.8	7.9	8.0	7.9	7.9	7.5	7.9	7.5
EC (µS/cm)	474	-	329	468	322	364	329	327	330	336	340	340	341	349	353	353
DO (mg/L)	7.3	-	7.3	7.3	7.5	7.5	7.3	7.3	7.3	7.3	7.3	7.2	7.3	5.9	7.3	6.1
Temp. (°C)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24

	Day 8		Day 9		Day 10		Day 11		Day 12		Day 13		Day 14		Day 15	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.1	7.7	7.9	7.4	8.0	7.8	8.0	7.6	8.0	8.0	7.8	8.0	8.2	8.1	8.1	8.0
EC (µS/cm)	382	349	394	363	450	395	450	448	435	464	459	469	468	474	467	478
DO (mg/L)	7.3	6.6	7.2	6.3	7.3	6.2	7.3	6.4	7.3	7.3	7.3	7.2	7.3	7.3	7.3	7.3
Temp. (°C)	24	24	25	24	24	24	24	24	24	24	24	24	24	24	24	24

	Day 16		Day 17		Day 18		Day 19		Day 20		Day 21		Day 22		Day 23	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	7.9	8.0	7.8	8.0	7.8	8.0	7.9	8.1	7.9	8.1	7.9	8.2	7.8	8.3	7.9
EC (µS/cm)	443	436	436	450	447	452	440	455	492	487	423	475	406	428	418	430
DO (mg/L)	7.1	7.1	7.5	7.1	7.3	7.1	7.4	7.2	7.3	7.1	7.3	7.0	7.3	7.2	7.3	7.2
Temp. (°C)	26	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24

	Day 24		Day 25		Day 26		Day 27		Day 28		Day 29		Day 30		Day 31	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.1	8.1	8.1	7.7	8.0	7.8	7.8	7.7	8.3	8.0	8.2	8.0	8.2	7.9	8.1	7.9
EC (µS/cm)	429	437	424	434	366	413	432	384	438	410	423	542	438	438	443	450
DO (mg/L)	7.3	7.1	7.3	7.0	7.2	7.2	7.3	7.1	7.3	7.1	7.3	7.0	7.1	6.8	7.4	7.3
Temp. (°C)	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24

	Day 32			New Solutions				Old Solutions		
	New	Old		AVERAGE	SD	CV		AVERAGE	SD	CV
pH	-	7.6	pH	8.0	0.14	1.8	pH	7.8	0.18	2.4
EC (µS/cm)	-	438	EC (µS/cm)	413	49	11.9	EC (µS/cm)	423	53	12.5
DO (mg/L)	-	6.8	DO	7.3	0.09	1.2	DO	7.0	0.40	5.7
Temp. (°C)	-	24	Temp. (°C)	24	0.39	5.3	Temp. (°C)	24	0.00	0.0

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Referenc CONTROL
SP15-008

Test Termination

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Replicate A

Fish	Length (mm)	Normal/ Abnormal
1	12	Normal
2	14	Normal
3	9	Normal
4	10	Normal
5	10	Normal
6	13	Normal
7	11	Normal
8	12	Normal
9	10	Normal
10	12	Normal
11	11	Normal
12	13	Normal
13	13	Normal
14	9	Normal
15	-	-

Dry Weight(mg) per fish	**3.16**
Avg. length (mm)	**11**

Replicate B

Fish	Length (mm)	Normal/ Abnormal
1	13	Normal
2	12	Normal
3	13	Normal
4	12	Normal
5	12	Normal
6	11	Normal
7	12	Normal
8	13	Normal
9	13	Normal
10	11	Normal
11	13	Normal
12	10	Normal
13	12	Normal
14	8	Normal
15	-	-

Dry Weight(mg) per fish	**3.35**
Avg. length (mm)	**12**

Replicate C

Fish	Length (mm)	Normal/ Abnormal
1	10	Normal
2	14	Normal
3	12	Normal
4	10	Normal
5	9	Normal
6	12	Normal
7	12	Normal
8	12	Normal
9	14	Normal
10	12	Normal
11	12	Normal
12	11	Normal
13	11	Normal
14	11	Normal
15	9	Normal

Dry Weight(mg) per fish	**3.05**
Avg. length (mm)	**11**

Replicate D

Fish	Length (mm)	Normal/ Abnormal
1	11	Normal
2	11	Normal
3	11	Normal
4	11	Normal
5	10	Normal
6	11	Normal
7	12	Normal
8	11	Normal
9	10	Normal
10	11	Normal
11	11	Normal
12	12	Normal
13	11	Normal
14	10	Normal
15	-	-

Dry Weight(mg) per fish	**3.10**
Avg. length (mm)	**11**

CETIS Summary Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Batch ID:	17-5846-1548	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	24 Jul-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Aug-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	21-0612-0341	24 Jul-15	24 Jul-15	NA	Teck Coal	
FR_UFR1 (site)	16-8247-1380	22 Jul-15 08:46	23 Jul-15 07:00	39h (10 °C)		
FR_FRCP1	04-7451-1029	22 Jul-15 09:14	23 Jul-15 07:00	39h (10 °C)		
GH_FR1	13-7898-2108	21 Jul-15 08:20	23 Jul-15 07:00	64h (10 °C)		
CM_MC2	05-3650-8332	21 Jul-15 14:00	23 Jul-15 07:00	58h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	control	Teck Coal	Lab Control		
FR_UFR1 (site)	Water Sample	Teck Coal	FR_UFR1 (site control)		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150721_		

Hatched Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	4	0.9667	0.9054	1	0.9333	1	0.01925	0.03849	3.98%	0.0%
FR_UFR1 (site)	4	0.85	0.4995	1	0.5333	1	0.1101	0.2203	25.91%	12.07%
FR_FRCP1	4	0.9667	0.9054	1	0.9333	1	0.01925	0.03849	3.98%	0.0%
GH_FR1	4	0.9833	0.9303	1	0.9333	1	0.01667	0.03333	3.39%	-1.72%
CM_MC2	4	0.95	0.897	1	0.9333	1	0.01667	0.03333	3.51%	1.72%

Hatched Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	1	0.9333	1	0.9333
FR_UFR1 (site)	1	1	0.5333	0.8667
FR_FRCP1	0.9333	0.9333	1	1
GH_FR1	0.9333	1	1	1
CM_MC2	0.9333	0.9333	1	0.9333

Hatched Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	15/15	14/15	15/15	14/15
FR_UFR1 (site)	15/15	15/15	8/15	13/15
FR_FRCP1	14/15	14/15	15/15	15/15
GH_FR1	14/15	15/15	15/15	15/15
CM_MC2	14/15	14/15	15/15	14/15

Fathead Minnow 32-d Survival and Growth Test

Nautilus Environmental

Analysis ID:	02-2700-6550	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:21	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	17-5846-1548	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	24 Jul-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Aug-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	21-0612-0341	24 Jul-15	24 Jul-15	NA	Teck Coal	
FR_UFR1 (site)	16-8247-1380	22 Jul-15 08:46	23 Jul-15 07:00	39h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	control	Teck Coal	Lab Control		
FR_UFR1 (site)	Water Sample	Teck Coal	FR_UFR1 (site control)		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	19.5%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFR1 (site)	0.9935	1.943	0.295	6	0.1794	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.04552916	0.04552916	1	0.987	0.3588	Non-Significant Effect
Error	0.2767633	0.04612722	6			
Total	0.3222924		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	14.96	47.47	0.0523	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8832	0.6451	0.2022	Normal Distribution

Hatched Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	0.9667	0.9054	1	0.9667	0.9333	1	0.01924	3.98%	0.0%
FR_UFR1 (site)	4	0.85	0.4995	1	0.9333	0.5333	1	0.1101	25.91%	12.07%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	1.375	1.254	1.496	1.375	1.31	1.441	0.03802	5.53%	0.0%
FR_UFR1 (site)	4	1.225	0.7567	1.693	1.319	0.8188	1.441	0.147	24.01%	10.97%

Hatched Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	1	0.9333	1	0.9333
FR_UFR1 (site)	1	1	0.5333	0.8667

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	1.441	1.31	1.441	1.31
FR_UFR1 (site)	1.441	1.441	0.8188	1.197

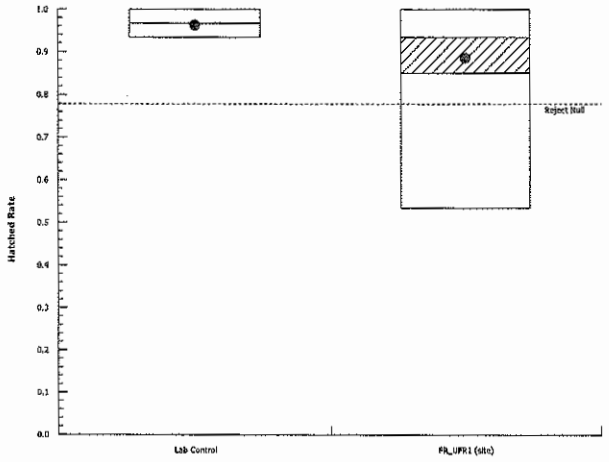
Hatched Rate Binomials

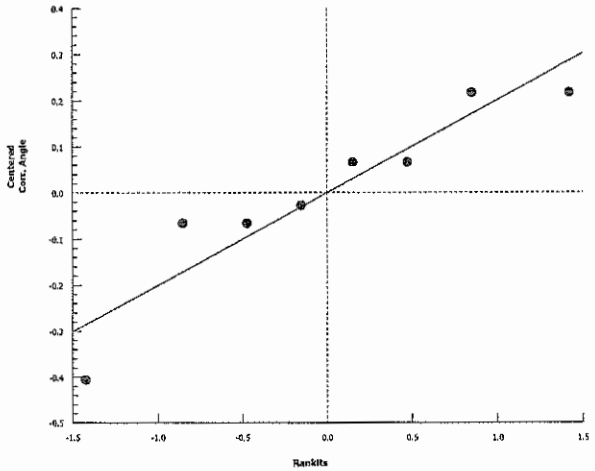
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	15/15	14/15	15/15	14/15
FR_UFR1 (site)	15/15	15/15	8/15	13/15

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Analysis ID: 02-2700-6550 **Endpoint:** Hatched Rate **CETIS Version:** CETISv1.8.7
Analyzed: 02 Sep-15 12:21 **Analysis:** Parametric-Two Sample **Official Results:** Yes

Graphics





Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	08-0347-8865	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:22	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	17-5846-1548	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	24 Jul-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Aug-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	21-0612-0341	24 Jul-15	24 Jul-15	NA	Teck Coal	
FR_FRCP1	04-7451-1029	22 Jul-15 09:14	23 Jul-15 07:00	39h (10 °C)		
GH_FR1	13-7898-2108	21 Jul-15 08:20	23 Jul-15 07:00	64h (10 °C)		
CM_MC2	05-3650-8332	21 Jul-15 14:00	23 Jul-15 07:00	58h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	control	Teck Coal	Lab Control		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150721_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	6.2%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_FRCP1	0	2.287	0.115	6	0.7500	CDF	Non-Significant Effect
		GH_FR1	-0.6547	2.287	0.115	6	0.9187	CDF	Non-Significant Effect
		CM_MC2	0.6547	2.287	0.115	6	0.4780	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.008672003	0.002890667	3	0.5714	0.6445	Non-Significant Effect
Error	0.06070402	0.005058668	12			
Total	0.06937602		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	0.1086	11.34	0.9908	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8929	0.8408	0.0620	Normal Distribution

Hatched Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	0.9667	0.9054	1	0.9667	0.9333	1	0.01924	3.98%	0.0%
FR_FRCP1	4	0.9667	0.9054	1	0.9667	0.9333	1	0.01924	3.98%	0.0%
GH_FR1	4	0.9833	0.9303	1	1	0.9333	1	0.01667	3.39%	-1.72%
CM_MC2	4	0.95	0.897	1	0.9333	0.9333	1	0.01667	3.51%	1.72%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	1.375	1.254	1.496	1.375	1.31	1.441	0.03802	5.53%	0.0%
FR_FRCP1	4	1.375	1.254	1.496	1.375	1.31	1.441	0.03802	5.53%	0.0%
GH_FR1	4	1.408	1.304	1.513	1.441	1.31	1.441	0.03292	4.68%	-2.39%
CM_MC2	4	1.343	1.238	1.447	1.31	1.31	1.441	0.03292	4.91%	2.39%

Hatched Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	1	0.9333	1	0.9333
FR_FRCP1	0.9333	0.9333	1	1
GH_FR1	0.9333	1	1	1
CM_MC2	0.9333	0.9333	1	0.9333

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Analysis ID:	08-0347-8865	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:22	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

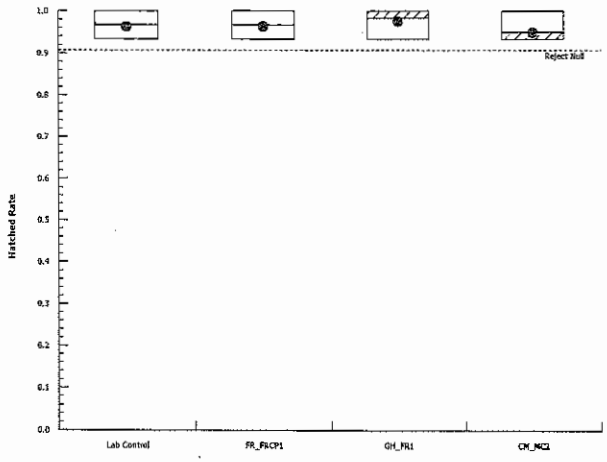
Angular (Corrected) Transformed Detail

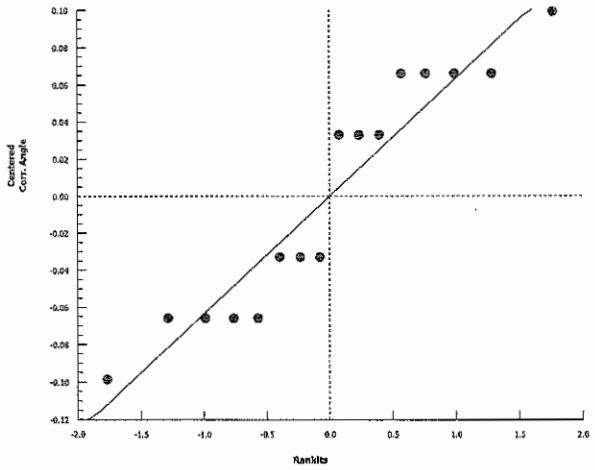
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	1.441	1.31	1.441	1.31
FR_FRCP1	1.31	1.31	1.441	1.441
GH_FR1	1.31	1.441	1.441	1.441
CM_MC2	1.31	1.31	1.441	1.31

Hatched Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	15/15	14/15	15/15	14/15
FR_FRCP1	14/15	14/15	15/15	15/15
GH_FR1	14/15	15/15	15/15	15/15
CM_MC2	14/15	14/15	15/15	14/15

Graphics





Fathead Minnow 32-d Survival and Growth Test

Nautilus Environmental

Analysis ID:	06-6604-2616	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:23	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	17-5846-1548	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	24 Jul-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Aug-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1 (site)	16-8247-1380	22 Jul-15 08:46	23 Jul-15 07:00	39h (10 °C)	Teck Coal	
FR_FRCP1	04-7451-1029	22 Jul-15 09:14	23 Jul-15 07:00	39h (10 °C)		
GH_FR1	13-7898-2108	21 Jul-15 08:20	23 Jul-15 07:00	64h (10 °C)		
CM_MC2	05-3650-8332	21 Jul-15 14:00	23 Jul-15 07:00	58h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1 (site)	Water Sample	Teck Coal	FR_UFR1 (site control)		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150721_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	20.2%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1 (site)		FR_FRCP1	-1.343	2.287	0.257	6	0.9820	CDF	Non-Significant Effect
		GH_FR1	-1.636	2.287	0.257	6	0.9911	CDF	Non-Significant Effect
		CM_MC2	-1.05	2.287	0.257	6	0.9647	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.07696575	0.02565525	3	1.017	0.4194	Non-Significant Effect
Error	0.3027793	0.02523161	12			
Total	0.3797451		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	9.915	11.34	0.0193	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8647	0.8408	0.0226	Normal Distribution

Hatched Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1 (site)	4	0.85	0.4995	1	0.9333	0.5333	1	0.1101	25.91%	0.0%
FR_FRCP1	4	0.9667	0.9054	1	0.9667	0.9333	1	0.01924	3.98%	-13.73%
GH_FR1	4	0.9833	0.9303	1	1	0.9333	1	0.01667	3.39%	-15.69%
CM_MC2	4	0.95	0.897	1	0.9333	0.9333	1	0.01667	3.51%	-11.76%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1 (site)	4	1.225	0.7567	1.693	1.319	0.8188	1.441	0.147	24.01%	0.0%
FR_FRCP1	4	1.375	1.254	1.496	1.375	1.31	1.441	0.03802	5.53%	-12.32%
GH_FR1	4	1.408	1.304	1.513	1.441	1.31	1.441	0.03292	4.68%	-15.01%
CM_MC2	4	1.343	1.238	1.447	1.31	1.31	1.441	0.03292	4.91%	-9.63%

Hatched Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1 (site)	1	1	0.5333	0.8667
FR_FRCP1	0.9333	0.9333	1	1
GH_FR1	0.9333	1	1	1
CM_MC2	0.9333	0.9333	1	0.9333

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	06-6604-2616	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:23	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

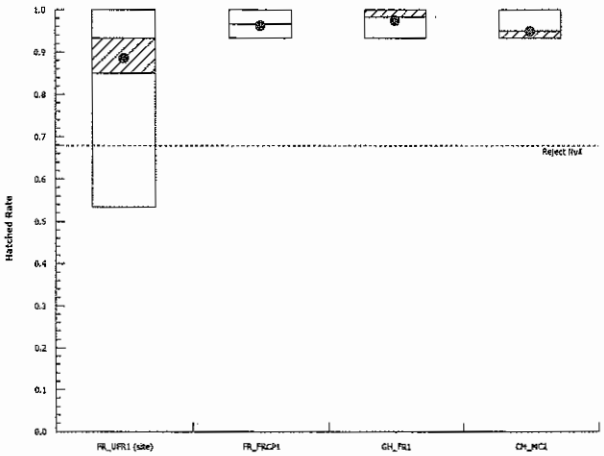
Angular (Corrected) Transformed Detail

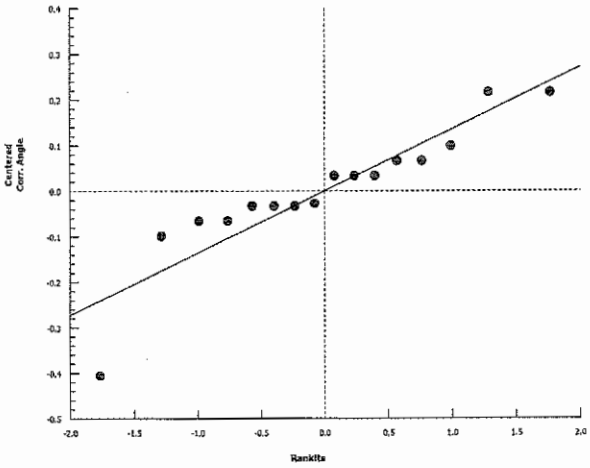
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1 (site)	1.441	1.441	0.8188	1.197
FR_FRCP1	1.31	1.31	1.441	1.441
GH_FR1	1.31	1.441	1.441	1.441
CM_MC2	1.31	1.31	1.441	1.31

Hatched Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1 (site)	15/15	15/15	8/15	13/15
FR_FRCP1	14/15	14/15	15/15	15/15
GH_FR1	14/15	15/15	15/15	15/15
CM_MC2	14/15	14/15	15/15	14/15

Graphics





CETIS Summary Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Batch ID:	17-5846-1548	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	24 Jul-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Aug-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	21-0612-0341	24 Jul-15	24 Jul-15	NA	Teck Coal	
FR_UFR1 (site)	16-8247-1380	22 Jul-15 08:46	23 Jul-15 07:00	39h (10 °C)		
FR_FRCP1	04-7451-1029	22 Jul-15 09:14	23 Jul-15 07:00	39h (10 °C)		
GH_FR1	13-7898-2108	21 Jul-15 08:20	23 Jul-15 07:00	64h (10 °C)		
CM_MC2	05-3650-8332	21 Jul-15 14:00	23 Jul-15 07:00	58h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	control	Teck Coal	Lab Control		
FR_UFR1 (site)	Water Sample	Teck Coal	FR_UFR1 (site control)		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150721_		

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	4	0.95	0.897	1	0.9333	1	0.01667	0.03333	3.51%	0.0%
FR_UFR1 (site)	4	0.25	0	1	0	1	0.25	0.5	200.0%	73.68%
FR_FRCP1	4	0.1333	0	0.5577	0	0.5333	0.1333	0.2667	200.0%	85.96%
GH_FR1	4	0.5333	0.3042	0.7625	0.3333	0.6667	0.07201	0.144	27.0%	43.86%
CM_MC2	4	0.2333	0	0.5632	0	0.4667	0.1036	0.2073	88.83%	75.44%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	0.9333	0.9333	1	0.9333
FR_UFR1 (site)	0	1	0	0
FR_FRCP1	0	0.5333	0	0
GH_FR1	0.6667	0.5333	0.6	0.3333
CM_MC2	0.3333	0	0.4667	0.1333

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	14/15	14/15	15/15	14/15
FR_UFR1 (site)	0/15	15/15	0/15	0/15
FR_FRCP1	0/15	8/15	0/15	0/15
GH_FR1	10/15	8/15	9/15	5/15
CM_MC2	5/15	0/15	7/15	2/15

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	16-4014-4397	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:26	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	17-5846-1548	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	24 Jul-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Aug-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	21-0612-0341	24 Jul-15	24 Jul-15	NA	Teck Coal	
FR_UFR1 (site)	16-8247-1380	22 Jul-15 08:46	23 Jul-15 07:00	39h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	control	Teck Coal	Lab Control		
FR_UFR1 (site)	Water Sample	Teck Coal	FR_UFR1 (site control)		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	56.1%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFR1 (site)	13.5	NA	1	6	0.0714	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.566923	1.566923	1	7.211	0.0363	Significant Effect
Error	1.30377	0.2172949	6			
Total	2.870693		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	99.23	47.47	0.0034	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.7372	0.6451	0.0059	Non-normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	0.95	0.897	1	0.9333	0.9333	1	0.01667	3.51%	0.0%
FR_UFR1 (site)	4	0.25	0	1	0	0	1	0.25	200.0%	73.68%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	1.343	1.238	1.447	1.31	1.31	1.441	0.03292	4.91%	0.0%
FR_UFR1 (site)	4	0.4574	-0.5863	1.501	0.1295	0.1295	1.441	0.328	143.4%	65.93%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	0.9333	0.9333	1	0.9333
FR_UFR1 (site)	0	1	0	0

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	1.31	1.31	1.441	1.31
FR_UFR1 (site)	0.1295	1.441	0.1295	0.1295

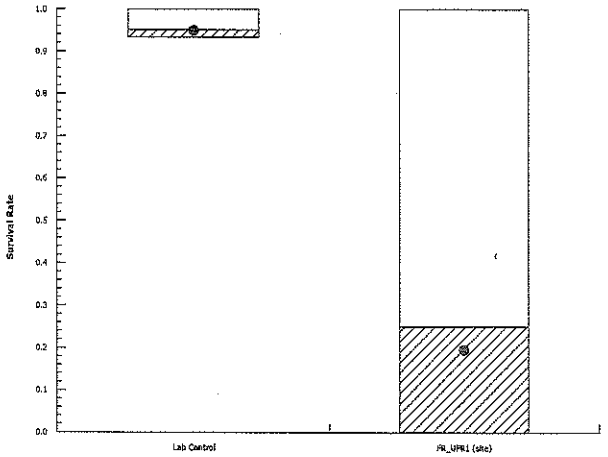
Survival Rate Binomials

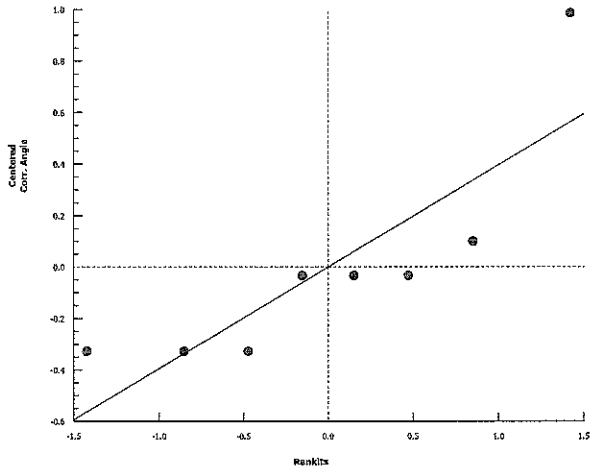
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	14/15	14/15	15/15	14/15
FR_UFR1 (site)	0/15	15/15	0/15	0/15

Fathead Minnow 32-d Survival and Growth Test | **Nautilus Environmental**

Analysis ID:	16-4014-4397	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:26	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Graphics





Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	01-8850-5673	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:26	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	17-5846-1548	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	24 Jul-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Aug-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	21-0612-0341	24 Jul-15	24 Jul-15	NA	Teck Coal	
FR_FRCP1	04-7451-1029	22 Jul-15 09:14	23 Jul-15 07:00	39h (10 °C)		
GH_FR1	13-7898-2108	21 Jul-15 08:20	23 Jul-15 07:00	64h (10 °C)		
CM_MC2	05-3650-8332	21 Jul-15 14:00	23 Jul-15 07:00	58h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	control	Teck Coal	Lab Control		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150721_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	29.0%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_FRCP1	6.277	2.287	0.379	6	<0.0001	CDF	Significant Effect
		GH_FR1	3.158	2.287	0.379	6	0.0107	CDF	Significant Effect
		CM_MC2	5.277	2.287	0.379	6	0.0003	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.541125	0.8470418	3	15.41	0.0002	Significant Effect
Error	0.6597689	0.05498074	12			
Total	3.200894		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.306	11.34	0.0976	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.948	0.8408	0.4584	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	0.95	0.897	1	0.9333	0.9333	1	0.01667	3.51%	0.0%
FR_FRCP1	4	0.1333	0	0.5577	0	0	0.5333	0.1333	200.0%	85.96%
GH_FR1	4	0.5333	0.3042	0.7625	0.5667	0.3333	0.6667	0.07201	27.0%	43.86%
CM_MC2	4	0.2333	0	0.5632	0.2333	0	0.4667	0.1036	88.83%	75.44%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	1.343	1.238	1.447	1.31	1.31	1.441	0.03292	4.91%	0.0%
FR_FRCP1	4	0.3018	-0.2466	0.8502	0.1295	0.1295	0.8188	0.1723	114.2%	77.52%
GH_FR1	4	0.8189	0.5856	1.052	0.8524	0.6155	0.9553	0.07332	17.91%	39.0%
CM_MC2	4	0.4677	0.03104	0.9044	0.4946	0.1295	0.752	0.1372	58.67%	65.16%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	0.9333	0.9333	1	0.9333
FR_FRCP1	0	0.5333	0	0
GH_FR1	0.6667	0.5333	0.6	0.3333
CM_MC2	0.3333	0	0.4667	0.1333

Analysis ID:	01-8850-5673	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:26	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

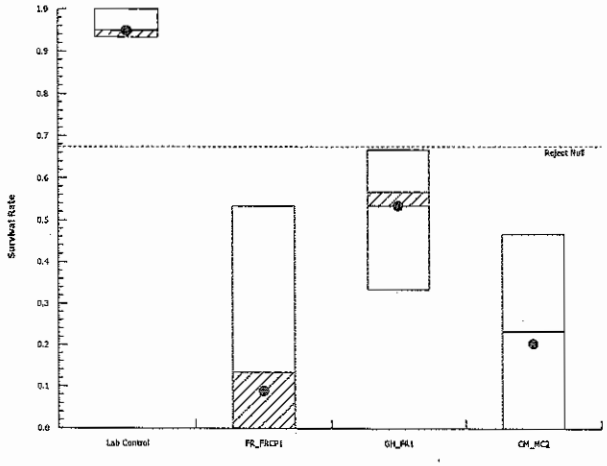
Angular (Corrected) Transformed Detail

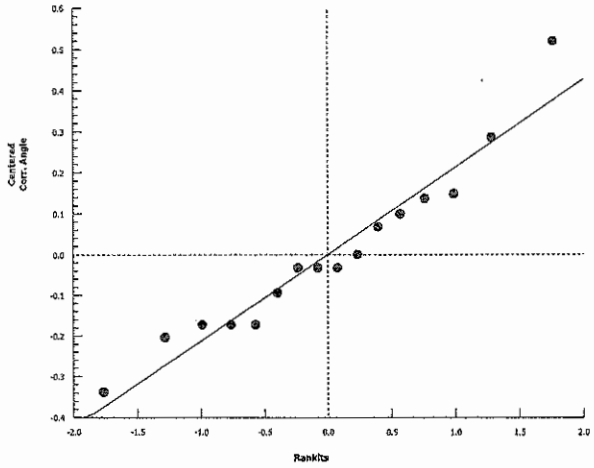
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	1.31	1.31	1.441	1.31
FR_FRCP1	0.1295	0.8188	0.1295	0.1295
GH_FR1	0.9553	0.8188	0.8861	0.6155
CM_MC2	0.6155	0.1295	0.752	0.3738

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	14/15	14/15	15/15	14/15
FR_FRCP1	0/15	8/15	0/15	0/15
GH_FR1	10/15	8/15	9/15	5/15
CM_MC2	5/15	0/15	7/15	2/15

Graphics





CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	06-8144-6587	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:27	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	17-5846-1548	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	24 Jul-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Aug-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1 (site)	16-8247-1380	22 Jul-15 08:46	23 Jul-15 07:00	39h (10 °C)	Teck Coal	
FR_FRCP1	04-7451-1029	22 Jul-15 09:14	23 Jul-15 07:00	39h (10 °C)		
GH_FR1	13-7898-2108	21 Jul-15 08:20	23 Jul-15 07:00	64h (10 °C)		
CM_MC2	05-3650-8332	21 Jul-15 14:00	23 Jul-15 07:00	58h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1 (site)	Water Sample	Teck Coal	FR_UFR1 (site control)		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150721_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	85.4%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1 (site)		FR_FRCP1	0.5478	2.287	0.65	6	0.5248	CDF	Non-Significant Effect
		GH_FR1	-1.272	2.287	0.65	6	0.9787	CDF	Non-Significant Effect
		CM_MC2	-0.03612	2.287	0.65	6	0.7627	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.5732901	0.1910967	3	1.184	0.3571	Non-Significant Effect
Error	1.937522	0.1614602	12			
Total	2.510813		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	5.547	11.34	0.1359	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8431	0.8408	0.0108	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1 (site)	4	0.25	0	1	0	0	1	0.25	200.0%	0.0%
FR_FRCP1	4	0.1333	0	0.5577	0	0	0.5333	0.1333	200.0%	46.67%
GH_FR1	4	0.5333	0.3042	0.7625	0.5667	0.3333	0.6667	0.07201	27.0%	-113.3%
CM_MC2	4	0.2333	0	0.5632	0.2333	0	0.4667	0.1036	88.83%	6.67%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1 (site)	4	0.4574	-0.5863	1.501	0.1295	0.1295	1.441	0.328	143.4%	0.0%
FR_FRCP1	4	0.3018	-0.2466	0.8502	0.1295	0.1295	0.8188	0.1723	114.2%	34.03%
GH_FR1	4	0.8189	0.5856	1.052	0.8524	0.6155	0.9553	0.07332	17.91%	-79.02%
CM_MC2	4	0.4677	0.03104	0.9044	0.4946	0.1295	0.752	0.1372	58.67%	-2.24%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1 (site)	0	1	0	0
FR_FRCP1	0	0.5333	0	0
GH_FR1	0.6667	0.5333	0.6	0.3333
CM_MC2	0.3333	0	0.4667	0.1333

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Analysis ID:	06-8144-6587	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:27	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

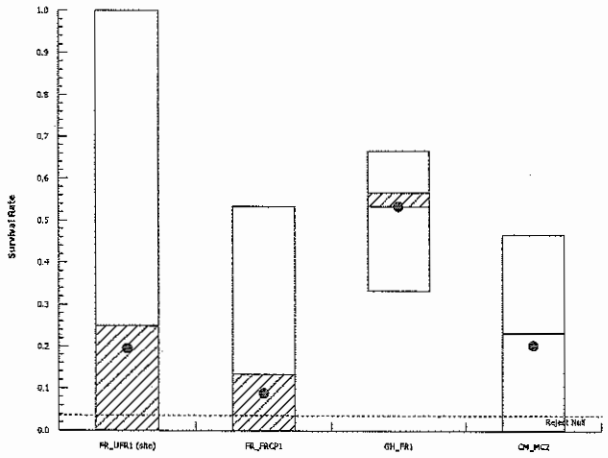
Angular (Corrected) Transformed Detail

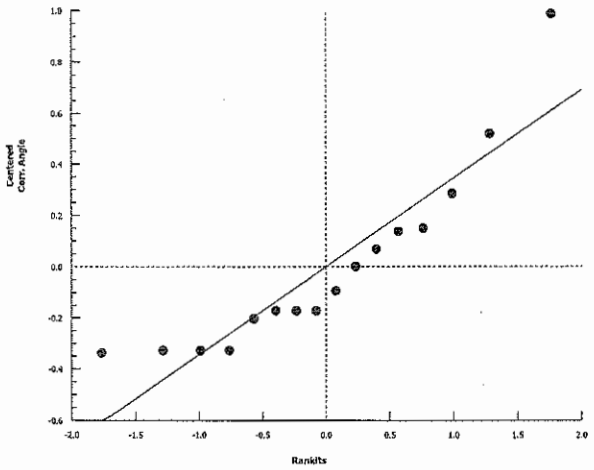
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1 (site)	0.1295	1.441	0.1295	0.1295
FR_FRCP1	0.1295	0.8188	0.1295	0.1295
GH_FR1	0.9553	0.8188	0.8861	0.6155
CM_MC2	0.6155	0.1295	0.752	0.3738

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1 (site)	0/15	15/15	0/15	0/15
FR_FRCP1	0/15	8/15	0/15	0/15
GH_FR1	10/15	8/15	9/15	5/15
CM_MC2	5/15	0/15	7/15	2/15

Graphics





CETIS Summary Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Batch ID:	17-5846-1548	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	24 Jul-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Aug-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	21-0612-0341	24 Jul-15	24 Jul-15	NA	Teck Coal	
FR_UFR1 (site)	16-8247-1380	22 Jul-15 08:46	23 Jul-15 07:00	39h (10 °C)		
FR_FRCP1	04-7451-1029	22 Jul-15 09:14	23 Jul-15 07:00	39h (10 °C)		
GH_FR1	13-7898-2108	21 Jul-15 08:20	23 Jul-15 07:00	64h (10 °C)		
CM_MC2	05-3650-8332	21 Jul-15 14:00	23 Jul-15 07:00	58h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	control	Teck Coal	Lab Control		
FR_UFR1 (site)	Water Sample	Teck Coal	FR_UFR1 (site control)		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150721_		

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	4	2.995	2.811	3.178	2.86	3.125	0.05768	0.1154	3.85%	0.0%
FR_UFR1 (site)	4	0.7597	-1.658	3.177	0	3.039	0.7597	1.519	200.0%	74.63%
FR_FRCP1	4	0.6492	-1.417	2.715	0	2.597	0.6492	1.298	200.0%	78.32%
GH_FR1	4	2.981	2.834	3.127	2.899	3.089	0.04599	0.09197	3.09%	0.47%
CM_MC2	4	2.256	-0.1798	4.691	0	3.273	0.7653	1.531	67.85%	24.68%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	2.948	3.125	3.047	2.86
FR_UFR1 (site)	0	3.039	0	0
FR_FRCP1	0	2.597	0	0
GH_FR1	2.91	3.089	3.025	2.899
CM_MC2	3.138	0	3.273	2.612

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	01-9111-3738	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:56	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	17-5846-1548	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	24 Jul-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Aug-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	21-0612-0341	24 Jul-15	24 Jul-15	NA	Teck Coal	
FR_UFR1 (site)	16-8247-1380	22 Jul-15 08:46	23 Jul-15 07:00	39h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	control	Teck Coal	Lab Control		
FR_UFR1 (site)	Water Sample	Teck Coal	FR_UFR1 (site control)		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	49.4%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFR1 (site)	12	NA	0	6	0.0429	Exact	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.991957	9.991957	1	8.608	0.0262	Significant Effect
Error	6.965026	1.160838	6			
Total	16.95698		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	173.5	47.47	0.0015	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.7379	0.6451	0.0060	Non-normal Distribution

Mean Dry Biomass-mg Summary

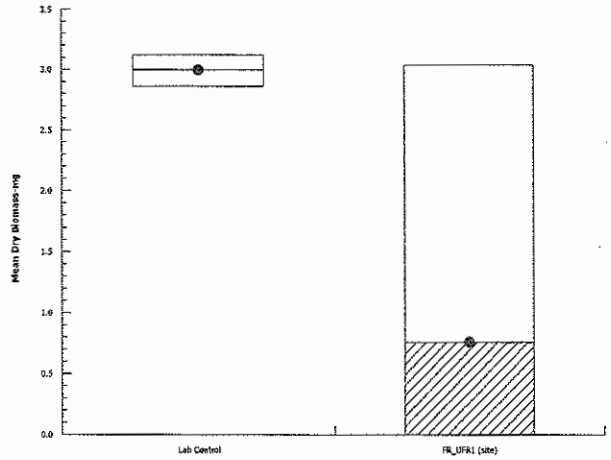
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	2.995	2.811	3.178	2.997	2.86	3.125	0.05768	3.85%	0.0%
FR_UFR1 (site)	4	0.7597	-1.658	3.177	0	0	3.039	0.7597	200.0%	74.63%

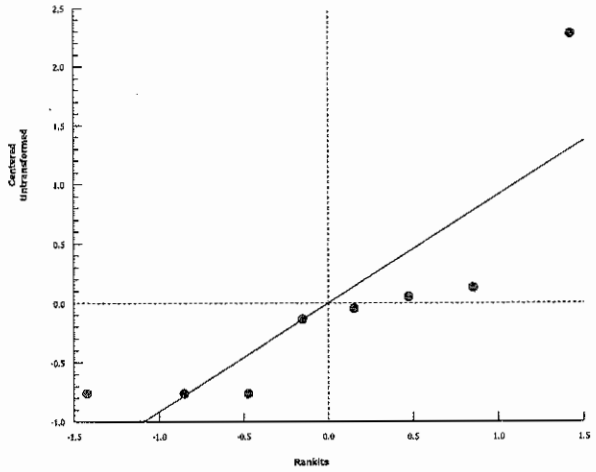
Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	2.948	3.125	3.047	2.86
FR_UFR1 (site)	0	3.039	0	0

Analysis ID:	01-9111-3738	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:56	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Graphics





Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	08-8596-5458	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:56	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	17-5846-1548	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	24 Jul-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Aug-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	21-0612-0341	24 Jul-15	24 Jul-15	NA	Teck Coal	
FR_FRCP1	04-7451-1029	22 Jul-15 09:14	23 Jul-15 07:00	39h (10 °C)		
GH_FR1	13-7898-2108	21 Jul-15 08:20	23 Jul-15 07:00	64h (10 °C)		
CM_MC2	05-3650-8332	21 Jul-15 14:00	23 Jul-15 07:00	58h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	control	Teck Coal	Lab Control		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150721_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	54.3%	

Steel Many-One Rank Sum Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_FRCP1	10	10	0	6	0.0276	Asymp	Significant Effect
		GH_FR1	17	10	0	6	0.6348	Asymp	Non-Significant Effect
		CM_MC2	18	10	0	6	0.7500	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	14.59106	4.863687	3	4.804	0.0201	Significant Effect
Error	12.15014	1.012511	12			
Total	26.7412		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	20.46	11.34	0.0001	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9075	0.8408	0.1060	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	2.995	2.811	3.178	2.997	2.86	3.125	0.05768	3.85%	0.0%
FR_FRCP1	4	0.6492	-1.417	2.715	0	0	2.597	0.6492	200.0%	78.32%
GH_FR1	4	2.981	2.834	3.127	2.968	2.899	3.089	0.04599	3.09%	0.47%
CM_MC2	4	2.256	-0.1798	4.691	2.875	0	3.273	0.7653	67.85%	24.68%

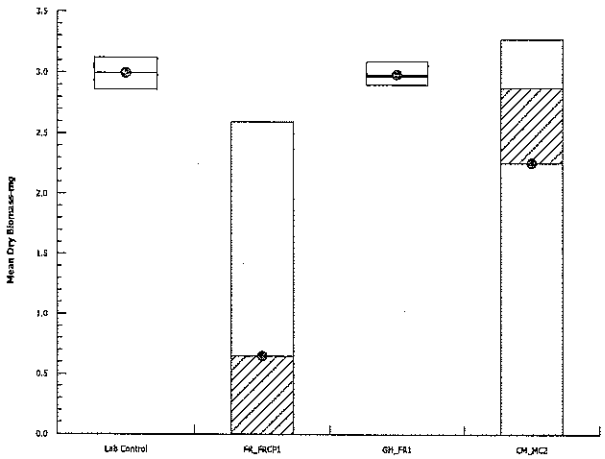
Mean Dry Biomass-mg Detail

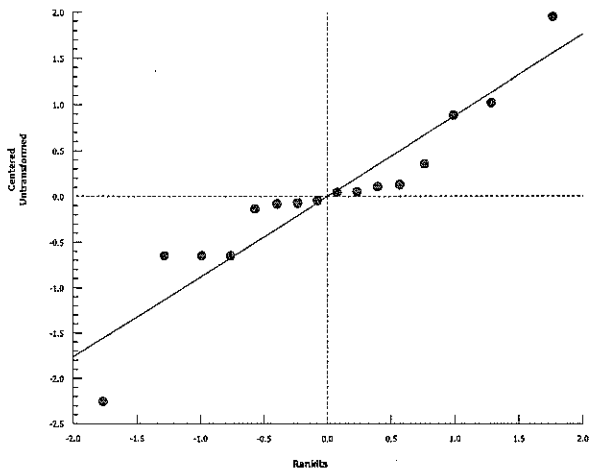
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	2.948	3.125	3.047	2.86
FR_FRCP1	0	2.597	0	0
GH_FR1	2.91	3.089	3.025	2.899
CM_MC2	3.138	0	3.273	2.612

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Analysis ID:	08-8596-5458	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:56	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	09-2648-8251	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:57	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	17-5846-1548	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	24 Jul-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Aug-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1 (site)	16-8247-1380	22 Jul-15 08:46	23 Jul-15 07:00	39h (10 °C)	Teck Coal	
FR_FRCP1	04-7451-1029	22 Jul-15 09:14	23 Jul-15 07:00	39h (10 °C)		
GH_FR1	13-7898-2108	21 Jul-15 08:20	23 Jul-15 07:00	64h (10 °C)		
CM_MC2	05-3650-8332	21 Jul-15 14:00	23 Jul-15 07:00	58h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1 (site)	Water Sample	Teck Coal	FR_UFR1 (site control)		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150721_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	268.0%	

Steel Many-One Rank Sum Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1 (site)		FR_FRCP1	17.5	10	1	6	0.6948	Asymp	Non-Significant Effect
		GH_FR1	23	10	0	6	0.9904	Asymp	Non-Significant Effect
		CM_MC2	22.5	10	1	6	0.9852	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	15.72541	5.241804	3	3.304	0.0575	Non-Significant Effect
Error	19.03533	1.586277	12			
Total	34.76074		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	11.61	11.34	0.0088	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9324	0.8408	0.2662	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1 (site)	4	0.7597	-1.658	3.177	0	0	3.039	0.7597	200.0%	0.0%
FR_FRCP1	4	0.6492	-1.417	2.715	0	0	2.597	0.6492	200.0%	14.55%
GH_FR1	4	2.981	2.834	3.127	2.968	2.899	3.089	0.04599	3.09%	-292.4%
CM_MC2	4	2.256	-0.1798	4.691	2.875	0	3.273	0.7653	67.85%	-196.9%

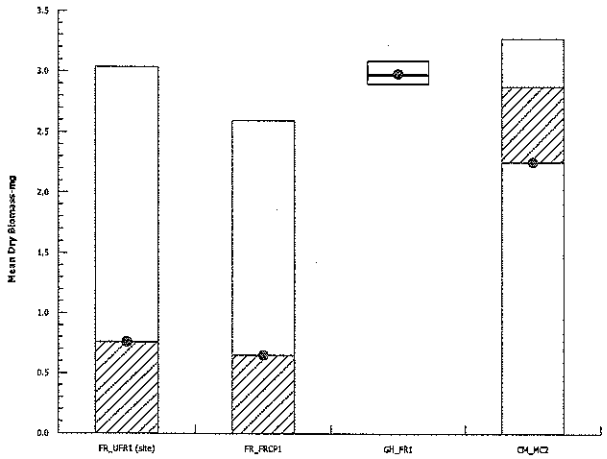
Mean Dry Biomass-mg Detail

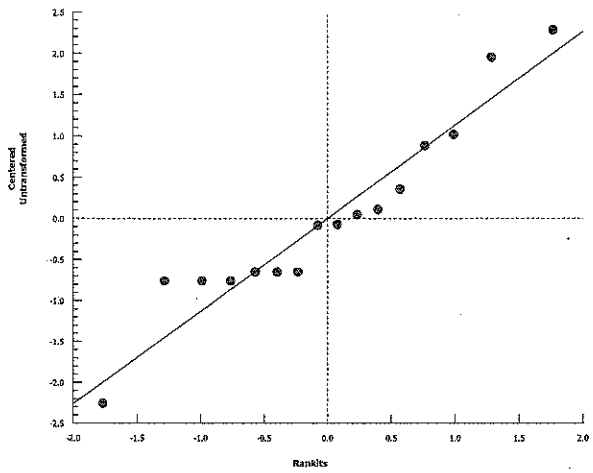
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1 (site)	0	3.039	0	0
FR_FRCP1	0	2.597	0	0
GH_FR1	2.91	3.089	3.025	2.899
CM_MC2	3.138	0	3.273	2.612

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Analysis ID:	09-2648-8251	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:57	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





CETIS Summary Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Batch ID:	17-5846-1548	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	24 Jul-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Aug-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	21-0612-0341	24 Jul-15	24 Jul-15	NA	Teck Coal	
FR_UFR1 (site)	16-8247-1380	22 Jul-15 08:46	23 Jul-15 07:00	39h (10 °C)		
FR_FRCP1	04-7451-1029	22 Jul-15 09:14	23 Jul-15 07:00	39h (10 °C)		
GH_FR1	13-7898-2108	21 Jul-15 08:20	23 Jul-15 07:00	64h (10 °C)		
CM_MC2	05-3650-8332	21 Jul-15 14:00	23 Jul-15 07:00	58h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	control	Teck Coal	Lab Control		
FR_UFR1 (site)	Water Sample	Teck Coal	FR_UFR1 (site control)		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150721_		

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	4	11.25	10.45	12.05	11	12	0.25	0.5	4.44%	0.0%
FR_UFR1 (site)	1	11			11	11	0	0	0.0%	2.22%
FR_FRCP1	1	13			13	13	0	0	0.0%	-15.56%
GH_FR1	4	12.75	11.95	13.55	12	13	0.25	0.5	3.92%	-13.33%
CM_MC2	3	15.33	9.082	21.58	13	18	1.453	2.517	16.41%	-36.3%

Length-mm Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	11	12	11	11
FR_UFR1 (site)		11		
FR_FRCP1		13		
GH_FR1	13	13	12	13
CM_MC2	15		13	18

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	10-5417-9005	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	17-5846-1548	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	24 Jul-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Aug-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	21-0612-0341	24 Jul-15	24 Jul-15	NA	Teck Coal	
FR_UFR1 (site)	16-8247-1380	22 Jul-15 08:46	23 Jul-15 07:00	39h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	control	Teck Coal	Lab Control		
FR_UFR1 (site)	Water Sample	Teck Coal	FR_UFR1 (site control)		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	11.7%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFR1 (site)	0.4472	2.353	1.316	3	0.3425	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.05	0.05	1	0.2	0.6850	Non-Significant Effect
Error	0.75	0.25	3			
Total	0.8		4			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance	1.8	34.12	0.2722	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.7008	0.1883	0.0098	Non-normal Distribution

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	11.25	10.45	12.05	11	11	12	0.25	4.44%	0.0%
FR_UFR1 (site)	1	11			11	11	11	0	0.0%	2.22%

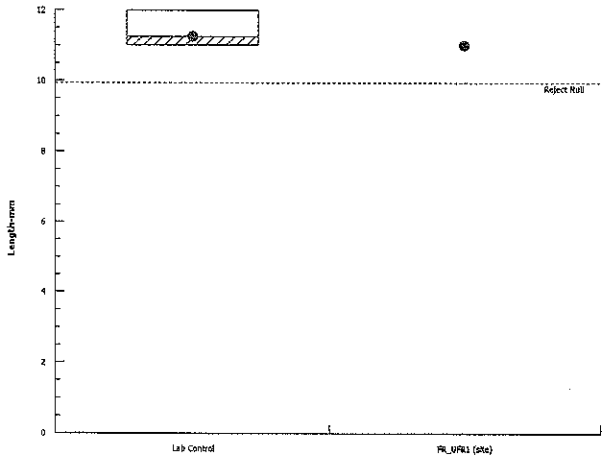
Length-mm Detail

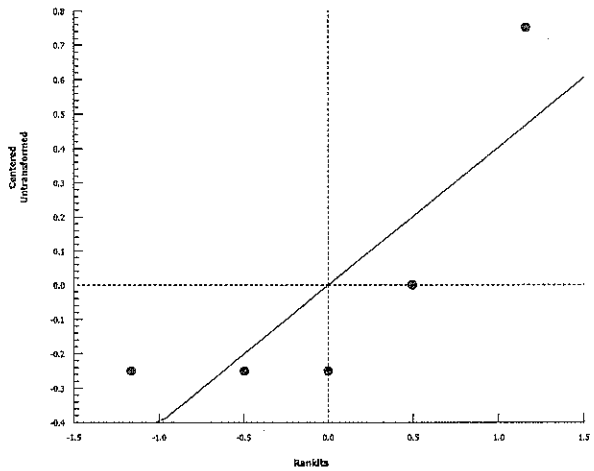
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	11	12	11	11
FR_UFR1 (site)	11			

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Analysis ID:	10-5417-9005	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	16-3460-7424	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:34	**Analysis:**	Parametric-Multiple Comparison	**Official Results:**	Yes
Batch ID:	17-5846-1548	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	24 Jul-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Aug-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	21-0612-0341	24 Jul-15	24 Jul-15	NA	Teck Coal	
FR_FRCP1	04-7451-1029	22 Jul-15 09:14	23 Jul-15 07:00	39h (10 °C)		
GH_FR1	13-7898-2108	21 Jul-15 08:20	23 Jul-15 07:00	64h (10 °C)		
CM_MC2	05-3650-8332	21 Jul-15 14:00	23 Jul-15 07:00	58h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	control	Teck Coal	Lab Control		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150721_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	23.2%	

Bonferroni Adj t Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_FRCP1	-1.176	2.566	3.818	3	1.0000	CDF	Non-Significant Effect
		GH_FR1	-1.594	2.566	2.415	6	1.0000	CDF	Non-Significant Effect
		CM_MC2	-4.018	2.566	2.608	5	1.0000	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	28.75	9.583333	3	5.412	0.0250	Significant Effect
Error	14.16667	1.770833	8			
Total	42.91667		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance	3.61	7.591	0.0651	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8677	0.8025	0.0611	Normal Distribution

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	11.25	10.45	12.05	11	11	12	0.25	4.44%	0.0%
FR_FRCP1	1	13			13	13	13	0	0.0%	-15.56%
GH_FR1	4	12.75	11.95	13.55	13	12	13	0.25	3.92%	-13.33%
CM_MC2	3	15.33	9.082	21.58	15	13	18	1.453	16.41%	-36.3%

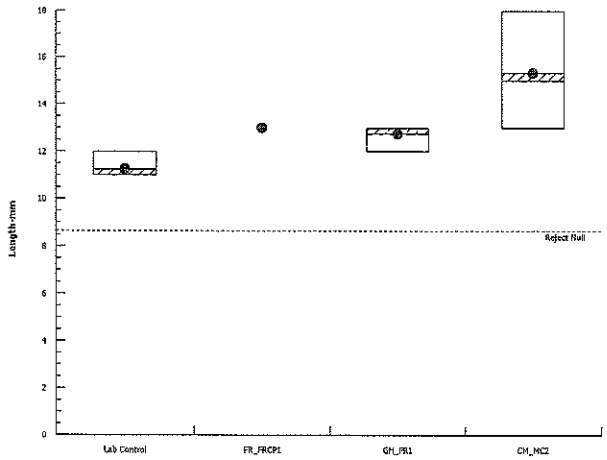
Length-mm Detail

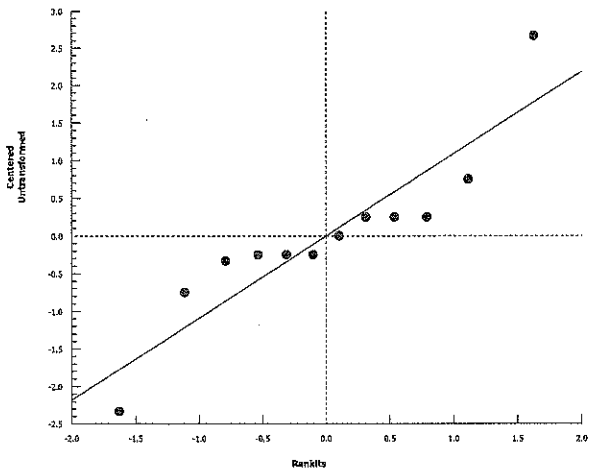
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	11	12	11	11
FR_FRCP1	13			
GH_FR1	13	13	12	13
CM_MC2	15	13	18	

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Analysis ID:	16-3460-7424	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:34	**Analysis:**	Parametric-Multiple Comparison	**Official Results:**	Yes

Graphics





Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	13-4973-2797	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:35	**Analysis:**	Parametric-Multiple Comparison	**Official Results:**	Yes
Batch ID:	17-5846-1548	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	24 Jul-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Aug-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1 (site)	16-8247-1380	22 Jul-15 08:46	23 Jul-15 07:00	39h (10 °C)	Teck Coal	
FR_FRCP1	04-7451-1029	22 Jul-15 09:14	23 Jul-15 07:00	39h (10 °C)		
GH_FR1	13-7898-2108	21 Jul-15 08:20	23 Jul-15 07:00	64h (10 °C)		
CM_MC2	05-3650-8332	21 Jul-15 14:00	23 Jul-15 07:00	58h (10 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1 (site)	Water Sample	Teck Coal	FR_UFR1 (site control)		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1		
GH_FR1	Water Sample	Teck Coal	GH_FR1		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WKLY_WS_20150721_		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	50.1%	

Bonferroni Adj t Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1 (site)		FR_FRCP1	-0.8633	2.912	6.745	0	1.0000	CDF	Non-Significant Effect
		GH_FR1	-0.9555	2.912	5.333	3	1.0000	CDF	Non-Significant Effect
		CM_MC2	-2.291	2.912	5.508	2	1.0000	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	18.80556	6.268518	3	2.336	0.1907	Non-Significant Effect
Error	13.41667	2.683333	5			
Total	32.22222		8			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance	2.4	12.06	0.1839	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8652	0.7007	0.1090	Normal Distribution

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1 (site)	1	11			11	11	11	0	0.0%	0.0%
FR_FRCP1	1	13			13	13	13	0	0.0%	-18.18%
GH_FR1	4	12.75	11.95	13.55	13	12	13	0.25	3.92%	-15.91%
CM_MC2	3	15.33	9.082	21.58	15	13	18	1.453	16.41%	-39.39%

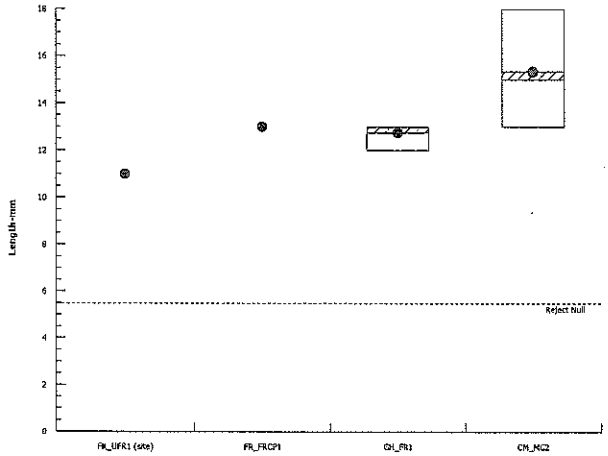
Length-mm Detail

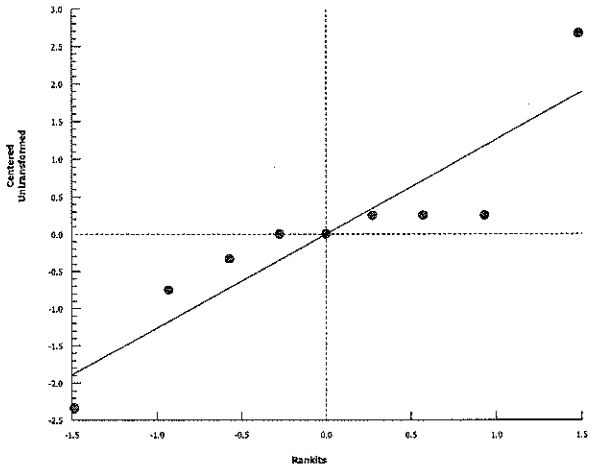
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1 (site)	11			
FR_FRCP1	13			
GH_FR1	13	13	12	13
CM_MC2	15	13	18	

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Analysis ID:	13-4973-2797	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Sep-15 12:35	**Analysis:**	Parametric-Multiple Comparison	**Official Results:**	Yes

Graphics





APPENDIX E – Analytical Chemistry

All analytical chemistry has for Q3 chronic toxicity has been uploaded to EMS.

APPENDIX F – Chain-of-Custody Forms

COC ID:	20150722-1225	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	28 Day H. azteca Pass/Fail (28DAHA)	7 D C. Dubia Pass/Fail (EPS1RM21)	72 hr P. subcapitata Pass/Fail (EPS1RM25)	48 hr Dapnia Sinlge Conc. Pass/Fail (EPS1RM14)	96 Hr Rainbow Trout Single Conc. Pass/Fail (EPS1RM13)							Receiving Temp (C)
FR_FRCP1_Q_06072015_N				WS	2015/07/22	09:14	G	2	x	x	x									10.0
FR_SP1_Q_06072015_N				WS	2015/07/22	10:03	G	3				2	1							10.0
FR_UFR1_Q_06072015_N				WS	2015/07/22	08:46	G	2	x	x	x									10.0
									WO#15566	WO#15564	WO#15565	WO#15563	WO#15562							

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Teak FRC Ant Bezzola	July 22 2015 12:44	Krysta Pearcy / Nautilus Environmental	July 23 /15 @ 0700h
			Rec'd 5x20L, 2x1L	

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Ant Bezzola	Mobile #	
	Sampler's Signature	[signature]	Date/Time	July 22 2015 12:44

COC ID:	20150722-1232	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Hydroqual			Email Invoice To	
Project Number				Lab Contact	Elisabeth Henson			Invoice Reports	
Department				Email	elisabeth_henson@golder.com			Email Report To	
Address	PO Box 100			Address				Email Reports	
								Shipping Company	
City	Elkford	State	BC	City		State		Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code		Country		Cooler Count	
Phone Number	1-250-865-5289			Phone Number	403-253-7121			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30 Day Fathead Minnow
15-0844									
FR_FRCP1_Q_06072015_N				WS	2015/07/22	09:14	G	2	2
FR_UFR1_Q_06072015_N				WS	2015/07/22	08:46	G	2	2
15-0845									

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Tak BRO Aita Bezzola	July 22 2015 12:44		

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Aita Bezzola	Mobile #	
	Sampler's Signature	[signature]	Date/Time	July 22 2015 12:44

2015/07/23 0845 15 All 8x20L NoS II manitoulin

Chain Of Custody Record

COC ID: July Quarterly_Nautilus_East | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Project Number				Contact Name				Address			
Contact Name	Zahir Jina			Address	8664 Commence Court						
Address	P.O. BOX 5000				Imperial Square Lake City			City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number				Shipping Company			
Phone Number	250-865-3301			Email Address				Tracking Number			
Email EDD To	Zahir.Jina@teck.com			Quote Number				CC Hardcopy To			
Email Report To	Zahir.Jina@teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										~~20L for LT50 Rainbow, 2 x 1 L for LT50 Daphnia~~ ↑ Does not apply, confirmed w/ client KLP
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow	28 d Hyallella p/f	72 h P. subcapitata p/f	7 d C. dubia p/f	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail				Confirmed add tests are pass/fail KLP.
GH_FR1_WS_2015_07_20_N	WS	2015/07/21	8:20	G	2			X	X	X						
GH_ERC_WS_2015_07_21_N	WS	2015/07/21	7:15	G	1				X	X						
								wo# 155560	wo# 155559	wo# 155558						

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	J. Evans (Nupar)	2015/07/21	9:00	Krysta Pearcy/Nautilus Environmental	Jul 23/15	0700	10.0	(Y) / N	(Y) / N	Y / N
				Recd 3x 20L KLP.				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Zahir Jina	Mobile #		Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature		Date/Time					

Chain Of Custody Record

COC ID: Quarterly_FR1_FMinnow_HydroQual | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	HydroQual Laboratories Ltd.			Send Invoice To			
Project Number				Contact Name	Jacklyn Pool			Address			
Contact Name	Zahir Jina			Address	#4, 6125 - 12th Street S.E						
Address	P.O. BOX 5000							City		State	
				City	Calgary	State	AB	Postal Code		Country	
City	Elkford	State	BC	Postal Code	T2H2K1	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number	403.253.7121			Shipping Company			
Phone Number	250-865-3301			Email Address				Tracking Number			
Email EDD To	Zahir.Jina@teck.com			Quote Number				CC Hardcopy To			
Email Report To	Zahir.Jina@teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV										Initial - PASS/FAIL
						ANALYSIS	30 d early life stage, fathead minnow	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail				
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.											
15-0843 GH_FR1_WS_2015_07_20_N	WS	7/21/2015	8:20	G	2		X									

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	J. Enns (Wapan)	2015/07/21	9:00					Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Zahir Jina	Mobile #		Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature		Date/Time					

2015/07/23 0845 15 At 8.2°C VOSII manitoulin

Nautilus Environmental
8664 Commerce Court
Imperial Square Lake City
Burnaby BC, V5A 4N7

COC # 22072015

Page 1 of 1

Report to:		Report Format / Distribution				Service Requested: (rush - subject to availability)
Company:	TECK COAL LTD (ELKVIEW)	☑ Standard	☐ Other			◉ Regular (Default)
Contact:	Michael Moore	☑ PDF	☑ Excel	☑ Digital	☐ Fax	○ Priority (2-3 Business Days) - 50% Surcharge
Address:	RR1 HWY 3	Email 1:	michael.moore@teck.com			○ Emergency (1 Business Day) - 100% Surcharge
Sparwood, BC, V0B 2G1, Canada		Email 2:	james.boldt@teck.com			○ For Emergency < 1 Day, ASAP or Weekend - Contact ALS
Phone:	250-425-8868 Fax:	Email 3:	casandra.knooihuizen@teck.com			Analysis Request
Invoice To:	Same as Report ? ◉ Yes ○ No	Email 4:	leigh.stickney@teck.com			Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:	Send all invoices to: dlteckcoalaccountspayable@teck.com	Client / Project Information:				
Contact:	Attn: Accounting	Job #:	Elkview Quarterly Toxicity Testing			
Address:	Same as above	PO / AFE:	359182			
		Legal Site Description:				
Phone:	Fax:	Quote #:				
Lab Work Order # (lab use only)		Nautilus Contact: Krysta Pearcy		Sampler:	Jenna D James B	

Sample	Sample Identification	Date (mmm-dd-yy)	Time (hh:mm)	Matrix	TECKCOAL-MONTHLY-VA	Toxicity 7day/72 hr	T-Se (CCMS)	T-Metal(TECKCOAL-MET-T-VA)	D-Metal(TECKCOAL-MET-D-VA)	EPH	TSS	TURBIDITY	PAH - low level detection	Toxicity 48-Hr Pass/Fail	Toxicity 7-day/ 72-Hr Pass/Fail	BOD	Number of Containers
	EV_EC1_WS_2015-07-22_N	22-Jul-15	12:30	WS										X			2
	EV_SP1_WS_2015-07-22_N	22-Jul-15	12:10	WS										X			2
	EV_MG1_WS_2015-07-22_N	22-Jul-15	11:45	WS										X			2
	EV_GT1_WS_2015-07-22_N	22-Jul-15	13:30	WS										X			2
	EV_BC1_WS_2015-07-22_N	22-Jul-15	11:05	WS										X			2
	EV_AQ1_WS_2015-07-22_N	22-Jul-15		WS										X			2
	EV_SM1_WS_2015-07-22_N	22-Jul-15	9:15	WS										X			2
	EV_LC1_WS_2015-07-22_N	22-Jul-15	9:45	WS										X			2
	EV_DC1_WS_2015-07-22_N	22-Jul-15	7:55	WS										X			2
	EV_HC1_WS_2015-07-22_N	22-Jul-15	8:40	WS											X		1
	EV_MC2_WS_2015-07-22_N	22-Jul-15	10:15	WS											X		1
																	18

Special Instructions / Regulations / Hazardous Details

Toxicity 7-Day/72-Hr Pass/ Fail =7 d C. dubia and 72 h P. subcapitata wo#-15568115569

Toxicity 48-Hr = 48 Hr Daphnia pass/fail wo# 15512 (retest)

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)					SHIPMENT VERIFICATION (lab use only)		
Released by:	Date & Time:	Received by:	Date:	Time:		Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF
James Boldt	22/7/2015	Krysta Pearcy	July 23, 2015	0700h		10.0°C			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

GENF 18.00 Front

3 COOLERS

Recd 2x20L
16x1L
KLP.

Chain Of Custody Record

COC ID: 20140902-1509 | Page: 1 of 1

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Coal Mountain Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Contact Name	Don Sacino			Contact Name				Address			
Address	2261 Corbin Rd.			Address	8664 commerce Court						
City	Sparwood	Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada	City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425 7377			Postal Code	V5A 4N7	Country	Canada	Task Code			
Email EDD To	Rick.Magliocco@teck.com			Phone Number				Shipping Company			
	Don.Sacino@teck.com			Email Address				Tracking Number			
	Carla.Romero@teck.com			PO Number				CC Hardcopy To			
								CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
					PRESERV.											
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia Pass/Fail	72 h P. subcapitata Pass/Fail	30 d fathead minnow Pass/Fail	28 d H. Azteca Pass/Fail	30-d O.mykiss embryo-alevin Pass/Fail			
									wo#15554	wo#15555		wo#15556				
CM_MC2_WKLY_WS_20150721_N	WS	21/7/2015	14:00	G	2				X	X		X				

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	T. Phillips / Neapgn	July 21, 2015	16:50	Krysta Pearcy / Nautilus Environmental	July 23, 2015	0700h	10.0	(Y) / N	(Y) / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	~~D. Sacino / Carla Romero / Kenneth Allen~~ Tyler Phillips	Mobile #	(250) 919-0965	Temp in °C	Samples on ice? / Sample intact? / Trip Blank?
Sampler's Signature		Date/Time	21-07-2015 16:30 hr		

Rec'd 2 x 20L
KP.

Chain Of Custody Record

COC ID: 20140902-1509

Turnaround Time:

Page: 1 of 1

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Coal Mountain Operation			Lab Name	Hydroqual Laboratories			Send Invoice To			
Contact Name	Don Sacino			Contact Name	Jacklyn Pool			Address			
Address	2261 Curbin Rd.			Address	#4, 6125-12th Street S.E.						
City	Sparwood	Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada	City	Calgary	State	AB	Postal Code		Country	
Phone Number	250 425 7377			Postal Code	T2H 2K1	Country	Canada	Task Code			
Email EDD To	Rick.Maghocco@teck.com			Phone Number	403-253-7121			Shipping Company			
	Don.Sacino@teck.com			Email Address				Tracking Number			
	Carla.Romero@teck.com			PO Number				CC Hardcopy To			
								CC Hardcopy To			

SAMPLE DETAILS / ANALYSIS REQUESTED / ADDITIONAL INFORMATION

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV / ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia	72 h P. subcapitata	30 d fathead minnow (Pass/Fail)	28 d H. Azteca	30-d O.mykiss embryo-alevin Pass/Fail				ADDITIONAL INFORMATION
15-0846																	
CM_MC2_WKLY_WS_20150721_N	WS	21/7/2015	14:00	G	2						X						

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	T. Phillips / Nupqu	July 21, 2015	16:30					Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

				Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Name	Tyler Phillips	Mobile #	(250)919-0965				
Sampler's Signature	[signature]	Date/Time	21-07-2015 16:30 hr				

2015/07/23 0845 15 [illegible] No SH Manitoulin

Chain Of Custody Record

COC ID:

Page: 1 of 1

Turnaround Time: RUSH

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Line Creek Operations			Lab Name	Nautilus Environmental			Send Invoice To			
Contact Name	Jay Jones			Contact Name	Krysta Pearcy			Address			
Address	Box 2003			Address	8664 commerce Court						
City	Sparwood	Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada	City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425-6111			Postal Code	V5A 4N7	Country	Canada	Task Code			
Email EDD To	jay.jones@teck.com			Phone Number				Shipping Company			
	leigh.stickney@teck.com			Email Address	Krysta@NautilusEnvironmental.com			Tracking Number			
				PO Number				CC Hardcopy To			
								CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED									ADDITIONAL INFORMATION
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV.	ANALYSIS: 3rd quarter Chonic tox(20L) (1)								① 7d C.dubia plf 72-h P.subcapitata plf Confirmed w/ client KLP.
LC_LCDSSLCC_WS_2015-07-21_N	WS	21-Jul-15	14:22		1		1								

WO#15552 7d C.dubia plf
15553 72-h P.subcapitata plf

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	Jay Jones	Teck	15:30	Krysta Pearcy Nautilus Environmental	July 23, 2015	0700h	Temp in °C: 10.0	Samples on ice? (Y) / N	Sample intact? (Y) / N	Trip Blank? Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Jay Jones / A WIGHT	Mobile #	250-423-3004	
Sampler's Signature	A. Wight	Date/Time	21-Jul-15	

Recd 1X20L
KLP.

COC ID:	20150729-1432	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS									ANALYSIS REQUESTED											
Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	28 Day H. arteca Pass/Fail (28DAHA)										Temp (°C)
FR_FRCP1_Q_13072015_N				WS	2015/07/29	12:38	G	1	1											15.0
FR_UFR1_Q_13072015_N				WS	2015/07/29	10:24	G	1	1											15.0

with 15560 ①

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Taken by Ash Bezda.	7-29-15 15:00	Krysta Pearcy / Nautilus Environmental	July 30/15 @ 0830

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Ash Bezda	Mobile #	
	Sampler's Signature		Date/Time	7. 29. 15 15:00

① Refresh sample. Rec'd 1 X 20L per sample

COC ID:	20150729-1440	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Hydroqual			Email Invoice To	
Project Number				Lab Contact	Elisabeth Henson			Invoice Reports	
Department				Email	elisabeth_henson@golder.com			Email Report To	
Address	PO Box 100			Address				Email Reports	
								Shipping Company	
City	Elkford	State	BC	City		State		Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code		Country		Cooler Count	
Phone Number	1-250-865-5289			Phone Number	403-253-7121			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS									ANALYSIS REQUESTED											
15-0811 Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30 Day Fathead Minnow											
FR_FRCP1_Q_13072015_N				WS	2015/07/29	12:38	G	2	2											
FR_UFR1_Q_13072015_N				WS	2015/07/29	10:24	G	2	2											
15-0815																				

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Teck FRO Andy Brooks	7-29-15 1530		

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Andy Brooks	Mobile #	
	Sampler's Signature		Date/Time	7-29-15 1530

2015/07/30 0950 13 AA 8x20L Manitowlin NOSH

Chain Of Custody Record

COC ID: July Quarterly_Nautilus_East, Re-Fresh #1

Page: 1 of 1

Turnaround Time: Rush:

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Greenhills Operation	Lab Name	Nautilus Environmental	Send Invoice To	
Project Number		Contact Name		Address	
Contact Name	Zahir Jina	Address	8664 Commence Court		
Address	P.O. BOX 5000		Imperial Square Lake City	City	State
		City	Burnaby State BC	Postal Code	Country
City	Elkford State BC	Postal Code	V5A 4N7 Country Canada	Task Code	
Postal Code	V0B1H0 Country Canada	Phone Number		Shipping Company	
Phone Number	250-865-3301	Email Address		Tracking Number	
Email EDD To	Zahir.Jina@teck.com	Quote Number		CC Hardcopy To	
Email Report To	Zahir.Jina@teck.com			CC Hardcopy To	

SAMPLE DETAILS / ANALYSIS REQUESTED / ADDITIONAL INFORMATION

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. / ANALYSIS	30 d early life stage, fathead minnow	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail					ADDITIONAL INFORMATION
GH_FR1_WS_2015_07_27_N	WS	2015/07/28		G	2			X									20L for LT50 Rainbow, 2 x 1 L for LT50 Daphnia

WO#15560 ①

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	M Calabrese Nupqu	July 28/15	16:30	Krysta Pearcy/Nautilus Environmental	July 30/15	0630	15.0	Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	~~Zahir Jina~~ M. Calabrese	Mobile #	647-244-7245
Sampler's Signature	[signature]	Date/Time	July 28/15 16:30

Temp in °C | Samples on ice? | Sample intact? | Trip Blank?

Chain Of Custody Record

COC ID: Quarterly_FR1_F.Minnow_HydroQual, Re-Fresh #1 | Page: 1 of 1

Turnaround Time: | **Rush:**

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Greenhills Operation	Lab Name	HydroQual Laboratories Ltd.	Send Invoice To	
Project Number		Contact Name	Jacklyn Pool	Address	
Contact Name	Zahir Jina	Address	#4, 6125 - 12th Street S.E		
Address	P.O. BOX 5000			City	State
		City	Calgary State AB	Postal Code	Country
~~City~~	~~Elkford~~ ~~State~~ ~~BC~~	Postal Code	T2H2K1 Country Canada	Task Code	
Postal Code	V0B1H0 Country Canada	Phone Number	403.253.7121	Shipping Company	
Phone Number	250-865-3301	Email Address		Tracking Number	
Email EDD To	Zahir.Jina@teck.com	Quote Number		CC Hardcopy To	
Email Report To	Zahir.Jina@teck.com			CC Hardcopy To	

15-088

SAMPLE DETAILS						ANALYSIS REQUESTED									ADDITIONAL INFORMATION
						PRESERV.									Initial - PASS/FAIL
						ANALYSIS	30 d early life stage, fathead minnow	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail			
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.										
GH_FR1_WS_2015_07_27_N	WS	7/28/2015		G	2		X								Re-fresh #1

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions
	M Calabrese / [illegible]	Jul 28/	16:30				Y / N Y / N Y / N
		[illegible]					Y / N Y / N Y / N
		[illegible]					Y / N Y / N Y / N
							Y / N Y / N Y / N

Sampler's Name	~~Zahir Jina~~ M. Calabrese	Mobile #	(403) 244-7245	Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature	[signature]	Date/Time	Jul 28/15 16:30				

2015/07/30 0950 13 All R201 [illegible]

Chain Of Custody Record

COC ID: 20140902-1509

Turnaronnd Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Coal Mountain Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Contact Name	Don Sacino			Contact Name	Krysta Pearcy			Address			
Address	2261 Corbin Rd.			Address	8664 commerce Court						
City	Sparwood	Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada	City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425 7377			Postal Code	V5A 4N7	Country	Canada	Task Code			
Email EDD To	Rick.Magliocco@teck.com			Phone Number				Shipping Company			
	Don.Sacino@teck.com			Email Address				Tracking Number			
	Carla.Romero@teck.com			PO Number				CC Hardcopy To			
								CC Hardcopy To			

SAMPLE DETAILS / ANALYSIS REQUESTED / ADDITIONAL INFORMATION

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. / ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia Pass/Fail	72 h P. subcapitata Pass/Fail	30 d fathead minnow Pass/Fail	28 d H. Azteca Pass/Fail					ADDITIONAL INFORMATION
												WO# 15556 (-)					
CM_MC2_WKLY_WS_20150729_N	WS	29/7/2015	8:00	G	2				X	X		X					

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
				Krysta Pearcy / Nautilus Environmental	July 30/15	0630	13.0	Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	JAMES BOLDT	Mobile #	250 - 425 - 7350
Sampler's Signature	[signature]	Date/Time	29-07-2015 9:30 hr

Temp in °C | Samples on ice? | Sample intact? | Trip Blank?

[illegible] sample. [illegible] 2x20L

Chain Of Custody Record

COC ID: 20140902-1509

Turnaround Time:

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Coal Mountain Operation	Lab Name	Hydroqual Laboratories	Send Invoice To	
Contact Name	Don Sacino	Contact Name	Jacklyn Pool	Address	
Address	2261 Corbin Rd.	Address	#4, 6125-12th Street S.E.		
City	Sparwood Prov. BC			City	State
Postal Code	V0B 2G0 Country Canada	City	Calgary State AB	Postal Code	Country
Phone Number	250 425 7377	Postal Code	T2H 2K1 Country Canada	Task Code	
Email EDD To	Rick.Magliocco@teck.com	Phone Number	403-253-7121	Shipping Company	
	Don.Sacino@teck.com	Email Address		Tracking Number	
	Carla.Romero@teck.com	PO Number		CC Hardcopy To	
				CC Hardcopy To	

SAMPLE DETAILS / ANALYSIS REQUESTED / ADDITIONAL INFORMATION

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. / ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia	72 h P. subcapitata	30 d fathead minnow (Pass/Fail)	28 d H. Azteca	30-d O.mykiss embryo-alevin Pass/Fail			
15-0846																
CM_MC2_WKLY_WS_20150729_N	WS	29/7/2015	8:00	G	2						X					

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
							Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Sampler's Name	JAMES BOLDT	Mobile #	(250) - 919 - 9876
Sampler's Signature	[signature]	Date/Time	29-07-2015 2:30hr

20115/07/30 ~~#~~ 095013 8x20L Manitoulin No SIE

COC ID:	20150805-1211	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS									ANALYSIS REQUESTED											
Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	28 Day H. azteca Pass/Fail (28DAHA) (1)											
FR_FRCP1_Q_20072015_N				WS	2015/08/05	10:40	G	1	1											
FR_UFR1_Q_20072015_N				WS	2015/08/05	09:55	G	1	1											

WO#155660

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	L. Wilm	Aug 5/15 12:00	Krysta Pearcy/ Nautilus Environmental	Aug 6/15 0630

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Lee Wilm	Mobile #	250-433-1354
	Sampler's Signature		Date/Time	Aug 5/15 - 17:00

Rec'd 1 X 20L Temp 15°C

(1) Second H. azteca test started w/ this sample

COC ID:	20150805-1213	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	HydroQual Laboratories			Email Invoice To	
Project Number				Lab Contact	Jacklyn Pool			Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	#4 6125-12th Street S.E.			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Calgary	State	AB	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number				Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

15-0844 Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30 Day Fathead minnow Pass/Fail (30DELSFM)
FR_FRCP1_Q_20072015_N				WS	2015/08/05	10:40	G	2	2
FR_UFR1_Q_20072015_N				WS	2015/08/05	09:55	G	2	2
15-0845									

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	L. Wilm Aug 5/15	12:00		

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Lee Wilm	Mobile #	250-433-1334
	Sampler's Signature	[signature]	Date/Time	Aug 5/15 12:00

2015/08/06 0900 HKS 8x20L carbop NOS H 15 Manitoulin

Chain Of Custody Record

COC ID: July Quarterly_Nautilus_East, Re-Fresh #2

Page: 1 of 1

Turnaround Time: Rush:

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Greenhills Operation	Lab Name	Nautilus Environmental	Send Invoice To	
Project Number		Contact Name		Address	
Contact Name	Zahir Jina	Address	8664 Commence Court		
Address	P.O. BOX 5000		Imperial Square Lake City	City	State
		City	Burnaby State BC	Postal Code	Country
City	Elkford State BC	Postal Code	V5A 4N7 Country Canada	Task Code	
Postal Code	V0B1H0 Country Canada	Phone Number		Shipping Company	
Phone Number	250-865-3301	Email Address		Tracking Number	
Email EDD To	Zahir.Jina@teck.com	Quote Number		CC Hardcopy To	
Email Report To	Zahir.Jina@teck.com			CC Hardcopy To	

SAMPLE DETAILS / ANALYSIS REQUESTED / ADDITIONAL INFORMATION

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. / ANALYSIS	30 d early life stage, fathead minnow	28 d Hyallella (1)	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail					ADDITIONAL INFORMATION
																	20L for LT50 Rainbow, 2x1L for LT50 Daphnia
'GH_FR1_WS_2015_08_03_N	WS	2015/08/05	8:30	G	2			X									Rec'd 2x20L up
								WO#15560									

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	M. Calabrese	Aug 5/15	9:00	Krysta Pearcy / Nautilus Environmental	Aug 6/15	0630	12.5	Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	~~Zahir Jina~~ M. Calabrese	Mobile #	647-244-7245
Sampler's Signature	M Calab	Date/Time	Aug 5/15 9:00

Temp in °C | Samples on ice? | Sample intact? | Trip Blank?

[illegible] last started [illegible]

Chain Of Custody Record

COC ID: Quarterly_FR1_F.Minnow_HydroQual, Re-Fresh #2 | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	HydroQual Laboratories Ltd.			Send Invoice To			
Project Number				Contact Name	Jacklyn Pool			Address			
Contact Name	Zahir Jina			Address	#4, 6125 - 12th Street S.E						
Address	P.O. BOX 5000							City		State	
				City	Calgary	State	AB	Postal Code		Country	
City	Elkford	State	BC	Postal Code	T2H2K1	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number	403.253.7121			Shipping Company			
Phone Number	250-865-3301			Email Address				Tracking Number			
Email EDD To	Zahir.Jina@teck.com			Quote Number				CC Hardcopy To			
Email Report To	Zahir.Jina@teck.com							CC Hardcopy To			

16-0843

SAMPLE DETAILS						ANALYSIS REQUESTED									ADDITIONAL INFORMATION
						PRISERV									Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail			
'GH_FR1_WS_2015_08_03_N	WS	8/5/2015	8:30	G	2		X								Re-fresh #2

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
2015/08/06 HES 0900	M. Calabrese	Aug 5/15	9:00				Y / N	Y / N	Y / N	
5x coolers 8x20L carboys							Y / N	Y / N	Y / N	
good condition							Y / N	Y / N	Y / N	
no seals / no initials							Y / N	Y / N	Y / N	
~ 15°C										
manitoulin										

Sampler's Name	M. Calabrese	Mobile #	647-244-7245	Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature	M Calabrese	Date/Time	Aug 5/15 9:00				

Chain Of Custody Record

COC ID: 20140902-1509

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Coal Mountain Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Contact Name	Don Sacino			Contact Name	Krysta Pearcy			Address			
Address	2261 Corbin Rd.			Address	8664 commerce Court						
City	Sparwood	Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada	City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425 7377			Postal Code	V5A 4N7	Country	Canada	Task Code			
Email EDD To	Rick.Magliocco@teck.com			Phone Number				Shipping Company			
	Don.Sacino@teck.com			Email Address				Tracking Number			
	Carla.Romero@teck.com			PO Number				CC Hardcopy To			
								CC Hardcopy To			

SAMPLE DETAILS / ANALYSIS REQUESTED / ADDITIONAL INFORMATION

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. / ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia Pass/Fail	72 h P. subcapitata Pass/Fail	30 d fathead minuow Pass/Fail	28 d H. Azteca Pass/Fail					ADDITIONAL INFORMATION
CM_MC2_WKLY_WS_20150805_N	WS	5/8/2015		G					~~X~~ ①	~~X~~ ①		X ② WO#15556					Rec'd 2x20L KP

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
				Krysta Pearcy / Nautilus Environmental	Aug 6/15	0630	10.0	Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
							Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Sampler's Name		Mobile #	
Sampler's Signature		Date/Time	05-08-2015 __:__ hr

① Confirmed w/ client this test is not required KP ② Second H. azteca test started with this sample KP

Chain Of Custody Record

COC ID: 20140902-1509 | Page: 1 of 2

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Coal Mountain Operation			Lab Name	Hydroqual Laboratories			Send Invoice To	
Contact Name	Don Sacino			Contact Name	Jacklyn Pool			Address	
Address	2261 Corbin Rd.			Address	#4, 6125-12th Street S.E.				
City	Sparwood	Prov.	BC					City	State
Postal Code	V0B 2G0	Country	Canada	City	Calgary	State	AB	Postal Code	Country
Phone Number	250 425 7377			Postal Code	T2H 2K1	Country	Canada	Task Code	
Email EDD To	Rick.Mast@teck.com			Phone Number	403-253-7121			Shipping Company	
	Don.Sacino@teck.com			Email Address				Tracking Number	
	Carla.Romero@teck.com			PO Number				CC Hardcopy To	
								CC Hardcopy To	

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. / ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia	72 h P. subcapitata	30 d fathead minnow (Pass/Fail)	28 d H. Azteca	30-d O.mykiss embryo-alevin Pass/Fail			
CM_MC2_WKLY_WS_20150805_N	WS	5/8/2015		G							X					
15-0846																

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time

Sample Receipt Conditions			
	Y / N	Y / N	Y / N
	Y / N	Y / N	Y / N
	Y / N	Y / N	Y / N
	Y / N	Y / N	Y / N
Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Sampler's Name		Mobile #	
Sampler's Signature		Date/Time	05-08-2015 __:__ hr

2015/08/06 0900 HKS 8x20L NOSII 15 Monitoulin

COC ID:	20150812-1415	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS									ANALYSIS REQUESTED											
Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	48 hr Dapnia Sinlge Conc. Pass/Fail (EPS1RM14)	96 Hr Rainbow Trout Single Conc. Pass/Fail (EPS1RM13)	28 Day H. azteca Pass/Fail (28DAHA)								Temp °C (1L)	Temp °C (20L)
FR_SKP1_Q_06072015_N				WS	2015/08/11	10:00	G	3		2	1									9.0	12.3
3) FR_FRCP1_Q_27072015_N				WS	2015/08/12	13:40	G	1				1									18.6
1) FR_UFR1_Q_27072015_N				WS	2015/08/12	13:01	G	1				1									18.9
									WO #	15615	15616	15566									

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
① refresh samples.	Tyler Rae Bezaire	Aug 12 2015 15:30	Nautilus NY - Nan Yamamoto 2x1L + 3x20L	Aug 13/15 @ 08:40

NB OF BOTTLES RETURNED/DESCRIPTION				
X NY	Sampler's Name		Mobile #	
	Sampler's Signature		Date/Time	Aug 12 2015 15:30

COC ID:	20150812-1416	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Hydroqual			Email Invoice To	
Project Number				Lab Contact	Elisabeth Henson			Invoice Reports	
Department				Email	elisabeth_henson@golder.com			Email Report To	
Address	PO Box 100			Address				Email Reports	
								Shipping Company	
City	Elkford	State	BC	City		State		Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code		Country		Cooler Count	
Phone Number	1-250-865-5289			Phone Number	403-253-7121			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

15-0844

Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30 Day Fathead Minnow
FR_FRCP1_Q_27072015_N				WS	2015/08/12	13:40	G	2	2
FR_UFR1_Q_27072015_N				WS	2015/08/12	13:01	G	2	2

5-0845

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	[illegible]	[illegible] Aug 12 2015 15:00		

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	[illegible]	Mobile #	
	Sampler's Signature	[signature]	Date/Time	Aug 12 2015 15:00

Nautilus WO# 15567

2015/08/13 0900 #23 8x20L Manitoulin No SII

Chain Of Custody Record

COC ID: Quarterly_Nautilus_East, Re-Fresh #3 | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Project Number				Contact Name				Address			
Contact Name	Zahir Jina			Address	8664 Commence Court						
Address	P.O. BOX 5000				Imperial Square Lake City			City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number				Shipping Company			
Phone Number	250-865-3301			Email Address				Tracking Number			
Email EDD To	Zahir.Jina@teck.com			Quote Number				CC Hardcopy To			
Email Report To	Zahir.Jina@teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail				Temp °C
'GH_FR1_WS_2015_08_12_N	WS	2015/08/12	1333	G	2			X								16.3
							WO # 15560									

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
= refresh sample =				Nautilus	Aug 13/15	08:40		Y / N	Y / N	Y / N
				NY - Nan Yamamoto				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				2 x 20 L				Y / N	Y / N	Y / N

Sampler's Name	Zahir Jina	Mobile #		Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature		Date/Time					

Chain Of Custody Record

COC ID: Quarterly_FR1_F.Minnow_HydroQual, Re-Fresh #3 | Page: 1 of 1

Turnaround Time: | **Rush:**

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	HydroQual Laboratories Ltd.			Send Invoice To			
Project Number				Contact Name	Jacklyn Pool			Address			
Contact Name	Zahir Jina			Address	#4, 6125 - 12th Street S.E						
Address	P.O. BOX 5000							City		State	
				City	Calgary	State	AB	Postal Code		Country	
City	Elkford	State	BC	Postal Code	T2H2K1	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number	403.253.7121			Shipping Company			
Phone Number	250-865-3301			Email Address				Tracking Number			
Email EDD To	Zahir.Jina@teck.com			Quote Number				CC Hardcopy To			
Email Report To	Zahir.Jina@teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED									ADDITIONAL INFORMATION
						PRESERV									Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow	28 d Hyalella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail			
15-0843															
GH_FR1_WS_2015_08_12_N	WS	8/12/2015	13 30	G	2		X								Re-fresh #3

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

				Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Name	Zahir Jina	Mobile #					
Sampler's Signature		Date/Time					

Nautilus wo#15561

2015/08/13 0900 ~~#~~ 23 RLDN Manitoulin WASH

Chain Of Custody Record

COC ID: 20140902-1509 | Page: 1 of 2

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Coal Mountain Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Contact Name	Don Sacino			Contact Name	Krysta Pearcy			Address			
Address	2261 Corbin Rd.			Address	8664 commerce Court						
City	Sparwood	Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada	City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425 7377			Postal Code	V5A 4N7	Country	Canada	Task Code			
Email EDD To	Rick.Magliocco@teck.com			Phone Number				Shipping Company			
	Don.Sacino@teck.com			Email Address				Tracking Number			
	Carla.Romero@teck.com			PO Number				CC Hardcopy To			
								CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV.	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia Pass/Fail	72 h P. subcapitata Pass/Fail	30 d fathead minnow Pass/Fail	28 d H. Azteca Pass/Fail				Temp °C
CM_MC2_WKLY_WS_20150812_N	WS	12/8/2015		G								X				15.0
											WO # 15556					

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
=refresh sample=				Nautilus - NY - Nan Yamamoto	Aug 13/15	08:40		Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				2X20L				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Kennedy Allen/ Don Sacino/ Carla Romero	Mobile #		Temp in °C	Samples on ice?
Sampler's Signature	Kennedy Allen	Date/Time	12-08-2015 16:45		Sample intact?
					Trip Blank?

Chain Of Custody Record

COC ID: 20140902-1509

Turnaround Time:

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Coal Mountain Operation	Lab Name	Hydroqual Laboratories	Send Invoice To	
Contact Name	Don Sacino	Contact Name	Jacklyn Pool	Address	
Address	2261 Corbin Rd.	Address	#4, 6125-12th Street S.E.		
City	Sparwood Prov. BC			City	State
Postal Code	V0B 2G0 Country Canada	City	Calgary State AB	Postal Code	Country
Phone Number	250 425 7377	Postal Code	T2H 2K1 Country Canada	Task Code	
Email EDD To	Rick.Magliocco@teck.com	Phone Number	403-253-7121	Shipping Company	
	Don.Sacino@teck.com	Email Address		Tracking Number	
	Carla.Romero@teck.com	PO Number		CC Hardcopy To	
				CC Hardcopy To	

SAMPLE DETAILS / ANALYSIS REQUESTED / ADDITIONAL INFORMATION

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. / ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia	72 h P. subcapitata	30 d fathead minnow (Pass/Fail)	28 d H. Azteca	30-d O.mykiss embryo-alevin Pass/Fail				ADDITIONAL INFORMATION
15-0846																	
CM_MC2_WKLY_WS_20150812_N	WS	12/8/2015		G							X						

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
							Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Sampler's Name	Carla Romero/ Don Sacino/ Kennedy Allen	Mobile #	
Sampler's Signature	Kennedy Allen	Date/Time	12-08-2015 [illegible] hr

Nautilus WO#15557

2015/08/13 0900 A#23 8x20C Manitoulin No SHF

COC ID:	20150819-0951	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 28 Day H. azteca Pass/Fail (28DAHA)	WO # 15566										Temp °C
FR_FRCP1_Q_03082015_N				WS	2015/08/19	09:47	G	1	1										SSD	~~15.1~~ 14.6
FR_UFR1_Q_03082015_N				WS	2015/08/19	09:07	G	1	1											14.2

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
= refresh sample =	EakFRO / A. Bezzola	Aug 19 2015 10:50	Nautilus - SSD - Sam Dhothar	Aug 20/15 09:15
			2x1 x 20L	

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	A. Bezzola	Mobile #	
	Sampler's Signature	[signature]	Date/Time	Aug 19 2015 10:50

COC ID:	20150819-0952	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Hydroqual			Email Invoice To	
Project Number				Lab Contact	Elisabeth Henson			Invoice Reports	
Department				Email	elisabeth_henson@golder.com			Email Report To	
Address	PO Box 100			Address				Email Reports	
								Shipping Company	
City	Elkford	State	BC	City		State		Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code		Country		Cooler Count	
Phone Number	1-250-865-5289			Phone Number	403-253-7121			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

15-0844

Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30 Day Fathead Minnow
FR_FRCP1_Q_03082015_N				WS	2015/08/19	09:47	G	2	2
FR_UFR1_Q_03082015_N				WS	2015/08/19	09:07	G	2	2

15-0845

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Test FRO Ata Bezzola	Aug 19 2015 10:50		

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Ata Bezzola	Mobile #	
	Sampler's Signature	[signature]	Date/Time	Aug 19 2015 10:50

Chain Of Custody Record

COC ID: Quarterly_Nautilus_East, Re-Fresh #4 | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Project Number				Contact Name				Address			
Contact Name	Zahir Jina			Address	8664 Commence Court						
Address	P.O. BOX 5000				Imperial Square Lake City			City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number				Shipping Company			
Phone Number	250-865-3301			Email Address				Tracking Number			
Email EDD To	Zahir.Jina@teck.com			Quote Number				CC Hardcopy To			
Email Report To	Zahir.Jina@teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail			Temperature	
'GH_FR1_WS_2015_08_19_N	WS	2015/08/19	11:50	G	2			X							12.8	
								WO# 15560								

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
=refreshsample=				Nautilus - SSD - Sam Dhaliwal	Aug 20/15	09:15		Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				2 x 20L				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

					Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Name	Zahir Jina	Mobile #						
Sampler's Signature		Date/Time						

Chain Of Custody Record

COC ID: Quarterly_FR1_F.Minnow_HydroQual, Re-Fresh #4 | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Greenhills Operation	Lab Name	HydroQual Laboratories Ltd.	Send Invoice To	
Project Number		Contact Name	Jacklyn Pool	Address	
Contact Name	Zahir Jina	Address	#4, 6125 - 12th Street S.E		
Address	P.O. BOX 5000			City	State
		City	Calgary State AB	Postal Code	Country
~~City~~	~~Elkford~~ ~~State~~ ~~BC~~	~~Postal Code~~	~~T2H2K1~~ ~~Country~~ ~~Canada~~	Task Code	
Postal Code	V0B1H0 Country Canada	Phone Number	403.253.7121	Shipping Company	
Phone Number	250-865-3301	Email Address		Tracking Number	
Email EDD To	Zahir.Jina@teck.com	Quote Number		CC Hardcopy To	
Email Report To	Zahir.Jina@teck.com			CC Hardcopy To	

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Initial - PASS/FAIL
						ANALYSIS	30 d early life stage, fathead minnow	28 d Hyaliella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail				
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.											
15-0843 'GH_FR1_WS_2015_08_19_N	WS	8/19/2015	1150	G	4		X									Re-fresh #4

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Zahir Jina	Mobile #		Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature		Date/Time					

2015/08/20 0930 10x20L 13 manitoba NOSI

Chain Of Custody Record

COC ID: 20140902-1509 | Page: 1 of 2

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Coal Mountain Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Contact Name	Don Sacino			Contact Name	Krysta Pearcy			Address			
Address	2261 Corbin Rd.			Address	8664 commerce Court						
City	Sparwood	Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada	City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425 7377			Postal Code	V5A 4N7	Country	Canada	Task Code			
Email EDD To	Rick.Magliocco@teck.com			Phone Number				Shipping Company			
	Don.Sacino@teck.com			Email Address				Tracking Number			
	Carla.Romero@teck.com			PO Number				CC Hardcopy To			
								CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV.	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia Pass/Fail	72 h P. subcapitata Pass/Fail	30 d fathead minnow Pass/Fail	28 d H. Azteca Pass/Fail				Temperature	
						ANALYSIS											
CM_MC2_WKLY_WS_20150819_N	WS	19/8/2015		G								X				16.4	
											WO# 15556						

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
=refresh sample=				Nautilus - NY - New Yorkmont	Aug 20/15	09:15		Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				2 x 20 L				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Kennedy Allen/ Don Sacino/ Carla Romero	Mobile #		Temp in °C	Samples on ice?
Sampler's Signature	Kennedy Allen	Date/Time	19-08-2015 14:30hr		Sample intact? / Trip Blank?

Chain Of Custody Record

COC ID: 20140902-1509 | Page: 1 of 2

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Coal Mountain Operation			Lab Name	Hydroqual Laboratories			Send Invoice To			
Contact Name	Don Sacino			Contact Name	Jacklyn Pool			Address			
Address	2261 Corbin Rd.			Address	#4, 6125-12th Street S.E.						
City	Sparwood	Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada	City	Calgary	State	AB	Postal Code		Country	
Phone Number	250 425 7377			Postal Code	T2H 2K1	Country	Canada	Task Code			
Email EDD To	tick.Maglocco@teck.com			Phone Number	403-253-7121			Shipping Company			
	Don.Sacino@teck.com			Email Address				Tracking Number			
	Carla.Romero@teck.com			PO Number				CC Hardcopy To			
								CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia	72 h P. subcapitata	30 d fathead minnow (Pass/Fail)	28 d H. Azteca	30-d O.mykiss embryo-alevin Pass/Fail			
15-0846																
CM_MC2_WKLY_WS_20150819_N	WS	19/8/2015		G							X					

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Carla Romero/ Don Sacino/ Kennedy Allen	Mobile #		Temp in °C	Samples on ice?
Sampler's Signature	Kennedy Allen	Date/Time	19-08-2015 14:30hr		Sample intact?
					Trip Blank?

COC ID:	20150826-1414	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS									ANALYSIS REQUESTED										
Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	28 Day H. azteca P/E										Temp °C
FR_FRCP1-WS-201508261215				WS	2015/08/26	12:15	G	1	1										18.3
FR_UFR1-WS-201508261224				WS	2015/08/26	12:24	G	1	1										18.3
									WO # 15566										

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
= Refresh Sample =	Ick FRC	Aug 26 2015 1423	Nautilus	Aug 27/15 @ 10:10
			N4 - Nan Yamamoto	
			2x20L	

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	A. Bozzo	Mobile #	
	Sampler's Signature		Date/Time	Aug 26, 2015 14:23

Chain Of Custody Record

COC ID: Quarterly_Nautilus_East, Re-Fresh #5 | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental			Send Invoice To	
Project Number				Contact Name				Address	
Contact Name	Zahir Jina			Address	8664 Commence Court				
Address	P.O. BOX 5000				Imperial Square Lake City			City	State
				City	Burnaby	State	BC	Postal Code	Country
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code	
Postal Code	V0B1H0	Country	Canada	Phone Number				Shipping Company	
Phone Number	250-865-3301			Email Address				Tracking Number	
Email EDD To	Zahir.Jina@teck.com			Quote Number				CC Hardcopy To	
Email Report To	Zahir.Jina@teck.com							CC Hardcopy To	

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow	28 d Hyallella P/F	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail				Temp °C
'GH_FR1_WS_2015_08_26_N	WS	2015/08/26	1245	G	2			X								10.7
							WO# 15560									

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
=refresh sample=				Nautilus	Aug 27/15	10:10		Y / N	Y / N	Y / N
				NY - Nan Yamamoto				Y / N	Y / N	Y / N
				2x20L				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

				Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Name	Zahir Jina	Mobile #	250 242 7537				
Sampler's Signature		Date/Time	Aug 26 15				

Chain Of Custody Record

COC ID: 20140902-1509 | Page: 1 of 2

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Coal Mountain Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Contact Name	Don Sacino			Contact Name	Krysta Pearcy			Address			
Address	2261 Corbin Rd.			Address	8664 commerce Court						
City	Sparwood	Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada	City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425 7377			Postal Code	V5A 4N7	Country	Canada	Task Code			
Email EDD To	Rick.Magliocco@teck.com			Phone Number				Shipping Company			
	Don.Sacino@teck.com			Email Address				Tracking Number			
	Carla.Romero@teck.com			PO Number				CC Hardcopy To			
								CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia Pass/Fail	72 h P. subcapitata Pass/Fail	30 d fathead minnow Pass/Fail	28 d H. Azteca Pass/Fail				Temp °C	
CM_MC2_WKLY_WS_20150826_N	WS	26/8/2015		G								X				15.5	
											WO # 15556						

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
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				NY - Ken Yamamoto				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
=refresh sample=				2X20L				Y / N	Y / N	Y / N

					Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Name	Kennedy Allen/ Carla Romero	Mobile #	2504233280					
Sampler's Signature		Date/Time	26-08-2015 15:30hr					

Section B-4: 4th Quarter 2015 Results

Nautilus Environmental

Toxicity testing on Elk Valley samples with *Ceriodaphnia dubia, Pseudokirchneriella subcapitata, Hyalella azteca, Pimephales promelas* and *Oncorhynchus mykiss*

Fourth Quarter 2015 Results

Final Report

Report date:
March 29, 2016

Submitted to:

Teck Coal Ltd.
Sparwood, BC

8664 Commerce Court
Burnaby, BC
V5A 4N7

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SIGNATURE PAGE

Krysta Pearcy, B.Sc.
Laboratory Biologist

James Elphick, R.P.Bio.
Senior Reviewer

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

1.0 INTRODUCTION

Nautilus Environmental conducted toxicity tests for Teck Coal Ltd. on samples collected from various locations in the Elk Valley as part of a quarterly and semi-annual chronic toxicity testing program required under BC Ministry of Environment permit number 107517. Test species required to be tested quarterly included a cladoceran (*Ceriodaphnia dubia*), a unicellular green alga (*Pseudokirchneriella subcapitata*), an amphipod (*Hyalella azteca*), and the fathead minnow (*Pimephales promelas*). An early life stages of rainbow trout (*Oncorhynchus mykiss*) test was conducted to fulfill semi-annual testing requirements.

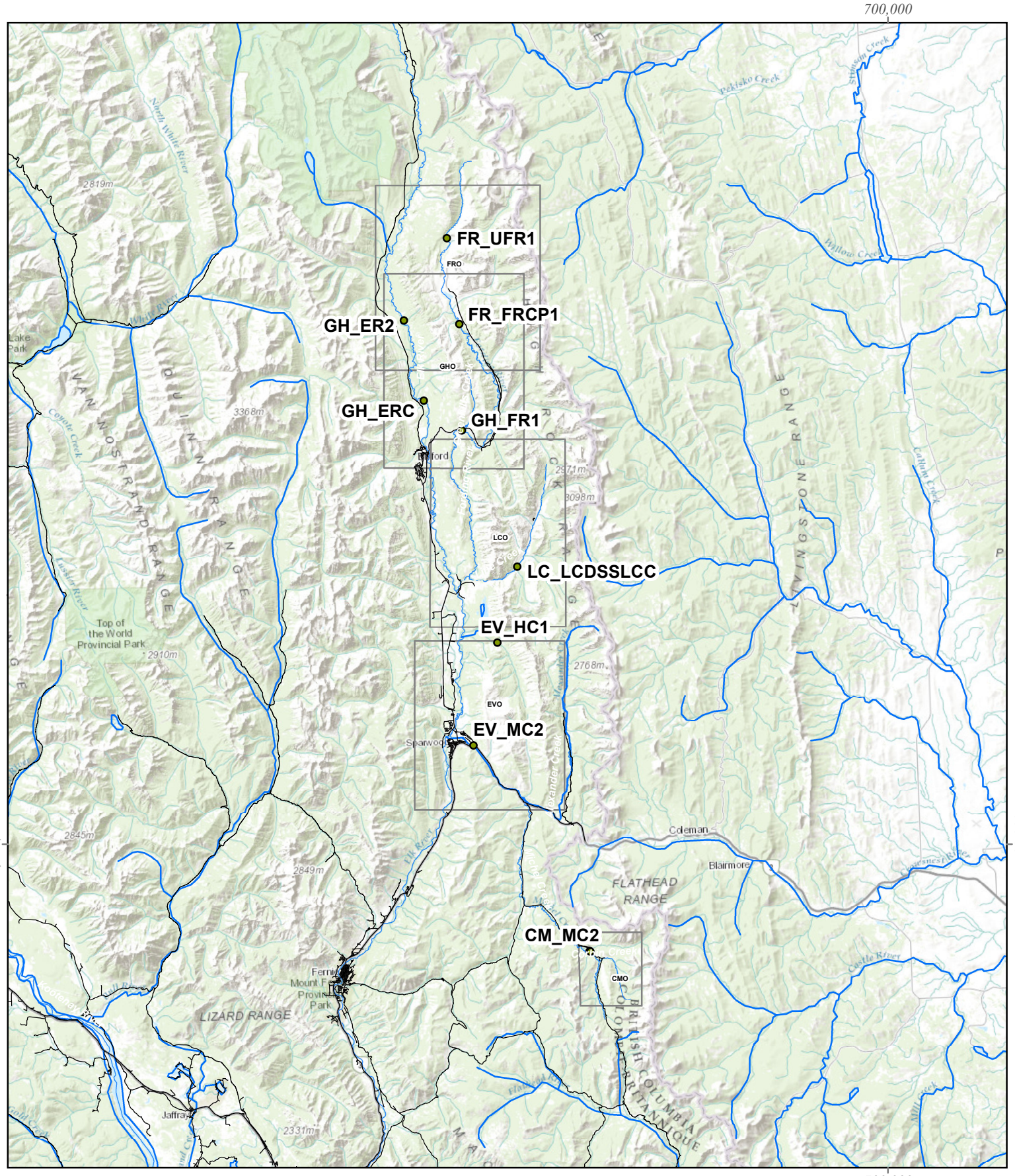
Water samples used for testing were transported in 20-L plastic containers in coolers containing ice packs. Samples were received at temperatures ranging from 1.0 to 12.0°C and were stored in the dark at 4 ± 2°C prior to testing. Table 1 outlines the toxicity tests that were conducted on each sample as well as sample collection dates. Refresh samples were collected weekly on the dates shown in Table 1 for the duration of the *H. azteca* and *P. promelas* and *O. mykiss* tests. The *P. promelas* test was conducted at the Nautilus Environmental laboratory in Calgary, AB (HydroQual); the other toxicity tests were conducted at the Burnaby, BC location.

This report presents the results of the toxicity tests. Copies of laboratory data sheets and printouts of statistical analyses are provided in Appendices A to E. Results of analytical chemistry that was performed on the samples tested in this program are provided in Appendix F. These samples were collected by Teck personnel at the same time the samples were collected for toxicity testing. The chain-of-custody forms are provided in Appendix G.

Table 1. Summary of toxicity testing program.

Sample ID	EMS Location ID	Species Tested	Sample Collection Dates
FR_UFR1 *	E216777	*C. dubia*, *P. subcapitata*, *H. azteca*, *P. promelas* and *O. mykiss*	October 26, November 2, November 9, November 16 and November 23, 2015
GH_ER2 *	0200389	*C. dubia*, *P. subcapitata* and *O. mykiss*	October 26, November 2, November 9, and November 16, 2015
FR_FRCP1	E300071	*C. dubia*, *P. subcapitata*, *H. azteca*, *P. promelas* and *O. mykiss*	October 26, November 2, November 9, November 16 and November 23, 2015
GH_FR1	0200378	*C. dubia*, *P. subcapitata*, *H. azteca*, *P. promelas* and *O. mykiss*	October 26, November 2, November 9, November 16 and November 23, 2015
GH_ERC	E300090	*C. dubia*, *P. subcapitata* and *O. mykiss*	October 26, November 2, November 9, and November 16, 2015
EV_MC2	E300091	*C. dubia*, *P. subcapitata* and *O. mykiss*	October 26, November 2, November 9, and November 16, 2015
EV_HC1	E102682	*C. dubia*, *P. subcapitata* and *O. mykiss*	October 26, November 2, November 9, and November 16, 2015
CM_MC2	E258937	*C. dubia*, *P. subcapitata*, *H. azteca*, *P. promelas* and *O. mykiss*	October 26, November 2, November 9, November 16 and November 23, 2015
LC_LCDSSLCC	E297110	*O. mykiss*	October 26, November 2, November 9, and November 16, 2015

* Site water control



Teck

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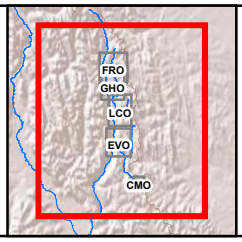

Chronic Toxicity Monitoring Locations

- Roads
- Rivers
- Monitoring Locations

N

0 4,000 8,000 16,000 Meters

DATE:	MINE OPERATION:
11/10/2015	Elk Valley
SCALE:	COORDINATE SYSTEM:
1:550,000	NAD 1983 UTM Zone 11N

Document Path: \\teckcominco.loc\CGO\Groups\TCGIS\Data\Operations\SPO\Dan_Vasiga\BaseLandscape_letter.mxd

2.0 METHODS

Methods for the toxicity tests using *C. dubia*, *P. subcapitata*, *H. azteca, P. promelas* and *O. mykiss* are summarized in Tables 2 through 6. Laboratory control water was 20% Perrier water prepared with deionized water for *C. dubia*; moderately hard water prepared by addition of reagent grade salts to dechlorinated municipal tap water for *P. promelas* according to a recipe provided by ASTM (1980); moderately hard water prepared by addition of reagent grade salts to dechlorinated municipal tap water for *H. azteca* according to a recipe provided in Environment Canada (2013); and dechlorinated municipal tap water for *O. mykiss*.

For the *H. azteca* tests, all of the site waters were supplemented with 25 mg/L chloride and 0.02 mg/L bromide using NaCl and NaBr, respectively, according to recommendations of the *Hyalella* Advisory Group (chaired by Chris Ingersoll, USGS) (Norberg-King et al., 2014), since low concentrations of these halides are known to impair growth of this species. The laboratory control water contained approximately 75 mg/L chloride and 0.8 mg/L bromide, respectively.

Statistical analyses were performed using CETIS (Tidepool Scientific Software, 2013), and involved comparison of results to both the laboratory and site water controls.

Table 2. Summary of test conditions: *Ceriodaphnia dubia* survival and reproduction test.

Test organism	*Ceriodaphnia dubia*
Test organism source	In-house culture
Test organism age	<24 h old neonates produced within 12 h
Test type	Static-renewal
Test duration	7 ± 1 day
Test vessel	20 mL test tube
Test volume	15 mL
Test replicates	10 test replicates per treatment
Number of organisms	1 per replicate
Control water	20% Perrier water
Test solution renewal	Daily
Test temperature	25 ± 1°C
Feeding	*Pseudokirchneriella subcapitata* and YCT
Light intensity	100 to 600 lux at water surface
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test protocol	Environment Canada (2007a)
Statistical software	CETIS
Test endpoint	Survival and reproduction
Test acceptability criteria for controls	≥80% survival; ≥15 young per surviving control producing three broods; ≥60% of controls producing three or more broods
Reference toxicant	Sodium chloride

Table 3. Summary of test conditions: *Pseudokirchneriella subcapitata* growth inhibition test.

Test organism	*Pseudokirchneriella subcapitata*, strain CPCC #37
Test organism source	In-house axenic culture, obtained from Canadian Phycological Culture Centre, and originally isolated from Nitelva River, Norway.
Test organism age	3-to 7-day old culture in logarithmic growth phase
Test type	Static
Test duration	72 hours
Test vessel	Microplate
Test volume	220 µL
Test replicates	4 replicates per treatment; 8 replicates for control
Number of organisms	10, 000 cells/mL
Control water	Deionized water with nutrients added
Test solution renewal	None
Test temperature	24 ± 2°C
Feeding	None
Light intensity	3600 to 4400 lux
Photoperiod	24 hours light
Sample filtration	Through a preconditioned membrane filter of 0.45 µm using a vacuum pump
Aeration	None
pH adjustment	None
Test protocol	Environment Canada (2007b)
Statistical software	CETIS
Test endpoint	Algal cell growth inhibition
Test acceptability criteria for controls	>16-fold increase in number of algal cells; CV ≤20%; no trend when analyzed using Mann-Kendall test
Reference toxicant	Zinc

Table 4. Summary of test conditions: *Hyalella azteca* survival and growth test.

Test organism	*Hyalella azteca*
Test organism source	Aquatic Research Organisms, NH
Test organism age	7-8 days old
Test type	Static-renewal
Test duration	28 days
Test vessel	375 mL glass container
Test volume	300 mL of water
Test replicates	5 test replicates per treatment
Number of organisms	10 per replicate
Control water	Moderately-hard water (hardness 80-100 mg/L $CaCO_3$) containing ~75 mg/L Cl and supplemented with 0.8 mg/L Br. Samples also supplemented with 25 mg/L Cl and 0.02 mg/L Br.
Test solution renewal	Twice daily
Test temperature	23 ± 1°C
Feeding	1 mL of YCT daily to each container. Tetramin daily, with amounts increasing weekly: Week 1: 0.5 mg, Week 2: 0.75 mg, Week 3: 1 mg, Week 4: 1.5 mg in each test container.
Light intensity	500 to 1000 lux at water surface
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test protocol	Modified from US EPA (2000), as described in Norberg-King et al. (2014)
Statistical software	CETIS
Test endpoint	Survival and dry weight
Test acceptability criteria for controls	Mean control survival of ≥80% survival
Reference toxicant	Sodium chloride

Table 5. Summary of test conditions: *Pimephales promelas* survival and growth test.

Test organism	*Pimephales promelas*
Test organism source	Aquatox, Hot Springs, AR
Test organism age	<24 hours
Test type	Static renewal
Test duration	28 days post hatch
Test vessel	1-L plastic container
Test volume	1 L
Test replicates	4 test replicates per treatment
Number of organisms	10 per replicate
Control water	Moderately-hard water (hardness 80-100 mg/L $CaCO_3$)
Test solution renewal	Daily
Test temperature	25 ± 1°C
Feeding	Twice a day, after hatch, with newly hatched brine shrimp *(Artemia nauplii)*
Light intensity	100 – 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	Provided post hatch (<100 bubbles/min)
Test protocol	US EPA (1996) and ASTM (2013)
Statistical software	CETIS
Test endpoint	Hatch, survival, length, biomass, normal development (which assesses incidence of deformities)
Test acceptability criteria for controls	>66% hatch; ≥70% post-hatch survival
Reference toxicant	Sodium chloride

Table 6. Summary of test conditions: *Oncorhynchus mykiss* embryo-alevin test.

Test organism	*Oncorhynchus mykiss*
Test organism source	Vancouver Island Trout Hatchery, Duncan, BC
Gamete quality	Small amount of water added to milt on a dry glass slide; verification of vigorous sperm motility using a compound microscope (100 X magnification)
Test organism age	<30 minutes post fertilization, <24 hour old gametes
Test type	Static renewal
Test duration	30 days
Test vessel	2-L plastic containers
Test volume	2 L
Test solution depth	17 cm
Test concentrations	100% (v/v), plus laboratory control
Test replicates	4 test replicates per treatment
No. of organisms	30 eggs per replicate
Control water	City of Burnaby dechlorinated municipal tap water (hardness 12 mg/L $CaCO_3$)
Test solution renewal	Daily (80% renewal)
Test temperature	14 ± 1°C
Feeding	None
Light intensity	Dark
Photoperiod	24 hours dark; low intensity light used during solution renewals
Aeration	6.5 ± 1 mL/min/L
Test protocol	Environment Canada (1998)
Statistical software	CETIS
Test endpoint	Survival, viability (which assesses incidence of deformities), length, wet weight
Test acceptability criteria for controls	≥65% normal hatched fish
Reference toxicant	Sodium dodecyl sulphate

3.0 RESULTS

Results of the toxicity tests using *C. dubia* are provided in Table 7. The site water and laboratory water controls performed similarly for this species, indicating that there was no adverse effect associated with the upstream Fording River and Elk River stations. No adverse effect was observed on survival of *C. dubia*; survival was 100% in all of the samples. An adverse effect on *C. dubia* reproduction was observed in two of the six samples (FR_FRCP1 and CM_MC2). Reduced reproduction in FR_FRCP1 and CM_MC2 was statistically significant relative to both the laboratory water and site water controls; percent reduction in reproduction was approximately 43 to 49% for FR_FRCP1 and 31 to 38% for CM_MC2 when compared to the site water and laboratory controls.

Results of the toxicity tests using *P. subcapitata* are provided in Table 8. In these tests, the site water controls produced 3.8-to 4.1-fold greater growth than the laboratory water control. This finding is not unusual, since the higher ionic strength associated with the site water controls would be expected to stimulate cell growth of this species relative to the very low ionic strength associated with the laboratory control water. Similarly, the samples exhibited a stimulation of cell growth relative to the laboratory water control; none of the samples exhibited a statistically significant reduction in cell growth relative to the laboratory water control. A statistically significant reduction in cell yield was observed for one sample (FR_FRCP1) when compared to the FR_UFR1 site water control; percent reduction compared to FR_UFR1 was 21%. Two samples (FR_FRCP1 and CM_MC2) had a statistically significant reduction in cell yield when compared to the GH_ER2 site water control; percent reduction compared to GH_ER2 was 27 and 13% for FR_FRCP1 and CM_MC2, respectively.

Results of the toxicity tests using *H. azteca* are provided in Table 9. Survival and dry weight in the site water and laboratory water controls were similar for this species, indicating that there was no adverse effects associated with the upstream Fording River station. No adverse effect was observed on *H. azteca* survival; survival was 92 to 100% in the samples and site water control. An adverse effect on dry weight was observed in one sample (CM_MC2) compared to the laboratory water control; percent reduction in dry weight compared to the laboratory water control was 21%. There were no statistically significant reductions in dry weight in the samples compared to the site water control.

Results of the toxicity tests using *P. promelas* are provided in Table 10. Hatch, survival, biomass, length and normal development were similar in the site water and laboratory water controls for

this species, indicating that there was no adverse or stimulatory effects associated with the upstream Fording River station. Survival of *P. promelas* was statistically significantly reduced in two samples (GH_FR1 and CM_MC2) compared to the laboratory water control; percent reduction was 57 and 68% compared to the laboratory water control for GH_FR1 and CM_MC2, respectively. Compared to the site water control, survival was statistically significantly reduced in one sample (CM_MC2); percent reduction was 61% compared to the site water control. There were no adverse effects on hatch, biomass, length, or normal development (i.e., incidence of deformities) in the samples compared to the site water and laboratory water controls.

The effects that were observed on fathead minnows were restricted to mortalities, and occurred predominantly between days 6 and 12 of the tests. Fathead minnows are known to be susceptible to adverse effects caused by fungi and microbes (Grothe and Johnson, 1996; Ksoz et al., 2997; Downey et al. 2000). These effects have been termed "sporadic mortality phenomenon", and are associated with mortalities that generally occur beginning on day 4 of the 7-day test with this species (Downey et al. 2000); this age is equivalent to day 6 of the 32-day test, which starts with an earlier life-stage. Effects associated with this phenomenon are generally associated with a high degree of between-replicate variability, as was in these 32-day tests. Thus, the pattern of effects observed with the samples tested here is consistent with effects caused by sporadic mortality phenomenon.

Results of the toxicity tests using *O. mykiss* are provided in Table 11. Survival, viability, length and wet weight of *O. mykiss* in the Elk River site water control and laboratory water control were similar, indicating that there were no adverse effects associated with the upstream Elk River station. There was a small (~10%) but statistically significant reduction in survival and viability in the Fording River site water control compared to the laboratory water control.

Survival and viability of *O. mykiss* were statistically significantly reduced in all samples compared to the laboratory water control; percent reduction ranged from 12 to 27%. Compared to the Fording River site water control, survival was statistically significantly reduced in two samples (FR_FRCP1 and GH_ERC) and viability was significantly reduced in three samples (FR_FRCP1, GH_FR1 and GH_ERC); percent reduction in survival and viability for these samples compared to the Fording River site water control ranged from 12 to 20%. Compared to the Elk River site water control, survival and viability were statistically significantly reduced in five samples (FR_FRCP1, GH_FR1, GH_ERC, EV_HC1 and CM_MC2); percent reduction in survival and viability for these samples compared to the Elk River site water control ranged from 12 to 23%.

Length of *O. mykiss* was statistically significantly reduced in two samples (FR_FRCP1 and GH_FR1) compared to the laboratory water control (~5% reduction). Compared to the Fording River site water control, length was statistically significantly reduced (~5% reduction) in three samples (FR_FRCP1, GH_FR1 and GH_ERC). Compared to the Elk River site water control, length was statistically significantly reduced (3% reduction) in one sample (GH_FR1). Wet weight of *O. mykiss* was statistically significantly reduced in one sample (GH_ERC) compared to the laboratory water control and both site water controls (~5% reduction).

There were no observations of unusual behaviour of *O. mykiss* in any of the test solutions, and the survival and viability endpoints were similar, indicating a low rate of deformities in all samples. A hatch rate was not calculated in these tests; however, the survival endpoint provides an appropriate measure of successful hatch, since the test is terminated shortly following hatch.

Table 7. Results: *Ceriodaphnia dubia* survival and reproduction test.

Sample ID	Survival (%)	Reproduction (Mean ± SD)
Laboratory Control	100	17.8 ± 4.6
FR_UFR1 (Site Control)	100	19.9 ± 3.1
GH_ER2 (Site Control)	100	19.5 ± 5.5
FR_FRCP1	100	10.1 ± 5.4 * α β
GH_FR1	100	22.1 ± 4.8
GH_ERC	100	21.4 ± 5.9
EV_MC2	100	19.7 ± 4.4
EV_HC1	100	21.1 ± 3.8
CM_MC2	100	12.3 ± 3.5 * α β

SD = Standard Deviation
* Result was significantly lower than the laboratory control
α Result was significantly lower than the site control FR_UFR1
β Result was significantly lower than the site control GH_ER2

Table 8. Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Sample ID	Cell Yield (x 10^4 cells/mL) (Mean ± SD)	Stimulation relative to laboratory control (%)
Laboratory Control	32.2 ± 1.8	-
FR_UFR1 (Site Control)	121.8 ± 7.9 β	277.5
GH_ER2 (Site Control)	132.1 ± 4.5	309.7
FR_FRCP1	96.2 ± 2.2 α β	198.4
GH_FR1	153.0 ± 5.0	374.4
GH_ERC	146.5 ± 3.1	354.3
EV_MC2	136.0 ± 4.1	321.7
EV_HC1	129.0 ± 3.9	300.0
CM_MC2	115.3 ± 3.5 β	257.4

SD = Standard Deviation
α Result was significantly lower than the site control FR_UFR1
β Result was significantly lower than the site control GH_ER2

Table 9. Results: *Hyalella azteca* survival and growth test.

Sample ID	Survival (%) (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Laboratory Control	98.0 ± 4.5	0.77 ± 0.14
FR_UFR1 (Site Control)	92.0 ± 8.4	0.80 ± 0.23
FR_FRCP1	100 ± 0.0	0.71 ± 0.03
GH_FR1	94.0 ± 5.5	0.74 ± 0.05
CM_MC2	100 ± 0.0	0.61 ± 0.06 *

SD = Standard Deviation
* Result was significantly lower than the laboratory control

Table 10. Results: *Pimephales promelas* survival and growth test.

Sample ID	Hatch (%) (Mean ± SD)	Survival (%) (Mean ± SD)	Biomass (mg) (Mean ± SD)	Length (mm) (Mean ± SD)	Normal development (%) (Mean ± SD)
Laboratory Control	91.7 ± 6.4	88.3 ± 6.4	1.2 ± 0.2	8.8 ± 1.0	98.2 ± 3.5
FR_UFR1 (Site Control)	95.0 ± 6.4	71.7 ± 22.7	1.2 ± 0.1	9.0 ± 1.4	97.9 ± 4.0
FR_FRCP1	98.3 ± 3.3	85.0 ± 14.8	1.6 ± 0.1	9.2 ± 0.5	98.3 ± 3.5
GH_FR1	88.3 ± 19.2	38.3 ± 26.9 *	1.0 ± 0.7	10.0 ± 1.0	100.0 ± 0.0
CM_MC2	91.7 ± 10.0	28.3 ± 22.7 * α	1.1 ± 0.3	12.5 ± 2.6	100.0 ± 0.0

SD = Standard Deviation
* Result was significantly lower than the laboratory control
α Result was significantly lower than the site control FR_UFR1

Table 11. Results: *Oncorhynchus mykiss* embryo-alevin test.

Sample ID	Survival (%) (Mean ± SD)	Viability (%) (Mean ± SD)	Length (mm) (Mean ± SD)	Wet Weight (mg) (Mean ± SD)
Laboratory Control	92.5 ± 3.1	92.5 ± 3.1	19.0 ± 0.4	79.8 ± 1.1
FR_UFR1 (Site Control)	83.2 ± 7.1 *	83.2 ± 7.1 *	19.0 ± 0.3	81.3 ± 2.9
GH_ER2 (Site Control)	86.8 ± 2.3	86.8 ± 2.3	18.4 ± 0.5 α	78.8 ± 2.6
FR_FRCP1	67.5 ± 1.7 * α β	66.7 ± 2.7 * α β	18.3 ± 0.2 * α	79.8 ± 1.0
GH_FR1	74.2 ± 5.0 * β	73.3 ± 3.8 * α β	17.9 ± 0.3 * α β	78.2 ± 1.5
GH_ERC	71.3 ± 20.4 * α β	68.8 ± 20.1 * α β	18.4 ± 0.4 α	76.1 ± 0.4 * α β
EV_MC2	80.8 ± 14.6 *	79.2 ± 14.0 *	18.7 ± 0.4	78.0 ± 2.0
EV_HC1	76.2 ± 3.5 * β	74.5 ± 2.6 * β	18.7 ± 0.3	80.1 ± 0.4
CM_MC2	75.9 ± 3.7 * β	75.1 ± 5.2 * β	19.0 ± 0.6	82.1 ± 1.7
LC_LCDSSLCC	81.6 ± 8.3 *	80.8 ± 8.2 *	18.6 ± 0.7	82.2 ± 3.4

SD = Standard Deviation
* Result was significantly lower than the laboratory control
α Result was significantly lower than the site control FR_UFR1
β Result was significantly lower than the site control GH_ER2

4.0 QA/QC

The health histories of the test organisms used in the exposures were acceptable and met the requirements of the Environment Canada protocols. The tests met all control acceptability criteria and water quality parameters remained within ranges specified in the protocols throughout the tests. There were no deviations from the test methodologies other than the planned modification to the *H. azteca* method described in Section 2.0. Uncertainty associated with these tests is best described by the standard deviations around the means.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 12. Results for these tests fell within the acceptable range for organism performance of mean and two standard deviations, based on historical results obtained by the laboratory with these tests. Thus, the sensitivity of the organisms used in these tests was appropriate.

Table 12. Reference toxicant test results.

Test Species	Endpoint	Historical Mean (2 SD Range)	CV (%)	Test Date
C. dubia	Survival (LC50): 2.0 g/L NaCl	2.0 (1.8–2.2)	5	November 3, 2015
	Reproduction (IC50): 1.4 g/L NaCl	1.5 (1.2–2.0)	14	
P. subcapitata	Growth (IC50): 35.7 µg/L Zn	28.5 (16.2–50.1)	32	November 3, 2015
H. azteca	Survival (LC50): 5.6 g/L NaCl	5.2 (4.4–6.2)	9	October 28, 2015
P. promelas	Survival (LC50): 0.6 g/L NaCl	0.9 (0.6–1.4)	15	November 2, 2015
	Biomass (IC25): 0.4 g/L NaCl	0.5 (0.4–0.7)	12	
O. mykiss	Viability (EC50): 3.0 mg/L SDS	4.0 (2.2 - 7.4)	36	October 27, 2015

SD = Standard Deviation, CV = Coefficient of Variation, LC = Lethal Concentration, IC = Inhibition Concentration, EC = Effect Concentration

5.0 REFERENCES

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6.0 END OF REPORT

APPENDIX A – *Ceriodaphnia dubia* Toxicity Test Data

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 15864

Start Date/Time: Oct 27/15 @ 1315h
Set up by: EMM

Sample Information:

Sample ID: Various, see results table for IDs.
Sample Date: Oct 26/15
Date Received: Oct 27/15
Sample Volume: Various

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 101615B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 0 5 ean
Mortality (%) in previous 7 d: 28 R
Individual female # used ≥8 young on test day 31,32,33,34,35,36,37,38,39,40

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd136
Stock Solution ID: 15Na03
Date Initiated: Nov 3/15

7-d LC50 (95% CL): 2.0 (1.7-2.3) g/L NaCL
7-d IC50 (95% CL): 1.4 (1.1-1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-2.0) g/L NaCL CV (%): 14

Test Results:

100% (v/v)	Survival (%) (Mean ± SD)	Reproduction (Mean ± SD)
Lab Negative Control	100 ± 0.0	17.8 ± 4.6
FR_UFR1_Q_05102015_N	100 ± 0.0	19.9 ± 3.1
GH_ER2_WS_2015-10-26_N	100 ± 0.0	19.5 ± 5.5
FR_FRCP1_Q_05102015_N	100 ± 0.0	10.1 ± 5.4 ①
GH_FR1_WS_2015-10-26_N	100 ± 0.0	22.1 ± 4.8
GH_ERC_WS_2015-10-26_N	100 ± 0.0	21.4 ± 5.9
EV_HC1_WS_2015-10-26_N	100 ± 0.0	21.1 ± 3.8
EV_MC2_WS_2015-10-26_N	100 ± 0.0	19.7 ± 4.4
CM_MC2_WS_2015-10-26_N	100 ± 0.0	12.3 ± 3.5 ①

Additional site/upstream controls

① Reproduction was significantly less than the lab control, FR_UFR1 and GH_ER2 (upstream controls).

Reviewed by: JGh
Date reviewed: Nov. 18/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: Teck grassy fall (6 samples + 1 ref)
Work Order #: 15864 various

Start Date & Time: OCT 27/15 @ 1515h
Stop Date & Time: NOV 3/15 @ 1400h
Test Species: *Ceriodaphnia dubia*

Lab control	Days													
Concentration	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.1	7.9	8.0	7.8	8.0	7.7	8.1	7.7	8.0	7.6	8.0	7.7	8.0	7.6
pH	8.0	7.8	8.0	7.9	8.1	7.9	8.1	7.9	7.9	7.9	8.0	7.9	8.0	7.8
Cond. (µS/cm)	223	224		222		222		222		222		222		221
Initials	EMM	MLT		EMM		EMM		JW		EMM		EMM		EMM

FR_UFR1 (100% c/w)	Days													
Concentration	0	1		2		3		4		5		6		7
Site control one	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	25.0	25.0	24.0	25.0	24.5	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.1	8.0	7.9	7.9	8.2	7.7	8.6	7.7	8.3	7.8	8.2	7.7	8.1	7.6
pH	8.2	8.1	8.1	8.0	8.1	8.0	8.1	8.0	8.2	8.0	8.1	8.0	8.2	7.9
Cond. (µS/cm)	364	362		358		360		357		359		358		362
Initials	EMM	MLT		EMM		EMM		JW		EMM		EMM		EMM

GH_ER2 100% (c/w)	Days													
Concentration	0	1		2		3		4		5		6		7
Site control two	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	24.5	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.0	8.0	8.0	7.9	8.2	7.8	8.1	7.7	8.3	7.6	8.2	7.7	8.1	7.6
pH	8.0	8.1	8.0	8.0	7.9	8.0	7.9	8.0	8.0	8.0	7.9	8.0	8.0	8.0
Cond. (µS/cm)	313	313		309		310		304		309		310		317
Initials	EMM	MLT		EMM		EMM		JW		EMM		EMM		EMM

9% 100 (c/w)	Days													
Concentration	0	1		2		3		4		5		6		7
FR_FRC8	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	24.5	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	7.9	7.8	8.1	7.9	8.2	7.6	8.0	7.7	8.3	7.6	8.2	7.6	8.1	7.5
pH	8.1	8.1	8.1	8.0	8.1	8.0	8.1	7.9	8.1	8.0	8.1	7.9	8.1	7.9
Cond. (µS/cm)	1042	1016		1023		1020		1024		1021		1023		1028
Initials	EMM	MLT		EMM		EMM		JW		EMM		EMM		EMM

Thermometer: 4 **DO meter:** 1 **pH meter:** 2 **Conductivity meter:** 1

	Lab Control	FR_FRC8	GH_FR1	GH_ERC
Hardness*	100	680	500	186
Alkalinity*	96	200	178	154

* mg/L as CaCO3

Analysts: EMM, JW, MLT, AWD, KL, MM
Reviewed by: JW
Date reviewed: Nov. 18/15

Sample Description: all clear

Comments: **Broodboard Used:** 101, 15B (#31-40)

Version 1.3 Issued May 22, 2015

Nautilus Environmental Company Inc.

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: Teck_Possible Variant
Work Order #: 15884

Start Date & Time: Oct 27/15 @ 1315h
Stop Date & Time: Nov 3/15 @ 1400h
Test Species: *Ceriodaphnia dubia*

100% (v/v) Concentration GH_FR1	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	7.9	7.9	8.0	7.5	8.1	7.8	7.9	7.8	8.2	7.6	8.2	7.6	8.2	7.6
pH	8.1	8.2	8.1	8.0	8.1	8.0	8.1	8.1	8.1	8.0	8.1	8.0	8.1	8.0
Cond. (µS/cm)	770	758		743		749		753		750		752		760
Initials	EMM	MLT		EMM		EMM		JW		EMM		EMM		EMM

100% (v/v) Concentration GH_ER1	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	24.5	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.0	7.8	7.9	7.8	8.2	8.0	8.0	7.7	8.4	8.0	8.1	7.6	8.2	7.5
pH	~~8.0~~ 8.1	8.2	8.1	8.1	8.1	8.1	8.1	8.1	8.0	8.1	8.1	8.0	8.1	8.0
Cond. (µS/cm)	355	352		350		350		350		350		351		360
Initials	EMM	MLT		EMM		EMM		JW		EMM		EMM		EMM

① 8.1

100% (v/v) Concentration EV_HC1	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.0	7.8	8.0	7.8	8.2	7.9	8.0	7.8	8.3	7.8	8.2	7.6	8.2	7.5
pH	8.1	8.2	8.1	8.0	8.1	8.0	8.1	8.1	8.2	8.1	8.1	8.1	8.1	8.1
Cond. (µS/cm)	739	731		726		728		741		730		740		745
Initials	EMM	MLT		EMM		EMM		JW		EMM		EMM		EMM

100% (v/v) Concentration EV_MC2	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	24.5	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.0	7.8	8.0	7.8	8.2	7.6	8.1	7.7	8.3	7.6	8.2	7.8	8.2	7.5
pH	7.9	8.1	8.0	8.1	7.9	8.1	8.0	8.1	7.8	8.0	7.9	8.0	8.0	8.0
Cond. (µS/cm)	744	772		761		760		778		762		779		769
Initials	EMM	MLT		EMM		EMM		JW		EMM		EMM		EMM

Thermometer: 4 **DO meter:** 1 **pH meter:** 2 **Conductivity meter:** 1

	~~Site Control~~ GHED2	EV_HC1	EV_MC2	CM_MC2
Hardness*	164	420	580	480
Alkalinity*	150	202	208	198

* mg/L as CaCO3

Analysts: EMM, AWD, MLT, KL, JW, YM
Reviewed by: JW
Date reviewed: Nov. 18/15

Sample Description: All clear

Comments: **Broodboard Used:** 1016SB

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: Teck passifail variays
Work Order #: 15864

Start Date & Time: oct 27/15 @ 1315h
Stop Date & Time: oct 30/15 @ 1400h
Test Species: *Ceriodaphnia dubia*

100%(v/v) Concentration CM_SNC2	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.0	7.8	8.0	7.4	8.2	7.8	8.2	7.7	8.2	7.8	8.2	7.6	8.2	7.6
pH	8.2	8.2	8.2	8.1	8.2	8.2	8.2	8.0	8.1	8.0	8.2	8.0	8.2	8.0
Cond. (µS/cm)	884	867		864		863		864		864		869		860
Initials	EMM	MLT		EMM		EMM		JIN		EMM		EMM		EMM

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: 4 DO meter: 1 pH meter: 2 Conductivity meter: 1

	~~Site Control~~ FR-UPR			
Hardness*	190			
Alkalinity*	136			

* mg/L as CaCO3

Analysts: ~~EMM~~, MH, MLT, AWD, KL, MH
Reviewed by: JOV
Date reviewed: Nov-18/15

Sample Description: all clear

Comments: Broodboard Used: 101615B

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: Teck Pass/Fail Various
Work Order: 15869

100% (v/v)

Start Date & Time: OCT 27/15 @ 1315h
Stop Date & Time: NOV 3/15 @ 1400h
Set up by: EMM

Days	Concentration: Lab control										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	✓	4	✓	4	4	4	4	✓	4	JW
5	3	3	8	3	5	✓	6	5	3	6	EMM
6	6	7	✓	7	✓	6	✓	✓	6	✓	EMM
7	9	9	11	✓	10	11	10	12	✓	8	EMM
8											
Total	18	19	23	10	19	22 EMM 21	20	22 EV 21	9	18	EMM

Days	Concentration: Site control one FR-UTR-1										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	✓	✓	4	✓	✓	4	4	3	✓	JW
5	3	3	2	6	5	4	6	6	4	2	EMM
6	7	7	6	✓	8	6	✓	✓	✓	9	EMM
7	12	13	10	14	✓	10	9	11	11	10	EMM
8											
Total	22	23	18	24	13	20	19	21	18 EMM	21	EMM

Days	Concentration: Site control two - GH-ER2										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	4	✓	4	4	2	4	4	✓	✓	JW
5	3	8	4	6	5	5	6	5	4	4	EMM
6	7	✓	6	✓	✓	✓	✓	✓	8	6	EMM
7	14	15	✓	10	11	12	12	12	10	✓	EMM
8											
Total	24	27	10	20	20	19	22	21	22	10	EMM

Days	Concentration: FR-FRCP1										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	✓	3	✓	✓	✓	✓	✓	✓	✓	JW
5	3	4	✓	3	✓	3	2	2	3	4	EMM
6	6	6	4	5	✓	5	4	6	6	6	EMM
7	8	✓	8	✓	✓	10	✓	✓	✓	✓	EMM
8											
Total	17	10	15	8	0	18	6	8	9	10	EMM

Days	Concentration: GH-FR1										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	4	4	✓	4	4	✓	✓	3	4	✓	JW
5	8	7	5	6	✓	4	3	6	✓	6	EMM
6	✓	✓	8	✓	8	7	6	✓	8	9	EMM
7	13	11	10	14	12	10	✓	14	13	10	EMM
8											
Total	25	22	23	24	24	21	9	23	25	25 EMM 25	EMM

Days	Concentration: GH-ERC										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	3	5	5	✓	✓	✓	✓	4	✓	JW
5	8	4	6	✓	3	3	4	3	✓	4	EMM
6	✓	✓	12	10	6	8	9	8	10	11	EMM
7	14	10	✓	12	✓	12	14	11	12	✓	EMM
8											
Total	25	17	23	27	9	23	27	22	26	15	EMM

Days	Concentration: EV-HC1										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	✓	3	3	2	4	4	✓	3	2	JW
5	✓	3	6	7	6	✓	7	4	6	9	EMM
6	6	9	✓	✓	✓	9	✓	8	✓	✓	EMM
7	12	10	14	13	10	12	12	✓	11	13	EMM
8											
Total	21	22	23	23	18	25	23	12	20	24	EMM

Days	Concentration: EV-HC2										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	4	5	✓	4	5	4	4	4	✓	4	JW
5	7	✓	2	✓	8	6	6	6	4	7	EMM
6	✓	7	6	7	8	✓	✓	✓	9	✓	EMM
7	10	12	3	11	12	11	10	9	✓	10	EMM
8											
Total	21	24	11	22	25	21	20	19	13	21	EMM

Days	Concentration: CM-MC2										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	4	1	✓	3	✓	✓	✓	✓	✓	JW
5	4	6	✓	5	7	4	4	✓	3	4	EMM
6	6	✓	4	8	✓	6	6	3	7	7	EMM
7	✓	6	4	✓	6	9	✓	6	✓	✓	EMM
8											
Total	10	16	9	13	16	19	10	9	10	11	EMM

Notes: X = mortality.

Sample Description: All clear

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JW

Date reviewed: Nov. 18/15

CETIS Summary Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Batch ID:	10-6020-9193	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 13:15	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	03 Nov-15 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 1h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	15-3783-0297	26 Oct-15	26 Oct-15	37h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	24h (5.5°)		
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	37h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	27h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	37h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	37h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	26h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:30	27 Oct-15 10:10	26h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	25h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

7d Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	10	1	1	1	1	1	0	0	0.0%	0.0%
FR_UFR1	10	1	1	1	1	1	0	0	0.0%	0.0%
GH_ER2	10	1	1	1	1	1	0	0	0.0%	0.0%
FR_FRCP1	10	1	1	1	1	1	0	0	0.0%	0.0%
GH_FR1	10	1	1	1	1	1	0	0	0.0%	0.0%
GH_ERC	10	1	1	1	1	1	0	0	0.0%	0.0%
EV_HC1	10	1	1	1	1	1	0	0	0.0%	0.0%
EV_MC2	10	1	1	1	1	1	0	0	0.0%	0.0%
CM_MC2	10	1	1	1	1	1	0	0	0.0%	0.0%

Reproduction Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	10	17.8	14.48	21.12	9	23	1.467	4.638	26.06%	0.0%
FR_UFR1	10	19.9	17.65	22.15	13	24	0.9939	3.143	15.79%	-11.8%
GH_ER2	10	19.5	15.56	23.44	10	27	1.74	5.503	28.22%	-9.55%
FR_FRCP1	10	10.1	6.234	13.97	0	18	1.709	5.405	53.51%	43.26%
GH_FR1	10	22.1	18.67	25.53	9	25	1.516	4.795	21.7%	-24.16%
GH_ERC	10	21.4	17.16	25.64	9	27	1.875	5.929	27.71%	-20.22%
EV_HC1	10	21.1	18.39	23.81	12	25	1.197	3.784	17.94%	-18.54%
EV_MC2	10	19.7	16.52	22.88	11	25	1.407	4.448	22.58%	-10.67%
CM_MC2	10	12.3	9.775	14.82	9	19	1.116	3.529	28.69%	30.9%

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

7d Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1	1	1	1	1	1	1	1	1	1
FR_UFR1	1	1	1	1	1	1	1	1	1	1
GH_ER2	1	1	1	1	1	1	1	1	1	1
FR_FRCP1	1	1	1	1	1	1	1	1	1	1
GH_FR1	1	1	1	1	1	1	1	1	1	1
GH_ERC	1	1	1	1	1	1	1	1	1	1
EV_HC1	1	1	1	1	1	1	1	1	1	1
EV_MC2	1	1	1	1	1	1	1	1	1	1
CM_MC2	1	1	1	1	1	1	1	1	1	1

Reproduction Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	18	19	23	10	19	21	20	21	9	18
FR_UFR1	22	23	18	24	13	20	19	21	18	21
GH_ER2	24	27	10	20	20	19	22	21	22	10
FR_FRCP1	17	10	15	8	0	18	6	8	9	10
GH_FR1	25	22	23	24	24	21	9	23	25	25
GH_ERC	25	17	23	27	9	23	27	22	26	15
EV_HC1	21	22	23	23	18	25	23	12	20	24
EV_MC2	21	24	11	22	25	21	20	19	13	21
CM_MC2	10	16	9	13	16	19	10	9	10	11

7d Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFR1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_MC2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	11-0251-8892	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	18 Nov-15 13:58	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes
Batch ID:	10-6020-9193	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 13:15	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	03 Nov-15 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 1h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	15-3783-0297	26 Oct-15	26 Oct-15	37h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	24h (5.5 °C)		
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	37h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	27h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	37h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	37h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	26h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:50	27 Oct-15 10:10	25h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	25h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact/Bonferroni-Holm Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFR1	1	1.0000	Exact	Non-Significant Effect
Lab Control		GH_ER2	1	1.0000	Exact	Non-Significant Effect
Lab Control		FR_FRCP1	1	1.0000	Exact	Non-Significant Effect
Lab Control		GH_FR1	1	1.0000	Exact	Non-Significant Effect
Lab Control		GH_ERC	1	1.0000	Exact	Non-Significant Effect
Lab Control		EV_HC1	1	1.0000	Exact	Non-Significant Effect
Lab Control		EV_MC2	1	1.0000	Exact	Non-Significant Effect
Lab Control		CM_MC2	1	1.0000	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
Lab Control	Negative Contr	10	0	10	1	0	0.0%
FR_UFR1		10	0	10	1	0	0.0%
GH_ER2		10	0	10	1	0	0.0%
FR_FRCP1		10	0	10	1	0	0.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		10	0	10	1	0	0.0%
EV_HC1		10	0	10	1	0	0.0%
EV_MC2		10	0	10	1	0	0.0%
CM_MC2		10	0	10	1	0	0.0%

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 11-0251-8892 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 18 Nov-15 13:58 **Analysis:** STP 2x2 Contingency Tables **Official Results:** Yes

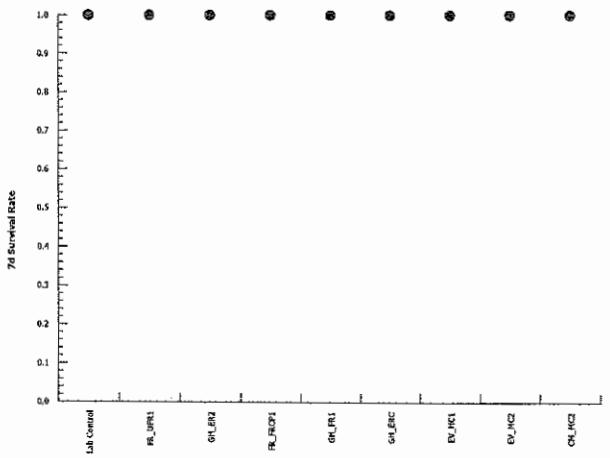
7d Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1	1	1	1	1	1	1	1	1	1
FR_UFR1	1	1	1	1	1	1	1	1	1	1
GH_ER2	1	1	1	1	1	1	1	1	1	1
FR_FRCP1	1	1	1	1	1	1	1	1	1	1
GH_FR1	1	1	1	1	1	1	1	1	1	1
GH_ERC	1	1	1	1	1	1	1	1	1	1
EV_HC1	1	1	1	1	1	1	1	1	1	1
EV_MC2	1	1	1	1	1	1	1	1	1	1
CM_MC2	1	1	1	1	1	1	1	1	1	1

7d Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFR1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_MC2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Analyst:_____ QA: JCL Nov-18/15

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	05-7991-1055	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	05 Nov-15 13:58	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes
Batch ID:	10-6020-9193	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 13:15	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	03 Nov-15 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 1h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	15-3783-0297	26 Oct-15	26 Oct-15	37h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	24h (5.5°C)		
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	37h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	27h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	37h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	37h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	26h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:30	27 Oct-15 10:10	26h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	25h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact/Bonferroni-Holm Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
FR_UFR1		Lab Control	1	1.0000	Exact	Non-Significant Effect
FR_UFR1		GH_ER2	1	1.0000	Exact	Non-Significant Effect
FR_UFR1		FR_FRCP1	1	1.0000	Exact	Non-Significant Effect
FR_UFR1		GH_FR1	1	1.0000	Exact	Non-Significant Effect
FR_UFR1		GH_ERC	1	1.0000	Exact	Non-Significant Effect
FR_UFR1		EV_HC1	1	1.0000	Exact	Non-Significant Effect
FR_UFR1		EV_MC2	1	1.0000	Exact	Non-Significant Effect
FR_UFR1		CM_MC2	1	1.0000	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
Lab Control		10	0	10	1	0	0.0%
FR_UFR1	Negative Contr	10	0	10	1	0	0.0%
GH_ER2		10	0	10	1	0	0.0%
FR_FRCP1		10	0	10	1	0	0.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		10	0	10	1	0	0.0%
EV_HC1		10	0	10	1	0	0.0%
EV_MC2		10	0	10	1	0	0.0%
CM_MC2		10	0	10	1	0	0.0%

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	05-7991-1055	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	05 Nov-15 13:58	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes

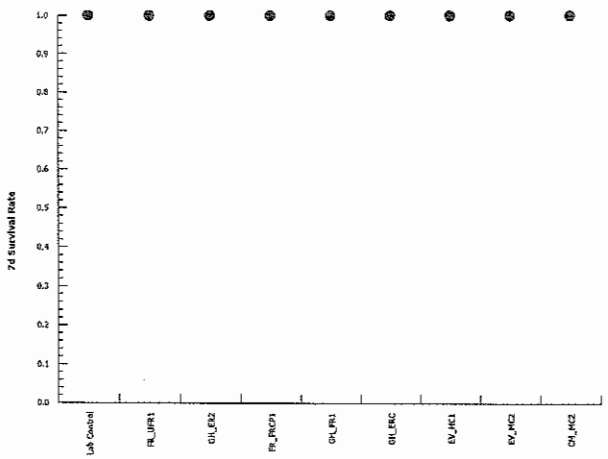
7d Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1	1	1	1	1	1	1	1	1	1
FR_UFR1	1	1	1	1	1	1	1	1	1	1
GH_ER2	1	1	1	1	1	1	1	1	1	1
FR_FRCP1	1	1	1	1	1	1	1	1	1	1
GH_FR1	1	1	1	1	1	1	1	1	1	1
GH_ERC	1	1	1	1	1	1	1	1	1	1
EV_HC1	1	1	1	1	1	1	1	1	1	1
EV_MC2	1	1	1	1	1	1	1	1	1	1
CM_MC2	1	1	1	1	1	1	1	1	1	1

7d Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFR1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_MC2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	15-0845-4603	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	18 Nov-15 14:07	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes
Batch ID:	10-6020-9193	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 13:15	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	03 Nov-15 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 1h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	15-3783-0297	26 Oct-15	26 Oct-15	37h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	24h (5.5 °C)		
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	37h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	27h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	37h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	37h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	26h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:50	27 Oct-15 10:10	25h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	25h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact/Bonferroni-Holm Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
GH_ER2		Lab Control	1	1.0000	Exact	Non-Significant Effect
GH_ER2		FR_UFR1	1	1.0000	Exact	Non-Significant Effect
GH_ER2		FR_FRCP1	1	1.0000	Exact	Non-Significant Effect
GH_ER2		GH_FR1	1	1.0000	Exact	Non-Significant Effect
GH_ER2		GH_ERC	1	1.0000	Exact	Non-Significant Effect
GH_ER2		EV_HC1	1	1.0000	Exact	Non-Significant Effect
GH_ER2		EV_MC2	1	1.0000	Exact	Non-Significant Effect
GH_ER2		CM_MC2	1	1.0000	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
Lab Control		10	0	10	1	0	0.0%
FR_UFR1		10	0	10	1	0	0.0%
GH_ER2	Negative Contr	10	0	10	1	0	0.0%
FR_FRCP1		10	0	10	1	0	0.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		10	0	10	1	0	0.0%
EV_HC1		10	0	10	1	0	0.0%
EV_MC2		10	0	10	1	0	0.0%
CM_MC2		10	0	10	1	0	0.0%

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	15-0845-4603	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	18 Nov-15 14:07	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes

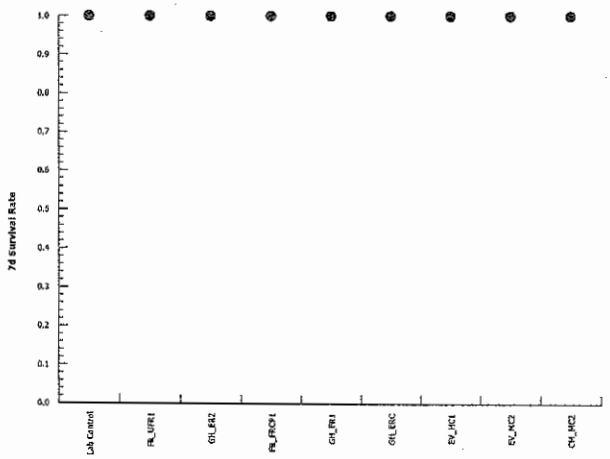
7d Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1	1	1	1	1	1	1	1	1	1
FR_UFR1	1	1	1	1	1	1	1	1	1	1
GH_ER2	1	1	1	1	1	1	1	1	1	1
FR_FRCP1	1	1	1	1	1	1	1	1	1	1
GH_FR1	1	1	1	1	1	1	1	1	1	1
GH_ERC	1	1	1	1	1	1	1	1	1	1
EV_HC1	1	1	1	1	1	1	1	1	1	1
EV_MC2	1	1	1	1	1	1	1	1	1	1
CM_MC2	1	1	1	1	1	1	1	1	1	1

7d Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFR1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_MC2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC2	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	00-7927-2430	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	05 Nov-15 13:46	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	10-6020-9193	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 13:15	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	03 Nov-15 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 1h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	15-3783-0297	26 Oct-15	26 Oct-15	37h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	24h (5.5°C)		
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	37h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	27h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	37h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	37h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	26h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:30	27 Oct-15 10:10	26h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	25h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	28.4%	

Steel Many-One Rank Sum Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFR1	119	73	5	18	0.9944	Asymp	Non-Significant Effect
		GH_ER2	122	73	4	18	0.9976	Asymp	Non-Significant Effect
		FR_FRCP1	65.5	73	3	18	0.0095	Asymp	Significant Effect
		GH_FR1	141.5	73	3	18	1.0000	Asymp	Non-Significant Effect
		GH_ERC	127.5	73	2	18	0.9996	Asymp	Non-Significant Effect
		EV_HC1	132	73	4	18	0.9999	Asymp	Non-Significant Effect
		EV_MC2	123.5	73	3	18	0.9985	Asymp	Non-Significant Effect
		CM_MC2	73.5	73	3	18	0.0500	Asymp	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1412.689	176.5861	8	8.126	<0.0001	Significant Effect
Error	1760.3	21.7321	81			
Total	3172.989		89			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.063	20.09	0.6402	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9255	0.962	<0.0001	Non-normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	00-7927-2430	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	05 Nov-15 13:46	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

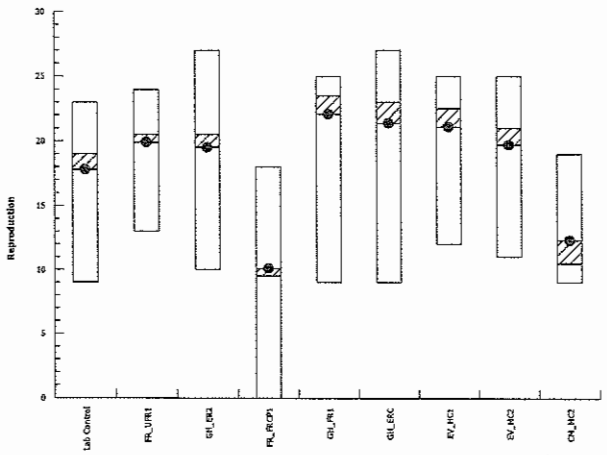
Reproduction Summary

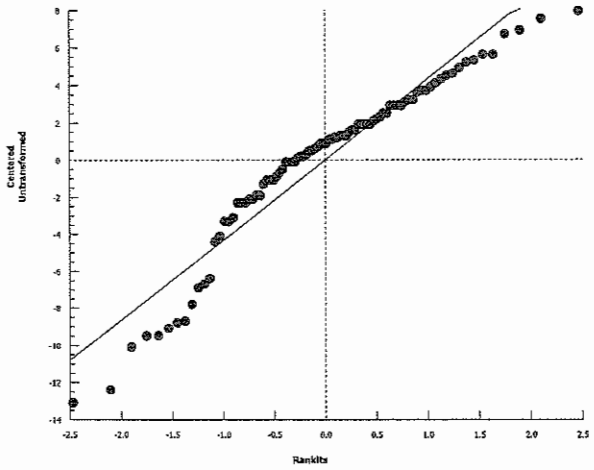
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	10	17.8	14.48	21.12	19	9	23	1.467	26.06%	0.0%
FR_UFR1	10	19.9	17.65	22.15	20.5	13	24	0.9939	15.79%	-11.8%
GH_ER2	10	19.5	15.56	23.44	20.5	10	27	1.74	28.22%	-9.55%
FR_FRCP1	10	10.1	6.234	13.97	9.5	0	18	1.709	53.51%	43.26%
GH_FR1	10	22.1	18.67	25.53	23.5	9	25	1.516	21.7%	-24.16%
GH_ERC	10	21.4	17.16	25.64	23	9	27	1.875	27.71%	-20.22%
EV_HC1	10	21.1	18.39	23.81	22.5	12	25	1.197	17.94%	-18.54%
EV_MC2	10	19.7	16.52	22.88	21	11	25	1.407	22.58%	-10.67%
CM_MC2	10	12.3	9.775	14.82	10.5	9	19	1.116	28.69%	30.9%

Reproduction Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	18	19	23	10	19	21	20	21	9	18
FR_UFR1	22	23	18	24	13	20	19	21	18	21
GH_ER2	24	27	10	20	20	19	22	21	22	10
FR_FRCP1	17	10	15	8	0	18	6	8	9	10
GH_FR1	25	22	23	24	24	21	9	23	25	25
GH_ERC	25	17	23	27	9	23	27	22	26	15
EV_HC1	21	22	23	23	18	25	23	12	20	24
EV_MC2	21	24	11	22	25	21	20	19	13	21
CM_MC2	10	16	9	13	16	19	10	9	10	11

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	18-7359-8757	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	05 Nov-15 13:46	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	10-6020-9193	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 13:15	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	03 Nov-15 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 1h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	15-3783-0297	26 Oct-15	26 Oct-15	37h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	24h (5.5°C)		
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	37h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	27h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	37h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	37h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	26h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:30	27 Oct-15 10:10	26h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	25h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C < T	NA	NA	28.4%	

Steel Many-One Rank Sum Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFR1	91	73	5	18	0.4716	Asymp	Non-Significant Effect
		GH_ER2	88	73	4	18	0.3652	Asymp	Non-Significant Effect
		FR_FRCP1	144.5	73	3	18	1.0000	Asymp	Non-Significant Effect
		GH_FR1	68.5	73	3	18	0.0186	Asymp	Significant Effect
		GH_ERC	82.5	73	2	18	0.1999	Asymp	Non-Significant Effect
		EV_HC1	78	73	4	18	0.1065	Asymp	Non-Significant Effect
		EV_MC2	86.5	73	3	18	0.3154	Asymp	Non-Significant Effect
		CM_MC2	136.5	73	3	18	1.0000	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1412.689	176.5861	8	8.126	<0.0001	Significant Effect
Error	1760.3	21.7321	81			
Total	3172.989		89			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.063	20.09	0.6402	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9255	0.962	<0.0001	Non-normal Distribution

Analysis ID: 18-7359-8757 **Endpoint:** Reproduction **CETIS Version:** CETISv1.8.7
Analyzed: 05 Nov-15 13:46 **Analysis:** Nonparametric-Control vs Treatments **Official Results:** Yes

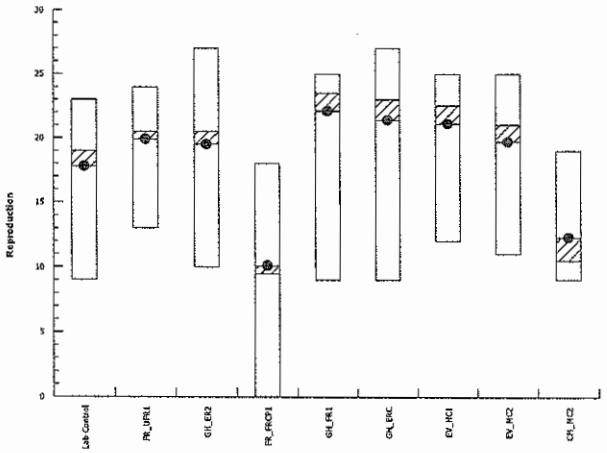
Reproduction Summary

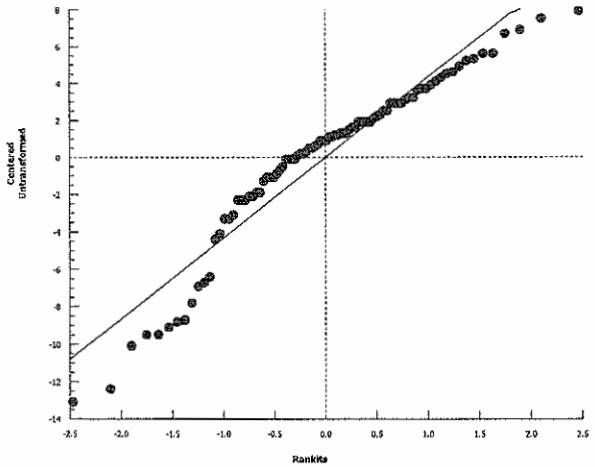
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	10	17.8	14.48	21.12	19	9	23	1.467	26.06%	0.0%
FR_UFR1	10	19.9	17.65	22.15	20.5	13	24	0.9939	15.79%	-11.8%
GH_ER2	10	19.5	15.56	23.44	20.5	10	27	1.74	28.22%	-9.55%
FR_FRCP1	10	10.1	6.234	13.97	9.5	0	18	1.709	53.51%	43.26%
GH_FR1	10	22.1	18.67	25.53	23.5	9	25	1.516	21.7%	-24.16%
GH_ERC	10	21.4	17.16	25.64	23	9	27	1.875	27.71%	-20.22%
EV_HC1	10	21.1	18.39	23.81	22.5	12	25	1.197	17.94%	-18.54%
EV_MC2	10	19.7	16.52	22.88	21	11	25	1.407	22.58%	-10.67%
CM_MC2	10	12.3	9.775	14.82	10.5	9	19	1.116	28.69%	30.9%

Reproduction Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	18	19	23	10	19	21	20	21	9	18
FR_UFR1	22	23	18	24	13	20	19	21	18	21
GH_ER2	24	27	10	20	20	19	22	21	22	10
FR_FRCP1	17	10	15	8	0	18	6	8	9	10
GH_FR1	25	22	23	24	24	21	9	23	25	25
GH_ERC	25	17	23	27	9	23	27	22	26	15
EV_HC1	21	22	23	23	18	25	23	12	20	24
EV_MC2	21	24	11	22	25	21	20	19	13	21
CM_MC2	10	16	9	13	16	19	10	9	10	11

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	11-6743-5452	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	05 Nov-15 13:58	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	10-6020-9193	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 13:15	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	03 Nov-15 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 1h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	15-3783-0297	26 Oct-15	26 Oct-15	37h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	24h (5.5°)		
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	37h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	27h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	37h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	37h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	26h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:30	27 Oct-15 10:10	26h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	25h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	25.4%	

Steel Many-One Rank Sum Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		Lab Control	91	73	5	18	0.4716	Asymp	Non-Significant Effect
		GH_ER2	108	73	5	18	0.9333	Asymp	Non-Significant Effect
		FR_FRCP1	59	73	1	18	0.0018	Asymp	Significant Effect
		GH_FR1	134.5	73	4	18	1.0000	Asymp	Non-Significant Effect
		GH_ERC	121.5	73	2	18	0.9972	Asymp	Non-Significant Effect
		EV_HC1	120	73	6	18	0.9957	Asymp	Non-Significant Effect
		EV_MC2	108.5	73	6	18	0.9391	Asymp	Non-Significant Effect
		CM_MC2	61	73	2	18	0.0031	Asymp	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1412.689	176.5861	8	8.126	<0.0001	Significant Effect
Error	1760.3	21.7321	81			
Total	3172.989		89			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.063	20.09	0.6402	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9255	0.962	<0.0001	Non-normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID:	11-6743-5452	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	05 Nov-15 13:58	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

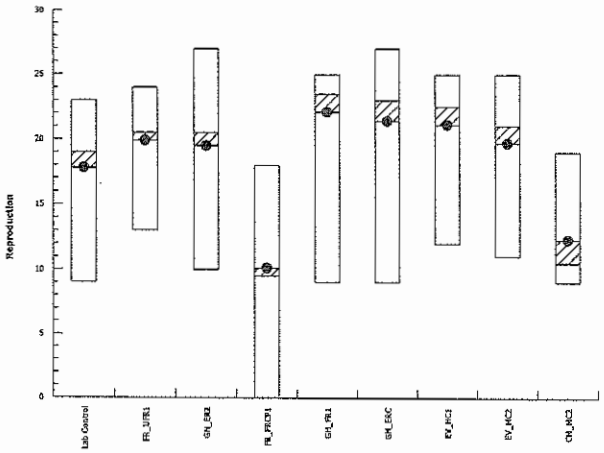
Reproduction Summary

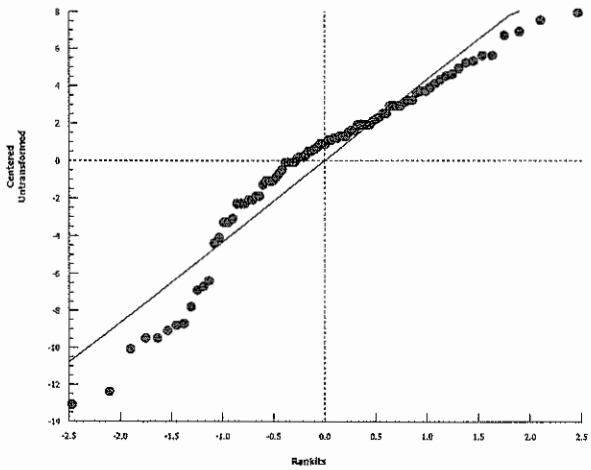
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	10	17.8	14.48	21.12	19	9	23	1.467	26.06%	0.0%
FR_UFR1	10	19.9	17.65	22.15	20.5	13	24	0.9939	15.79%	-11.8%
GH_ER2	10	19.5	15.56	23.44	20.5	10	27	1.74	28.22%	-9.55%
FR_FRCP1	10	10.1	6.234	13.97	9.5	0	18	1.709	53.51%	43.26%
GH_FR1	10	22.1	18.67	25.53	23.5	9	25	1.516	21.7%	-24.16%
GH_ERC	10	21.4	17.16	25.64	23	9	27	1.875	27.71%	-20.22%
EV_HC1	10	21.1	18.39	23.81	22.5	12	25	1.197	17.94%	-18.54%
EV_MC2	10	19.7	16.52	22.88	21	11	25	1.407	22.58%	-10.67%
CM_MC2	10	12.3	9.775	14.82	10.5	9	19	1.116	28.69%	30.9%

Reproduction Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	18	19	23	10	19	21	20	21	9	18
FR_UFR1	22	23	18	24	13	20	19	21	18	21
GH_ER2	24	27	10	20	20	19	22	21	22	10
FR_FRCP1	17	10	15	8	0	18	6	8	9	10
GH_FR1	25	22	23	24	24	21	9	23	25	25
GH_ERC	25	17	23	27	9	23	27	22	26	15
EV_HC1	21	22	23	23	18	25	23	12	20	24
EV_MC2	21	24	11	22	25	21	20	19	13	21
CM_MC2	10	16	9	13	16	19	10	9	10	11

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	11-4988-9863	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	05 Nov-15 13:58	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	10-6020-9193	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 13:15	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	03 Nov-15 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 1h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	15-3783-0297	26 Oct-15	26 Oct-15	37h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	24h (5.5°C)		
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	37h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	27h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	37h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	37h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	26h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:30	27 Oct-15 10:10	26h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	25h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C < T	NA	NA	25.4%	

Steel Many-One Rank Sum Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		Lab Control	119	73	5	18	0.9944	Asymp	Non-Significant Effect
		GH_ER2	102	73	5	18	0.8268	Asymp	Non-Significant Effect
		FR_FRCP1	151	73	1	18	1.0000	Asymp	Non-Significant Effect
		GH_FR1	75.5	73	4	18	0.0711	Asymp	Non-Significant Effect
		GH_ERC	88.5	73	2	18	0.3824	Asymp	Non-Significant Effect
		EV_HC1	90	73	6	18	0.4355	Asymp	Non-Significant Effect
		EV_MC2	101.5	73	6	18	0.8147	Asymp	Non-Significant Effect
		CM_MC2	149	73	2	18	1.0000	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1412.689	176.5861	8	8.126	<0.0001	Significant Effect
Error	1760.3	21.7321	81			
Total	3172.989		89			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.063	20.09	0.6402	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9255	0.962	<0.0001	Non-normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	11-4988-9863	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	05 Nov-15 13:58	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

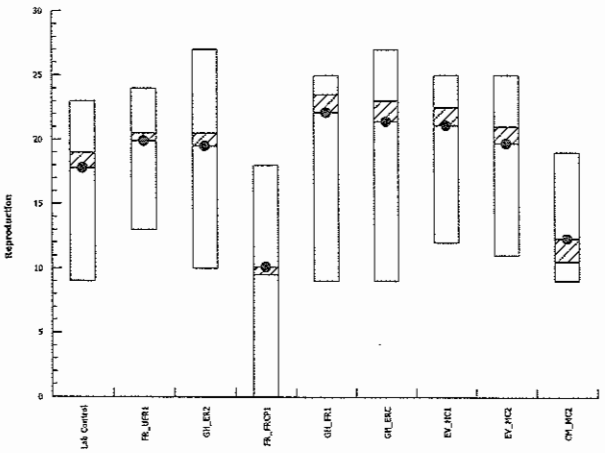
Reproduction Summary

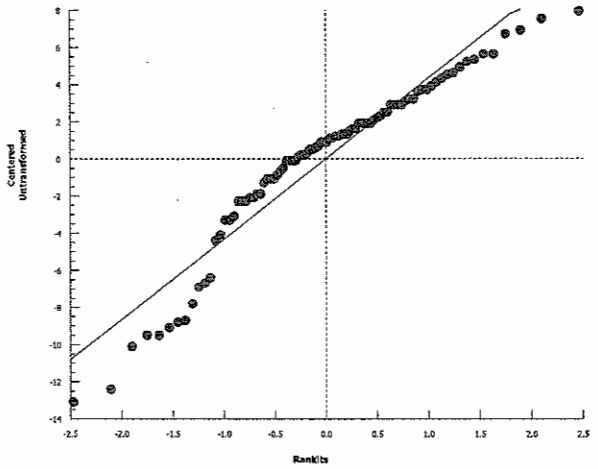
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	10	17.8	14.48	21.12	19	9	23	1.467	26.06%	0.0%
FR_UFR1	10	19.9	17.65	22.15	20.5	13	24	0.9939	15.79%	-11.8%
GH_ER2	10	19.5	15.56	23.44	20.5	10	27	1.74	28.22%	-9.55%
FR_FRCP1	10	10.1	6.234	13.97	9.5	0	18	1.709	53.51%	43.26%
GH_FR1	10	22.1	18.67	25.53	23.5	9	25	1.516	21.7%	-24.16%
GH_ERC	10	21.4	17.16	25.64	23	9	27	1.875	27.71%	-20.22%
EV_HC1	10	21.1	18.39	23.81	22.5	12	25	1.197	17.94%	-18.54%
EV_MC2	10	19.7	16.52	22.88	21	11	25	1.407	22.58%	-10.67%
CM_MC2	10	12.3	9.775	14.82	10.5	9	19	1.116	28.69%	30.9%

Reproduction Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	18	19	23	10	19	21	20	21	9	18
FR_UFR1	22	23	18	24	13	20	19	21	18	21
GH_ER2	24	27	10	20	20	19	22	21	22	10
FR_FRCP1	17	10	15	8	0	18	6	8	9	10
GH_FR1	25	22	23	24	24	21	9	23	25	25
GH_ERC	25	17	23	27	9	23	27	22	26	15
EV_HC1	21	22	23	23	18	25	23	12	20	24
EV_MC2	21	24	11	22	25	21	20	19	13	21
CM_MC2	10	16	9	13	16	19	10	9	10	11

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	09-1912-1221	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	05 Nov-15 14:04	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	10-6020-9193	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 13:15	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	03 Nov-15 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 1h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	15-3783-0297	26 Oct-15	26 Oct-15	37h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	24h (5.5°c)		
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	37h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	27h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	37h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	37h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	26h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:30	27 Oct-15 10:10	26h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	25h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	25.9%	

Steel Many-One Rank Sum Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
GH_ER2		Lab Control	88	73	4	18	0.3652	Asymp	Non-Significant Effect
		FR_UFR1	102	73	5	18	0.8268	Asymp	Non-Significant Effect
		FR_FRCP1	63	73	1	18	0.0052	Asymp	Significant Effect
		GH_FR1	127.5	73	3	18	0.9996	Asymp	Non-Significant Effect
		GH_ERC	119	73	2	18	0.9944	Asymp	Non-Significant Effect
		EV_HC1	117	73	4	18	0.9905	Asymp	Non-Significant Effect
		EV_MC2	106.5	73	5	18	0.9132	Asymp	Non-Significant Effect
		CM_MC2	68.5	73	2	18	0.0186	Asymp	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1412.689	176.5861	8	8.126	<0.0001	Significant Effect
Error	1760.3	21.7321	81			
Total	3172.989		89			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.063	20.09	0.6402	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9255	0.962	<0.0001	Non-normal Distribution

Analysis ID:	09-1912-1221	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	05 Nov-15 14:04	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

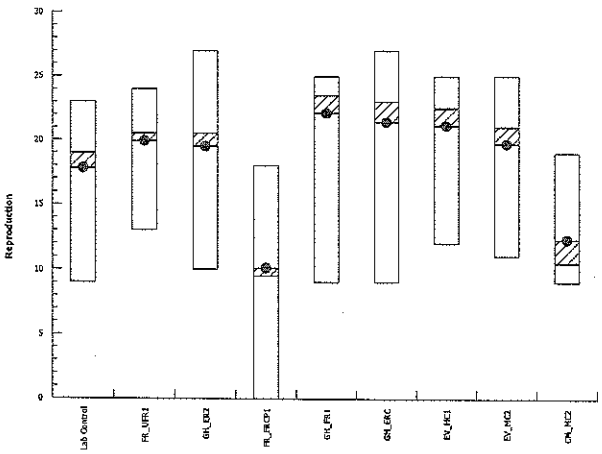
Reproduction Summary

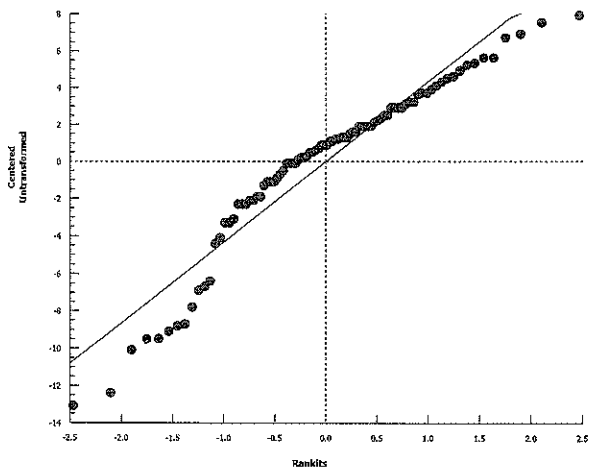
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	10	17.8	14.48	21.12	19	9	23	1.467	26.06%	0.0%
FR_UFR1	10	19.9	17.65	22.15	20.5	13	24	0.9939	15.79%	-11.8%
GH_ER2	10	19.5	15.56	23.44	20.5	10	27	1.74	28.22%	-9.55%
FR_FRCP1	10	10.1	6.234	13.97	9.5	0	18	1.709	53.51%	43.26%
GH_FR1	10	22.1	18.67	25.53	23.5	9	25	1.516	21.7%	-24.16%
GH_ERC	10	21.4	17.16	25.64	23	9	27	1.875	27.71%	-20.22%
EV_HC1	10	21.1	18.39	23.81	22.5	12	25	1.197	17.94%	-18.54%
EV_MC2	10	19.7	16.52	22.88	21	11	25	1.407	22.58%	-10.67%
CM_MC2	10	12.3	9.775	14.82	10.5	9	19	1.116	28.69%	30.9%

Reproduction Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	18	19	23	10	19	21	20	21	9	18
FR_UFR1	22	23	18	24	13	20	19	21	18	21
GH_ER2	24	27	10	20	20	19	22	21	22	10
FR_FRCP1	17	10	15	8	0	18	6	8	9	10
GH_FR1	25	22	23	24	24	21	9	23	25	25
GH_ERC	25	17	23	27	9	23	27	22	26	15
EV_HC1	21	22	23	23	18	25	23	12	20	24
EV_MC2	21	24	11	22	25	21	20	19	13	21
CM_MC2	10	16	9	13	16	19	10	9	10	11

Graphics





CETIS Analytical Report

Report Date: 05 Nov-15 14:05 (p 11 of 12)
Test Code: 15864 | 05-3181-6567

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	04-4948-4151	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	05 Nov-15 14:04	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Batch ID:	10-6020-9193	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 13:15	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	03 Nov-15 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 1h	**Source:**	In-House Culture	**Age:**	<24h

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	15-3783-0297	26 Oct-15	26 Oct-15	37h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	24h (5.5 °C)		
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	37h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	27h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	37h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	37h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	26h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:~~30~~ 50	27 Oct-15 10:10	26h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	25h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C < T	NA	NA	25.9%	

Steel Many-One Rank Sum Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
GH_ER2		Lab Control	122	73	4	18	0.9976	Asymp	Non-Significant Effect
		FR_UFR1	108	73	5	18	0.9333	Asymp	Non-Significant Effect
		FR_FRCP1	147	73	1	18	1.0000	Asymp	Non-Significant Effect
		GH_FR1	82.5	73	3	18	0.1999	Asymp	Non-Significant Effect
		GH_ERC	91	73	2	18	0.4716	Asymp	Non-Significant Effect
		EV_HC1	93	73	4	18	0.5445	Asymp	Non-Significant Effect
		EV_MC2	103.5	73	5	18	0.8602	Asymp	Non-Significant Effect
		CM_MC2	141.5	73	2	18	1.0000	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1412.689	176.5861	8	8.126	<0.0001	Significant Effect
Error	1760.3	21.7321	81			
Total	3172.989		89			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.063	20.09	0.6402	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9255	0.962	<0.0001	Non-normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	04-4948-4151	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	05 Nov-15 14:04	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

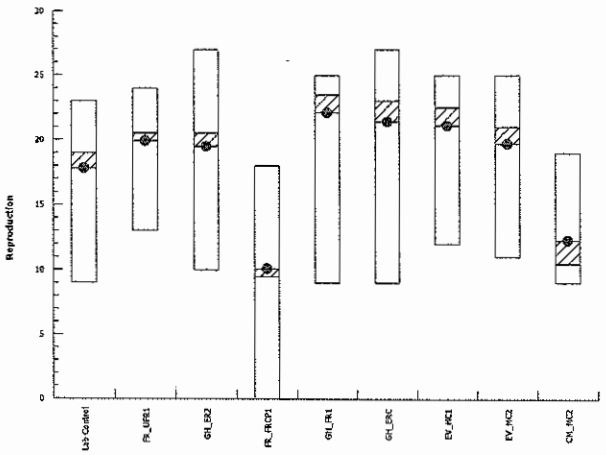
Reproduction Summary

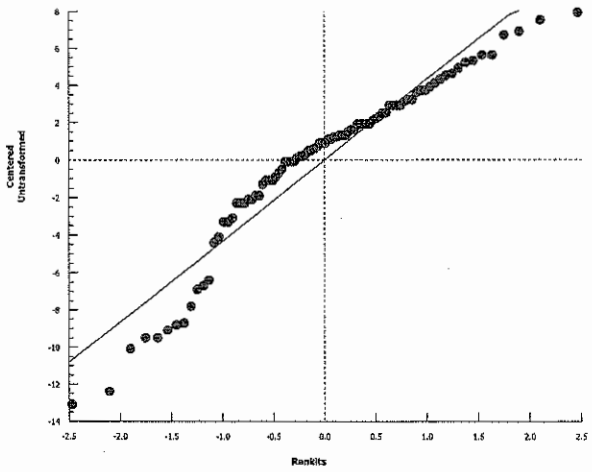
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	10	17.8	14.48	21.12	19	9	23	1.467	26.06%	0.0%
FR_UFR1	10	19.9	17.65	22.15	20.5	13	24	0.9939	15.79%	-11.8%
GH_ER2	10	19.5	15.56	23.44	20.5	10	27	1.74	28.22%	-9.55%
FR_FRCP1	10	10.1	6.234	13.97	9.5	0	18	1.709	53.51%	43.26%
GH_FR1	10	22.1	18.67	25.53	23.5	9	25	1.516	21.7%	-24.16%
GH_ERC	10	21.4	17.16	25.64	23	9	27	1.875	27.71%	-20.22%
EV_HC1	10	21.1	18.39	23.81	22.5	12	25	1.197	17.94%	-18.54%
EV_MC2	10	19.7	16.52	22.88	21	11	25	1.407	22.58%	-10.67%
CM_MC2	10	12.3	9.775	14.82	10.5	9	19	1.116	28.69%	30.9%

Reproduction Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	18	19	23	10	19	21	20	21	9	18
FR_UFR1	22	23	18	24	13	20	19	21	18	21
GH_ER2	24	27	10	20	20	19	22	21	22	10
FR_FRCP1	17	10	15	8	0	18	6	8	9	10
GH_FR1	25	22	23	24	24	21	9	23	25	25
GH_ERC	25	17	23	27	9	23	27	22	26	15
EV_HC1	21	22	23	23	18	25	23	12	20	24
EV_MC2	21	24	11	22	25	21	20	19	13	21
CM_MC2	10	16	9	13	16	19	10	9	10	11

Graphics





Client: Teck Coal

W.O.#: 15864

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/L CaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L CaCO_3$)	Technician
FR_UFR1	Oct 27/15	50	7.0	7.2	136		50	9.5	190	KL
GH_ER2		50	7.6	7.7	150		50	8.2	164	
FR_FRCP1		50	10.1	10.2	200		10①	6.8	680	
GH_FR1		50	9.1	9.3	178		~~50~~ 10①	5.0	500	
GH_FRC		50	7.8	7.9	154		50	9.3	186	
EV_HC1		50	10.3	10.5	202		~~50~~ 10①	4.2	420	
EV_MC2		50	10.5	10.6	208		~~50~~ 10①	5.8	580	
cm_MC2		50	10.1	10.3	198		10①	4.8	480	
201, Peak Control	↓	50	4.9	5.0	96		50	5.0	100	↓

Notes: ① Diluted sample to 100 mL with D.I. water

Reviewed by: JDu

Date Reviewed: Nov. 18/15

APPENDIX B – *Pseudokirchneriella subcapitata* Toxicity Test Data

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15865

Start Date: Oct 27/15
Set up by: MLT/EMM

Sample Information:

Sample ID: Various, see results table for ID's
Sample Date: Oct 26/15
Date Received: Oct 27/15
Sample Volume: Various

Test Organism Information:

Culture Date: Oct 23/15
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC135
Stock Solution ID: 15Zn03
Date Initiated: NOV 3/15

72-h IC50 (95% CL): 35.7 (30.6 - 41.4) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 28.5 (16.2 - 50.1) ug/L Zn CV (%): 32

Test Results:

	Cell Yield (Mean ± SD)		
Negative Control	32.2	±	1.8
FR_UFR1_Q_05102015_N ①	121.8	±	7.9 *c
GH_ER2_WS_2015_10_26_N ②	132.1	±	4.5 *b
FR_FRCP1_Q_05102015_N	96.2	±	2.2 *ac
GH_FR1_WS_2015_10_26_N	153.0	±	5.0 *bd
GH_ERC_WS_2015_10_26_N	146.5	±	3.1 *bd
EV_HC1_WS_2015-10-26_N	129.0	±	3.9 *
EV_MC2_WS_2015-10-26_N	136.0	±	4.1 *b
CM_MC2_WS_2015-10-26_N	115.3	±	3.5 *c

a. indicates cell yield that was significantly less than the site con FR_UFR1
b. indicates cell yield that were significantly great than the site contr FR_UFR1
c indicates cell yi that were significar less than the site control GH_ER2

① site control ② site control. *indicates cell yield that were significantly greater than the lab control
d. indicates the cell yield that were significantly greater than site control GH_ER2

Reviewed by: JCh
Date reviewed: Nov. 18/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: MLT/EMM

Sample ID: various (Pass/Fail) | Test Date/Time: Oct 27/15 @ 1700h

Work Order No.: 15865 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 23/15 | Age of Culture: 4d | Culture Health: Good.

Culture Count: 1 289 2 312 | Average: 300.5 | Culture Cell Density (c1): 300.5 x 10^4 cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 300.5 x 104 cells/ml = 7.32 mL

Time Zero Counts: 1 18 2 23 | Average: 20.5

No. of Cells/mL: 20.5 x 10^4 | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9318 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.1	23.0	24.5	24.5	25.0	25.0	✓	✓	✓	✓
FR_UFR1	8.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
GH_ER2	8.0	23.0					✓	✓	✓	✓
FR_FRCP1	8.1	23.0					✓	✓	–	✓
GH_FR1	8.1	23.0					✓	✓	✓	✓
GH_ERC	8.0	23.0					✓	✓	✓	✓
EV_HC1	8.1	23.0					✓	✓	✓	✓
EV_MC2	8.0	23.0					✓	✓	✓	✓
CM_MC2	8.2	23.0					✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 7.1 Well 2: 7.1

Final control pH: Well 1: 7.2 Well 2: 7.2

Light intensity (lux): 3880 Date measured: Oct 27/15

Instruments: Thermometer 4 pH meter 2 Light meter 1

Sample Description: clear (all samples)

Comments:

Reviewed: JCL Date reviewed: Nov. 18/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal — Start Date/Time: Oct 27/15 @ 1700h
Work Order #: 15805 — Termination Date: Oct 30/15 @ 1700h
Sample ID: various (Pass/Fail) — Test set up by: MLT/Emm
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control Lab Control (DI w/ nutrients)	A	34					MLT
	B	30					
	C	33					
	D	32					
	E	34					
	F	34					
	G	36					
	H	33					
100% (v/v) FR_UFR1 (site control)	A	124					
	B	116					
	C	120					
	D	124					
	mean A E	133					
	mean B F	117					
	mean C G	136					
	mean D H	115					
100% (v/v) GH_ER2 (site control)	A	140					
	B	134					
	C	136					
	D	129					
	mean A E	130					
	mean B F	130					
	mean C G	128					
	mean D H	138					
100% (v/v) FR_FRCP1	A	100					
	B	95					
	C	96					
	D	98					
100% (v/v) GH_FR1	A	160					
	B	153					
	C	155					
	D	148					
100% (v/v) GH_ERC	A	147					
	B	152					
	C	145					
	D	146					

Comments:

Reviewed by: JCM — Date Reviewed: Nov 18/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal
Start Date/Time: Oct 27/15 @ 1700h
Work Order #: 15865
Termination Date: Oct 30/15 @ 1700h
Sample ID: various (Pass/Fail)
Test set up by: MCT/EMM

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control MCT	A						
	B						
	C						
	D						
	E						
	F						
	G						
	H						
100% (v/v) EV_HCl	A	129					MCT
	B	134					
	C	125					
	D	132					
100% (v/v) EV_MC2	A	140					
	B	131					
	C	139					
	D	138					
100% (v/v) CM_MC2	A	112					
	B	118					
	C	115					
	D	120					↓
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						
	A						
	B						
	C						
	D						

Comments:

Reviewed by: JCM
Date Reviewed: Nov. 18/15

Pseudokirchneriella subcapitata Algal Counts

Client: Teck Coal
WO#: 15865
Sample ID: Teck Coal samples pass/fail

Start Date/Time: 27-Oct-15 @ 1700h
Termination Date: 30-Oct-15 @ 1700h

Initial Cell Density: 9318 cell/mL

									205000		
									0.22		
									0.01		
Concentratio	Rep	Count 1 ($x 10^4$)	Count 2 ($x 10^4$)	Count 3 ($x 10^4$)	Count 4 ($x 10^4$)	Mean ($x 10^4$)	Cell Yield ($x 10^4$) cell/mL		9318.2		
Control Lab Water	A	34				34	33.1	mean	32.3		
	B	30				30	29.1	SD	1.7525		
	C	33				33	32.1	CV	5.4228		
	D	32				32	31.1				
	E	34				34	33.1				
	F	34				34	33.1				
	G	36				36	35.1				
	H	33				33	32.1				
Control Site Water (FR_UFRI) **100% (v/v)**	A	121				121	120.1	mean	121.8		
	B	116				116	115.1	SD	7.8513		
	C	120				120	119.1	CV	6.4451		
	D	124				124	123.1				
	E	133				133	132.1				
	F	117				117	116.1				
	G	136				136	135.1				
	H	115				115	114.1				
Control Site Water (GH_ER2) **100% (v/v)**	A	140				140	139.1	mean	132.2		
	B	134				134	133.1	SD	4.5178		
	C	136				136	135.1	CV	3.4176		
	D	129				129	128.1				
	E	130				130	129.1				
	F	130				130	129.1				
	G	128				128	127.1				
	H	138				138	137.1				
FR_FRCPI **100% (v/v)**	A	100				100	99.1			mean	96.3
	B	95				95	94.1			SD	2.2174
	C	96				96	95.1				
	D	98				98	97.1				
GH_FRI **100% (v/v)**	A	160				160	159.1			mean	153.1
	B	153				153	152.1			SD	4.9666
	C	155				155	154.1				
	D	148				148	147.1				
GH_ERC **100% (v/v)**	A	147				147	146.1			mean	146.6
	B	152				152	151.1			SD	3.1091
	C	145				145	144.1				
	D	146				146	145.1				
EV_HC1 **100% (v/v)**	A	129				129	128.1			mean	129.1
	B	134				134	133.1			SD	3.9158
	C	125				125	124.1				
	D	132				132	131.1				
EV_MC2 **100% (v/v)**	A	140				140	139.1			mean	136.1
	B	131				131	130.1			SD	4.0825
	C	139				139	138.1				
	D	138				138	137.1				
CM_MC2 **100% (v/v)**	A	112				112	111.1			mean	115.3
	B	118				118	117.1			SD	3.5
	C	115				115	114.1				
	D	120				120	119.1				

JGL Nov. 18/15

CETIS Summary Report

Test Code: 15865 | 14-7769-5344

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Batch ID:	06-5628-2240	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 17:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 17:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	20-7626-6504	27 Oct-15	27 Oct-15	17h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	28h (5.5 °C)		
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	41h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	31h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	41h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	41h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	30h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:30	27 Oct-15 10:10	30h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	28h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

① site control
② site control
③ lab control = DI w/ nutrients

Cell Yield Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	8	32.25	30.78	33.72	29	35	0.6196	1.753	5.43%	0.0%
FR_UFR1	8	121.8	115.2	128.3	114	135	2.776	7.851	6.45%	-277.5%
GH_ER2	8	132.1	128.3	135.9	127	139	1.597	4.518	3.42%	-309.7%
FR_FRCP1	4	96.25	92.72	99.78	94	99	1.109	2.217	2.3%	-198.4%
GH_FR1	4	153	145.1	160.9	147	159	2.483	4.967	3.25%	-374.4%
GH_ERC	4	146.5	141.6	151.4	144	151	1.555	3.109	2.12%	-354.3%
EV_HC1	4	129	122.8	135.2	124	133	1.958	3.916	3.04%	-300.0%
EV_MC2	4	136	129.5	142.5	130	139	2.041	4.082	3.0%	-321.7%
CM_MC2	4	115.3	109.7	120.8	111	119	1.75	3.5	3.04%	-257.4%

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	33	29	32	31	33	33	35	32
FR_UFR1	120	115	119	123	132	116	135	114
GH_ER2	139	133	135	128	129	129	127	137
FR_FRCP1	99	94	95	97				
GH_FR1	159	152	154	147				
GH_ERC	146	151	144	145				
EV_HC1	128	133	124	131				
EV_MC2	139	130	138	137				
CM_MC2	111	117	114	119				

CETIS Analytical Report

Test Code: 15865 | 14-7769-5344

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	13-5484-1374	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Nov-15 15:31	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	06-5628-2240	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 17:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 17:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	20-7626-6504	27 Oct-15	27 Oct-15	17h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	28h (5.5°C)		
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	41h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	31h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	41h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	41h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	30h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:30	27 Oct-15 10:10	30h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	28h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control (1)		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site (2))		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N (3)		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

(1) lab control = DI w/ nutrients
(2) site control
(3) site control

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C < T	NA	NA	22.3%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFR1	38.42	2.523	5.876	14	<0.0001	CDF	Significant Effect
		GH_ER2	42.88	2.523	5.876	14	<0.0001	CDF	Significant Effect
		FR_FRCP1	22.43	2.523	7.197	10	<0.0001	CDF	Significant Effect
		GH_FR1	42.33	2.523	7.197	10	<0.0001	CDF	Significant Effect
		GH_ERC	40.05	2.523	7.197	10	<0.0001	CDF	Significant Effect
		EV_HC1	33.91	2.523	7.197	10	<0.0001	CDF	Significant Effect
		EV_MC2	36.37	2.523	7.197	10	<0.0001	CDF	Significant Effect
		CM_MC2	29.09	2.523	7.197	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7405	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	70854.6	8856.825	8	408.1	<0.0001	Significant Effect
Error	846.375	21.70192	39			
Total	71700.98		47			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	15.32	20.09	0.0532	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9659	0.9345	0.1749	Normal Distribution

Analysis ID: 13-5484-1374 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 09 Nov-15 15:31 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

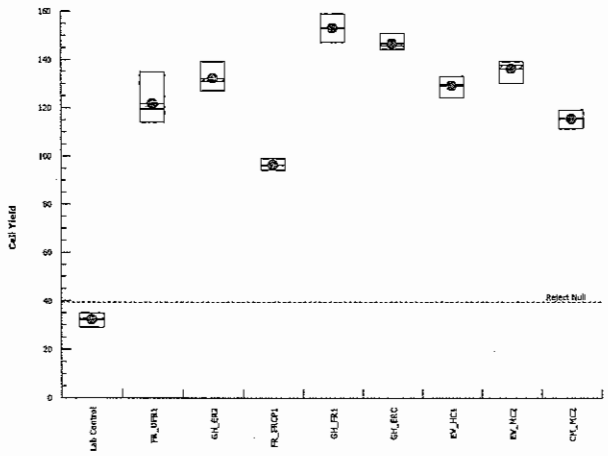
Cell Yield Summary

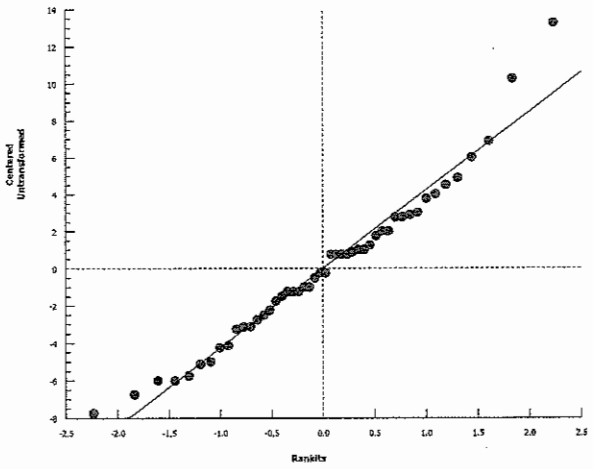
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	8	32.25	30.78	33.72	32.5	29	35	0.6196	5.43%	0.0%
FR_UFR1	8	121.8	115.2	128.3	119.5	114	135	2.776	6.45%	-277.5%
GH_ER2	8	132.1	128.3	135.9	131	127	139	1.597	3.42%	-309.7%
FR_FRCP1	4	96.25	92.72	99.78	96	94	99	1.109	2.3%	-198.4%
GH_FR1	4	153	145.1	160.9	153	147	159	2.483	3.25%	-374.4%
GH_ERC	4	146.5	141.6	151.4	145.5	144	151	1.555	2.12%	-354.3%
EV_HC1	4	129	122.8	135.2	129.5	124	133	1.958	3.04%	-300.0%
EV_MC2	4	136	129.5	142.5	137.5	130	139	2.041	3.0%	-321.7%
CM_MC2	4	115.3	109.7	120.8	115.5	111	119	1.75	3.04%	-257.4%

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	33	29	32	31	33	33	35	32
FR_UFR1	120	115	119	123	132	116	135	114
GH_ER2	139	133	135	128	129	129	127	137
FR_FRCP1	99	94	95	97				
GH_FR1	159	152	154	147				
GH_ERC	146	151	144	145				
EV_HC1	128	133	124	131				
EV_MC2	139	130	138	137				
CM_MC2	111	117	114	119				

Graphics





CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	09-3082-7844	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Nov-15 15:33	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	06-5628-2240	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 17:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 17:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	28h (5.5°C)	Teck Coal	
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	41h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	31h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	41h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	41h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	30h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:30	27 Oct-15 10:10	30h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	28h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site	① ②	① site control ② site control
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	6.39%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_ER2	-4.087	2.502	6.351	14	1.0000	CDF	Non-Significant Effect
		FR_FRCP1	8.202	2.502	7.778	10	<0.0001	CDF	Significant Effect
		GH_FR1	-10.05	2.502	7.778	10	1.0000	CDF	Non-Significant Effect
		GH_ERC	-7.961	2.502	7.778	10	1.0000	CDF	Non-Significant Effect
		EV_HC1	-2.332	2.502	7.778	10	1.0000	CDF	Non-Significant Effect
		EV_MC2	-4.583	2.502	7.778	10	1.0000	CDF	Non-Significant Effect
		CM_MC2	2.091	2.502	7.778	10	0.1151	CDF	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9049	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9254.5	1322.071	7	51.29	<0.0001	Significant Effect
Error	824.875	25.77734	32			
Total	10079.38		39			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	7.834	18.48	0.3475	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9667	0.9236	0.2807	Normal Distribution

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	09-3082-7844	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Nov-15 15:33	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

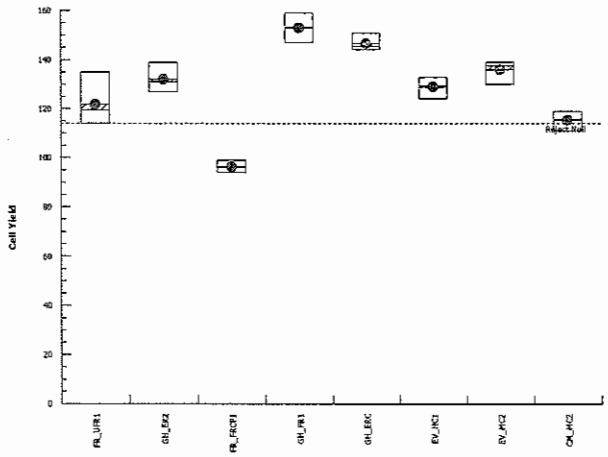
Cell Yield Summary

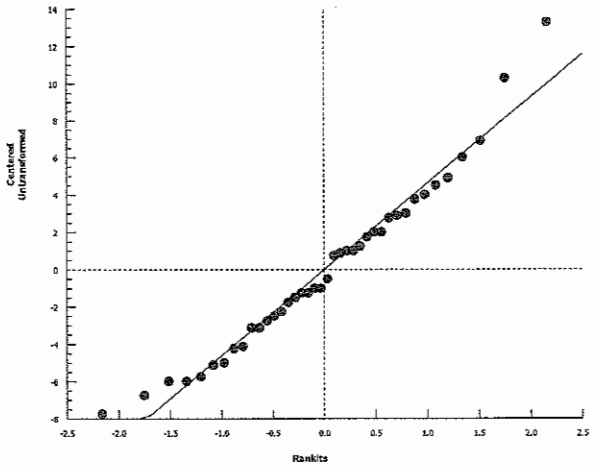
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	8	121.8	115.2	128.3	119.5	114	135	2.776	6.45%	0.0%
GH_ER2	8	132.1	128.3	135.9	131	127	139	1.597	3.42%	-8.52%
FR_FRCP1	4	96.25	92.72	99.78	96	94	99	1.109	2.3%	20.94%
GH_FR1	4	153	145.1	160.9	153	147	159	2.483	3.25%	-25.67%
GH_ERC	4	146.5	141.6	151.4	145.5	144	151	1.555	2.12%	-20.33%
EV_HC1	4	129	122.8	135.2	129.5	124	133	1.958	3.04%	-5.96%
EV_MC2	4	136	129.5	142.5	137.5	130	139	2.041	3.0%	-11.7%
CM_MC2	4	115.3	109.7	120.8	115.5	111	119	1.75	3.04%	5.34%

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1	120	115	119	123	132	116	135	114
GH_ER2	139	133	135	128	129	129	127	137
FR_FRCP1	99	94	95	97				
GH_FR1	159	152	154	147				
GH_ERC	146	151	144	145				
EV_HC1	128	133	124	131				
EV_MC2	139	130	138	137				
CM_MC2	111	117	114	119				

Graphics





CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	01-8310-3147	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Nov-15 15:33	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	06-5628-2240	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 17:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 17:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	28h (5.5°c)	Teck Coal	
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	41h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	31h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	41h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	41h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	30h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:30	27 Oct-15 10:10	30h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	28h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site	①	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N	②	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

① site control
② site control

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C < T	NA	NA	6.39%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_ER2	4.087	2.502	6.351	14	0.0009	CDF	Significant Effect
		FR_FRCP1	-8.202	2.502	7.778	10	1.0000	CDF	Non-Significant Effect
		GH_FR1	10.05	2.502	7.778	10	<0.0001	CDF	Significant Effect
		GH_ERC	7.961	2.502	7.778	10	<0.0001	CDF	Significant Effect
		EV_HC1	2.332	2.502	7.778	10	0.0716	CDF	Non-Significant Effect
		EV_MC2	4.583	2.502	7.778	10	0.0002	CDF	Significant Effect
		CM_MC2	-2.091	2.502	7.778	10	1.0000	CDF	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9049	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9254.5	1322.071	7	51.29	<0.0001	Significant Effect
Error	824.875	25.77734	32			
Total	10079.38		39			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	7.834	18.48	0.3475	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9667	0.9236	0.2807	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 01-8310-3147 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 09 Nov-15 15:33 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

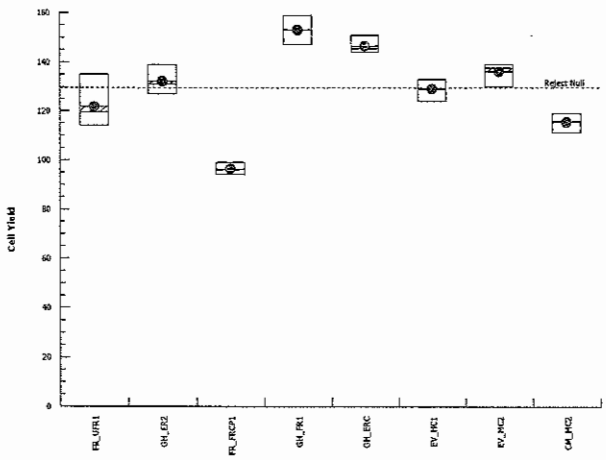
Cell Yield Summary

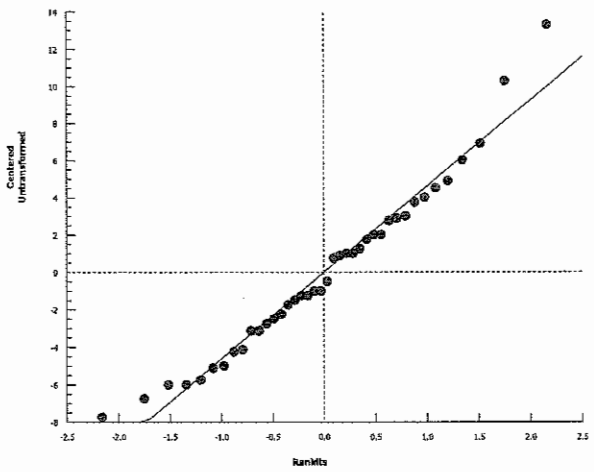
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	8	121.8	115.2	128.3	119.5	114	135	2.776	6.45%	0.0%
GH_ER2	8	132.1	128.3	135.9	131	127	139	1.597	3.42%	-8.52%
FR_FRCP1	4	96.25	92.72	99.78	96	94	99	1.109	2.3%	20.94%
GH_FR1	4	153	145.1	160.9	153	147	159	2.483	3.25%	-25.67%
GH_ERC	4	146.5	141.6	151.4	145.5	144	151	1.555	2.12%	-20.33%
EV_HC1	4	129	122.8	135.2	129.5	124	133	1.958	3.04%	-5.96%
EV_MC2	4	136	129.5	142.5	137.5	130	139	2.041	3.0%	-11.7%
CM_MC2	4	115.3	109.7	120.8	115.5	111	119	1.75	3.04%	5.34%

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1	120	115	119	123	132	116	135	114
GH_ER2	139	133	135	128	129	129	127	137
FR_FRCP1	99	94	95	97				
GH_FR1	159	152	154	147				
GH_ERC	146	151	144	145				
EV_HC1	128	133	124	131				
EV_MC2	139	130	138	137				
CM_MC2	111	117	114	119				

Graphics





CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	10-0671-4916	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Nov-15 15:34	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	06-5628-2240	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 17:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 17:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	28h (5.5°C)	Teck Coal	
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	41h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	31h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	41h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	41h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	30h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:30	27 Oct-15 10:10	30h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	28h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site	①	① site control
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N	②	② site control
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	5.89%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
GH_ER2		FR_UFR1	4.087	2.502	6.351	14	0.0009	CDF	Significant Effect
		FR_FRCP1	11.54	2.502	7.778	10	<0.0001	CDF	Significant Effect
		GH_FR1	-6.714	2.502	7.778	10	1.0000	CDF	Non-Significant Effect
		GH_ERC	-4.624	2.502	7.778	10	1.0000	CDF	Non-Significant Effect
		EV_HC1	1.005	2.502	7.778	10	0.5391	CDF	Non-Significant Effect
		EV_MC2	-1.246	2.502	7.778	10	0.9988	CDF	Non-Significant Effect
		CM_MC2	5.428	2.502	7.778	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.2751	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9254.5	1322.071	7	51.29	<0.0001	Significant Effect
Error	824.875	25.77734	32			
Total	10079.38		39			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	7.834	18.48	0.3475	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9667	0.9236	0.2807	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 10-0671-4916 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 09 Nov-15 15:34 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

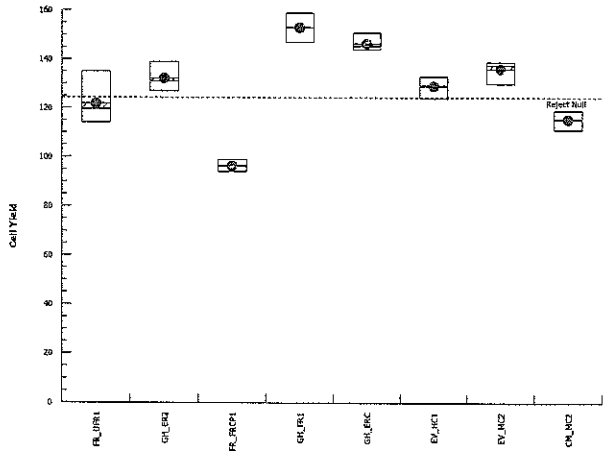
Cell Yield Summary

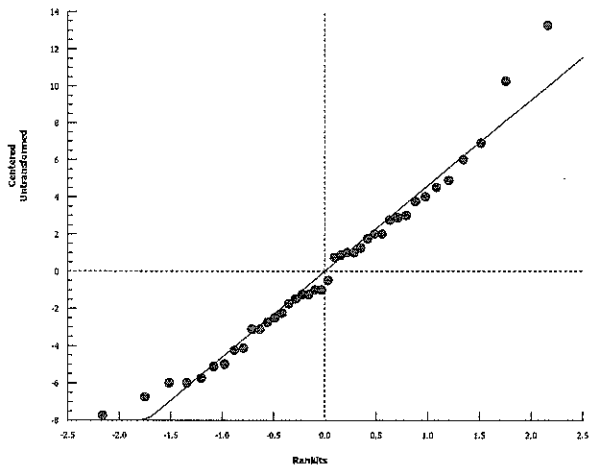
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	8	121.8	115.2	128.3	119.5	114	135	2.776	6.45%	0.0%
GH_ER2	8	132.1	128.3	135.9	131	127	139	1.597	3.42%	-8.52%
FR_FRCP1	4	96.25	92.72	99.78	96	94	99	1.109	2.3%	20.94%
GH_FR1	4	153	145.1	160.9	153	147	159	2.483	3.25%	-25.67%
GH_ERC	4	146.5	141.6	151.4	145.5	144	151	1.555	2.12%	-20.33%
EV_HC1	4	129	122.8	135.2	129.5	124	133	1.958	3.04%	-5.96%
EV_MC2	4	136	129.5	142.5	137.5	130	139	2.041	3.0%	-11.7%
CM_MC2	4	115.3	109.7	120.8	115.5	111	119	1.75	3.04%	5.34%

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1	120	115	119	123	132	116	135	114
GH_ER2	139	133	135	128	129	129	127	137
FR_FRCP1	99	94	95	97				
GH_FR1	159	152	154	147				
GH_ERC	146	151	144	145				
EV_HC1	128	133	124	131				
EV_MC2	139	130	138	137				
CM_MC2	111	117	114	119				

Graphics





CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	09-7972-3835	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Nov-15 15:34	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	06-5628-2240	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 17:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 17:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	28h (5.5°C)	Teck Coal	
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	41h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	31h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	41h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	41h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	30h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:30	27 Oct-15 10:10	30h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	28h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site ①)		① site control
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N ②		② site control
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C < T	NA	NA	5.89%	

Dunnett Multiple Comparison Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
GH_ER2		FR_UFR1	-4.087	2.502	6.351	14	1.0000	CDF	Non-Significant Effect
		FR_FRCP1	-11.54	2.502	7.778	10	1.0000	CDF	Non-Significant Effect
		GH_FR1	6.714	2.502	7.778	10	<0.0001	CDF	Significant Effect
		GH_ERC	4.624	2.502	7.778	10	0.0002	CDF	Significant Effect
		EV_HC1	-1.005	2.502	7.778	10	0.9968	CDF	Non-Significant Effect
		EV_MC2	1.246	2.502	7.778	10	0.4190	CDF	Non-Significant Effect
		CM_MC2	-5.428	2.502	7.778	10	1.0000	CDF	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.2751	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9254.5	1322.071	7	51.29	<0.0001	Significant Effect
Error	824.875	25.77734	32			
Total	10079.38		39			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	7.834	18.48	0.3475	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9667	0.9236	0.2807	Normal Distribution

Analysis ID: 09-7972-3835 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 09 Nov-15 15:34 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

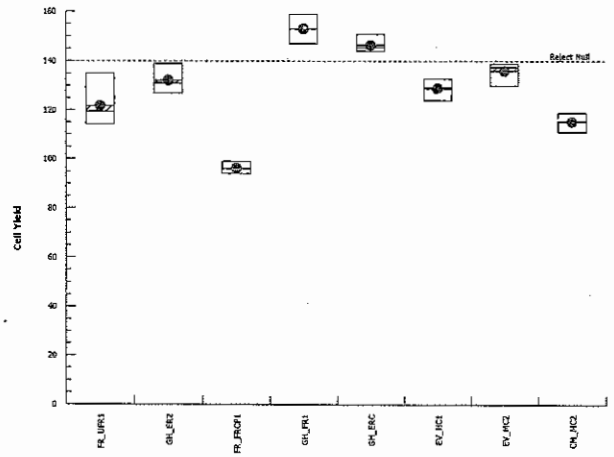
Cell Yield Summary

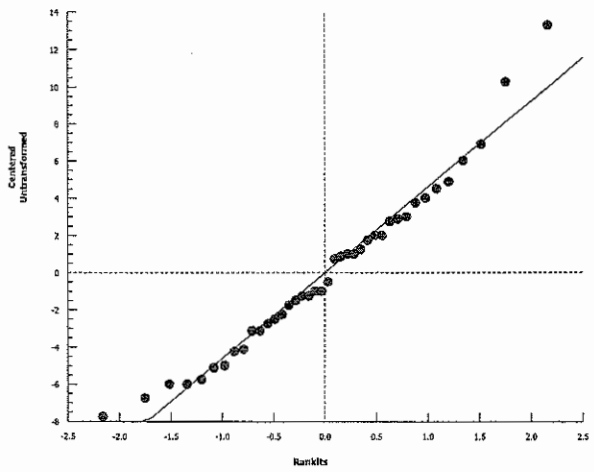
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	8	121.8	115.2	128.3	119.5	114	135	2.776	6.45%	0.0%
GH_ER2	8	132.1	128.3	135.9	131	127	139	1.597	3.42%	-8.52%
FR_FRCP1	4	96.25	92.72	99.78	96	94	99	1.109	2.3%	20.94%
GH_FR1	4	153	145.1	160.9	153	147	159	2.483	3.25%	-25.67%
GH_ERC	4	146.5	141.6	151.4	145.5	144	151	1.555	2.12%	-20.33%
EV_HC1	4	129	122.8	135.2	129.5	124	133	1.958	3.04%	-5.96%
EV_MC2	4	136	129.5	142.5	137.5	130	139	2.041	3.0%	-11.7%
CM_MC2	4	115.3	109.7	120.8	115.5	111	119	1.75	3.04%	5.34%

Cell Yield Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1	120	115	119	123	132	116	135	114
GH_ER2	139	133	135	128	129	129	127	137
FR_FRCP1	99	94	95	97				
GH_FR1	159	152	154	147				
GH_ERC	146	151	144	145				
EV_HC1	128	133	124	131				
EV_MC2	139	130	138	137				
CM_MC2	111	117	114	119				

Graphics





APPENDIX C – *Hyalella azteca* Toxicity Test Data

Hyalella azteca Test Summary Sheet

Client: Teck
Work Order No.: 15867

Start Date: 28-Oct-15
Set up by: KJL

Sample Information:

Sample ID: Various - See Below
Sample Date: Oct 26, Nov 2, 9, 16, 2015
Date Received: Oct 27, Nov 3, 10, 17, 2015
Sample Volume: 1x 20L per refresh

Test Organism Information:

Species: *Hyalella azteca*
Supplier: Aquatic Research Organisms, NH
Date received: 28-Oct-15
Age or size (Day 0): 8-days

NaCl Reference Toxicant Results:

Reference Toxicant ID: HA105
Stock Solution ID: n/a
Date Initiated: 28-Oct-15

96-h LC50 (95% CL): 5.6 (4.5 - 6.9) g/L NaCl

96-h LC50 Reference Toxicant Mean and Range: 5.2 (4.4 - 6.2) g/L NaCl CV (%): 9

Test Results:

Sample ID	Survival ± SD (%)	Average Dry Wt. ± SD (mg)
Control	98.0 ± 4.5	0.77 ± 0.14
FR_UFR1	92.0 ± 8.4	0.80 ± 0.23
GH_FR1	94.0 ± 5.5	0.74 ± 0.05
FR_FRCP1	100 ± 0.0	0.71 ± 0.03
CM_MC2	100 ± 0.0	0.61 ± 0.06*

* Samples that are significantly different from Control.

Reviewed by: [signature]

Date reviewed: December 9, 2015

Chronic *H. azteca* Sediment Toxicity Test Data Sheet

Freshwater Sediment Water Quality

Client: Teck
WO #: 15867
Sample ID: See below

Start Date: 28-Oct-15
Termination Date: 25-Nov-15
Test Organism: *H. azteca*

Temperature (°C)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control	22.0	22.0	23.5	22.5	23.0	22.5	22.5	22.5	23.0	22.0	22.5	22.5	22.0	22.0	22.0
FR_UFR1	22.0	22.0	23.5	22.5	23.0	22.5	22.5	22.5	23.0	22.0	22.5	22.5	22.0	22.0	22.0
GH_FR1	22.0	22.0	23.5	22.5	23.0	22.5	22.5	22.5	23.0	22.0	22.5	22.5	22.0	22.0	22.0
FR_FRCP1	22.0	22.0	23.5	22.5	23.0	22.5	22.5	22.5	23.0	22.0	22.5	22.5	22.0	22.0	22.0
CM_MC2	22.0	22.0	23.5	22.5	23.0	22.5	22.5	22.5	23.0	22.0	22.5	22.5	22.0	22.0	22.0
Technician Initials	EC	KL	KP	A	~	KJ~	KJ	KL	KL	KL	A	~	KL	KL	JS

Conductivity (µS)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control	440	460	426	429	425	433	447	436	423	417	423	436	424	419	419
FR_UFR1	410	419	452	455	460	467	462	457	444	437	447	457	454	443	445
GH_FR1	811	806	836	851	842	846	841	839	843	830	843	855	841	840	831
FR_FRCP1	1093	1098	1100	1110	1096	1092	1095	1088	1095	1096	1092	1108	1085	1083	1077
CM_MC2	935	915	955	942	953	949	936	932	887	863	881	890	874	871	873
Technician Initials	EC	KL	KP	A	~	KJ~		KL	KL	KL	~	~	KL	KL	JS

Comments:

Reviewed by: KP

Date Reviewed: Dec 9, 2015

Chronic *H. azteca* Sediment Toxicity Test Data Sheet
Freshwater Sediment Water Quality

Client: Teck
WO #: 15867
Sample ID: See below

Start Date: 28-Oct-15
Termination Date: 25-Nov-15
Test Organism: *H. azteca*

Temperature (°C)

Sample ID	Day													
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Control	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
FR_UFR1	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
GH_FR1	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
FR_FRCP1	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
CM_MC2	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Technician Initials	JS	KL	A	A	KL	KL	KL	KL	KL	A	KJL	KL	KL	KL

Conductivity (µS)

Sample ID	Day													
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Control	422	421	429	421	423	423	418	425	431	432	438	437	430	430
FR_UFR1	447	450	447	448	450	446	448	442	442	448	445	446	441	443
GH_FR1	850	850	865	854	843	837	839	868	882	887	904	866	854	863
FR_FRCP1	1154	1155	1151	1166	1144	1128	1123	1130	1134	1131	1126	1118	1100	1112
CM_MC2	935	937	934	945	926	916	914	764	766	767	752	748	745	752
Technician Initials	JS	KL	A	A	KL	KL	KL	KL	KL	A	KJL	KL	KL	KL

Comments:

Reviewed by:

Date Reviewed: Dec. 9, 2015

Chronic *H. azteca* Sediment Toxicity Test Data Sheet
Freshwater Sediment Water Quality

Client: Teck
WO #: 15867
Sample ID: See below

Start Date: 28-Oct-15
Termination Date: 25-Nov-15
Test Organism: *H. azteca*

Dissolved oxygen (mg/L)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control	8.0	~~7.5~~ 7.3	6.6	6.2	6.4	6.5	6.5	6.5	6.3	6.4	6.6	6.1	6.0	6.3	6.0
FR_UFR1	~~9.8~~ 8.7	6.9	6.2	6.3	6.3	6.3	6.6	6.6	6.5	6.3	6.5	6.2	5.4	6.2	6.0
GH_FR1	~~8.7~~ 8.7	6.9	6.3	6.5	6.4	6.4	6.4	6.3	6.3	6.1	6.6	6.3	5.5	6.2	6.0
FR_FRCP1	~~9.0~~ 8.7	6.8	6.4	6.4	6.5	6.4	6.5	6.4	6.3	6.3	6.4	6.2	5.7	6.2	6.1
CM_MC2	~~9.0~~ 8.7	7.0	6.3	6.3	6.5	6.5	6.5	6.6	6.6	6.3	6.7	6.3	5.3	6.4	6.4
Technician Initials	EC	KL	KL	~	~	KJ	KJ	KL	KL	KL	~	~	KL	KL	JS

pH

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control	7.8	7.5	7.5	7.6	7.5	7.2	7.2	7.3	7.2	7.3	7.5	7.4	7.2	7.3	7.1
FR_UFR1	8.2	8.0	8.0	8.0	7.9	7.8	7.8	7.9	7.8	7.8	7.9	7.9	7.7	7.8	7.7
GH_FR1	8.1	8.1	8.1	8.1	8.1	8.0	7.9	8.0	8.0	8.0	8.1	8.0	8.0	8.0	7.9
FR_FRCP1	8.1	8.1	8.0	8.0	8.0	8.0	7.9	8.0	8.0	8.0	8.1	8.1	8.0	7.9	7.9
CM_MC2	8.2	8.2	8.1	8.1	8.1	8.0	7.9	8.1	8.1	8.2	8.2	8.2	7.9	8.1	8.0
Technician Initials	EC	KL	KL	~	~	KJ	KJ	KL	KL	KL	~	~	KL	KL	JS

Comments:

Reviewed by: GL

Date Reviewed: Dec. 9, 2015

Chronic *H. azteca* Sediment Toxicity Test Data Sheet

Freshwater Sediment Water Quality

Client: Teck
WO #: 15867
Sample ID: See below

Start Date: 28-Oct-15
Termination Date: 25-Nov-15
Test Organism: *H. azteca*

Dissolved oxygen (mg/L)

Sample ID	Day													
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Control	5.6	5.6	6.2	6.3	5.7	6.2	6.3	5.4	6.1	5.8	5.9	5.6	5.3	5.3
FR_UFR1	6.0	5.5	6.1	6.2	5.2	6.0	5.8	5.6	5.9	5.9	5.8	5.7	5.6	5.2
GH_FR1	6.1	5.5	6.3	6.1	5.4	6.2	6.6	5.4	5.8	5.9	5.8	5.2	5.3	5.0
FR_FRCP1	6.4	5.7	6.4	6.0	5.5	6.1	6.5	5.4	5.9	5.8	6.0	5.6	5.5	5.2
CM_MC2	6.5	5.8	6.4	5.9	6.0	6.2	6.3	5.1	6.0	5.9	5.7	6.8	5.6	5.4
Technician Initials	JS	KL	AD	2	KL	KL	KL	KL	KJL	AD	KJL	KL	KL	KL

① 6.7

pH

Sample ID	Day													
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Control	7.2	7.2	7.0	7.3	7.1	7.1	7.0	7.21	7.4	7.5	7.2	7.0	7.0	7.0
FR_UFR1	7.7	7.7	7.7	7.8	7.6	7.7	7.6	7.6	7.8	7.5	7.6	7.5	7.5	7.5
GH_FR1	7.9	7.8	7.9	7.9	7.9	7.8	7.8	7.8	7.9	8.0	7.7	7.6	7.6	7.6
FR_FRCP1	7.9	7.8	7.9	7.8	7.9	7.8	7.8	7.8	7.9	7.9	7.7	7.7	7.7	7.6
CM_MC2	7.9	7.9	7.9	7.9	8.0	7.9	7.7	7.7	7.8	7.9	7.7	7.9	7.8	7.8
Technician Initials	KL	KL	AD	2	KL	KL	KL	KL	KJL	AD	KJL	KL	KL	KL

Comments:

Reviewed by: [signature] Date Reviewed: Dec. 9, 2015

H. azteca Sediment Toxicity Test Data Sheet

Freshwater Sediment Survival and Weight

Client: **Teck**
WO #: **15867**

Start Date: **28-Oct-15**
Termination Date: **25-Nov-15**
Test Organism: **H. azteca**

Sample ID	Rep	1028 Pan No. Blue	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
Control	A	1	10	0	0	KJL	984.47	994.24	10	KL
	B	2	9	0	KL 1		973.15	980.22	9	
	C	3	10	0	0		993.68	1001.51	10	
	D	4	10	0	0		1002.24	1008.22	10	
	E	5	10	0	0		989.90	996.87	10	
FR_UFR1	A	6	9	0	1		988.70	996.56	9	
	B	7	8	0	2		973.24	979.11	8	
	C	8	10	0	0		984.04	993.38	10	
	D	9	10	0	0		996.81	1001.20	10	
	E	10	9	0	1		991.72	1000.83	9	
GH_FR1	A	11	9	0	1		994.22	1000.62	9	
	B	12	9	1	0		995.05	1001.40	9	
	C	13	9	0	1		979.54	986.32	9	
	D	14	10	0	0		980.96	988.17	10	
	E	15	10	0	0		982.90	991.22	10	
FR_FRCP1	A	16	10	0	0		991.16	998.39	10	
	B	17	10	0	0		996.49	1003.42	10	
	C	18	10	0	0		985.99	992.70	10	
	D	19	10	0	0		988.87	996.04	10	
	E	20	10	0	0		989.75	997.27	10	

Comments: 10% re-weigh: #1: 994.09, #12: 1001.34, # KL

Reviewed by: [signature]

Date Reviewed: Dec 9, 2015

H. azteca Sediment Toxicity Test Data Sheet

Freshwater Sediment Survival and Weight

Client: **Teck**

WO #: **15867**

Start Date: **28-Oct-15**

Termination Date: **25-Nov-15**

Test Organism: **H. azteca**

Sample ID	Rep	1028 Pan No. Blue	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
CM_MC2	A	21	10	0	0	KJL	976.25	982.98	10	KL
	B	22	10	0	0		1000.89	1007.43	10	
	C	23	10	0	0		983.60	988.75	10	
	D	24	10	0	0		984.75	990.74	10	
	E	25	10	0	0		988.80	995.13	10	
	A									
	B									
	C									
	D									
	E									
	A									
	B									
	C									
	D									
	E									
	A									
	B									
	C									
	D									
	E									

Comments: 101 re-weigh: #23: 988.71

Reviewed by: KW

Date Reviewed: Dec. 9, 2015

CETIS Summary Report

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Batch ID:	07-6763-1190	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	28 Oct-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Nov-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	01-1766-8348	28 Oct-15	28 Oct-15	NA	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	35h (5.5 °C)		
GH_FR1	06-4454-5624	26 Oct-15	27 Oct-15 10:10	48h (3.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	38h (4.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	35h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
08-0317-7326	Survival Rate	Control Resp	0.98	0.8 - NL	Yes	Passes Acceptability Criteria

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	5	0.98	0.9245	1	0.9	1	0.02	0.04472	4.56%	0.0%
FR_UFR1	5	0.92	0.8161	1	0.8	1	0.03742	0.08367	9.09%	6.12%
GH_FR1	5	0.94	0.872	1	0.9	1	0.02449	0.05477	5.83%	4.08%
FR_FRCP1	5	1	1	1	1	1	0	0	0.0%	-2.04%
CM_MC2	5	1	1	1	1	1	0	0	0.0%	-2.04%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	1	0.9	1	1	1
FR_UFR1	0.9	0.8	1	1	0.9
GH_FR1	0.9	0.9	0.9	1	1
FR_FRCP1	1	1	1	1	1
CM_MC2	1	1	1	1	1

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	10/10	9/10	10/10	10/10	10/10
FR_UFR1	9/10	8/10	10/10	10/10	9/10
GH_FR1	9/10	9/10	9/10	10/10	10/10
FR_FRCP1	10/10	10/10	10/10	10/10	10/10
CM_MC2	10/10	10/10	10/10	10/10	10/10

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CETIS Analytical Report

Test Code: 15867 | 06-8228-0530

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	08-0317-7326	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Dec-15 15:46	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	07-6763-1190	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	28 Oct-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Nov-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	01-1766-8348	28 Oct-15	28 Oct-15	NA	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	35h (5.5 °C)		
GH_FR1	06-4454-5624	26 Oct-15	27 Oct-15 10:10	48h (3.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	38h (4.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	35h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
Control		FR_UFR1	0.1811	0.1811	Exact	Non-Significant Effect
Control		GH_FR1	0.3087	0.3087	Exact	Non-Significant Effect
Control		FR_FRCP1	1	1.0000	Exact	Non-Significant Effect
Control		CM_MC2	1	1.0000	Exact	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.98	0.8 - NL	Yes	Passes Acceptability Criteria

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
Control	Negative Contr	49	1	50	0.98	0.02	0.0%
FR_UFR1		46	4	50	0.92	0.08	6.12%
GH_FR1		47	3	50	0.94	0.06	4.08%
FR_FRCP1		50	0	50	1	0	-2.04%
CM_MC2		50	0	50	1	0	-2.04%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	1	0.9	1	1	1
FR_UFR1	0.9	0.8	1	1	0.9
GH_FR1	0.9	0.9	0.9	1	1
FR_FRCP1	1	1	1	1	1
CM_MC2	1	1	1	1	1

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	10/10	9/10	10/10	10/10	10/10
FR_UFR1	9/10	8/10	10/10	10/10	9/10
GH_FR1	9/10	9/10	9/10	10/10	10/10
FR_FRCP1	10/10	10/10	10/10	10/10	10/10
CM_MC2	10/10	10/10	10/10	10/10	10/10

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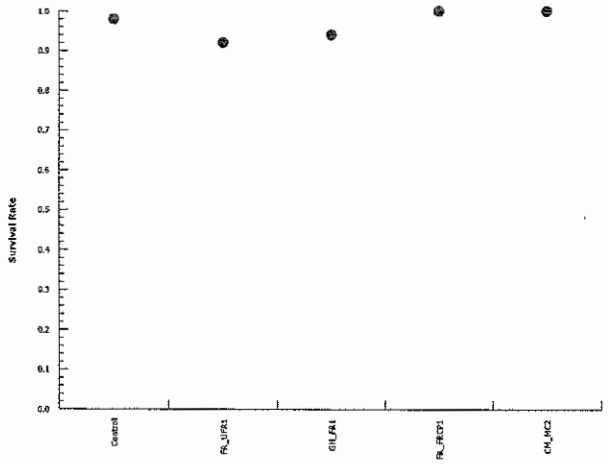
Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	08-0317-7326	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Dec-15 15:46	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes

Graphics



Dec-9/15

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	13-9471-2017	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Dec-15 9:45	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	07-6763-1190	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	28 Oct-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Nov-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	35h (5.5 °C)	Teck Coal	
GH_FR1	06-4454-5624	26 Oct-15	27 Oct-15 10:10	48h (3.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	38h (4.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	35h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_FR1	1	1.0000	Exact	Non-Significant Effect
FR_UFR1		FR_FRCP1	1	1.0000	Exact	Non-Significant Effect
FR_UFR1		CM_MC2	1	1.0000	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1	Reference Sed	46	4	50	0.92	0.08	0.0%
GH_FR1		47	3	50	0.94	0.06	-2.17%
FR_FRCP1		50	0	50	1	0	-8.7%
CM_MC2		50	0	50	1	0	-8.7%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1	0.9	0.8	1	1	0.9
GH_FR1	0.9	0.9	0.9	1	1
FR_FRCP1	1	1	1	1	1
CM_MC2	1	1	1	1	1

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1	9/10	8/10	10/10	10/10	9/10
GH_FR1	9/10	9/10	9/10	10/10	10/10
FR_FRCP1	10/10	10/10	10/10	10/10	10/10
CM_MC2	10/10	10/10	10/10	10/10	10/10

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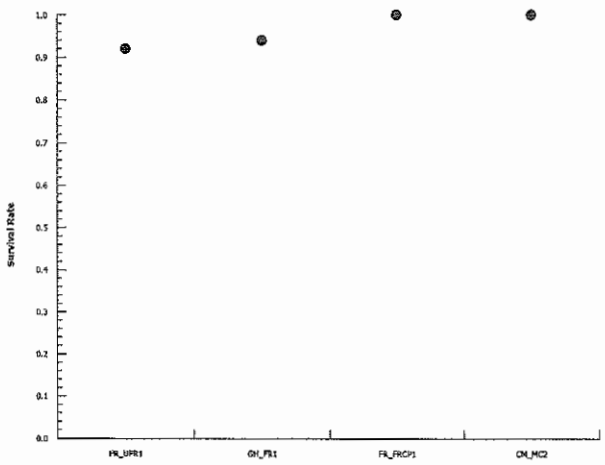
Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	13-9471-2017	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Dec-15 9:45	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes

Graphics



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CETIS Summary Report

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Batch ID:	07-6763-1190	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	28 Oct-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Nov-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	01-1766-8348	28 Oct-15	28 Oct-15	NA	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	35h (5.5 °C)		
GH_FR1	06-4454-5624	26 Oct-15	27 Oct-15 10:10	48h (3.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	38h (4.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	35h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	5	0.7681	0.5945	0.9417	0.598	0.977	0.06251	0.1398	18.2%	0.0%
FR_UFR1	5	0.7985	0.5187	1.078	0.439	1.012	0.1008	0.2253	28.22%	-3.95%
GH_FR1	5	0.7446	0.6797	0.8095	0.7056	0.832	0.02336	0.05224	7.02%	3.06%
FR_FRCP1	5	0.7112	0.673	0.7494	0.671	0.752	0.01376	0.03076	4.33%	7.41%
CM_MC2	5	0.6148	0.5376	0.692	0.515	0.673	0.02781	0.06218	10.11%	19.96%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	0.977	0.7855	0.783	0.598	0.697
FR_UFR1	0.8733	0.7337	0.934	0.439	1.012
GH_FR1	0.7111	0.7056	0.7533	0.721	0.832
FR_FRCP1	0.723	0.693	0.671	0.717	0.752
CM_MC2	0.673	0.654	0.515	0.599	0.633

Dec-9/15

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	16-0596-4087	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Dec-15 15:48	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	07-6763-1190	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	28 Oct-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Nov-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	01-1766-8348	28 Oct-15	28 Oct-15	NA	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	35h (5.5 °C)		
GH_FR1	06-4454-5624	26 Oct-15	27 Oct-15 10:10	48h (3.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	38h (4.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	35h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Water Sample	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	19.1%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Control		FR_UFR1	30	NA	0	8	0.7262	Exact	Non-Significant Effect
		GH_FR1	27	NA	0	8	0.5000	Exact	Non-Significant Effect
		FR_FRCP1	23	NA	0	8	0.2103	Exact	Non-Significant Effect
		CM_MC2	19	NA	0	8	0.0476	Exact	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.09972104	0.02493026	4	1.601	0.2129	Non-Significant Effect
Error	0.3113946	0.01556973	20			
Total	0.4111156		24			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	16.46	13.28	0.0025	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.904	0.8877	0.0224	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	5	0.7681	0.5945	0.9417	0.783	0.598	0.977	0.06251	18.2%	0.0%
FR_UFR1	5	0.7985	0.5187	1.078	0.8733	0.439	1.012	0.1008	28.22%	-3.95%
GH_FR1	5	0.7446	0.6797	0.8095	0.721	0.7056	0.832	0.02336	7.02%	3.06%
FR_FRCP1	5	0.7112	0.673	0.7494	0.717	0.671	0.752	0.01376	4.33%	7.41%
CM_MC2	5	0.6148	0.5376	0.692	0.633	0.515	0.673	0.02781	10.11%	19.96%

Mean Dry Weight-mg Detail

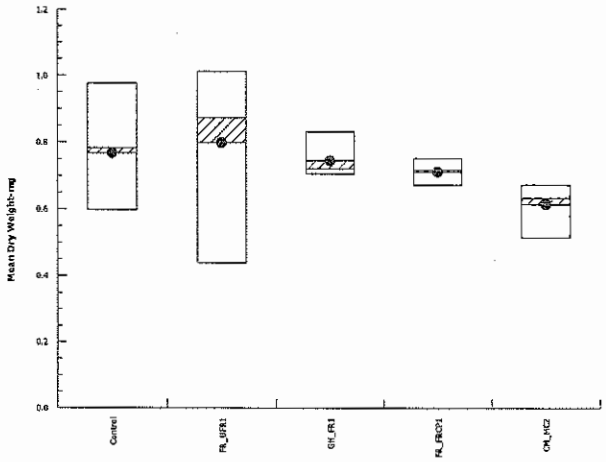
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	0.977	0.7855	0.783	0.598	0.697
FR_UFR1	0.8733	0.7337	0.934	0.439	1.012
GH_FR1	0.7111	0.7056	0.7533	0.721	0.832
FR_FRCP1	0.723	0.693	0.671	0.717	0.752
CM_MC2	0.673	0.654	0.515	0.599	0.633

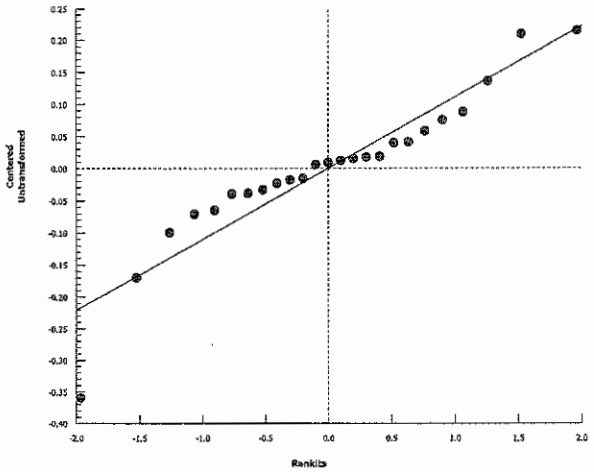
Dec-9/15

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	16-0596-4087	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Dec-15 15:48	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Graphics





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Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	08-0638-8067	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Dec-15 9:45	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	07-6763-1190	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	28 Oct-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	25 Nov-15	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	35h (5.5 °C)	Teck Coal	
GH_FR1	06-4454-5624	26 Oct-15	27 Oct-15 10:10	48h (3.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	38h (4.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	35h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	17.8%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_FR1	22	NA	0	8	0.1548	Exact	Non-Significant Effect
		FR_FRCP1	21	NA	0	8	0.1111	Exact	Non-Significant Effect
		CM_MC2	20	NA	0	8	0.0754	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0893807	0.02979356	3	2.044	0.1483	Non-Significant Effect
Error	0.2332377	0.01457735	16			
Total	0.3226184		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	16.26	11.34	0.0010	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8545	0.866	0.0063	Non-normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	5	0.7985	0.5187	1.078	0.8733	0.439	1.012	0.1008	28.22%	0.0%
GH_FR1	5	0.7446	0.6797	0.8095	0.721	0.7056	0.832	0.02336	7.02%	6.75%
FR_FRCP1	5	0.7112	0.673	0.7494	0.717	0.671	0.752	0.01376	4.33%	10.93%
CM_MC2	5	0.6148	0.5376	0.692	0.633	0.515	0.673	0.02781	10.11%	23.0%

Mean Dry Weight-mg Detail

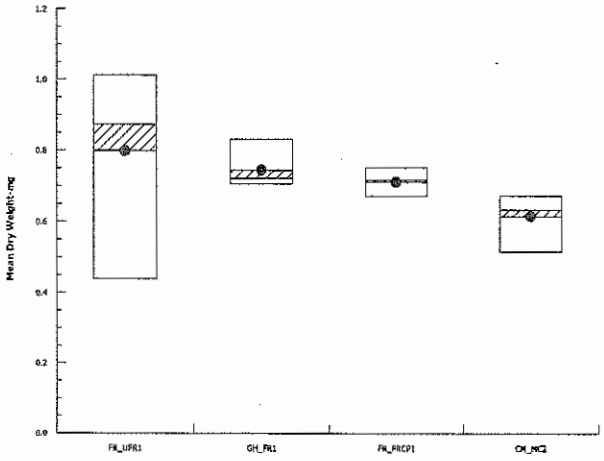
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1	0.8733	0.7337	0.934	0.439	1.012
GH_FR1	0.7111	0.7056	0.7533	0.721	0.832
FR_FRCP1	0.723	0.693	0.671	0.717	0.752
CM_MC2	0.673	0.654	0.515	0.599	0.633

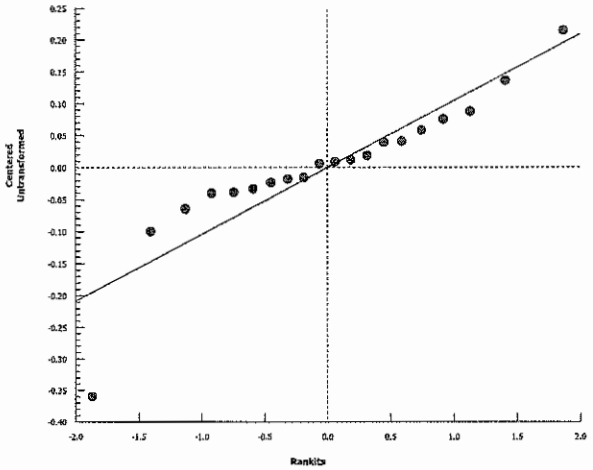
Dec-9/15

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	08-0638-8067	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Dec-15 9:45	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Graphics





Dec 9/15

Client: Teck

W.O.#: 15867

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
FR_UFR1	Oct 28 KL 26/15	50	7.0	7.2	136		50	9.5	190	KL
FR_FRCP1		↓	10.1	10.2	200		10①	6.8	680	↓
GH_FR1			9.1	9.3	178		10①	5.0	500	
CM_MC2		↓	10.1	10.3	198		10①	4.8	480	↓
MHW										
FR_UFR1	KNOV Oct 2 /15	50	7.7	7.8	152		KL 50	9.5	190	KL
FR_FRCP1	↓	↓	10.5	10.7	206		10①	6.2	620	↓
GH_FR1			10.0	10.2	196		↓	4.8	480	
CM_MC2	↓	↓	9.7	9.8	192		↓	5.1	510	↓
FR_UFR1	Nov 9/15	50	7.5 KL 4	7.7 KL 6	144		50	9.2	184	KL
FR_FRCP1	↓	↓	10.4	10.6	204		10①	6.7	670	↓
GH_FR1			9.7 KL 6	9.7	190		↓	4.7	470	
CM_MC2	↓	↓	10.2	10.4	200		↓	4.7	470	↓

Notes: ① Sample diluted w/ DI up to 100ml

Reviewed by: [signature]

Date Reviewed: Dec. 9, 2015

Client: Teck

W.O.#: 15867

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
FR_UFR1	Nov 16/15	50	7.3	7.4	144		50	8.9	178	KL
FR_FRCP1	↓	↓	10.9	11.0	216		10①	6.4	640	↓
GH_FR1			9.6	9.7	190		↓	5.6	560	
CM_MC2			8.7	8.9	170			4.2	420	

Notes: ①10 Sample diluted w/ DI up to 100mL

Reviewed by: [signature]

Date Reviewed: Dec. 9, 2015

APPENDIX D – *Pimephales promelas* Toxicity Test Data

HydroQual Laboratories Ltd.

ATTN: Krysta Pearcy
Nautilus Environmental
8664 Commerce Court
Burnaby, BC
Canada

Received: various dates
Report Date: 2015/12/08
Version: FINAL

HydroQual Test Report

Client: NAU104
Reference: 15-1475; 15-1476; 15-1477; 15-1478
Client Reference: FR_FRCP1
FR_UFR1
GH_FR1_WS
CM_MC2_WS
Billing: not given

Jacklyn Poole

Senior Verifier

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference: Control

Test Log

Date	Day	Time	Technicians	Chem. Cart Used	Fed		Feeding Rate	Bench Sheet Review	
					AM	PM		First	Second
2015/10/28	0	1700	ML/HKS	2	-	-	-	ML	HKS
2015/10/29	1	1210	ML	2	-	-	-	ML	DS
2015/10/30	2	0830	ML	2	-	-	-	ML	JP
2015/10/31	3	0900	CQ	2	-	-	-	CQ	JP
2015/11/01	4	0930	ML	2	-	-	-	ML	HKS
2015/11/02	5	1140	ML	2	-	✓	1 mL	ML	DS
2015/11/03	6	1000	HKS	2	✓	✓	1 mL	HKS	JP
2015/11/04	7	0945	ML	2	✓	✓	1 mL	ML	HKS
2015/11/05	8	1330	HKS	2	✓	✓	1 mL	HKS	DS
2015/11/06	9	0930	HKS	2	✓	✓	1 mL	HKS	CQ
2015/11/07	10	1300	HS	2	✓	✓	1 mL	HS	JN
2015/11/08	11	1330	ML	2	✓	✓	1 mL	ML	DS
2015/11/09	12	1030	ML	2	✓	✓	1 mL	ML	JP
2015/11/10	13	1030	ML	2	✓	✓	1 mL	ML	CQ
2015/11/11	14	1145	ML	2	✓	✓	1 mL	ML	JN
2015/11/12	15	1200	HS	2	✓	✓	1 mL	HS	JP
2015/11/13	16	1000	HS	2	✓	✓	1 mL	HS	JP
2015/11/14	17	1530	DS	2	✓	✓	1 mL	DS	-
2015/11/15	18	1600	ML/DS	2	✓	✓	1 mL	ML	DS
2015/11/16	19	0930	ML	2	✓	✓	1 mL	ML	JP
2015/11/17	20	1030	ML	2	✓	✓	1.5 mL	ML	DS
2015/11/18	21	1030	HS	2	✓	✓	1.5 mL	HS	DS
2015/11/19	22	0945	ML	2	✓	✓	1.5 mL	HS	ML
2015/11/20	23	1100	HS	2	✓	✓	1.5 mL	HS	CQ
2015/11/21	24	1030	HS	2	✓	✓	1.5 mL	HS	JN
2015/11/22	25	1300	ML	2	✓	✓	1.5 mL	ML	DS
2015/11/23	26	1345	ML	2	✓	✓	1.5 mL	ML	HS
2015/11/24	27	1340	ML/HS	2	✓	✓	1.5 mL	ML	HS
2015/11/25	28	1045	HS/JN	2	✓	✓	1.5 mL	JN	HS
2015/11/26	29	1330	HS/DS	2	✓	✓	1.5 mL	HS	DS
2015/11/27	30	1000	HS/JN	2	✓	✓	1.5 mL	HS	JN
2015/11/28	31	1100	DS/JN	2	✓	✓	1.5 mL	DS	JN
2015/11/29	32	1000	JK/JW	2	-	-	-	JK	CQ

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference Control

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

	Day 1		Day 2			Day 3		Day 4		Day 5	Day 6	Day 7	Day 8
replicate	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	15	0	15	0	15	15	-	3	12	13 (+2embryos)	13	12	12
b	15	0	15	0	15	15	-	2	13	15	15	15	15
c	13	2	12	1	15	15	-	2	13	14(+1embryo)	14	14	14
d	15	0	15	0	15	14	1	10	5	13(+2embryo)	13	13	13
e	30	0	30	0									
f	29	1	27	2									

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2

Number of Alive Organisms

replicate	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16
a	12	12	12	12	12	12	12	12
b	15	15	15	15	15	15	15	15
c	14	14	14	14	14	14	14	14
d	13	13	13	13(1)	13(1)	13	13	13

replicate	Day 17	Day 18	Day 19	Day 20	Day 21	Day 22	Day 23	Day 24
a	12	12	12	12	12	12	12	12
b	14	14	14	14	14	14	14	14
c	14	14	14	14	14	14	14	14
d	13	13	13	13	13	13	13	13

replicate	Day 25	Day 26	Day 27	Day 28	Day 29	Day 30	Day 31	Day 32
a	12	12	12	12	12	12	12	12
b	14	14	14	14	14	14	14	14
c	14	14	14	14	14	14	14	14
d	13	13	13	13	13	13	13	13

Comments/Observations: None

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	87%	92%	80%	10	1.45	0%
b	100%	93%	93%	8	1.07	7%
c	93%	100%	93%	8	1.36	0%
d	87%	100%	87%	9	1.60	0%
Average	**92%**	**96%**	**88%**	**9**	**1.37**	**2%**

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference Control

Chemistries

	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.0	-	8.1	8.0	8.1	7.9	8.0	8.0	8.1	7.8	8.1	7.9	8.1	8.1	8.0	8.0
EC (µS/cm)	503	-	489	498	498	492	500	510	471	470	487	479	466	480	462	407
DO (mg/L)	7.3	-	7.3	6.6	7.3	7.0	7.4	7.3	7.3	7.0	7.2	7.1	7.0	7.0	7.0	7.0
Temp. (°C)	23.5	-	23.6	23.5	23.5	23.5	23.5	23.5	23.6	23.5	23.5	23.5	23.5	23.6	23.5	23.5

	Day 8		Day 9		Day 10		Day 11		Day 12		Day 13		Day 14		Day 15	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.1	7.9	8.0	7.9	8.1	8.1	8.1	8.1	8.1	7.9	7.9	8.1	8.2	8.1	8.0	7.9
EC (µS/cm)	454	475	467	470	448	483	493	493	506	503	470	505	456	490	478	482
DO (mg/L)	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.2	7.3	7.3
Temp. (°C)	23.8	23.7	23.5	23.7	23.9	23.5	23.6	23.5	23.5	23.5	23.5	23.5	23.7	23.5	24.1	23.5

	Day 16		Day 17		Day 18		Day 19		Day 20		Day 21		Day 22		Day 23	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.0	8.0	8.1	8.1	8.2	8.1	8.2	8.2	8.1	7.8	8.1	7.8	8.1	8.0	8.0	8.0
EC (µS/cm)	475	484	445	478	448	490	475	459	466	466	439	439	408	413	403	412
DO (mg/L)	7.3	7.3	7.3	7.2	7.2	7.1	7.3	7.3	7.3	6.3	7.3	7.3	7.3	7.3	7.3	7.3
Temp. (°C)	23.9	23.5	23.6	23.6	23.5	23.5	23.5	23.5	23.5	23.5	23.9	23.6	23.6	23.5	23.6	23.5

	Day 24		Day 25		Day 26		Day 27		Day 28		Day 29		Day 30		Day 31	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.0	8.1	8.3	8.1	8.1	8.0	8.0	7.9	7.9	7.8	8.0	7.6	8.0	7.9	7.8	8.0
EC (µS/cm)	419	416	400	413	394	414	393	408	429	425	431	449	414	431	434	440
DO (mg/L)	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
Temp. (°C)	23.5	23.5	23.7	23.5	23.5	23.5	23.5	23.5	23.6	23.5	23.6	23.5	23.5	23.5	23.5	23.6

	Day 32	
	New	Old
pH	-	7.9
EC (µS/cm)	-	474
DO (mg/L)	-	7.5
Temp. (°C)	-	23.7

	New Solutions		
	AVERAGE	SD	CV
pH	8.1	0.10	1.2
EC (µS/cm)	454	34	7.4
DO	7.3	0.07	0.9
Temp. (°C)	24	0.16	2.1

	Old Solutions		
	AVERAGE	SD	CV
pH	8.0	0.13	1.6
EC (µS/cm)	461	33	7.2
DO	7.2	0.23	3.2
Temp. (°C)	24	0.06	0.3

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference: Control

Test Termination

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Replicate A		
Fish	Length (mm)	Normal/ Abnormal
1	10	N
2	11	N
3	11	N
4	9	N
5	8	N
6	8	N
7	10	N
8	9	N
9	11	N
10	11	N
11	8	N
12	na	na*
13	-	-
14	-	-
15	-	-

*killed by technician prior to observation and length measurement

Dry Weight(mg) per fish	**1.45**
Avg. length (mm)	**10**

Replicate B		
Fish	Length (mm)	Normal/ Abnormal
1	5	N
2	7	N
3	10	N
4	8	N
5	8	A/S
6	8	N
7	6	N
8	3	N
9	8	N
10	8	N
11	8	N
12	10	N
13	8	N
14	9	N
15	-	-

Dry Weight(mg) per fish	**1.07**
Avg. length (mm)	**8**

Replicate C		
Fish	Length (mm)	Normal/ Abnormal
1	11	N
2	10	N
3	9	N
4	4	N
5	7	N
6	8	N
7	9	N
8	8	N
9	10	N
10	7	N
11	11	N
12	8	N
13	7	N
14	9	N
15	-	-

Dry Weight(mg) per fish	**1.36**
Avg. length (mm)	**8**

Replicate D		
Fish	Length (mm)	Normal/ Abnormal
1	9	N
2	9	N
3	8	N
4	8	N
5	7	N
6	10	N
7	7	N
8	10	N
9	10	N
10	9	N
11	8	N
12	9	N
13	12	N
14	-	-
15	-	-

Dry Weight(mg) per fish	**1.60**
Avg. length (mm)	**9**

Internal Tracking Sheet

Client:	NAU104
Reference:	15-1476

Client:

Client:	Nautilus Environmental	Operation:	Burnaby
Address:	8664 Commerce Court	Billing:	not given
City:	Burnaby	Contact:	Krysta Pearcy
Province:	BC	Tel:	604 420 8773
Country:	Canada	Fax:	not given
Postal Code:	V5A 4N7	Email:	krysta@nautilusenvironmental.com

Sample:

type:	water			collection method:	grab
collected:	various dates	at:	various times	by:	not given
shipped:	various dates	by:	drop off		
received:	various dates	at:	various times	by:	MC
signed-in:	various dates	at:	various times	by:	MC
container:	6 x 20L carboys			sample condition:	good condition
seals present:	no			initials on seals:	no
storage:	4 +/1 2 degreed in darkness			initial temperature (°C):	5; 8; 8; 12; 9

Samples are disposed following PERS-SWI-004

Chemical and Physical Measurements at Sample Receipt:

sample:	01	02	03	04	05	
client code:	FR_UFR1_Q_05102015_N	FR_UFR1_Q_12102015_N	FR_UFR1_Q_19102015_N	FR_UFR1_Q_26102015_N	FR_UFR1_Q_02112015_N	**FR_UFR1**
collection date:	2015/10/26	2015/11/02	2015/11/09	2015/11/16	2015/11/24	
collection time:	1303	1000	1030	1200	1215	

pH:	7.9	7.9	7.9	7.9	8.0
EC (µS/cm):	375	403	335	336	341
DO (mg/L):	9.6	12.7	9.1	9.6	10.9
temp (°C):	10.8	153	15.7	10.9	8.7
hardness:	161	154	174	177	149
alkalinity:	133	154	187	189	121
colour:	colourless	colourless	colourless	colourless	colourless
odour:	odourless	odourless	odourless	odourless	odourless

Meter/Probe Used: chem cart 1/chem cart 2/**chem cart 3**/product/soils

Each sampling container EC checked (initials): HKS__

Test Log:

test code:	FM-32D
started:	2015/10/28
ended:	2015/11/29
prelim made:	-
prelim sent:	-
reported:	2015/12/03

Our liability is limited to the cost of the test requested on the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results in part or in whole.

HydroQual Laboratories Ltd., #4, 6125 12th Street SE, Calgary, Alberta, Canada T2H 2K1
tel (403) 253-7121 fax (403) 252-9363 www.hydroqual.ca

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference: 15-1476

Test Log

Date	Day	Time	Technicians	Chem. Cart Used	Fed		Feeding Rate	Bench Sheet Review		Sample Pre-Aeration Time (minutes)
					AM	PM		First	Second	
2015/10/28	0	1700	ML/HKS	2	-	-	-	ML	HKS	90
2015/10/29	1	1210	ML	2	-	-	-	ML	DS	90
2015/10/30	2	0830	ML	2	-	-	-	ML	JP	90
2015/10/31	3	0900	CQ	2	-	-	-	CQ	JP	90
2015/11/01	4	0925	ML	2	-	-	-	ML	HKS	90
2015/11/02	5	1115	ML	2	-	✓	1 mL	ML	DS	90
2015/11/03	6	1000	HKS	2	✓	✓	1 mL	HKS	JP	90
2015/11/04	7	0945	ML	2	✓	✓	1 mL	ML	HKS	90
2015/11/05	8	1330	HKS	2	✓	✓	1 mL	HKS	DS	90
2015/11/06	9	0930	HKS	2	✓	✓	1 mL	HKS	CQ	90
2015/11/07	10	1300	HS	2	✓	✓	1 mL	HS	JN	90
2015/11/08	11	1330	ML	2	✓	✓	1 mL	ML	DS	90
2015/11/09	12	1030	ML	2	✓	✓	1 mL	ML	JP	90
2015/11/10	13	1030	ML	2	✓	✓	1 mL	ML	CQ	90
2015/11/11	14	1130	ML	2	✓	✓	1 mL	ML	JW	60
2015/11/12	15	1200	HS	2	✓	✓	1 mL	HS	JP	60
2015/11/13	16	1000	HS	2	✓	✓	1 mL	HS	JP	60
2015/11/14	17	1530	DS	2	✓	✓	1 mL	DS	-	75
2015/11/15	18	1600	ML/DS	2	✓	✓	1 mL	ML	DS	90
2015/11/16	19	0930	ML	2	✓	✓	1 mL	ML	JP	90
2015/11/17	20	1030	ML	2	✓	✓	1.5 mL	ML	DS	60
2015/11/18	21	1030	HS	2	✓	✓	1.5 mL	HS	DS	60
2015/11/19	22	0945	ML	2	✓	✓	1.5 mL	HS	ML	60
2015/11/20	23	1100	HS	2	✓	✓	1.5 mL	HS	CQ	60
2015/11/21	24	1045	HS	2	✓	✓	1.5 mL	HS	JN	60
2015/11/22	25	1300	ML	2	✓	✓	1.5 mL	ML	DS	60
2015/11/23	26	1345	ML	2	✓	✓	1.5 mL	ML	HS	60
2015/11/24	27	1340	ML/HS	2	✓	✓	1.5 mL	ML	HS	60
2015/11/25	28	1045	HS/JN	2	✓	✓	1.5 mL	JN	HS	60
2015/11/26	29	1330	HS/DS	2	✓	✓	1.5 mL	HS	DS	60
2015/11/27	30	1000	HS/JN	2	✓	✓	1.5 mL	HS	JN	60
2015/11/28	31	1100	DS/JN	2	✓	✓	1.5 mL	DS	JN	60
2015/11/29	32	1125	JK/JW	2	-	-	-	JK	CQ	-

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference 15-1476

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

	Day 1		Day 2			Day 3		Day 4		Day 5	Day 6	Day 7	Day 8
replicate	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	2	13	0	15	13	2	5	10	13 (+2embryos)	13	13	7
b	15	0	15	0	15	14	1	10	5	12 (+2embryos)	14	14	14
c	14	1	14	0	15	13	2	2	13	15	14	14	11
d	15	0	15	0	15	15	0	11	4	15	15	15	15
e	29	1	29	0									
f	28	2	27	1									

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2

Number of Alive Organisms

replicate	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16
a	7	6	6	6	6 (1)	6	6	6
b	14	14	14	13	13	13	13	13
c	11	11	11	11	11	11	11	11
d	14	14	14	14	14	14	14	14

replicate	Day 17	Day 18	Day 19	Day 20	Day 21	Day 22	Day 23	Day 24
a	6	6	6	6	6	6	6	6
b	13	13	13	13	13 (1)	12	12	12
c	11	11	11	11	11	11	11	11
d	14	14	14	14	14	14	14	14

replicate	Day 25	Day 26	Day 27	Day 28	Day 29	Day 30	Day 31	Day 32
a	6	6	6	6	6	6	6	6
b	12	12	12	12	12	12	12	12
c	11	11	11	11	11	11	11	11
d	14	14	14	14	14	14	14	14

Comments/Observations: None

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	87%	46%	40%	11	3.23	0%
b	93%	86%	80%	8	1.31	8%
c	100%	73%	73%	9	1.75	0%
d	100%	93%	93%	8	1.37	0%
Average	**95%**	**75%**	**72%**	**9**	**1.91**	**2%**

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference 15-1476

Chemistries

	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	-	8.3	8.2	8.2	8.0	8.1	8.2	8.2	8.2	8.2	8.0	8.2	8.1	8.1	8.1
EC (µS/cm)	391	-	390	383	391	386	373	395	390	389	388	381	388	383	375	352
DO (mg/L)	7.4	-	7.3	7.0	7.3	7.2	7.5	7.3	7.3	7.2	7.3	7.3	7.3	7.3	7.3	7.3
Temp. (°C)	23.5	-	23.5	23.5	23.5	23.5	23.5	23.5	23.6	23.5	23.8	23.5	23.8	23.6	23.5	23.5

	Day 8		Day 9		Day 10		Day 11		Day 12		Day 13		Day 14		Day 15	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	8.2	8.1	8.1	8.3	8.2	8.3	8.2	8.2	8.2	8.2	8.1	8.3	8.3	8.3	8.2
EC (µS/cm)	375	370	376	374	372	366	373	386	374	372	373	376	371	395	369	418
DO (mg/L)	7.3	7.3	7.3	7.3	7.3	7.1	7.3	7.3	7.3	7.3	7.2	7.2	7.2	6.9	7.3	7.3
Temp. (°C)	23.6	23.9	23.6	23.7	24.0	23.9	23.5	23.5	23.8	23.5	24.4	23.5	24.3	24.3	23.8	23.6

	Day 16		Day 17		Day 18		Day 19		Day 20		Day 21		Day 22		Day 23	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.1	8.2	8.1	8.2	8.3	8.1	8.3	8.4	8.2	8.2	8.3	8.3	8.3	8.2	8.3	8.2
EC (µS/cm)	365	400	369	380	380	380	363	368	381	381	344	370	322	338	332	373
DO (mg/L)	7.3	7.2	7.3	7.1	7.3	6.9	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
Temp. (°C)	23.9	23.6	23.7	23.6	23.5	23.5	23.5	23.5	23.5	23.5	23.9	23.8	23.6	23.5	23.6	23.5

	Day 24		Day 25		Day 26		Day 27		Day 28		Day 29		Day 30		Day 31	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.3	8.3	8.4	8.3	8.1	8.1	8.3	8.1	8.2	8.1	8.2	8.1	8.1	8.1	8.1	8.1
EC (µS/cm)	394	374	322	344	328	336	382	391	343	377	347	394	351	377	370	400
DO (mg/L)	7.3	7.2	7.3	7.3	7.3	7.3	7.3	6.9	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
Temp. (°C)	23.7	23.6	23.5	23.5	23.5	23.5	23.5	23.5	23.9	23.5	24.2	23.8	23.6	23.5	23.5	23.6

	Day 32	
	New	Old
pH	-	8.2
EC (µS/cm)	-	379
DO (mg/L)	-	7.3
Temp. (°C)	-	23.6

	New Solutions		
	AVERAGE	SD	CV
pH	8.2	0.09	1.0
EC (µS/cm)	368	21	5.7
DO	7.3	0.04	0.5
Temp. (°C)	24	0.25	3.4

	Old Solutions		
	AVERAGE	SD	CV
pH	8.2	0.09	1.1
EC (µS/cm)	378	18	4.6
DO	7.2	0.13	1.8
Temp. (°C)	24	0.18	0.7

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference: 15-1476

Test Termination

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Replicate A

Fish	Length (mm)	Normal/ Abnormal
1	8	normal
2	13	normal
3	12	normal
4	11	normal
5	9	normal
6	10	normal
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**3.23**
Avg. length (mm)	**11**

Replicate B

Fish	Length (mm)	Normal/ Abnormal
1	9	normal
2	8	normal
3	6	normal
4	9	normal
5	8	normal
6	8	normal
7	9	normal
8	8	normal
9	10	normal
10	7	normal
11	4	abnormal spine
12	5	normal
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**1.31**
Avg. length (mm)	**8**

Replicate C

Fish	Length (mm)	Normal/ Abnormal
1	9	normal
2	8	normal
3	8	normal
4	11	normal
5	8	normal
6	8	normal
7	9	normal
8	8	normal
9	8	normal
10	9	normal
11	8	normal
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**1.75**
Avg. length (mm)	**9**

Replicate D

Fish	Length (mm)	Normal/ Abnormal
1	4	na*
2	9	normal
3	7	normal
4	7	normal
5	11	normal
6	8	normal
7	6	normal
8	7	normal
9	4	normal
10	10	normal
11	8	normal
12	7	normal
13	8	normal
14	9	normal
15	-	-

Dry Weight(mg) per fish	**1.37**
Avg. length (mm)	**8**

* accidently killed by tech prior to observation

Internal Tracking Sheet

Client:	NAU104
Reference:	15-1475

Client:

Client:	Nautilus Environmental	Operation:	Burnaby
Address:	8664 Commerce Court	Billing:	not given
City:	Burnaby	Contact:	Krysta Pearcy
Province:	BC	Tel:	604 420 8773
Country:	Canada	Fax:	not given
Postal Code:	V5A 4N7	Email:	krysta@nautilusenvironmental.com

Sample:

type:	water			collection method:	grab
collected:	various dates	at:	various times	by:	not given
shipped:	various dates	by:	drop off		
received:	various dates	at:	various times	by:	MC
signed-in:	various dates	at:	various times	by:	MC
container:	6 x 20 L carboys			sample condition:	good condition
seals present:	no			initials on seals:	no
storage:	4 +/- 2 degrees in darkness			initial temperature (°C):	5; 8; 8; 12; 11

Samples are disposed following PERS-SWI-004

Chemical and Physical Measurements at Sample Receipt:

sample:	01	02	03	04	05	
client code:	FR_FRCP1_Q-05102015_N	FR_FRCP1_Q-12102015_N	FR_FRCP1_Q-19102015_N	FR_FRCP1_Q-26102015_N	FR_FRCP1_Q-02112015_N	FR_FRCP1
collection date:	2015/10/26	2015/11/02	2015/11/09	2015/11/16	2015/11/24	
collection time:	1010	1154	1144	0930	1215	

pH:	7.8	7.9	7.9	7.4	7.8
EC (µS/cm):	1084	1077	980	892	1166
DO (mg/L):	8.9	9.1	8.7	8.8	11.0
temp (°C):	14.5	12.6	15.7	12.0	8.7
hardness:	509	538	568	435	562
alkalinity:	161	199	212	244	203
colour:	colourless	colourless	colourless	colourless	colourless
odour:	odourless	odourless	odourless	odourless	odourless

Meter/Probe Used: chem cart 1/chem cart 2/**chem cart 3**/product/soils
Each sampling container EC checked (initials): ML, MC__

Test Log:

test code:	FM-32D
started:	2015/10/28
ended:	2015/11/29
prelim made:	-
prelim sent:	-
reported:	2015/12/03

Our liability is limited to the cost of the test requested on the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results in part or in whole.

HydroQual Laboratories Ltd., #4, 6125 12th Street SE, Calgary, Alberta, Canada T2H 2K1
tel (403) 253-7121 fax (403) 252-9363 www.hydroqual.ca

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference: 15-1475

Test Log

Date	Day	Time	Technicians	Chem. Cart Used	Fed		Feeding Rate	Bench Sheet Review		Sample Pre-Aeration Time (minutes)
					AM	PM		First	Second	
2015/10/28	0	1700	ML/HKS	2	-	-	-	ML	HKS	90
2015/10/29	1	1210	ML	2	-	-	-	ML	DS	90
2015/10/30	2	0815	ML	2	-	-	-	ML	JP	90
2015/10/31	3	0900	CQ	2	-	-	-	CQ	JP	90
2015/11/01	4	0930	ML	2	-	-	-	ML	HKS	90
2015/11/02	5	1130	ML	2	-	✓	1 mL	ML	DS	90
2015/11/03	6	1000	HKS	2	✓	✓	1 mL	HKS	JP	90
2015/11/04	7	0945	ML	2	✓	✓	1 mL	ML	HKS	90
2015/11/05	8	1330	HKS	2	✓	✓	1 mL	HKS	DS	90
2015/11/06	9	0930	HKS	2	✓	✓	1 mL	HKS	CQ	90
2015/11/07	10	1300	HS	2	✓	✓	1 mL	HS	JN	90
2015/11/08	11	1330	ML	2	✓	✓	1 mL	ML	DS	90
2015/11/09	12	1030	ML	2	✓	✓	1 mL	ML	JP	90
2015/11/10	13	1030	ML	2	✓	✓	1 mL	ML	CQ	90
2015/11/11	14	1130	ML	2	✓	✓	1 mL	ML	JN	60
2015/11/12	15	1200	HS	2	✓	✓	1 mL	HS	JP	60
2015/11/13	16	1000	HS	2	✓	✓	1 mL	HS	JP	60
2015/11/14	17	1530	DS	2	✓	✓	1 mL	DS	-	75
2015/11/15	18	1600	ML/DS	2	✓	✓	1 mL	ML	DS	90
2015/11/16	19	0930	ML	2	✓	✓	1 mL	ML	JP	90
2015/11/17	20	1030	ML	2	✓	✓	1.5 mL	ML	DS	60
2015/11/18	21	1030	HS	2	✓	✓	1.5 mL	HS	DS	60
2015/11/19	22	0945	ML	2	✓	✓	1.5 mL	HS	ML	60
2015/11/20	23	1100	HS	2	✓	✓	1.5 mL	HS	CQ	60
2015/11/21	24	1030	HS	2	✓	✓	1.5 mL	HS	JN	60
2015/11/22	25	1300	ML	2	✓	✓	1.5 mL	ML	DS	60
2015/11/23	26	1345	ML	2	✓	✓	1.5 mL	ML	HS	60
2015/11/24	27	1340	ML/HS	2	✓	✓	1.5 mL	ML	HS	60
2015/11/25	28	1045	HS/JN	2	✓	✓	1.5 mL	JN	HS	60
2015/11/26	29	1330	HS/DS	2	✓	✓	1.5 mL	HS	DS	60
2015/11/27	30	1000	HS/JN	2	✓	✓	1.5 mL	HS	JN	60
2015/11/28	31	1100	DS/JN	2	✓	✓	1.5 mL	DS	JN	60
2015/11/29	32	1040	JK/JW	2	-	-	-	JK	CQ	-

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference 15-1475

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

	Day 1		Day 2			Day 3		Day 4		Day 5	Day 6	Day 7	Day 8
replicate	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	15	0	15	0	15	14	1	5	10	15	15	14(1)	14(1)
b	15	0	15	0	15	12	3	5	10	14	14	14	11
c	14	1	14	0	15	13	2	1	14	15	15	15	14
d	14	1	14	0	15	13	2	2	13	15	15	15	15
e	25	5	25	0									
f	30	0	30	0									

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2

Number of Alive Organisms

replicate	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16
a	13(1)	13(1)	13(1)	12	12	12	12	12
b	11(1)	11(1)	10	10	10	10	10	10
c	14	14	14	14	14	14	14	14
d	15	15	15	15	15	15	15	15

replicate	Day 17	Day 18	Day 19	Day 20	Day 21	Day 22	Day 23	Day 24
a	12	12	12	12	12	12	12	12
b	10	10	10	10	10	10	10	10
c	14	14	14	14	14	14	14	14
d	15	15	15	15	15	15	15	15

replicate	Day 25	Day 26	Day 27	Day 28	Day 29	Day 30	Day 31	Day 32
a	12	12	12	12	12	12	12	12
b	10	10	10	10	10	10	10	10
c	14	14	14	14	14	14	14	14
d	15	15	15	15	15	15	15	15

Comments/Observations: None

replicate	**Hatching Success**	**Post Hatch Survival**	**Cumulative Survival**	**Average Length (mm)**	**Dry Weight per fish (mg)**	**Incidence of Deformities**
a	100%	80%	80%	9	1.85	0%
b	93%	71%	67%	10	2.36	0%
c	100%	93%	93%	9	1.74	0%
d	100%	100%	100%	9	1.53	7%
Average	**98%**	**86%**	**85%**	**9**	**1.87**	**2%**

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference 15-1475

Chemistries

	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.1	-	8.2	8.2	8.2	8.0	8.1	8.0	8.1	7.8	8.1	7.8	8.1	8.1	8.1	8.0
EC (µS/cm)	1061	-	1009	1008	1051	1008	1046	1050	1053	1017	1041	1025	1036	1001	998	890
DO (mg/L)	7.4	-	7.3	6.7	7.3	7.1	7.5	7.1	7.3	7.1	7.3	7.3	7.3	7.3	7.3	7.2
Temp. (°C)	23.5	-	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.4	23.5	23.6	23.8	23.5	23.5

	Day 8		Day 9		Day 10		Day 11		Day 12		Day 13		Day 14		Day 15	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	8.1	8.0	8.0	8.2	8.1	8.2	8.1	8.2	8.0	8.2	8.1	8.2	8.1	8.1	8.0
EC (µS/cm)	990	895	1007	905	993	921	980	908	1003	904	996	901	988	916	899	912
DO (mg/L)	7.3	7.2	7.3	7.3	7.3	7.2	7.3	7.2	7.3	7.2	7.3	7.2	7.1	7.3	7.3	7.3
Temp. (°C)	23.8	23.5	23.6	23.8	24	23.6	23.5	23.5	23.6	23.5	24.2	23.5	24.9	23.5	24	23.5

	Day 16		Day 17		Day 18		Day 19		Day 20		Day 21		Day 22		Day 23	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.0	8.1	8.1	8.0	8.2	8.1	8.2	8.2	8.1	8.0	8.2	8.1	8.2	8.1	8.2	8.0
EC (µS/cm)	1054	951	1033	970	1048	945	1036	975	1035	942	994	974	933	869	908	856
DO (mg/L)	7.3	7.3	7.3	7.0	7.3	7.2	7.3	7.1	7.3	7.0	7.3	7.2	7.3	7.3	7.3	7.3
Temp. (°C)	23.8	23.5	23.5	23.6	23.5	23.5	23.5	23.5	23.5	23.5	23.8	23.5	23.8	23.5	23.6	23.6

	Day 24		Day 25		Day 26		Day 27		Day 28		Day 29		Day 30		Day 31	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.1	8.1	8.2	8.2	8.2	8.0	8.1	7.7	8.1	7.9	8.1	7.9	8.0	8.1	8.1	8.0
EC (µS/cm)	913	855	903	860	688	859	920	885	929	921	1099	901	956	1155	1171	1016
DO (mg/L)	7.3	7.3	7.3	7.3	7.2	7.3	7.3	6.7	7.3	7.3	7.3	7.3	7.2	7.3	7.3	7.3
Temp. (°C)	23.7	23.6	23.6	23.5	23.9	23.5	23.5	23.5	23.8	23.5	24.2	23.6	23.5	23.8	23.5	23.5

	Day 32	
	New	Old
pH	-	8.0
EC (µS/cm)	-	1088
DO (mg/L)	-	7.3
Temp. (°C)	-	23.8

	New Solutions		
	AVERAGE	SD	CV
pH	8.1	0.07	0.8
EC (µS/cm)	993	83	8.3
DO	7.3	0.05	0.7
Temp. (°C)	24	0.31	4.2

	Old Solutions		
	AVERAGE	SD	CV
pH	8.0	0.11	1.4
EC (µS/cm)	946	72	7.7
DO	7.2	0.16	2.2
Temp. (°C)	24	0.10	0.4

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference: 15-1475

Test Termination

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Replicate A		
Fish	Length (mm)	Normal/ Abnormal
1	9	N
2	10	N
3	10	N
4	8	N
5	9	N
6	10	N
7	10	N
8	7	N
9	9	N
10	8	N
11	10	N
12	8	N
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**1.85**
Avg. length (mm)	**9**

Replicate B		
Fish	Length (mm)	Normal/ Abnormal
1	11	N
2	8	N
3	9	N
4	10	N
5	10	N
6	9	N
7	12	N
8	9	N
9	10	N
10	10	N
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**2.36**
Avg. length (mm)	**10**

Replicate C		
Fish	Length (mm)	Normal/ Abnormal
1	10	N
2	10	N
3	8	N
4	7	N
5	8	N
6	8	N
7	11	N
8	8	N
9	9	N
10	7	N
11	10	N
12	9	N
13	9	N
14	10	N
15	-	-

Dry Weight(mg) per fish	**1.74**
Avg. length (mm)	**9**

Replicate D		
Fish	Length (mm)	Normal/ Abnormal
1	6	A/S
2	10	N
3	10	N
4	10	N
5	9	N
6	8	N
7	8	N
8	9	N
9	5	N
10	11	N
11	9	N
12	9	N
13	7	N
14	8	N
15	11	N

Dry Weight(mg) per fish	**1.53**
Avg. length (mm)	**9**

Internal Tracking Sheet

Client:	NAU104
Reference:	15-1477

Client:

Client:	Nautilus Environmental	Operation:	Burnaby
Address:	8664 Commerce Court	Billing:	not given
City:	Burnaby	Contact:	Krysta Pearcy
Province:	BC	Tel:	604 420 8773
Country:	Canada	Fax:	not given
Postal Code:	V5A 4N7	Email:	krysta@nautilusenvironmental.com

Sample:

type:	water			collection method:	grab
collected:	various dates	at:	various times	by:	not given
shipped:	2015/10/26	by:	drop off		
received:	2015/10/27	at:	1150	by:	MC
signed-in:	2015/10/27	at:	1220	by:	MC
container:	6 x 20L carboys			sample condition:	good condition
seals present:	no			initials on seals:	no
storage:	4 +/1 2 degrees in darkness			initial temperature (°C):	4; 8; 8; 7; 9

Samples are disposed following PERS-SWI-004

Chemical and Physical Measurements at Sample Receipt:

sample:	01	02	03	04	05	
client code:	GH_FR1_WS_2015_10_26_N	GH_FR1_WS_2015_11_02_N	GH_FR1_WS_2015_11_09_N	GH_FR1_WS_2015_11_16_N	GH_FR1_WS-2015_11_23_N	**GH_FR1_WS**
collection date:	2015/10/26	2015/11/02	2015/11/09	2015/11/16	2015/11/24	
collection time:	not given	not given	not given	not given	1215	

pH:	7.8	7.7	7.9	7.8	8.1
EC (µS/cm):	773	818	690	690	731
DO (mg/L):	9.8	7.4	9.7	9.4	10.5
temp (°C):	10.8	13.8	15.5	11.6	9.0
hardness:	320	389	341	346	333
alkalinity:	155	164	186	232	184
colour:	colourless	colourless	colourless	colourless	colourless
odour:	odourless	odourless	odourless	odourless	odourless

Meter/Probe Used: chem cart 1/chem cart 2/**chem cart 3**/product/soils

Each sampling container EC checked (initials): ML__

Test Log:

test code:	FM-32D
started:	2015/10/28
ended:	2015/11/29
prelim made:	-
prelim sent:	-
reported:	2015/12/03

Our liability is limited to the cost of the test requested on the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results in part or in whole.

HydroQual Laboratories Ltd., #4, 6125 12th Street SE, Calgary, Alberta, Canada T2H 2K1
tel (403) 253-7121 fax (403) 252-9363 www.hydroqual.ca

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference: 15-1477

Test Log

Date	Day	Time	Technicians	Chem. Cart Used	Fed		Feeding Rate	Bench Sheet Review		Sample Pre-Aeration Time (minutes)
					AM	PM		First	Second	
2015/10/28	0	1700	ML/HKS	2	-	-	-	ML	HKS	90
2015/10/29	1	1125	ML	2	-	-	-	ML	DS	90
2015/10/30	2	0740	ML	2	-	-	-	ML	JP	90
2015/10/31	3	0900	CQ	2	-	-	-	CQ	JP	90
2015/11/01	4	0915	ML	2	-	-	-	ML	HKS	90
2015/11/02	5	1115	ML	2	-	✓	1 mL	ML	DS	90
2015/11/03	6	1000	HKS	2	✓	✓	1 mL	HKS	JP	90
2015/11/04	7	0945	ML	2	✓	✓	1 mL	ML	HKS	90
2015/11/05	8	1330	HKS	2	✓	✓	1 mL	HKS	DS	90
2015/11/06	9	0930	HKS	2	✓	✓	1 mL	HKS	CQ	90
2015/11/07	10	1300	HS	2	✓	✓	1 mL	HS	JN	90
2015/11/08	11	1330	ML	2	✓	✓	1 mL	ML	DS	90
2015/11/09	12	1030	ML	2	✓	✓	1 mL	ML	JP	90
2015/11/10	13	1030	ML	2	✓	✓	1 mL	ML	CQ	90
2015/11/11	14	1130	ML	2	✓	✓	1 mL	ML	JN	60
2015/11/12	15	1200	HS	2	✓	✓	1 mL	HS	JP	60
2015/11/13	16	1000	HS	2	✓	✓	1 mL	HS	JP	75
2015/11/14	17	1530	DS	2	✓	✓	1 mL	DS	-	90
2015/11/15	18	1600	ML/DS	2	✓	✓	1 mL	ML	DS	90
2015/11/16	19	0930	ML	2	✓	✓	1 mL	ML	JP	60
2015/11/17	20	1030	ML	2	✓	✓	1 mL	ML	DS	60
2015/11/18	21	1030	HS	2	✓	✓	1 mL	HS	DS	60
2015/11/19	22	0945	ML	2	✓	✓	1 mL	HS	ML	60
2015/11/20	23	1100	HS	2	✓	✓	1 mL	HS	CQ	60
2015/11/21	24	1030	HS	2	✓	✓	1 mL	HS	JN	60
2015/11/22	25	1300	ML	2	✓	✓	1 mL	ML	DS	60
2015/11/23	26	1345	ML	2	✓	✓	1 mL	ML	HS	60
2015/11/24	27	1340	ML/HS	2	✓	✓	1 mL	ML	HS	60
2015/11/25	28	1045	HS/JN	2	✓	✓	1 mL	JN	HS	60
2015/11/26	29	1330	HS/DS	2	✓	✓	1 mL	HS	DS	60
2015/11/27	30	1000	HS/JK	2	✓	✓	1 mL	HS	JN	60
2015/11/28	31	1100	DS/JN	2	✓	✓	1 mL	DS	JN	60
2015/11/29	32	1215	JK/JW	2	-	-	-	JK	CQ	-

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference 15-1477

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

	Day 1		Day 2			Day 3		Day 4		Day 5	Day 6	Day 7	Day 8
replicate	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14	1	14	0	15	15	-	4	11	15	13	13	10
b	14	1	13	0	15	15	-	7	8	14 (+1embryo)	13	13	7
c	13	2	13	0	15	15	-	3	12	15	15	15 (1)	14 (1)
d	14	1	14	0	15	15	-	6	9	8	1 (1)	1	0
e	28	2	25	3									
f	26	4	26	0									

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2

Number of Alive Organisms

replicate	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16
a	9	8	8	8	8	8	8	8
b	6	6	6	6	6	6	6	6
c	14 (1)	14 (1)	13 (1)	12	12	11	11	11
d	0	0	0	0	0	0	0	0

replicate	Day 17	Day 18	Day 19	Day 20	Day 21	Day 22	Day 23	Day 24
a	8	8	8	8	8	8	8	8
b	6	6	6	6	6	6	6	6
c	11	10	10	10	10	10	10	10
d	0	0	0	0	0	0	0	0

replicate	Day 25	Day 26	Day 27	Day 28	Day 29	Day 30	Day 31	Day 32
a	8	8	8	8	8	8	8	8
b	6	6	6	6	6	6	6	6
c	10	10	10	10	10	10	9	9
d	0	0	0	0	0	0	0	0

Comments/Observations: None

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	100%	53%	53%	10	2.52	0%
b	93%	43%	40%	11	3.58	0%
c	100%	60%	60%	9	1.93	0%
d	60%	0%	0%	0	0.00	0%
Average	**88%**	**39%**	**38%**	**10**	**2.68**	**0%**

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference 15-1477

Chemistries

	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.3	-	8.4	8.3	8.3	8.1	8.2	8.0	8.3	8.0	8.3	8.0	8.3	8.1	8.2	8.0
EC (µS/cm)	777	-	780	762	793	790	775	761	789	757	788	747	782	718	763	675
DO (mg/L)	7.4	-	7.3	6.9	7.3	7.2	7.5	7.3	7.3	7.2	7.3	7.2	7.3	7.2	7.3	7.3
Temp. (°C)	23.5	-	23.5	23.5	23.5	23.5	23.7	23.5	23.6	23.5	23.5	23.5	23.7	23.6	23.5	23.5

	Day 8		Day 9		Day 10		Day 11		Day 12		Day 13		Day 14		Day 15	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	8.1	8.1	8.0	8.3	8.2	8.2	8.1	8.2	8.0	8.1	8.1	8.2	8.0	8.2	8.0
EC (µS/cm)	768	643	764	660	757	666	743	688	756	674	748	667	735	686	742	678
DO (mg/L)	7.3	7.2	7.3	7.3	7.3	7.2	7.3	7.3	7.3	7.2	7.3	7.1	7.2	7.3	7.3	7.2
Temp. (°C)	23.8	23.5	23.8	23.8	23.6	23.7	23.6	23.5	23.8	23.5	23.9	23.5	24.3	23.5	24.2	23.6

	Day 16		Day 17		Day 18		Day 19		Day 20		Day 21		Day 22		Day 23	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.0	8.0	8.1	8.1	8.3	8.1	8.2	8.0	8.1	8.1	8.2	8.1	8.2	8.1	8.2	8.1
EC (µS/cm)	742	666	771	676	768	669	754	707	753	675	774	640	678	625	663	649
DO (mg/L)	7.3	7.2	7.3	7.3	7.3	7.1	7.3	7.2	7.2	7.2	7.3	7.3	7.3	7.3	7.3	7.3
Temp. (°C)	23.9	23.8	23.9	23.6	23.5	23.5	23.5	23.5	23.5	23.5	23.8	23.7	23.6	23.5	23.9	23.5

	Day 24		Day 25		Day 26		Day 27		Day 28		Day 29		Day 30		Day 31	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.3	8.1	8.3	8.2	8.1	8.0	8.2	8.0	8.2	8.0	8.1	8.0	8.1	8.0	8.1	7.9
EC (µS/cm)	669	656	672	695	683	665	698	658	735	696	732	685	728	694	745	725
DO (mg/L)	7.3	7.2	7.3	7.3	7.3	7.1	7.3	7.2	7.3	7.2	7.3	7.3	7.3	7.2	7.3	7.3
Temp. (°C)	23.6	23.6	23.6	23.5	23.7	23.5	23.5	23.5	23.7	23.8	24.0	23.8	24.0	23.5	23.5	23.5

	Day 32	
	New	Old
pH	-	7.9
EC (µS/cm)	-	694
DO (mg/L)	-	7..2
Temp. (°C)	-	23.8

	New Solutions		
	AVERAGE	SD	CV
pH	8.2	0.09	1.1
EC (µS/cm)	745	37	5.0
DO	7.3	0.04	0.6
Temp. (°C)	24	0.22	3.0

	Old Solutions		
	AVERAGE	SD	CV
pH	8.1	0.08	1.0
EC (µS/cm)	689	39	5.7
DO	7.2	0.09	1.2
Temp. (°C)	24	0.11	0.5

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference: 15-1477

Test Termination

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Replicate A		
Fish	Length (mm)	Normal/ Abnormal
1	12	normal
2	10	normal
3	10	normal
4	11	normal
5	11	normal
6	6	normal
7	8	normal
8	8	normal
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**2.52**
Avg. length (mm)	**10**

Replicate B		
Fish	Length (mm)	Normal/ Abnormal
1	8	normal
2	12	normal
3	13	normal
4	11	normal
5	9	normal
6	11	normal
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**3.58**
Avg. length (mm)	**11**

Replicate C		
Fish	Length (mm)	Normal/ Abnormal
1	8	normal
2	10	normal
3	10	normal
4	11	normal
5	9	normal
6	6	normal
7	10	normal
8	8	normal
9	10	normal
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**1.93**
Avg. length (mm)	**9**

Replicate D		
Fish	Length (mm)	Normal/ Abnormal
1	-	-
2	-	-
3	-	-
4	-	-
5	-	-
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**0.00**
Avg. length (mm)	**0**

Internal Tracking Sheet

Client:	NAU104
Reference:	15-1478

Client:

Client:	Nautilus Environmental	Operation:	Burnaby
Address:	8664 Commerce Court	Billing:	not given
City:	Burnaby	Contact:	Krysta Pearcy
Province:	BC	Tel:	604 420 8773
Country:	Canada	Fax:	not given
Postal Code:	V5A 4N7	Email:	krysta@nautilusenvironmental.com

Sample:

type:	water			collection method:	grab
collected:	various dates	at:	various times	by:	not given
shipped:	various dates	by:	drop off		
received:	various dates	at:	various times	by:	MC
signed-in:	various dates	at:	various times	by:	MC
container:	6 x 20L carboys			sample condition:	good condition
seals present:	no			initials on seals:	no
storage:	4 +/1 2 degreed in darkness			initial temperature (^{o}C):	5; 8; 9.2; 8

Samples are disposed following PERS-SWI-004

Chemical and Physical Measurements at Sample Receipt:

sample:	01	02	03	04	05	
client code:	CM_MC2_WS-2015_10_26_N	CM_MC2_WS-2015-11-02_N	CM_MC2_WS-2015-11-09_N	CM_MC2_WS-2015-11-16_N	CM_MC2_WS-2015-11-23_N	**CM_MC2_WS**
collection date:	2015/10/26	2015/11/02	2015/11/09	2015/11/16	2015/11/24	
collection time:	1230	1145	1240	1200	1220	

pH:	7.8	7.9	7.9	7.4	7.9
EC (µS/cm):	911	866	779	560	753
DO (mg/L):	9.7	8.9	9.4	9.3	10.6
temp (^{o}C):	10.6	11.6	15.8	12.5	8.3
hardness:	385	439	397	330	363
alkalinity:	190	202	175	184	210
colour:	colourless	colourless	colourless	colourless	colourless
odour:	odourless	odourless	odourless	odourless	odourless

Meter/Probe Used: chem cart 1/chem cart 2/**chem cart 3**/product/soils

Each sampling container EC checked (initials):ML__

Test Log:

test code:	FM-32D
started:	2015/10/28
ended:	2015/11/29
prelim made:	-
prelim sent:	-
reported:	2015/12/03

Our liability is limited to the cost of the test requested on the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results in part or in whole.

HydroQual Laboratories Ltd., #4, 6125 12th Street SE, Calgary, Alberta, Canada T2H 2K1
tel (403) 253-7121 fax (403) 252-9363 www.hydroqual.ca

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference: 15-1478

Test Log

Date	Day	Time	Technicians	Chem. Cart Used	Fed		Feeding Rate	Bench Sheet Review		Sample Pre-Aeration Time (minutes)
					AM	PM		First	Second	
2015/10/28	0	1700	ML/HKS	**2**	-	-	-	ML	HKS	90
2015/10/29	1	1140	ML	**2**	-	-	-	ML	DS	90
2015/10/30	2	0745	ML	**2**	-	-	-	ML	JP	90
2015/10/31	3	0900	CQ	**2**	-	-	-	CQ	JP	90
2015/11/01	4	1100	ML	**2**	-	-	-	ML	HKS	90
2015/11/02	5	1130	ML	**2**	-	✓	1 mL	ML	DS	90
2015/11/03	6	1000	HKS	**2**	✓	✓	1 mL	HKS	JP	90
2015/11/04	7	0945	ML	**2**	✓	✓	1 mL	HKS	DS	90
2015/11/05	8	1330	HKS	**2**	✓	✓	1 mL	HKS	DS	90
2015/11/06	9	0930	HKS	**2**	✓	✓	1 mL	HKS	CQ	90
2015/11/07	10	1300	HS	**2**	✓	✓	1 mL	HS	JN	90
2015/11/08	11	1330	ML	**2**	✓	✓	1 mL	ML	DS	90
2015/11/09	12	1030	ML	**2**	✓	✓	1 mL	ML	JP	90
2015/11/10	13	1030	ML	**2**	✓	✓	1 mL	ML	CQ	90
2015/11/11	14	1130	ML	**2**	✓	✓	1 mL	ML	JN	60
2015/11/12	15	1130	HS	**2**	✓	✓	1 mL	HS	JP	60
2015/11/13	16	1000	HS	**2**	✓	✓	1 mL	HS	JP	60
2015/11/14	17	1530	DS	**2**	✓	✓	1 mL	DS	-	75
2015/11/15	18	1600	ML/DS	**2**	✓	✓	1 mL	ML	DS	90
2015/11/16	19	0930	ML	**2**	✓	✓	1 mL	ML	JP	90
2015/11/17	20	1030	ML	**2**	✓	✓	1 mL	ML	DS	60
2015/11/18	21	1030	HS	**2**	✓	✓	1 mL	HS	DS	60
2015/11/19	22	0945	ML	**2**	✓	✓	1 mL	HS	ML	60
2015/11/20	23	1100	HS	**2**	✓	✓	1 mL	HS	CQ	60
2015/11/21	24	1030	HS	**2**	✓	✓	1 mL	HS	JN	60
2015/11/22	25	1300	ML	**2**	✓	✓	1 mL	ML	DS	60
2015/11/23	26	1345	ML	**2**	✓	✓	1 mL	ML	HS	60
2015/11/24	27	1340	ML/HS	**2**	✓	✓	1 mL	ML	HS	60
2015/11/25	28	1045	HS/JN	**2**	✓	✓	1 mL	JN	HS	60
2015/11/26	29	1330	HS/DS	**2**	✓	✓	1 mL	HS	DS	60
2015/11/27	30	1000	HS/JN	**2**	✓	✓	1 mL	HS	JN	60
2015/11/28	31	1100	DS/JN	**2**	✓	✓	1 mL	DS	JN	60
2015/11/29	32	1225	JK/JW	**2**	-	-	-	JK	CQ	-

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference 15-1478

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

	Day 1		Day 2			Day 3		Day 4		Day 5	Day 6	Day 7	Day 8
replicate	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14	1	13	1	15	15	0	7	7	12 (+1embryo)	12	12	12
b	15	0	14	1	15	13	2	10	4	6 +(7embryos)	13	13	12
c	15	0	14	1	15	12	3	11	4	12(+3embryos)	15	12	10
d	13	2	12	1	15	12	3	8	7	13(+2embryos)	15	15	8
e	28	2	28	0									
f	27	3	27	0									

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2

Number of Alive Organisms

replicate	Day 9	Day 10	Day 11	Day 12	Day 13	Day 14	Day 15	Day 16
a	9	9	9	9	9	9	9	9
b	10	5	5	5	4	4	4	4
c	4(1)	1	1	1	1	1	1	1
d	7	4	4	3	3	3	3	3

replicate	Day 17	Day 18	Day 19	Day 20	Day 21	Day 22	Day 23	Day 24
a	9	9	9	9	9	9	9	9
b	4	4	4	4	4	4	4	4
c	1	1	1	1	1	1	1	1
d	3	3	3	3	3	3	3	3

replicate	Day 25	Day 26	Day 27	Day 28	Day 29	Day 30	Day 31	Day 32
a	9	9	9	9	9	9	9	9
b	4	4	4	4	4	4	4	4
c	1	1	1	1	1	1	1	1
d	3	3	3	3	3	3	3	3

Comments/Observations: None

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	80%	75%	60%	10	2.03	0%
b	87%	31%	27%	11	4.18	0%
c	100%	7%	7%	16	12.01	0%
d	100%	20%	20%	13	7.06	0%
Average	**92%**	**33%**	**28%**	**12**	**6.32**	**0%**

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference 15-1478

Chemistries

	Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	-	8.3	8.3	8.2	8.0	8.2	8.0	8.2	8.0	8.2	7.9	8.2	8.1	8.1	8.1
EC (µS/cm)	870	-	885	867	901	865	865	880	898	875	887	870	865	886	857	792
DO (mg/L)	7.4	-	7.3	6.9	7.3	7.3	7.4	7.1	7.3	7.0	7.3	7.1	7.3	7.2	7.3	7.3
Temp. (°C)	23.5	-	23.5	23.5	23.5	23.5	23.5	23.5	23.6	23.5	23.5	23.5	23.8	23.5	23.5	23.5

	Day 8		Day 9		Day 10		Day 11		Day 12		Day 13		Day 14		Day 15	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	8.1	8.1	8.0	8.3	8.2	8.2	8.1	8.2	8.1	8.2	8.1	8.0	8.1	8.1	8.0
EC (µS/cm)	812	745	798	738	780	740	791	763	797	761	785	751	767	753	785	763
DO (mg/L)	7.3	7.3	7.3	7.3	7.3	7.2	7.3	7.3	7.3	7.2	7.3	7.1	7.3	7.2	7.3	7.2
Temp. (°C)	23.7	23.8	23.6	23.8	23.9	23.7	23.5	23.5	23.8	23.5	24.2	23.5	23.8	23.5	24.2	23.5

	Day 16		Day 17		Day 18		Day 19		Day 20		Day 21		Day 22		Day 23	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.1	8.0	8.1	8.2	8.3	8.0	8.2	8.2	8.1	8.1	8.2	8.1	8.2	8.1	8.3	8.1
EC (µS/cm)	843	769	819	746	860	782	858	768	847	783	853	721	594	692	585	697
DO (mg/L)	7.3	7.2	7.4	7.3	7.1	7.1	7.3	7.1	7.3	7.1	7.3	7.3	7.3	7.3	7.3	7.3
Temp. (°C)	23.6	23.6	23.6	23.6	23.5	23.5	23.5	23.5	23.8	23.5	23.9	23.7	23.5	23.5	23.9	23.8

	Day 24		Day 25		Day 26		Day 27		Day 28		Day 29		Day 30		Day 31	
	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old
pH	8.2	8.2	8.4	8.2	8.2	8.1	8.3	8.1	8.2	8.1	8.3	8.1	8.2	8.1	8.1	8.0
EC (µS/cm)	634	599	608	733	611	586	614	577	640	615	737	617	777	671	800	7.2
DO (mg/L)	7.3	7.3	7.3	7.2	7.2	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.4	7.3	7.3
Temp. (°C)	23.6	23.6	23.5	23.5	23.8	23.5	23.5	23.5	23.6	23.5	23.5	23.9	23.5	23.5	23.5	23.5

	Day 32	
	New	Old
pH	-	8.1
EC (µS/cm)	-	702
DO (mg/L)	-	7.2
Temp. (°C)	-	23.8

	New Solutions		
	AVERAGE	SD	CV
pH	8.2	0.08	1.0
EC (µS/cm)	782	100	12.8
DO	7.3	0.05	0.7
Temp. (°C)	24	0.20	2.8

	Old Solutions		
	AVERAGE	SD	CV
pH	8.1	0.08	1.0
EC (µS/cm)	722	156	21.6
DO	7.2	0.11	1.5
Temp. (°C)	24	0.12	0.5

Fathead Minnow Bench Sheet

Method FM 32 Day ELS Client NAU104 Reference: 15-1478

Test Termination

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Replicate A

Fish	Length (mm)	Normal/ Abnormal
1	8	normal
2	11	normal
3	9	normal
4	10	normal
5	9	normal
6	9	normal
7	9	normal
8	10	normal
9	11	normal
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**2.03**
Avg. length (mm)	**10**

Replicate B

Fish	Length (mm)	Normal/ Abnormal
1	10	normal
2	14	normal
3	6	normal
4	14	normal
5	-	-
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**4.18**
Avg. length (mm)	**11**

Replicate C

Fish	Length (mm)	Normal/ Abnormal
1	16	normal
2	-	-
3	-	-
4	-	-
5	-	-
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**12.01**
Avg. length (mm)	**16**

Replicate D

Fish	Length (mm)	Normal/ Abnormal
1	12	normal
2	13	normal
3	15	normal
4	-	-
5	-	-
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-

Dry Weight(mg) per fish	**7.06**
Avg. length (mm)	**13**

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Batch ID:	10-2351-8281	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	28 Oct-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	29 Nov-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	20-7626-6504	27 Oct-15	27 Oct-15	24h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	35h (5.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	48h (3.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	38h (4.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	35h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Hatched Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	4	0.9167	0.8151	1	0.8667	1	0.03191	0.06383	6.96%	0.0%
FR_UFR1	4	0.95	0.8484	1	0.8667	1	0.03191	0.06383	6.72%	-3.64%
GH_FR1	4	0.8833	0.5786	1	0.6	1	0.09574	0.1915	21.68%	3.64%
FR_FRCP1	4	0.9833	0.9303	1	0.9333	1	0.01667	0.03333	3.39%	-7.27%
CM_MC2	4	0.9167	0.7575	1	0.8	1	0.05	0.1	10.91%	0.0%

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	4	8.75	7.227	10.27	8	10	0.4787	0.9574	10.94%	0.0%
FR_UFR1	4	9	6.75	11.25	8	11	0.7071	1.414	15.71%	-2.86%
GH_FR1	3	10	7.516	12.48	9	11	0.5774	1	10.0%	-14.29%
FR_FRCP1	4	9.25	8.454	10.05	9	10	0.25	0.5	5.41%	-5.71%
CM_MC2	4	12.5	8.29	16.71	10	16	1.323	2.646	21.17%	-42.86%

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	4	1.204	0.9423	1.466	1.002	1.387	0.08224	0.1645	13.66%	0.0%
FR_UFR1	4	1.224	1.036	1.412	1.047	1.291	0.05898	0.118	9.64%	-1.66%
GH_FR1	4	0.9843	-0.07531	2.044	0	1.431	0.333	0.6659	67.65%	18.24%
FR_FRCP1	4	1.551	1.457	1.646	1.483	1.62	0.0297	0.05939	3.83%	-28.85%
CM_MC2	4	1.136	0.7294	1.543	0.8007	1.412	0.1278	0.2555	22.49%	5.65%

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	4	0.8833	0.7818	0.9849	0.8	0.9333	0.03191	0.06383	7.23%	0.0%
FR_UFR1	4	0.7167	0.3556	1	0.4	0.9333	0.1134	0.2269	31.66%	18.87%
GH_FR1	4	0.3833	0	0.811	0	0.6	0.1344	0.2687	70.11%	56.6%
FR_FRCP1	4	0.85	0.6148	1	0.6667	1	0.07391	0.1478	17.39%	3.77%
CM_MC2	4	0.2833	0	0.6444	0.06667	0.6	0.1134	0.2269	80.08%	67.92%

Jan-15/16

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Hatched Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	0.8667	1	0.9333	0.8667
FR_UFR1	0.8667	0.9333	1	1
GH_FR1	1	0.9333	1	0.6
FR_FRCP1	1	0.9333	1	1
CM_MC2	0.8	0.8667	1	1

Length-mm Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	10	8	8	9
FR_UFR1	11	8	9	8
GH_FR1	10	11	9	
FR_FRCP1	9	10	9	9
CM_MC2	10	11	16	13

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	1.156	1.002	1.271	1.387
FR_UFR1	1.291	1.047	1.283	1.275
GH_FR1	1.346	1.431	1.16	0
FR_FRCP1	1.483	1.575	1.62	1.527
CM_MC2	1.218	1.113	0.8007	1.412

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	0.8	0.9333	0.9333	0.8667
FR_UFR1	0.4	0.8	0.7333	0.9333
GH_FR1	0.5333	0.4	0.6	0
FR_FRCP1	0.8	0.6667	0.9333	1
CM_MC2	0.6	0.2667	0.06667	0.2

Hatched Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	13/15	15/15	14/15	13/15
FR_UFR1	13/15	14/15	15/15	15/15
GH_FR1	15/15	14/15	15/15	9/15
FR_FRCP1	15/15	14/15	15/15	15/15
CM_MC2	12/15	13/15	15/15	15/15

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	12/15	14/15	14/15	13/15
FR_UFR1	6/15	12/15	11/15	14/15
GH_FR1	8/15	6/15	9/15	0/15
FR_FRCP1	12/15	10/15	14/15	15/15
CM_MC2	9/15	4/15	1/15	3/15

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	05-7168-0001	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jan-16 11:16	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-2351-8281	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	28 Oct-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	29 Nov-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	20-7626-6504	27 Oct-15	27 Oct-15	24h	Teck Coal	
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	48h (3.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	38h (4.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	35h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	14.7%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		GH_FR1	0.1158	1.943	0.28	6	0.4558	CDF	Non-Significant Effect
		FR_FRCP1	-1.829	1.943	0.13	6	0.9414	CDF	Non-Significant Effect
		CM_MC2	-0.1012	1.943	0.201	6	0.5387	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.04779356	0.01593119	3	0.5479	0.6590	Non-Significant Effect
Error	0.3489232	0.02907693	12			
Total	0.3967167		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	4.733	11.34	0.1925	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8939	0.8408	0.0642	Normal Distribution

Hatched Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	0.9167	0.8151	1	0.9	0.8667	1	0.03191	6.96%	0.0%
GH_FR1	4	0.8833	0.5786	1	0.9667	0.6	1	0.09574	21.68%	3.64%
FR_FRCP1	4	0.9833	0.9303	1	1	0.9333	1	0.01667	3.39%	-7.27%
CM_MC2	4	0.9167	0.7575	1	0.9333	0.8	1	0.05	10.91%	0.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	1.286	1.101	1.471	1.253	1.197	1.441	0.05811	9.04%	0.0%
GH_FR1	4	1.27	0.8509	1.688	1.375	0.8861	1.441	0.1316	20.72%	1.29%
FR_FRCP1	4	1.408	1.304	1.513	1.441	1.31	1.441	0.03292	4.68%	-9.5%
CM_MC2	4	1.297	1.025	1.569	1.319	1.107	1.441	0.08549	13.19%	-0.81%

Hatched Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	0.8667	1	0.9333	0.8667
GH_FR1	1	0.9333	1	0.6
FR_FRCP1	1	0.9333	1	1
CM_MC2	0.8	0.8667	1	1

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Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	05-7168-0001	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jan-16 11:16	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

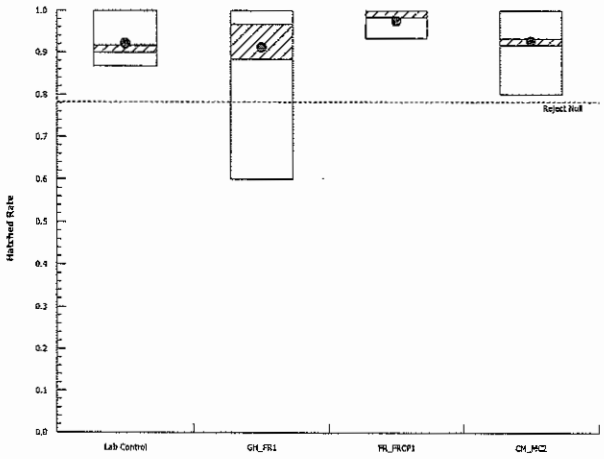
Angular (Corrected) Transformed Detail

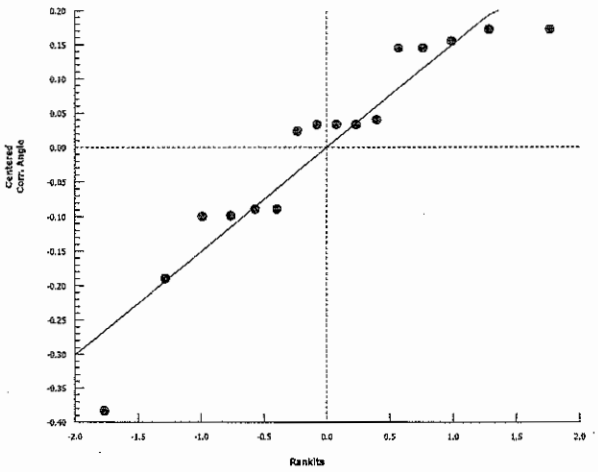
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	1.197	1.441	1.31	1.197
GH_FR1	1.441	1.31	1.441	0.8861
FR_FRCP1	1.441	1.31	1.441	1.441
CM_MC2	1.107	1.197	1.441	1.441

Hatched Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	13/15	15/15	14/15	13/15
GH_FR1	15/15	14/15	15/15	9/15
FR_FRCP1	15/15	14/15	15/15	15/15
CM_MC2	12/15	13/15	15/15	15/15

Graphics





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Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	17-4660-1027	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jan-16 11:16	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-2351-8281	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	28 Oct-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	29 Nov-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	35h (5.5 °C)	Teck Coal	
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	48h (3.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	38h (4.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	35h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	12.7%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_FR1	0.5392	1.943	0.280	6	0.3046	CDF	Non-Significant Effect
		FR_FRCP1	-0.9047	1.943	0.131	6	0.7998	CDF	Non-Significant Effect
		CM_MC2	0.4875	1.943	0.202	6	0.3216	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.04481848	0.01493949	3	0.5121	0.6815	Non-Significant Effect
Error	0.3500875	0.02917396	12			
Total	0.394906		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	4.693	11.34	0.1957	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9051	0.8408	0.0970	Normal Distribution

Hatched Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	0.95	0.8484	1	0.9667	0.8667	1	0.03191	6.72%	0.0%
GH_FR1	4	0.8833	0.5786	1	0.9667	0.6	1	0.09574	21.68%	7.02%
FR_FRCP1	4	0.9833	0.9303	1	1	0.9333	1	0.01667	3.39%	-3.51%
CM_MC2	4	0.9167	0.7575	1	0.9333	0.8	1	0.05	10.91%	3.51%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	1.347	1.16	1.535	1.375	1.197	1.441	0.05894	8.75%	0.0%
GH_FR1	4	1.27	0.8509	1.688	1.375	0.8861	1.441	0.1316	20.72%	5.77%
FR_FRCP1	4	1.408	1.304	1.513	1.441	1.31	1.441	0.03292	4.68%	-4.53%
CM_MC2	4	1.297	1.025	1.569	1.319	1.107	1.441	0.08549	13.19%	3.76%

Hatched Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	0.8667	0.9333	1	1
GH_FR1	1	0.9333	1	0.6
FR_FRCP1	1	0.9333	1	1
CM_MC2	0.8	0.8667	1	1

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Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	17-4660-1027	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jan-16 11:16	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

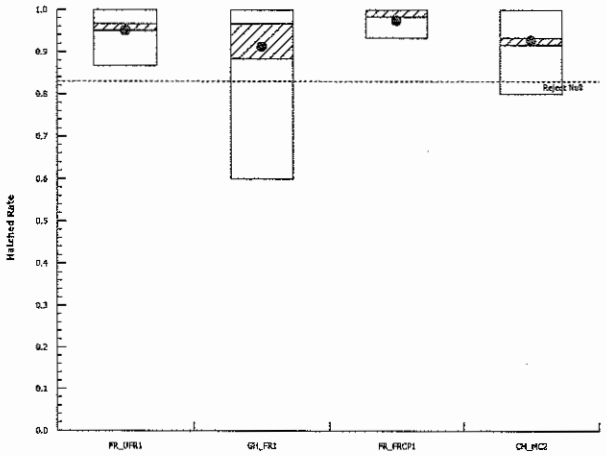
Angular (Corrected) Transformed Detail

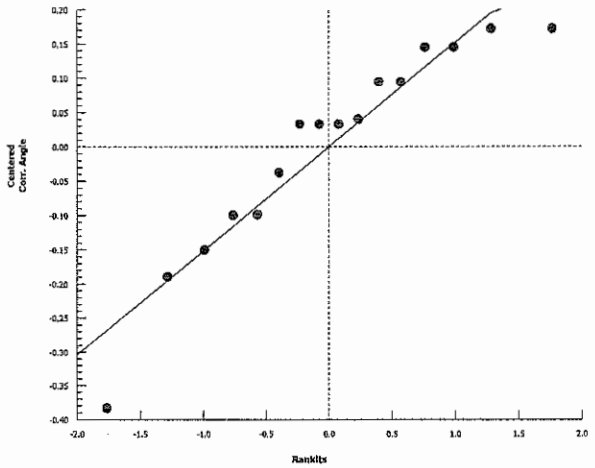
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	1.197	1.31	1.441	1.441
GH_FR1	1.441	1.31	1.441	0.8861
FR_FRCP1	1.441	1.31	1.441	1.441
CM_MC2	1.107	1.197	1.441	1.441

Hatched Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	13/15	14/15	15/15	15/15
GH_FR1	15/15	14/15	15/15	9/15
FR_FRCP1	15/15	14/15	15/15	15/15
CM_MC2	12/15	13/15	15/15	15/15

Graphics





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CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	06-4263-2277	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Dec-15 16:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-2351-8281	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	28 Oct-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	29 Nov-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	20-7626-6504	27 Oct-15	27 Oct-15	24h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	35h (5.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	11.2%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFR1	-0.7379	1.943	0.161	6	0.7558	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00746223	0.00746223	1	0.5446	0.4884	Non-Significant Effect
Error	0.08222078	0.01370346	6			
Total	0.08968301		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.029	47.47	0.9820	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.942	0.6451	0.6304	Normal Distribution

Hatched Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	0.9167	0.8151	1	0.9	0.8667	1	0.03191	6.96%	0.0%
FR_UFR1	4	0.95	0.8484	1	0.9667	0.8667	1	0.03191	6.72%	-3.64%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	1.286	1.101	1.471	1.253	1.197	1.441	0.05811	9.04%	0.0%
FR_UFR1	4	1.347	1.16	1.535	1.375	1.197	1.441	0.05894	8.75%	-4.75%

Hatched Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	0.8667	1	0.9333	0.8667
FR_UFR1	0.8667	0.9333	1	1

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	1.197	1.441	1.31	1.197
FR_UFR1	1.197	1.31	1.441	1.441

Hatched Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	13/15	15/15	14/15	13/15
FR_UFR1	13/15	14/15	15/15	15/15

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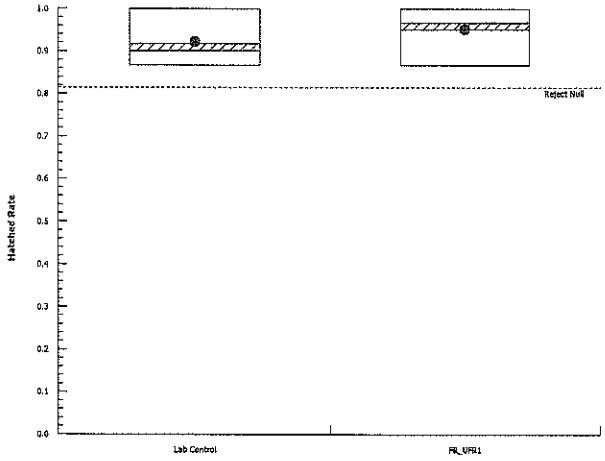
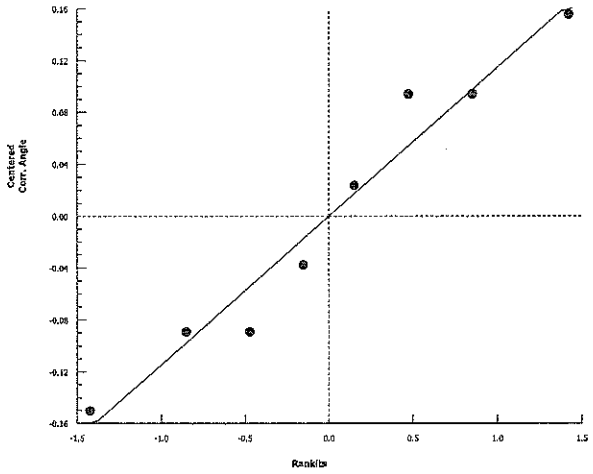
Analysis ID:	06-4263-2277	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Dec-15 16:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Analyst:_____ QA: Jan-15/16

CETIS Analytical Report

Test Code: 15868 | 03-0162-6746

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	18-1588-3864	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jan-16 11:18	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-2351-8281	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	28 Oct-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	29 Nov-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	20-7626-6504	27 Oct-15	27 Oct-15	24h	Teck Coal	
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	48h (3.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	38h (4.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	35h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	24.0%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		GH_FR1	3.362	1.943	0.347	6	0.0076	CDF	Significant Effect
		FR_FRCP1	0.2327	1.943	0.23	6	0.4119	CDF	Non-Significant Effect
		CM_MC2	4.978	1.943	0.270	6	0.0013	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.621179	0.540393	3	8.936	0.0022	Significant Effect
Error	0.7256593	0.0604716	12			
Total	2.346838		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.482	11.34	0.3231	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9719	0.8408	0.8689	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	0.8833	0.7818	0.9849	0.9	0.8	0.9333	0.03191	7.23%	0.0%
GH_FR1	4	0.3833	0	0.811	0.4667	0	0.6	0.1344	70.11%	56.6%
FR_FRCP1	4	0.85	0.6148	1	0.8667	0.6667	1	0.07391	17.39%	3.77%
CM_MC2	4	0.2833	0	0.6444	0.2333	0.06667	0.6	0.1134	80.08%	67.92%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	1.231	1.075	1.387	1.253	1.107	1.31	0.04904	7.97%	0.0%
GH_FR1	4	0.6298	0.08258	1.177	0.7517	0.1295	0.8861	0.1719	54.6%	48.84%
FR_FRCP1	4	1.203	0.8612	1.546	1.208	0.9553	1.441	0.1075	17.87%	2.23%
CM_MC2	4	0.5384	0.1241	0.9527	0.5031	0.2612	0.8861	0.1302	48.36%	56.26%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	0.8	0.9333	0.9333	0.8667
GH_FR1	0.5333	0.4	0.6	0
FR_FRCP1	0.8	0.6667	0.9333	1
CM_MC2	0.6	0.2667	0.06667	0.2

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Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	18-1588-3864	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jan-16 11:18	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

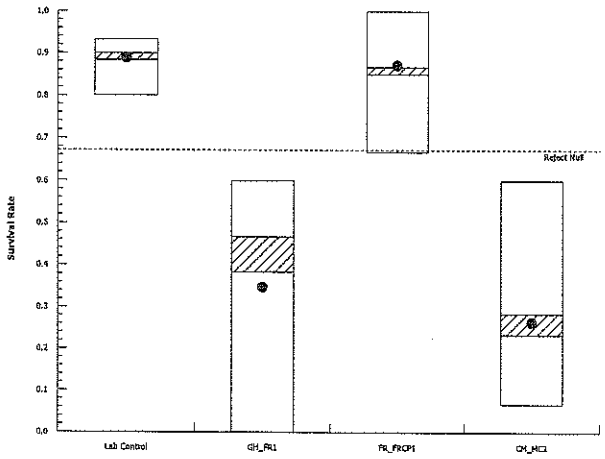
Angular (Corrected) Transformed Detail

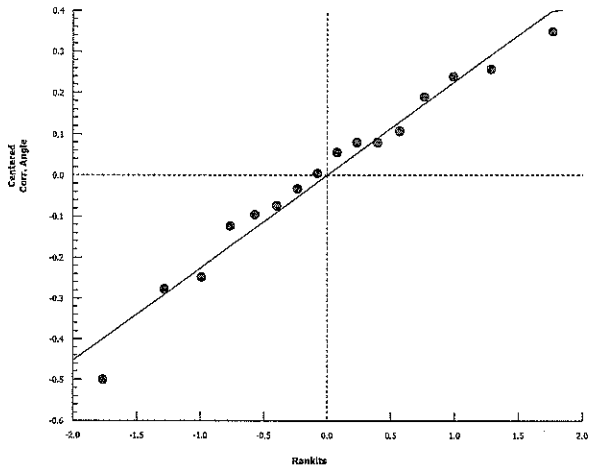
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	1.107	1.31	1.31	1.197
GH_FR1	0.8188	0.6847	0.8861	0.1295
FR_FRCP1	1.107	0.9553	1.31	1.441
CM_MC2	0.8861	0.5426	0.2612	0.4636

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	12/15	14/15	14/15	13/15
GH_FR1	8/15	6/15	9/15	0/15
FR_FRCP1	12/15	10/15	14/15	15/15
CM_MC2	9/15	4/15	1/15	3/15

Graphics





Analyst:_____ QA:_____

CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	20-9869-6631	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jan-16 11:19	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-2351-8281	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	28 Oct-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	29 Nov-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	35h (5.5 °C)	Teck Coal	
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	48h (3.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	38h (4.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	35h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	45.6%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_FR1	1.867	1.943	0.419	6	0.0556	CDF	Non-Significant Effect
		FR_FRCP1	-1.012	1.943	0.328	6	0.8248	CDF	Non-Significant Effect
		CM_MC2	2.684	1.943	0.358	6	0.0182	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.215002	0.4050006	3	5.399	0.0139	Significant Effect
Error	0.9001451	0.07501209	12			
Total	2.115147		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	0.6096	11.34	0.8942	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9572	0.8408	0.6109	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	0.7167	0.3556	1	0.7667	0.4	0.9333	0.1134	31.66%	0.0%
GH_FR1	4	0.3833	0	0.811	0.4667	0	0.6	0.1344	70.11%	46.51%
FR_FRCP1	4	0.85	0.6148	1	0.8667	0.6667	1	0.07391	17.39%	-18.6%
CM_MC2	4	0.2833	0	0.6444	0.2333	0.06667	0.6	0.1134	80.08%	60.47%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	1.032	0.6181	1.447	1.068	0.6847	1.31	0.1302	25.22%	0.0%
GH_FR1	4	0.6298	0.08258	1.177	0.7517	0.1295	0.8861	0.1719	54.6%	39.0%
FR_FRCP1	4	1.203	0.8612	1.546	1.208	0.9553	1.441	0.1075	17.87%	-16.56%
CM_MC2	4	0.5384	0.1241	0.9527	0.5031	0.2612	0.8861	0.1302	48.36%	47.85%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	0.4	0.8	0.7333	0.9333
GH_FR1	0.5333	0.4	0.6	0
FR_FRCP1	0.8	0.6667	0.9333	1
CM_MC2	0.6	0.2667	0.06667	0.2

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Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	20-9869-6631	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jan-16 11:19	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

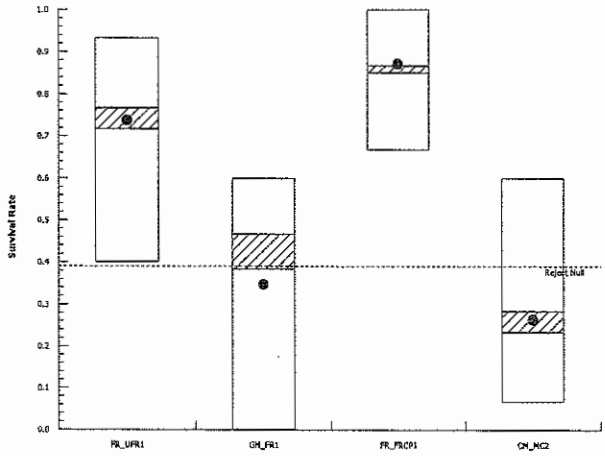
Angular (Corrected) Transformed Detail

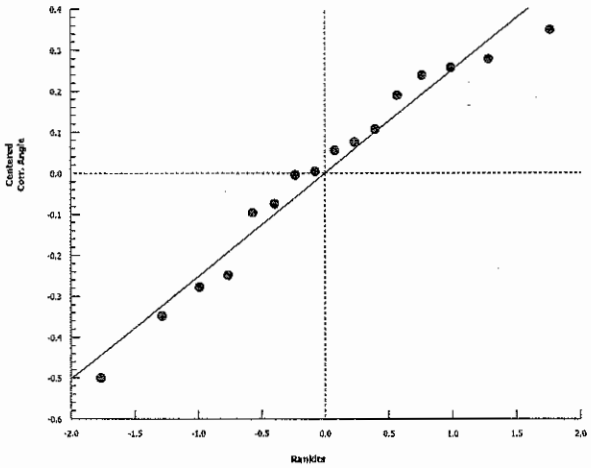
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	0.6847	1.107	1.028	1.31
GH_FR1	0.8188	0.6847	0.8861	0.1295
FR_FRCP1	1.107	0.9553	1.31	1.441
CM_MC2	0.8861	0.5426	0.2612	0.4636

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	6/15	12/15	11/15	14/15
GH_FR1	8/15	6/15	9/15	0/15
FR_FRCP1	12/15	10/15	14/15	15/15
CM_MC2	9/15	4/15	1/15	3/15

Graphics





JM 8/16

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	02-8889-2774	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Dec-15 16:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-2351-8281	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	28 Oct-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	29 Nov-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	20-7626-6504	27 Oct-15	27 Oct-15	24h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	35h (5.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	24.0%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFR1	1.427	1.943	0.270	6	0.1018	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.07875819	0.07875819	1	2.035	0.2036	Non-Significant Effect
Error	0.2322117	0.03870194	6			
Total	0.3109699		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	7.045	47.47	0.1431	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9366	0.6451	0.5776	Normal Distribution

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	0.8833	0.7818	0.9849	0.9	0.8	0.9333	0.03191	7.23%	0.0%
FR_UFR1	4	0.7167	0.3556	1	0.7667	0.4	0.9333	0.1134	31.66%	18.87%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	1.231	1.075	1.387	1.253	1.107	1.31	0.04904	7.97%	0.0%
FR_UFR1	4	1.032	0.6181	1.447	1.068	0.6847	1.31	0.1302	25.22%	16.12%

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	0.8	0.9333	0.9333	0.8667
FR_UFR1	0.4	0.8	0.7333	0.9333

Angular (Corrected) Transformed Detail

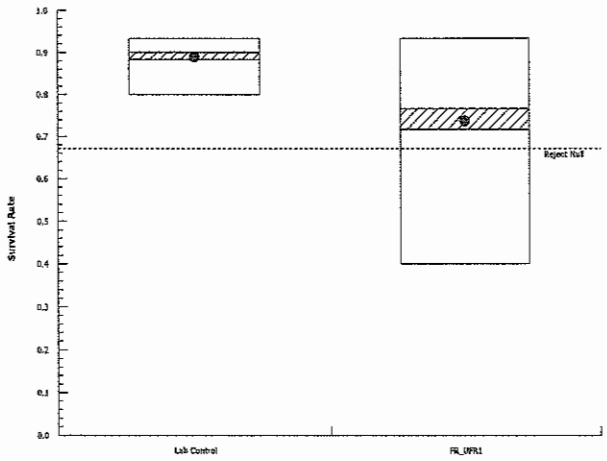
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	1.107	1.31	1.31	1.197
FR_UFR1	0.6847	1.107	1.028	1.31

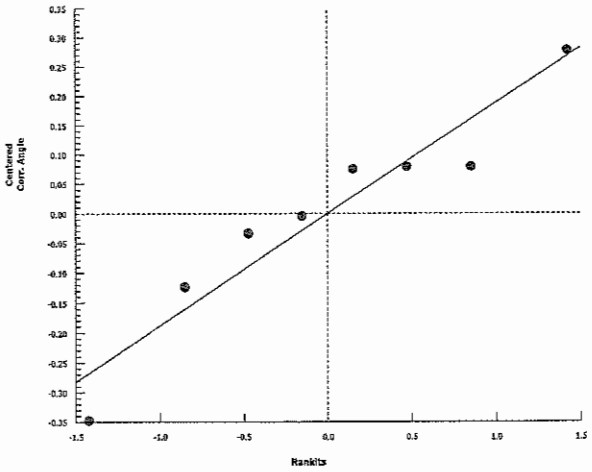
Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	12/15	14/15	14/15	13/15
FR_UFR1	6/15	12/15	11/15	14/15

Analysis ID:	02-8889-2774	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Dec-15 16:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	10-1415-4373	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jan-16 11:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-2351-8281	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	28 Oct-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	29 Nov-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	20-7626-6504	27 Oct-15	27 Oct-15	24h	Teck Coal	
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	48h (3.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	38h (4.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	35h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	25.4%	

Unequal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		GH_FR1	0.6405	2.353	0.807	3	0.2837	CDF	Non-Significant Effect
		FR_FRCP1	-3.972	2.353	0.206	3	0.9857	CDF	Non-Significant Effect
		CM_MC2	0.4475	2.015	0.306	5	0.3366	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.6905123	0.2301708	3	1.707	0.2185	Non-Significant Effect
Error	1.61799	0.1348325	12			
Total	2.308502		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	12.6	11.34	0.0056	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8485	0.8408	0.0129	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	1.204	0.9423	1.466	1.213	1.002	1.387	0.08224	13.66%	0.0%
GH_FR1	4	0.9843	-0.07531	2.044	1.253	0	1.431	0.333	67.65%	18.24%
FR_FRCP1	4	1.551	1.457	1.646	1.551	1.483	1.62	0.0297	3.83%	-28.85%
CM_MC2	4	1.136	0.7294	1.543	1.166	0.8007	1.412	0.1278	22.49%	5.65%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	1.156	1.002	1.271	1.387
GH_FR1	1.346	1.431	1.16	0
FR_FRCP1	1.483	1.575	1.62	1.527
CM_MC2	1.218	1.113	0.8007	1.412

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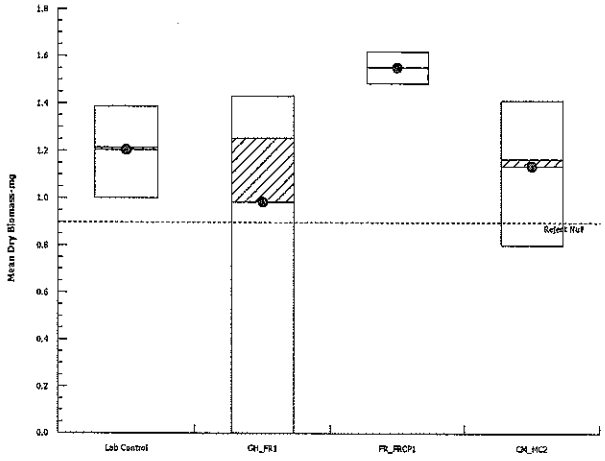
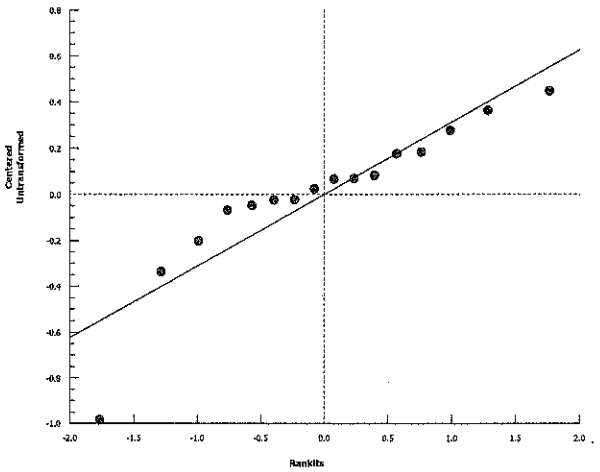
Fathead Minnow 32-d Survival and Growth Test | **Nautilus Environmental**

Analysis ID:	10-1415-4373	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jan-16 11:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Jan 11/18

 Analyst:_____ QA:_____

CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	19-2267-2669	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jan-16 11:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-2351-8281	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	28 Oct-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	29 Nov-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	35h (5.5 °C)	Teck Coal	
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	48h (3.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	38h (4.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	35h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	24.5%	

Unequal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_FR1	0.7088	2.353	0.796	3	0.2648	CDF	Non-Significant Effect
		FR_FRCP1	-4.957	2.132	0.141	4	0.9961	CDF	Non-Significant Effect
		CM_MC2	0.6254	2.132	0.3	4	0.2828	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.6893256	0.2297752	3	1.747	0.2107	Non-Significant Effect
Error	1.578569	0.1315474	12			
Total	2.267895		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	14.09	11.34	0.0028	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8258	0.8408	0.0061	Non-normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	1.224	1.036	1.412	1.279	1.047	1.291	0.05898	9.64%	0.0%
GH_FR1	4	0.9843	-0.07531	2.044	1.253	0	1.431	0.333	67.65%	19.58%
FR_FRCP1	4	1.551	1.457	1.646	1.551	1.483	1.62	0.0297	3.83%	-26.74%
CM_MC2	4	1.136	0.7294	1.543	1.166	0.8007	1.412	0.1278	22.49%	7.19%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	1.291	1.047	1.283	1.275
GH_FR1	1.346	1.431	1.16	0
FR_FRCP1	1.483	1.575	1.62	1.527
CM_MC2	1.218	1.113	0.8007	1.412

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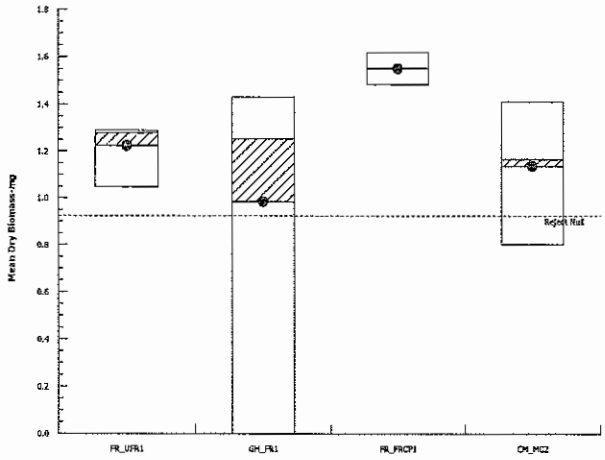
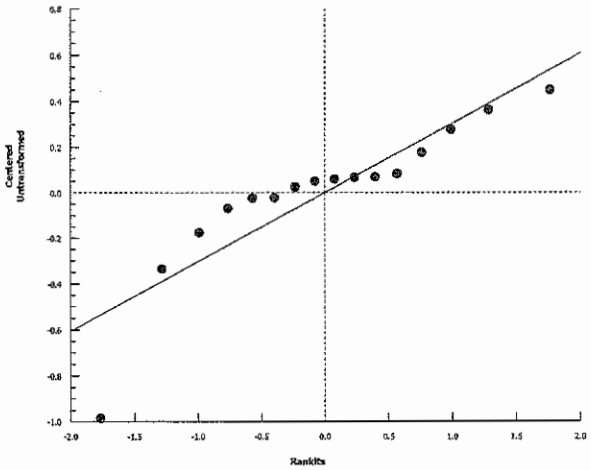
Analysis ID:	19-2267-2669	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jan-16 11:51	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





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Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	13-6836-6428	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Dec-15 17:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-2351-8281	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	28 Oct-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	29 Nov-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	20-7626-6504	27 Oct-15	27 Oct-15	24h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	35h (5.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	16.3%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFR1	-0.1976	1.943	0.197	6	0.5751	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0008000557	0.0008000557	1	0.03906	0.8499	Non-Significant Effect
Error	0.1229062	0.02048437	6			
Total	0.1237063		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.944	47.47	0.5987	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8897	0.6451	0.2327	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	1.204	0.9423	1.466	1.213	1.002	1.387	0.08224	13.66%	0.0%
FR_UFR1	4	1.224	1.036	1.412	1.279	1.047	1.291	0.05898	9.64%	-1.66%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	1.156	1.002	1.271	1.387
FR_UFR1	1.291	1.047	1.283	1.275

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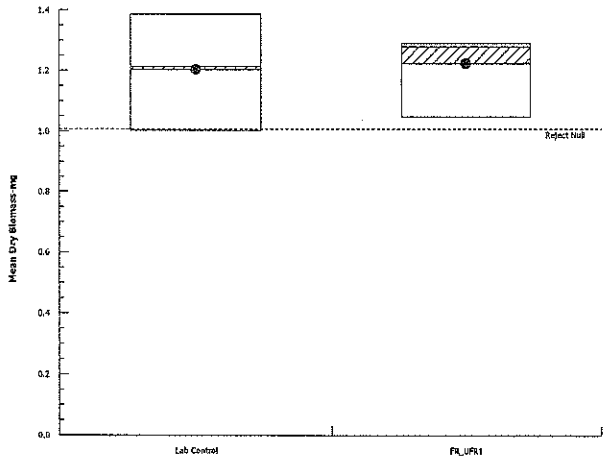
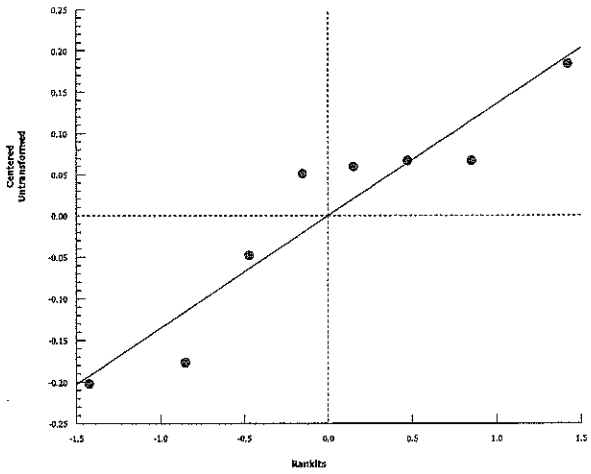
Analysis ID:	13-6836-6428	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Dec-15 17:15	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





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CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	12-7136-0249	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jan-16 11:20	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-2351-8281	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	28 Oct-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	29 Nov-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	20-7626-6504	27 Oct-15	27 Oct-15	24h	Teck Coal	
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	48h (3.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	38h (4.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	35h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	31.2%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		GH_FR1	-1.679	2.015	1.5	5	0.9230	CDF	Non-Significant Effect
		FR_FRCP1	-0.9258	1.943	1.049	6	0.8049	CDF	Non-Significant Effect
		CM_MC2	-2.666	1.943	2.734	6	0.9814	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	33.23333	11.07778	3	4.598	0.0255	Significant Effect
Error	26.5	2.409091	11			
Total	59.73333		14			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	7.137	11.34	0.0677	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9449	0.8328	0.4475	Normal Distribution

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	8.75	7.227	10.27	8.5	8	10	0.4787	10.94%	0.0%
GH_FR1	3	10	7.516	12.48	10	9	11	0.5774	10.0%	-14.29%
FR_FRCP1	4	9.25	8.454	10.05	9	9	10	0.25	5.41%	-5.71%
CM_MC2	4	12.5	8.29	16.71	12	10	16	1.323	21.17%	-42.86%

Length-mm Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	10	8	8	9
GH_FR1	10	11	9	
FR_FRCP1	9	10	9	9
CM_MC2	10	11	16	13

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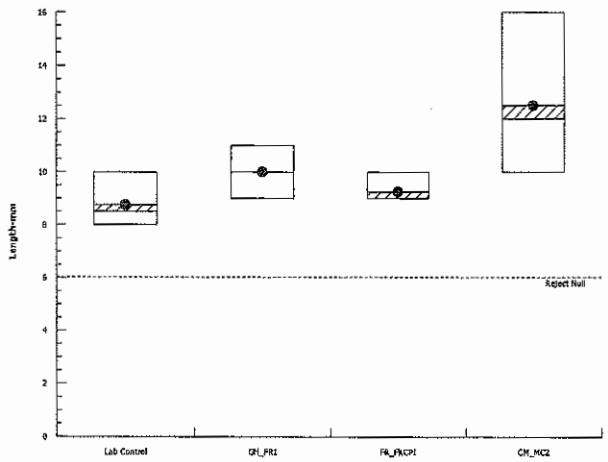
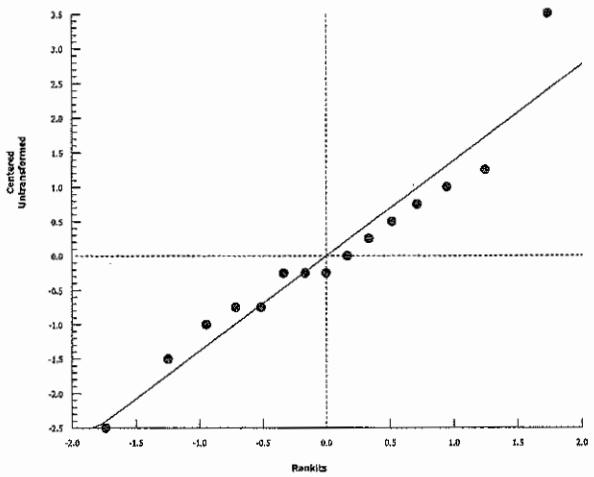
Analysis ID:	12-7136-0249	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jan-16 11:20	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





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CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	03-2827-3952	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jan-16 11:21	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-2351-8281	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	28 Oct-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	29 Nov-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	35h (5.5 °C)	Teck Coal	
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	48h (3.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	38h (4.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	35h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	32.4%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_FR1	-1.035	2.015	1.947	5	0.8260	CDF	Non-Significant Effect
		FR_FRCP1	-0.3333	1.943	1.457	6	0.6249	CDF	Non-Significant Effect
		CM_MC2	-2.333	1.943	2.915	6	0.9708	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	30.65	10.21667	3	3.778	0.0438	Significant Effect
Error	29.75	2.704545	11			
Total	60.4		14			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.213	11.34	0.1017	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9481	0.8328	0.4950	Normal Distribution

Length-mm Summary

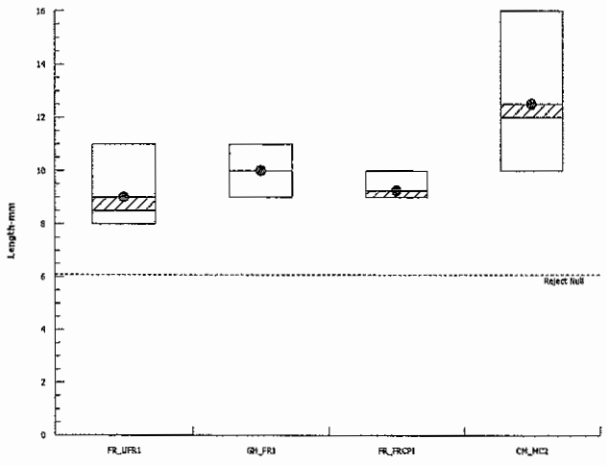
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	9	6.75	11.25	8.5	8	11	0.7071	15.71%	0.0%
GH_FR1	3	10	7.516	12.48	10	9	11	0.5774	10.0%	-11.11%
FR_FRCP1	4	9.25	8.454	10.05	9	9	10	0.25	5.41%	-2.78%
CM_MC2	4	12.5	8.29	16.71	12	10	16	1.323	21.17%	-38.89%

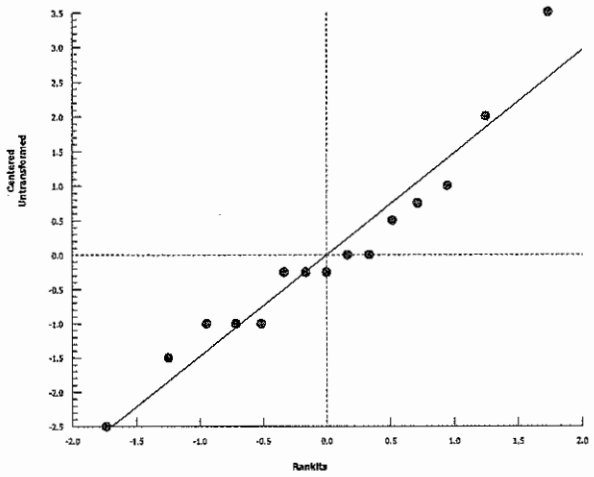
Length-mm Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	11	8	9	8
GH_FR1	10	11	9	
FR_FRCP1	9	10	9	9
CM_MC2	10	11	16	13

Analysis ID:	03-2827-3952	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jan-16 11:21	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	07-4573-0472	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Dec-15 16:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-2351-8281	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	28 Oct-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	29 Nov-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	20-7626-6504	27 Oct-15	27 Oct-15	24h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	35h (5.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	19.0%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFR1	-0.2928	1.943	1.659	6	0.6102	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.125	0.125	1	0.08571	0.7796	Non-Significant Effect
Error	8.75	1.458333	6			
Total	8.875		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.182	47.47	0.5382	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8607	0.6451	0.1221	Normal Distribution

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	8.75	7.227	10.27	8.5	8	10	0.4787	10.94%	0.0%
FR_UFR1	4	9	6.75	11.25	8.5	8	11	0.7071	15.71%	-2.86%

Length-mm Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	10	8	8	9
FR_UFR1	11	8	9	8

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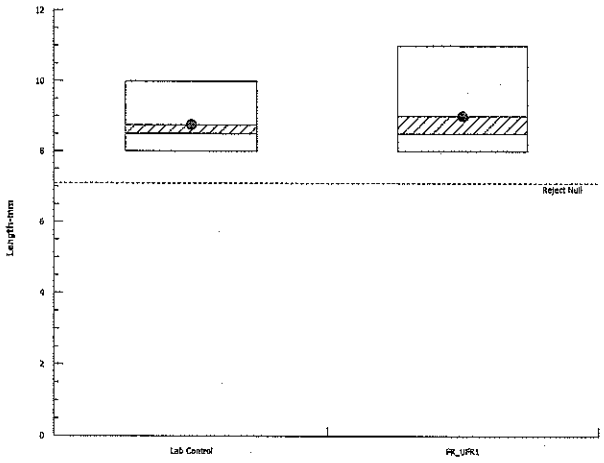
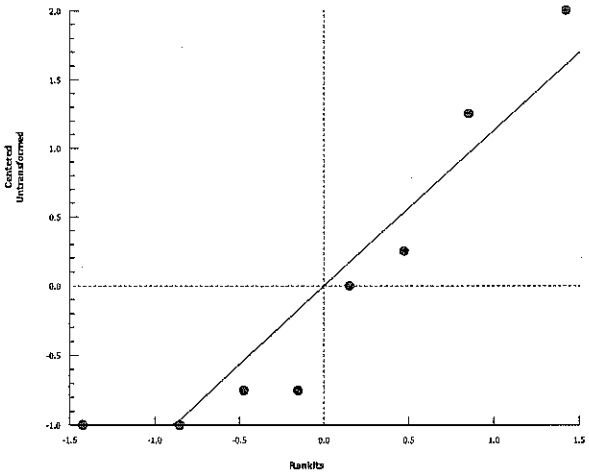
Fathead Minnow 32-d Survival and Growth Test | **Nautilus Environmental**

Analysis ID:	07-4573-0472	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Dec-15 16:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Analyst:_____ QA:_____

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CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	11-0771-9963	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jan-16 11:22	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-2351-8281	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	28 Oct-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	29 Nov-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	20-7626-6504	27 Oct-15	27 Oct-15	24h	Teck Coal	
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	48h (3.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	38h (4.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	35h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	9.08%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		GH_FR1	0.2856	2.015	0.081	5	0.3933	CDF	Non-Significant Effect
		FR_FRCP1	0.0583	1.943	0.086	6	0.4777	CDF	Non-Significant Effect
		CM_MC2	1.652	1.943	0.161	6	0.0748	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.05208896	0.01736299	3	2.042	0.1664	Non-Significant Effect
Error	0.09354626	0.008504205	11			
Total	0.1456352		14			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.847	11.34	0.0769	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8561	0.8328	0.0212	Normal Distribution

Proportion Normal Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	0.9821	0.9253	1	1	0.9286	1	0.01786	3.64%	0.0%
GH_FR1	3	1	1	1	1	1	1	0	0.0%	-1.82%
FR_FRCP1	4	0.9833	0.9303	1	1	0.9333	1	0.01667	3.39%	-0.12%
CM_MC2	4	1	1	1	1	1	1	0	0.0%	-1.82%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	1.399	1.294	1.503	1.429	1.3	1.437	0.03288	4.7%	0.0%
GH_FR1	3	1.387	1.338	1.436	1.393	1.365	1.403	0.01139	1.42%	0.82%
FR_FRCP1	4	1.396	1.303	1.489	1.419	1.31	1.437	0.02926	4.19%	0.18%
CM_MC2	4	1.262	1.019	1.504	1.298	1.047	1.403	0.07612	12.07%	9.8%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	1	0.9286	1	1
GH_FR1	1	1	1	
FR_FRCP1	1	1	1	0.9333
CM_MC2	1	1	1	1

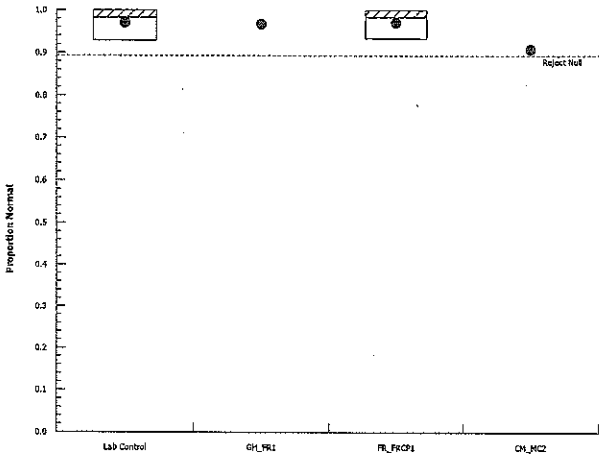
Jan 8/16

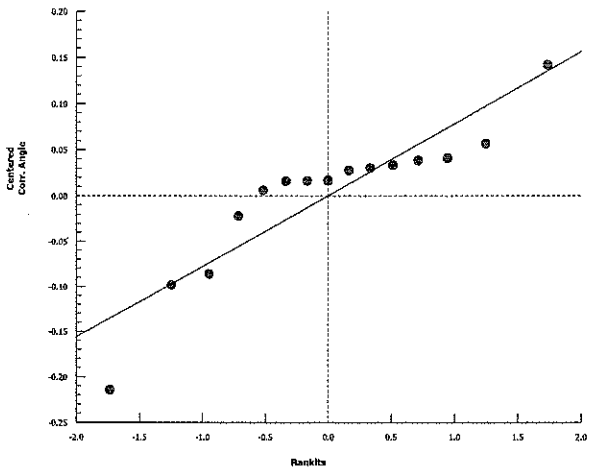
Analysis ID:	11-0771-9963	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jan-16 11:22	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	1.426	1.3	1.437	1.432
GH_FR1	1.393	1.365	1.403	
FR_FRCP1	1.426	1.412	1.437	1.31
CM_MC2	1.403	1.318	1.047	1.278

Graphics





JM 2/16

CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	15-2338-7921	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jan-16 11:22	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-2351-8281	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	28 Oct-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	29 Nov-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	35h (5.5 °C)	Teck Coal	
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	48h (3.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	38h (4.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	35h (4.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	10.5%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_FR1	-0.2855	2.015	0.087	5	0.6067	CDF	Non-Significant Effect
		FR_FRCP1	-0.4601	1.943	0.09	6	0.6692	CDF	Non-Significant Effect
		CM_MC2	1.346	1.943	0.163	6	0.1134	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.04622719	0.01540907	3	1.768	0.2113	Non-Significant Effect
Error	0.09587966	0.008716333	11			
Total	0.1421069		14			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.653	11.34	0.0838	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8954	0.8328	0.0809	Normal Distribution

Proportion Normal Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	0.9792	0.9129	1	1	0.9167	1	0.02083	4.26%	0.0%
GH_FR1	3	1	1	1	1	1	1	0	0.0%	-2.13%
FR_FRCP1	4	0.9833	0.9303	1	1	0.9333	1	0.01667	3.39%	-0.43%
CM_MC2	4	1	1	1	1	1	1	0	0.0%	-2.13%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	1.375	1.261	1.489	1.392	1.278	1.437	0.03571	5.2%	0.0%
GH_FR1	3	1.387	1.338	1.436	1.393	1.365	1.403	0.01139	1.42%	-0.9%
FR_FRCP1	4	1.396	1.303	1.489	1.419	1.31	1.437	0.02926	4.19%	-1.55%
CM_MC2	4	1.262	1.019	1.504	1.298	1.047	1.403	0.07612	12.07%	8.23%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	1	0.9167	1	1
GH_FR1	1	1	1	
FR_FRCP1	1	1	1	0.9333
CM_MC2	1	1	1	1

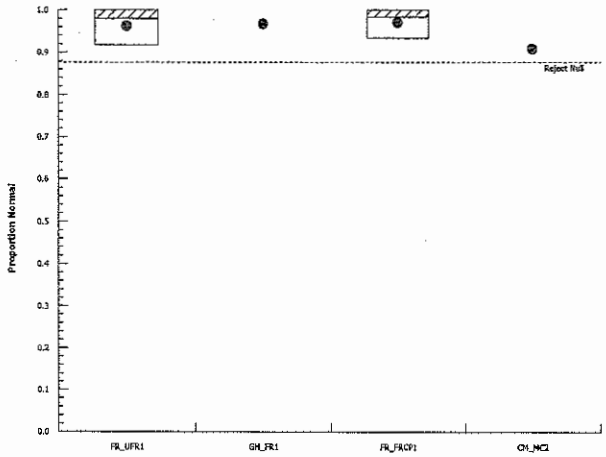
Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

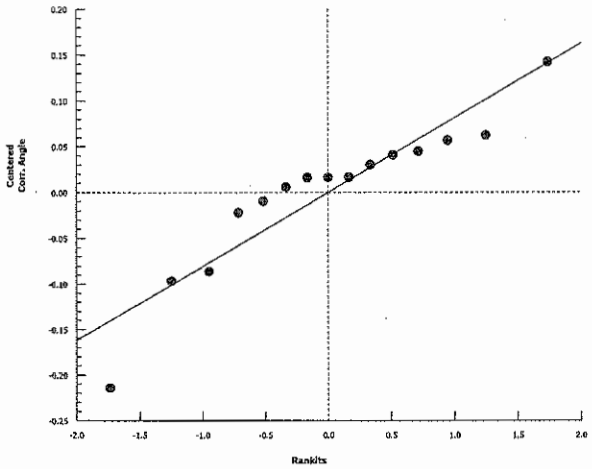
Analysis ID:	15-2338-7921	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jan-16 11:22	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	1.365	1.278	1.419	1.437
GH_FR1	1.393	1.365	1.403	
FR_FRCP1	1.426	1.412	1.437	1.31
CM_MC2	1.403	1.318	1.047	1.278

Graphics





Fathead Minnow 32-d Survival and Growth Test

Nautilus Environmental

Analysis ID:	19-3996-6642	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Dec-15 16:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-2351-8281	**Test Type:**	Survival-Development-Growth	**Analyst:**	Krysta Pearcy
Start Date:	28 Oct-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	29 Nov-15	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Lab Control	20-7626-6504	27 Oct-15	27 Oct-15	24h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	35h (5.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Lab Control	Water Sample	Teck Coal	Lab Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	5.24%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Lab Control		FR_UFR1	0.4904	1.943	0.094	6	0.3206	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001133539	0.001133539	1	0.2405	0.6412	Non-Significant Effect
Error	0.02827726	0.004712877	6			
Total	0.0294108		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.18	47.47	0.8951	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8004	0.6451	0.0289	Normal Distribution

Proportion Normal Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	0.9821	0.9253	1	1	0.9286	1	0.01786	3.64%	0.0%
FR_UFR1	4	0.9792	0.9129	1	1	0.9167	1	0.02083	4.26%	0.3%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	4	1.399	1.294	1.503	1.429	1.3	1.437	0.03288	4.7%	0.0%
FR_UFR1	4	1.375	1.261	1.489	1.392	1.278	1.437	0.03571	5.2%	1.7%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	1	0.9286	1	1
FR_UFR1	1	0.9167	1	1

Angular (Corrected) Transformed Detail

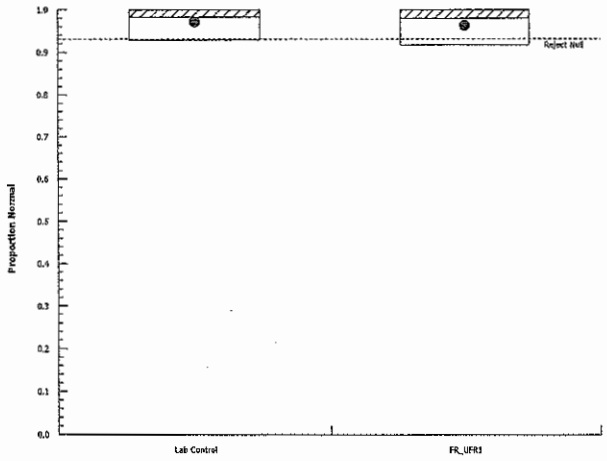
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	1.426	1.3	1.437	1.432
FR_UFR1	1.365	1.278	1.419	1.437

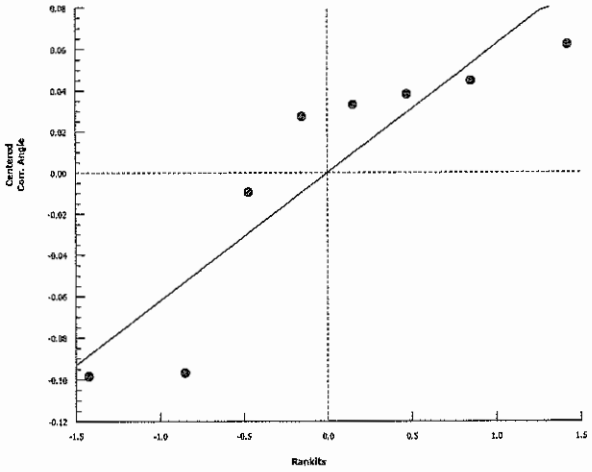
JMG/16

Fathead Minnow 32-d Survival and Growth Test | **Nautilus Environmental**

Analysis ID:	19-3996-6642	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Dec-15 16:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





APPENDIX E – *Oncorhynchus mykiss* Toxicity Test Data

Embryo-Alevin Test Summary Sheet

Client: Teck
Work Order No.: 15866
Test Date: October 27 - November 24, 2015
Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: Various - see table below
Sample Date: October 26, November 2, November 9, & November 16, 2015
Date Received: October 27, November 3, November 10, & November 17, 2015
Sample Volume: (3 - 8) x 20 L per refresh

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L CaCO3): 8 - 12
Alkalinity (mg/L CaCO3): 8 - 10

Test Organism Information:

Batch No: 102715
Source: Vancouver Island Trout Hatchery, Duncan, BC
Loading Density: 1.00 g / L
Number male broodstock used: 3
Number female broodstock used: 4

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE80
Stock Solution ID: 15S01
Date Initiated: October 27, 2015
7-d EC50 (95% CL): 3.0 (2.9 - 3.2) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.2 - 7.4) mg/L SDS
Reference Toxicant CV (%): 36

Test Results:

Sample ID	Survival (%) (Mean ± SD)	Viability (%) (Mean ± SD)	Length (mm) (Mean ± SD)	Wet weight (mg) (Mean ± SD)
Control	92.5 ± 3.1	92.5 ± 3.1	19.0 ± 0.4	79.8 ± 1.1
FR_UFR1	83.2 ± 7.1 *	83.2 ± 7.1 *	19.0 ± 0.3	81.3 ± 2.9
GH_ER2	86.8 ± 2.3	86.8 ± 2.3	18.4 ± 0.5 †	78.8 ± 2.6
FR_FRCP1	67.5 ± 1.7 *†§	66.7 ± 2.7 *†§	18.3 ± 0.2 *†	79.8 ± 1.0
GH_FR1	74.2 ± 5.0 *§	73.3 ± 3.8 *†§	17.9 ± 0.3 *†§	78.2 ± 1.5
GH_ERC	71.3 ± 20.4 *†§	68.8 ± 20.1 *†§	18.4 ± 0.4 †	76.1 ± 0.4 *†§
EV_HC1	76.2 ± 3.5 *§	74.5 ± 2.6 *§	18.7 ± 0.3	80.1 ± 0.4
EV_MC2	80.8 ± 14.6 *	79.2 ± 14.0 *	18.7 ± 0.4	78.0 ± 2.0
CM_MC2	75.9 ± 3.7 *§	75.1 ± 5.2 *§	19.0 ± 0.6	82.1 ± 1.7
LC_LCDSSLCC	81.6 ± 8.3 *	80.8 ± 8.2 *	18.6 ± 0.7	82.2 ± 3.4

* Indicates results that were significantly lower relative to laboratory control
† Indicates results that were significantly lower relative to site control FR_UFR1
§ Indicates results that were significantly lower relative to site control GH_ER2

Reviewed by: Edmund Canaria
Date reviewed: December 11, 2015

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 15866

Start Date & Time: Oct 26/15 @ 1615h (7 AM)
Stop Date & Time: Nov 24/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration: Control	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.8	9.9	9.8	10.0	9.6	9.9	9.8	9.8	9.8	9.8	9.7	9.6	9.8
pH	6.8	6.9	7.1	6.9	7.0	7.0	7.0	7.0	7.1	7.0	7.1	6.8	7.0
Cond. (µS/cm)	33	35		34		33		35		35		34	
Initials	YYL	A		YYL		SSD		A		A		YYL	

FR-UFR1 Concentration: 100	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	15.0	14.5	14.5	14.5	14.5	~~14.0~~ 13.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.0	9.9	9.8	9.9	9.5	10.2	9.6	9.9	9.9	9.9	9.8	9.5	9.8
pH	8.2	8.2	8.1	8.0	7.9	8.2	7.9	8.1	7.9	8.0	8.1	8.0	8.0
Cond. (µS/cm)	358	362		359		360		362		360		362	
Initials	YYL	A		YYL		SSD		A		A		YYL	

GH-ER2 Concentration: 100	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.5	14.5	14.5	14.5	13.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.1	9.9	9.8	9.9	9.8	10.2	9.7	9.9	9.8	9.8	9.8	9.8	9.7
pH	8.1	8.2	8.1	8.0	7.9	7.9	7.9	8.0	8.0	8.1	8.0	7.9	8.1
Cond. (µS/cm)	309	311		308		310		312		310		312	
Initials	YYL	A		YYL		SSD		A		A		YYL	

FR-FRCP1 Concentration: 100	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	15.0	14.5	14.5	14.5	14.5	13.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.9	9.9	9.8	9.3	9.7	10.2	9.8	9.9	9.9	9.9	9.9	9.8	9.9
pH	8.2	8.2	8.2	8.1	8.1	8.1	8.1	8.1	8.0	8.1	8.0	8.0	8.1
Cond. (µS/cm)	1031	1038		1028		1033		1036		1030		1034	
Initials	YYL	A		YYL		SSD		A		A		YYL	

Thermometer: Temp-2 DO meter: DO-2/3 (100% → 7) pH meter: pH 1/3 Conductivity meter: C-2/3

	Control	FR-UFR1	GH-ER2	FR-FRCP1
Hardness*	12	190	164	680
Alkalinity*	8	136	150	300

* mg/L as CaCO3

Analysts: YYL, SSD, AMD
Reviewed by:
Date reviewed: Dec. 8, 2015

Sample Description: all samples appear clear & colourless

Comments: ① 13.5

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 15866

Start Date & Time: Oct 26/15 @ 1615h 7AM
Stop Date & Time: Nov 29/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

GH_FR1 100

% (v/v) Concentration ~~Control~~	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	15.0	14.5	14.5	14.5	14.5	13.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.2	9.8	9.9	9.6	9.8	10.2	9.8	9.9	9.9	9.9	9.7	9.8	9.9
pH	8.1	8.1	8.2	8.0	8.2	8.2	8.1	8.1	8.1	8.1	8.0	8.1	8.1
Cond. (µS/cm)	765	767		766		765		770		766		768	
Initials	YYL	A		YML		SSD		A		A		YML	

GH_ERL 100

Concentration	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	15.0	14.5	14.5	14.5	14.5	13.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.2	9.8	9.9	9.6	9.8	10.2	9.7	9.8	9.9	9.9	9.8	9.9	9.7
pH	8.0	8.1	8.1	8.0	8.1	8.1	8.1	8.1	8.1	8.0	8.0	8.0	8.1
Cond. (µS/cm)	348	352		348		351		352		351		352	
Initials	YYL	A		YML		SSD		A		A		YML	

EV_HC1 100

Concentration	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.5	14.5	14.5	14.5	13.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.1	9.8	9.9	9.6	9.9	10.2	9.8	9.9	9.9	9.9	9.9	9.9	9.7
pH	8.2	8.2	8.2	8.1	8.1	8.3	8.1	8.1	8.1	8.1	8.0	8.1	8.1
Cond. (µS/cm)	739	746		744		742		750		745		748	
Initials	YML	A		YML		SSD		A		A		YML	

EV_MC2 100

Concentration	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	13.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.0	9.9	9.8	9.5	9.8	10.2	9.8	9.9	9.8	9.9	9.9	9.8	9.7
pH	7.8	7.9	~~8.0~~ 8.0	7.8	8.0	8.0	8.1	8.0	8.1	8.1	8.0	7.9	8.0
Cond. (µS/cm)	787	792		788		755		756		757		758	
Initials	YML	A		YML		SSD		A		A		YML	

08.0

Thermometer: Temp-7 (100% →) DO meter: DO-2/3 (100% →) pH meter: pH 1/3 Conductivity meter: C-2/3

	GH_FR1 ~~Control~~	GH_ERC	EV_HC1	EV_MC2
Hardness*	500	186	420	580
Alkalinity*	178	154	202	208

* mg/L as CaCO3

Analysts: YYL, SSD, AWD
Reviewed by: [signature]
Date reviewed: Dec. 8, 2015

Sample Description: all samples appear clear + colourless

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 15866

Start Date & Time: Oct 26/15 @ 1615h 7AD
Stop Date & Time: Nov 24/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

CM_MC2 100

% (v/v) Concentration ~~Control~~ YYL	Days 0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	13.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.9	9.9	9.8	9.6	9.8	10.2	9.8	9.9	9.9	9.9	9.8	9.7	9.7
pH	8.2	8.2	8.2	8.1	8.1	8.3	8.2	8.1	8.9	8.1	8.0	8.2	8.2
Cond. (µS/cm)	888	883		870		888		882		882		883	
Initials	YYL	A		YYL		SSD		A		A		YYL	

LC_LCDSSLCC Concentration 100	Days 0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	14.5	14.5	14.5	14.5	~~13.5~~ 14.0	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.2	10.0	9.8	9.9	9.8	10.2	9.9	9.9	9.9	9.9	9.9	9.8	9.8
pH	8.1	8.1	8.1	8.0	8.1	8.3	8.2	8.0	8.1	8.1	8.0	8.1	8.1
Cond. (µS/cm)	862	861		864		865		872		870		867	
Initials	YYL	YYL		YYL		SSD		A		A		YYL	

Concentration	Days												
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)													
DO (mg/L)													
pH													
Cond. (µS/cm)													
Initials													

Concentration	Days												
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)													
DO (mg/L)													
pH													
Cond. (µS/cm)													
Initials													

Thermometer: Temp-7 DO meter: DO-2/3 pH meter: pH 1/3 Conductivity meter: C-2/3

100% → 100% →

	Control		CM_MC2	LC_LCDSSLCC
Hardness*			480	480
Alkalinity*			198	192

* mg/L as CaCO3

Analysts: YYL, SSD, AWD

Reviewed by: [signature]

Date reviewed: Dec 8, 2015

Sample Description: all samples appear clear + colourless

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 15866

Start Date & Time: Oct 24/15 @ 1615h
Stop Date & Time: Nov 24/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

o/o (U/J) Concentration Control	Days													
	7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.9	9.7	9.8	9.6	9.8	9.7	9.8	9.6	9.9	9.8	9.9	9.8	9.7	9.6
pH	6.8	7.0	6.8	6.9	6.8	6.8	6.8	6.8	6.8	7.0	6.8	7.0	6.9	7.0
Cond. (µS/cm)	35		34		36		34		35		35		35	
Initials	YYL		SSD		KL		SSD		A		A		YYL	

FR_UFR1 Concentration 100	Days													
	7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.9	9.7	9.8	9.7	10.2	9.6	9.9	9.5	9.8	9.9	9.9	9.9	9.8	9.7
pH	8.2	8.1	8.2	7.9	8.1	7.9	8.1	7.8	7.9	7.9	7.9	8.0	8.0	8.1
Cond. (µS/cm)	363		357		361		360		359		360		363	
Initials	YYL		SSD		KL		SSD		A		A		YYL	

GH_ER2 Concentration 100	Days													
	7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.0	9.7	9.8	9.8	10.2	9.7	9.9	9.6	9.9	9.8	9.9	9.8	9.6	9.6
pH	8.0	8.1	8.0	7.9	8.0	7.9	8.0	7.9	8.0	8.1	8.0	8.0	8.0	8.1
Cond. (µS/cm)	312		307		312		309		317		312		313	
Initials	YYL		SSD		KL		SSD		A		A		YYL	

FR_FRCP1 Concentration 100	Days													
	7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.0	9.6	9.9	9.8	10.2	9.7	10.0	9.7	9.8	9.6	9.9	9.8	9.7	9.8
pH	8.0	8.1	8.0	8.0	8.2	8.0	8.1	8.0	8.1	8.1	8.1	8.0	8.1	8.2
Cond. (µS/cm)	1036		1018		1035		1021		1035		1035		1034	
Initials	YYL		SSD		KL		SSD		A		A		YYL	

Thermometer: Temp-7 DO meter: DO-2/3 pH meter: pH 1/3 Conductivity meter: C-2/3

	Control	FR_UFR1 100%	GH_ER2	FR_FRCP1
Hardness*	8	196	168	600
Alkalinity*	8	150	150	196

* mg/L as CaCO3

Analysts: YYL, SSD, AWD, KL
Reviewed by:
Date reviewed: Dec. 8 2015

Sample Description: all samples appear clear + colourless

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 15866

Start Date & Time: Oct 26/15 @ 1615h
Stop Date & Time: Nov 24/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

GH_FRI 100

% (v/v) Concentration ~~Control~~ YWL	Days 7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.8	9.8	9.8	9.7	10.2	9.7	10.1	9.7	9.9	9.8	9.8	9.9	9.6	9.8
pH	8.1	8.1	8.1	8.1	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.1	8.1	8.2
Cond. (µS/cm)	768		761		775		771		775		773		777	
Initials	YWL		SSD		KL		SSD		A		A		YWL	

GH_ERC Concentration 100	Days 7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.9	9.8	9.8	9.7	10.2	9.7	10.0	9.6	9.8	9.9	9.9	9.8	9.5	9.8
pH	8.0	8.1	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.1	8.0	8.1	8.1	8.2
Cond. (µS/cm)	351		347		354		351		354		355		357	
Initials	YWL		SSD		KL		SSD		A		A		YWL	

EV_HCl Concentration 100	Days 7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.9	9.7	9.9	9.8	10.2	9.7	9.9	9.7	9.8	9.9	9.9	9.9	9.6	9.8
pH	8.2	8.1	8.1	8.0	8.2	8.0	8.1	8.0	8.1	8.1	8.0	8.1	8.2	8.3
Cond. (µS/cm)	747		738		757		755		760		758		760	
Initials	YWL		SSD		KL		SSD		A		A		YWL	

EV_MC2 Concentration 100	Days 7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.0	9.8	9.9	9.8	10.2	9.7	10.0	9.8	9.9	9.9	10.0	9.8	9.7	9.8
pH	7.9	8.1	7.9	8.1	8.0	8.0	8.0	8.1	8.0	8.1	8.0	8.0	8.1	8.2
Cond. (µS/cm)	739		734		558①		552		554		552		555	
Initials	YWL		SSD		KL		SSD		A		A		YWL	

Thermometer: Temp-7 DO meter: DO-2/3 pH meter: pH 1/3 Conductivity meter: C-2/3

	EV_MC2 ~~Control~~ YWL	GH_FRI ~~100~~ YWL 100% →	GH_ERC	EV_HCl
Hardness*	320	510	210	450
Alkalinity*	156	188	156	190

* mg/L as CaCO3

Analysts: YYL, SSD, AWD, KL

Reviewed by: [signature]

Date reviewed: Dec. 8, 2015

Sample Description: All samples appear clear + colourless

Comments: ① confirmed w/ 2nd C-meter

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 15866

Start Date & Time: Oct 24/15 @ 1615h (7 YYL)
Stop Date & Time: Nov 24/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

CM-MC2 100 — % (v/v) Concentration ~~Control~~ YYL

	Days													
	7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.9	9.7	9.7	9.8	10.2	9.7	10.0	9.8	9.9	9.8	9.9	9.9	9.5	9.7
pH	8.1	8.2	8.0	8.1	8.1	8.0	8.1	8.0	8.1	8.1	8.1	8.0	8.2	8.2
Cond. (µS/cm)	877		874		820		805		807		806		809	
Initials	YYL		SSD		KL		SSD		A		A		YYL	

LC-LCDSSLCC Concentration 100

	Days													
	7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.8	9.8	9.8	9.8	10.2	9.7	10.1	9.8	9.8	9.9	9.9	9.7	9.5	9.8
pH	8.2	8.1	8.2	8.1	8.2	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.2	8.2
Cond. (µS/cm)	872		863		899		894		903		902		906	
Initials	YYL		SSD		KL		SSD		A		A		YYL	

Concentration	Days													
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: Temp-7 **DO meter:** DO-2/3 (100% → 100% →) **pH meter:** pH 1/3 **Conductivity meter:** C-2/3

	Control	~~100%~~	CM-MC2	LC-LCDSSLCC
Hardness*			460	540
Alkalinity*			180	202

* mg/L as CaCO3

Analysts: YYL, SSD, AWD, KL

Reviewed by: [signature]
Date reviewed: Dec. 8, 2015

Sample Description: All samples appear clear + colourless

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 15866

Start Date & Time: October 27, 2015 @1615h
Stop Date & Time: Nov 24/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

Control Concentration (% v/v)	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	15.0	14.5	14.0	14.5	15.0	14.5	15.0	14.5	14.5	14.5	14.5	15.0	15.0
DO (mg/L)	9.9	9.7	9.6	9.6	9.8	9.7	9.8	9.6	10.1	9.6	10.1	9.6	9.8	9.9
pH	6.8	7.0	6.8	6.8	6.6	6.6	6.8	6.8	6.8	7.0	6.8	7.0	6.9	7.0
Cond. (µS/cm)	35		42		332		33		32		32		42	
Initials	YYL		JS/KLP		KL		SSD		A		A		YYL	

FR_UFR1 Concentration 100	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	15.0	14.0	14.0	14.5	15.0	14.5	15.0	14.5	14.5	14.5	14.5	15.0	15.0
DO (mg/L)	9.7	9.8	9.8	9.7	10.2	9.6	9.9	9.6	10.0	9.7	10.0	9.7	9.8	9.8
pH	8.0	7.9	7.9	8.0	8.2	7.8	8.0	7.9	8.1	8.1	8.1	8.1	8.1	8.0
Cond. (µS/cm)	361		360		368		363		357		360		360	
Initials	YYL		JS/KLP		KL		SSD		A		A		YYL	

GH_ER2 Concentration 100	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	15.0	13.5	14.0	14.5	15.0	14.5	15.0	14.5	14.5	14.5	14.5	15.0	15.0
DO (mg/L)	9.8	9.8	10.1	9.7	10.2	9.6	9.9	9.7	10.0	9.8	10.0	9.6	9.7	9.8
pH	7.9	8.0	7.8	8.0	8.1	7.8	7.9	7.9	8.0	8.1	8.0	8.1	8.1	8.1
Cond. (µS/cm)	313		315		316		322		312		315		316	
Initials	YYL		JS/KLP		KL		SSD		A		A		YYL	

FR_FRCP1 Concentration 100	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	15.0	13.5	14.0	14.5	15.0	14.5	15.0	14.5	14.6	14.5	14.5	15.0	15.0
DO (mg/L)	9.7	9.8	10.0	9.7	10.2	9.6	10.0	9.7	10.0	9.7	10.0	9.7	9.9	9.8
pH	7.9	8.0	8.0	8.1	8.2	7.9	8.1	8.0	8.1	8.1	8.1	8.1	8.0	8.1
Cond. (µS/cm)	1029		1106		1108		1103		1098		1090		1097	
Initials	YYL		JS/KLP		KL		SSD		A		A		YYL	

Thermometer: temp-7 **DO meter:** DO-213 (100% →) **pH meter:** pH-113 **Conductivity meter:** C-213

	Control	FR_UFR1	GH_ER2	FR_FRCP1
Hardness*	10	184	176	670
Alkalinity*	10	146	150	220

* mg/L as CaCO3

Analysts: YYL, SSD, AWD, KL, JS, KLP
Reviewed by:
Date reviewed: Dec. 8, 2015

Sample Description: all samples appear clear + colourless

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 15866

Start Date & Time: October 27, 2015 @1615h
Stop Date & Time: Nov 24/15 @1100h
Test Species: *Oncorhynchus mykiss*

GH_FR1 ~~Control~~ MW
Concentration (% v/v) 100

	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	15.0	13.5	14.0	14.5	15.0	14.5	15.0	14.5	14.6	14.5	14.6	15.0	15.0
DO (mg/L)	9.6	9.8	10.0	9.7	10.2	9.6	10.0	9.8	10.0	9.8	10.1	9.6	10.0	9.7
pH	8.1	8.1	8.0	8.1	8.2	7.9	8.0	8.0	8.0	8.1	8.0	8.1	8.1	8.2
Cond. (µS/cm)	773		782		790		791		795		784		777	
Initials	MW		JS/KLP		KL		SSD		A		A		MW	

GH_ERC
Concentration 100

	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	15.0	13.5	14.0	14.5	15.0	14.5	15.0	14.5	14.6	14.5	14.5	15.0	15.0
DO (mg/L)	9.8	9.9	10.0	9.7	10.2	9.6	10.0	9.7	10.0	9.8	10.0	9.7	10.0	9.6
pH	8.0	8.1	7.8	8.1	8.0	7.9	8.1	8.0	8.1	8.1	8.0	8.1	8.1	8.2
Cond. (µS/cm)	353		362		362		363		359		361		361	
Initials	MW		JS/KLP		KL		SSD		A		A		MW	

EV_HC1
Concentration 100

	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	15.0	13.5	14.0	14.5	15.0	14.5	15.0	14.5	14.6	14.5	14.5	15.0	15.0
DO (mg/L)	9.6	9.8	10.1	9.7	10.2	9.5	10.0	9.7	10.0	9.9	10.0	9.6	9.9	9.8
pH	8.1	8.1	8.0	8.2	8.2	7.9	8.0	8.1	8.0	8.1	8.1	8.0	8.1	8.1
Cond. (µS/cm)	759		769		770		774		768		770		759	
Initials	MW		JS/KLP		KL		SSD		A		A		MW	

EV_MC2
Concentration 100

	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	15.0	13.5	14.0	14.5	15.0	14.5	15.0	14.5	14.5	14.5	14.5	15.0	15.0
DO (mg/L)	9.8	9.9	10.2	9.8	10.2	9.5	9.9	9.7	10.0	9.8	10.0	9.7	9.9	10.0
pH	8.0	8.1	7.9	8.1	8.1	7.9	8.1	8.0	8.1	8.1	8.0	8.0	8.0	8.2
Cond. (µS/cm)	546		612		612		613		608		606		610	
Initials	MW		JS/KLP		KL		SSD		A		A		MW	

Thermometer: temp -7 (100% →) **DO meter:** DO-2/3 (100% →) **pH meter:** pH-1/3 **Conductivity meter:** C-2/3

	~~Control~~ MW	GH_ERC	EV_HC1	EV_MC2
Hardness*	470	196	430	430
Alkalinity*	192	156	198	180

* mg/L as CaCO3

Analysts: YYL, SSD, AWD, KL, JS, KLP
Reviewed by:
Date reviewed: Dec. 8, 2015

Sample Description: All samples appear clear + colourless

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 15866

Start Date & Time: October 27, 2015 @ 1615h
Stop Date & Time: Nov 24/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

CM_MC2 ~~Control~~ YML

Concentration (% v/v)	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	15.0	13.5	14.0	14.5	15.0	14.5	15.0	14.5	14.5	14.5	14.5	15.0	15.0
DO (mg/L)	9.8	9.9	10.2	9.7	10.2	9.5	10.0	9.6	10.2	~~9.7~~	10.0	9.6	9.8	9.7
pH	8.1	8.1	8.0	8.2	8.2	8.0	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.2
Cond. (µS/cm)	807		889		885		885		~~877~~		~~875~~		881	
Initials	YML		JS/KLP		YL		SSD		A		A		YML	

LC_LCDSSLCC

Concentration 100	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	15.0	14.0	14.0	14.5	15.0	14.5	15.0	14.5	14.5	14.5	14.5	15.0	15.0
DO (mg/L)	9.8	9.9	10.3	9.7	10.2	9.5	10.1	9.6	10.0	9.8	10.0	9.7	9.5	9.8
pH	8.1	8.1	8.1	8.2	8.1	8.0	8.1	8.1	8.2	8.1	8.1	8.1	8.1	8.1
Cond. (µS/cm)	902		911		913		914		918		912		909	
Initials	YML		JS/KLP		YL		SSD		A		A		YML	

Concentration 100	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration 100	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: temp-7 **DO meter:** DO-2/3 **pH meter:** pH-1/3 **Conductivity meter:** C-2/3

100% → 100%

	Control		CM_MC2	LC_LCDSSLCC
Hardness*			440	550
Alkalinity*			208	198

* mg/L as CaCO3

Analysts: YYL, SSD, AWD, KL, JS, KLP
Reviewed by:
Date reviewed: Dec. 8, 2015

Sample Description: All samples appear clear + colourless

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 15866

Start Date & Time: October 27 2015 @ 1615h
Stop Date & Time: Nov 24/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

Control — Concentration (% v/v)

	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	15.0	15.0	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	15.0
DO (mg/L)	9.8	9.7	9.9	9.7	9.9	10.0	9.8	9.8	9.8	9.8	9.9	9.7	9.2	9.0
pH	6.8	6.9	6.8	6.9	7.0	7.0	7.0	6.9	7.0	7.1	7.0	7.1	7.2	7.2
Cond. (µS/cm)	32		31		34		29		31		31		31	
Initials	YYL		YYL		KL		YYL		A		A		KL	

FR_UFR1 — Concentration 100

	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	15.0	15.0	13.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	15.0
DO (mg/L)	9.6	9.9	9.9	9.6	10.0	10.0	9.9	10.0	9.8	9.8	9.8	9.8	9.7	9.6
pH	7.9	8.0	8.0	8.0	8.8	8.0	8.0	7.9	8.0	8.1	8.0	8.1	7.9	8.1
Cond. (µS/cm)	353		346		344 350		352		357		358		357	
Initials	YYL		YYL		KL		YYL		A		A		KL	

GH_ER2 — Concentration 100

	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	15.0	15.0	13.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	15.0
DO (mg/L)	9.8	9.9	10.0	9.8	10.0	10.0	10.0	10.0	9.8	9.9	9.8	9.7	9.7	9.1
pH	7.9	8.1	7.8	8.0	7.8	7.8	8.1	8.0	8.1	8.0	8.1	8.1	7.9	8.1
Cond. (µS/cm)	307		308		313		311		315		312		316	
Initials	YYL		YYL		KL		YYL		A		A		KL	

FR_FRCP1 — Concentration 100

	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	15.0	15.0	13.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	15.0
DO (mg/L)	9.8	9.8	10.0	9.8	10.0	10.0	10.0	10.0	9.9	9.8	9.9	9.8	9.7	9.1
pH	8.0	8.0	8.0	8.0	8.0	7.9	8.1	8.1	8.1	8.1	8.0	8.1	8.0	8.2
Cond. (µS/cm)	1080		1049		1054		1055		1069		1064		1074	
Initials	YYL		YYL		KL		YYL		A		A		KL	

Thermometer: temp-7 **DO meter:** DO-213 **pH meter:** pH-113 **Conductivity meter:** C-213

100% →

	Control	FR_UFR1	GH_ER2	FR_FRCP1
Hardness*	10	176	164	620
Alkalinity*	8	140	148	218

* mg/L as CaCO3

Analysts: YYL, ~~SSD~~ SSD, AWD, KL

Reviewed by:

Date reviewed: Dec. 8, 2015

Sample Description: All samples appear clear + colourless

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 15866

Start Date & Time: October 27 2015 @1615h
Stop Date & Time: Nov 24/15 @1100h
Test Species: *Oncorhynchus mykiss*

GH_FR1 Concentration 100	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	15.0	15.0	13.5	14.5	14.5	~~14.5~~ 14.5	14.5		14.6	14.6	14.5	14.5	14.5	15.0
DO (mg/L)	9.7	9.9	10.1	9.8	10.0	10.0	9.7	9.9	9.8	9.9	9.8	9.7	9.5	9.2
pH	8.0	8.1	8.0	8.1	8.0	8.0	8.2	8.1	8.1	8.2	8.1	8.0	8.0	8.2
Cond. (µS/cm)	776		794		799		798		804		801		808	
Initials	YYL		YYL		KL		YYL		A		A		KL	

GH_ERC Concentration 100	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	15.0	15.0	13.5	14.5	14.5	14.5	14.5	14.5	14.6	14.6	14.5	14.5	14.5	15.0
DO (mg/L)	9.5	9.7	9.9	9.8	10.0	10.0	9.8	10.0	9.8	9.9	9.9	9.8	9.5	9.2
pH	7.9	8.1	7.9	8.0	7.8	8.0	8.1	8.2	8.1	8.2	8.1	8.1	7.9	8.2
Cond. (µS/cm)	356		357		359		359		360		364		366	
Initials	YYL		YYL		KL		YYL		A		A		KL	

EV_HC1 Concentration 100	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	15.0	15.0	13.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.6	14.5	15.0
DO (mg/L)	9.8	9.9	9.8	9.7	10.0	10.0	10.1	10.0	9.8	9.9	9.9	9.7	9.6	9.2
pH	8.0	8.1	8.0	8.0	8.0	8.0	8.1	8.0	8.1	8.1	8.0	8.1	8.0	8.2
Cond. (µS/cm)	760		745		733		734		742		740		744	
Initials	YYL		YYL		KL		YYL		A		A		KL	

EV_MC2 Concentration 100	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	15.0	15.0	13.5	14.5	14.5	14.6	14.5	14.5	14.5	14.6	14.5	14.5	14.5	15.0
DO (mg/L)	9.7	9.9	10.0	9.6	10.0	10.0	9.7	10.0	9.8	9.8	9.9	9.8	9.6	9.2
pH	8.0	8.1	7.8	8.0	7.8	8.1	7.9	8.1	8.0	8.1	8.0	8.0	7.9	8.1
Cond. (µS/cm)	603		4440		445		445		451		405		447	
Initials	YYL		YYL		KL		YYL		A		A		KL	

Thermometer: temp-7 **DO meter:** DO-213 **pH meter:** pH-113 **Conductivity meter:** C-213

100% → 100% →

GH_FR1 ~~Control~~	GH_ERC	EV_HC1	EV_MC2
Hardness* 480	180	450	280
Alkalinity* 192	154	196	138

* mg/L as CaCO3

Analysts: YYL, AWD, KL
Reviewed by: [signature]
Date reviewed: Dec 8, 2015

Sample Description: ① ~~double check w/ 2nd meter~~ YYL, all samples appear clear + colourless

Comments: ① double checked w/ 2nd meter.

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 15866

Start Date & Time: October 27, 2015 @1615h
Stop Date & Time: Nov 24/15 @1100h
Test Species: *Oncorhynchus mykiss*

CM_MC2 Concentration 100	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	15.0	15.0	13.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	15.0
DO (mg/L)	9.5	9.8	9.9	9.8	10.0	10.2	9.7	10.0	9.8	9.9	9.8	9.7	9.5	9.2
pH	8.0	8.1	8.0	8.1	7.9	8.1	8.0	8.0	8.1	8.1	8.0	8.1	8.0	8.2
Cond. (µS/cm)	866		866		864		868		870		875		876	
Initials	YYL		YYL		KL		YYL		A		A		KL	

LC_LCDSSLCC Concentration 100	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	15.0	15.0	13.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	15.0	15.0
DO (mg/L)	9.8	9.9	10.0	9.7	10.2	10.1	9.9	9.9	9.8	9.8	9.9	9.7	9.5	9.2
pH	7.9	8.0	8.0	8.0	7.9	8.1	8.0	8.0	8.0	8.1	8.0	8.1	8.1	8.2
Cond. (µS/cm)	895		860		860		862		870		873		870	
Initials	YYL		YYL		KL		YYL		A		A		KL	

Concentration	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: temp-7 **DO meter:** DO-213 **pH meter:** pH-113 **Conductivity meter:** C-213

100% → 100% →

	Control		CM_MC2	LC_LCDSSLCC
Hardness*			380	460
Alkalinity*			172	192

* mg/L as CaCO3

Analysts: YYL, AWD, KL
Reviewed by: [signature]
Date reviewed: Dec. 8, 2015

Sample Description: all samples appear clear + colourless

Comments: ① double checked w/ 2nd meter.

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 15866

Start Date & Time: October 27 2015 @ 1615h
Stop Date & Time: November 24, 2015 @ 1100h
Test Species: *Oncorhynchus mykiss*

Control Concentration (%v/v)	Days													
	28 final													
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	\	15.0												
DO (mg/L)	\	9.7												
pH	\	6.9												
Cond. (µS/cm)	37													
Initials	YYL													

FR_UFR1 Concentration 100	Days													
	28 final													
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	\	15.0												
DO (mg/L)	\	9.7												
pH	\	8.1												
Cond. (µS/cm)	361													
Initials	YYL													

GH_ER2 Concentration 100	Days													
	28 final													
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	\	15.0												
DO (mg/L)	\	9.6												
pH	\	8.1												
Cond. (µS/cm)	320													
Initials	YYL													

FR_FRCP1 Concentration 100	Days													
	28 final													
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	\	15.0												
DO (mg/L)	\	9.5												
pH	\	8.2												
Cond. (µS/cm)	1075													
Initials	YYL													

Thermometer: temp-7 **DO meter:** DO-2 (100% →) **pH meter:** pH-1 **Conductivity meter:** C-2

	Control	FR_UFR1	GH_ER2	FR_FRCP1
Hardness*	10	176	164	620
Alkalinity*	8	140	148	218

* mg/L as CaCO3

Analysts: YYL

Reviewed by: [signature]
Date reviewed: Dec. 8, 2015

Sample Description: all samples appear clear + colourless

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 15866

Start Date & Time: October 27 2015 @ 1615h
Stop Date & Time: November 24, 2015 @ 1100h
Test Species: *Oncorhynchus mykiss*

GH_FR1 Concentration 100	Days													
	28 final													
	new	~~old~~	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)		15.0												
DO (mg/L)		9.5												
pH		8.3												
Cond. (µS/cm)		807												
Initials		YYL												

GH_ERC Concentration 100	Days													
	28 final													
	new	~~old~~	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)		15.0												
DO (mg/L)		9.6												
pH		8.3												
Cond. (µS/cm)		366												
Initials		YYL												

EV_HC1 Concentration 100	Days													
	28 final													
	new	~~old~~	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)		15.0												
DO (mg/L)		9.8												
pH		8.2												
Cond. (µS/cm)		746												
Initials		YYL												

EV_MC2 Concentration 100	Days													
	28 final													
	new	~~old~~	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)		15.0												
DO (mg/L)		9.6												
pH		8.2												
Cond. (µS/cm)		454												
Initials		YYL												

Thermometer: temp-1 **DO meter:** DO-2 **pH meter:** pH-1 **Conductivity meter:** C-2

GH_FR1	Control 100% →	GH_ERC 100% →	EV_HC1	EV_MC2
Hardness*	480	180	450	280
Alkalinity*	192	154	196	138

* mg/L as CaCO3

Analysts: YYL
Reviewed by: [signature]
Date reviewed: Dec. 8, 2015

Sample Description: all samples appear clear + colourless

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 15866

Start Date & Time: October 27 2015 @ 1615h
Stop Date & Time: November 24, 2015 @ 1100h
Test Species: *Oncorhynchus mykiss*

CM_MC2 Concentration 100	Days													
	28 final													
	new	~~old~~	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)		15.0												
DO (mg/L)		9.6												
pH		8.2												
Cond. (µS/cm)	684													
Initials	YYL													

LC_LCDSSLCC Concentration 100	Days													
	28 final													
	new	~~old~~	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)		15.0												
DO (mg/L)		9.5												
pH		8.2												
Cond. (µS/cm)	868													
Initials	YYL													

Concentration	Days													
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: temp-1 **DO meter:** DO-2 **pH meter:** pH-1 **Conductivity meter:** C-2

100% → 100%

	Control		CM_MC2	LC_LCDSSLCC
Hardness*			380	460
Alkalinity*			172	192

* mg/L as CaCO3

Analysts: YYL

Reviewed by: [signature]
Date reviewed: Dec. 8, 2015

Sample Description: all samples appear clear + colourless

Comments:

Embryo-Alevin Toxicity Test
Daily Mortality

Client: Tech
Sample ID: Various
Work Order #: 15866

Start Date & Time: Oct 27/15 @ 1615h
Stop Date & Time: Nov 24/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	8	9	10	11	12	Total Dead Eggs/Embryos/ Alevins
control	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	2									0				0
	3													0
	4													0
100 FR-VFR1	1													0
	2													0
	3						1							1
	4						0							0
100 GH-ER2	1									0				0
	2													0
	3													0
	4													0
100 FR-FRCP1	1												0	0
	2							1					0	1
	3							1	1				0	2
	4							0	0				1	1
100 GH-FR1	1						1		0	1			0	2
	2						0		0	0			0	0
	3								1		1		1	3
	4								0		0		0	0
100 GH-ERC	1												0	0
	2												0	0
	3						1						0	1
	4						0						1	1
100 EV-HC1	1						0						0	0
	2						1		1				0	2
	3						0		0				1	1
	4						0		0				0	0
100 EV-MC2	1									2	2		1	5
	2									0	0		0	0
	3												0	0
	4		1										0	1
Tech Initials		[illegible]	[illegible]	KL	[illegible]	[illegible]	KL	[illegible]	SSD	KL	SSD	[illegible]	[illegible]	[illegible]

Comments:

Reviewed by: [signature]
Date reviewed: Dec. 8, 2015

Embryo-Alevin Toxicity Test
Daily Mortality

Client: Teck
Sample ID: Various
Work Order #: 15866

Start Date & Time: Oct 27/15 @ 1615h
Stop Date & Time: Nov 24/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities												Total Dead Eggs/Embryos/ Alevins
		1	2	3	4	5	6	7	8	9	10	11	12	
~~100 Leachate~~ CM_MC2	1	0	0	0	0	0	1	0	0	0	0	0	0	1
	2	↓	↓	↓	↓	↓	0	↓	0	↓	↓	↓	↓	0
	3	↓	↓	↓	↓	↓	0	↓	1	↓	↓	↓	↓	1
	4	↓	↓	↓	↓	↓	1	↓	0	1	↓	↓	↓	2
100 LC_LCDSSLCC	1	↓	↓	↓	↓	↓	0	↓	↓	0	↓	↓	↓	0
	2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0
	3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	1	1
	4	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0	0
	1													
	2													
	3													
	4													
	1													
	2													
	3													
	4													
	1													
	2													
	3													
	4													
	1													
	2													
	3													
	4													
	1													
	2													
	3													
	4													
Tech Initials		MW	[illegible]	KL	[illegible]	[illegible]	KL	MW	SSD	KL	SSD	AT	[illegible]	MW

Comments:

Reviewed by: [signature] **Date reviewed:** Dec. 8, 2015

Embryo-Alevin Toxicity Test
Daily Mortality

Client: Tech
Sample ID: Various
Work Order #: 15866

Start Date & Time: Oct 27/15 @ 1615h
Stop Date & Time: Nov 24/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities												Total Dead Eggs/Embryos/ Alevins
		① 13	14	15	16	17	18	19	20	② 21	22	23	24	
control	1	0	0	0	0	0	0	② 0	0	0	0	1	0	1
	2			0				②				1	1	2
	3			0					②			0	1	1
	4			0				②					0	0
100	1			0				②	2	0			0	2
FR_UFR1	2			0				②	2	0			1	3
	3			0					② 1	5	1		0	7
	4			0			1		② 0	3	0		0	4
100	1			0			0	②	0	2	1			3
GH_ER2	2			0			0		② 0	1	3			4
	3			0			0	②	0	0	2	1		3
	4			0			0	②	0	0	1	2		3
100	1			0	1		0	②	0	3	3	2		9
FR_FRCP1	2		1	0	2		1	②	2	0	1	0		7
	3		0	0	0	1	0	②	0	2	1	2		6
	4		1	1	1	0	0	② 2	0	1	0	1		7
100	1		0	0	0	0	0	0	② 1	2	1	1		5
GH_FR1	2	2	1	0	1	1	0	2	② 1	0	0	0		8
	3	0	1	0	0	1	0	② 1	1	1	0	0		5
	4		0	0	1	0	0	② 0	1	1	0	3		6
100	1		0	0	0	0	0	② 1	0	3	2	0	1	7
GH_ERC	2		1	0			1	② 0	0	1	2	0	1	6
	3		0	0			0	0 ②	0	0	1	2	0	3
	4		1	0			0	0 ②	7	4	2	1	0	15
100	1		0	0			0	0	② 1	0	3	0	1	5
EV_HC1	2		1	0	2		0	0	② 1	0	0	1	0	5
	3		1	0	0		0	0 ②	0	1	1	0		3
	4		0	0			0	0	② 0	1	1			2
100	1		0	0			0	② 0	2	3	2			7
EV_MC2	2		0	0			0	② 0	1	0	1			2
	3		1	1			1	0	② 0	0	0			3
	4		0	0			0	② 0	0	1	1			2
Tech Initials		YWL	YWL	LLP	KL	SSD	A	M	YWL	YWL	YWL	KL	SSD	YWL

Comments:
① at eyed stage
② starting to hatch
③ controls ≥50% hatched - at alevin stage

Reviewed by: [signature]
Date reviewed: Dec. 8, 2015

Embryo-Alevin Toxicity Test
Daily Mortality

Client: Teck
Sample ID: various
Work Order #: 15866

Start Date & Time: Oct 27/15 @ 1615h
Stop Date & Time: Nov 24/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

Concentration	Rep	Day of Test - No. of Mortalities												Total Dead Eggs/Embryos/ Alevins
		13 ①	14	15	16	17	18	19 ②	20	21 ③	22	23	24	
100 ~~control~~	1	0	1	0	0	0	1	1	2/	0	0	0	0	4
CM_MC2	2	↓	0	0	↓	1	0	2 1	0	0	1	6	↓	9
	3		1	0		0	0	0	2 2	1	0	2		6
	4		0	1	a +1	↓	0	~~2~~ 1	2 2	0	0	0		5
100	1		0	0	a 0		0	2 0	0	0	1	3		4
LC_LCDSSLCC	2		0	0			0	2 0	0	2	0	0		2
	3		0	0			1	2 0	0	0	0	0		1
	4	↓	0	0	↓	↓	0	2 0	0	0	0	1	↓	1
	1													
	2													
	3													
	4													
	1													
	2													
	3													
	4													
	1													
	2													
	3													
	4													
	1													
	2													
	3													
	4													
	1													
	2													
	3													
	4													
	1													
	2													
	3													
	4													
Tech Initials		MM	MM	KLD	KL	SSD	[illegible]	[illegible]	MM	MM	MM	KL	SSD	MM

Comments:
① at eyed stage
② starting to hatch
③ controls ≥50% hatched - at alevin stage

Reviewed by: [signature]
Date reviewed: Dec. 8, 2015

Embryo-Alevin Toxicity Test
Daily Mortality

Client: Teck
Sample ID: Various
Work Order #: 15866

Start Date & Time: Oct 27/15 @ 1615h
Stop Date & Time: Nov 24/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Embryos/ Alevins	Total Undeveloped/ Unhatched - Abnormal (1)	Total No. Alevins - Normal	Total Exposed Eggs
		25	26	27	28 (2)	29	30	31				
Control	1	0	0	1	0				1	0	28	30
	2			0	1				1	0	27	30
	3			0	2				2	0	27	30
	4			1	0				1	0	28	29
100 FR_UFR1	1			2	1				3	0	25	30
	2			0	0				0	0	27	30
	3			↓	|				0	0	22	30
	4	↓	↓						0	0	25	29
100 GH_ER2	1	0	0	1					1	0	26	30
	2	1	0	0					1	0	27	32
	3	0	1	|					1	0	25	29
	4	0	0	|					0	0	27	30
100 FR_FRCP1	1	1	0	↓					1	0	20	30
	2	0	2						2	0	20	30
	3	0	0	2					2	1	19	30
	4	0	0	1					1	0	21	30
100 GH_FR1	1	0	0	0					0	0	23	30
	2	0	0	1					1	0	21	30
	3	0	1	0					1	0	21	30
	4	0	0	|					0	1	23	30
100 GH_ERC	1	0	0	|					0	3	20	30
	2	0	0	|					0	0	25	31
	3	0	0	|					0	0	26	30
	4	1	0	↓	↓				1	0	12	29
100 EV_MC1	1	0	0	1	1				2	1	22	30
	2	0	0	1	0				1	0	20	29
	3	0	0	0	2				2	1	23	30
	4	0	1	1	3				~~4~~ 5	0	23	~~29~~ 30
100 EV_MC2	1	0	0	0	0				0	0	19	30
	2	0	0	|	0				0	0	29	31
	3	1	0	|	1				2	0	24	29
	4	0	0	↓	1				1	2	25	31
Tech Initials												

Comments: (1) See Test Termination Datasheets for abnormality assessment details
(2) Test terminated

Reviewed by: [signature]
Date reviewed: Dec 8, 2015

Embryo-Alevin Toxicity Test
Daily Mortality

Client: Teck
Sample ID: Various
Work Order #: 15866

Start Date & Time: Oct 27/15 @ 1615h
Stop Date & Time: Nov 29/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities 25	26	27	28 (2)	29	30	31	Total Dead Embryos/ Alevins	Total (1) Undeveloped/ Unhatched/ Abnormal	Total No. Alevins Normal	Total Exposed Eggs
100 ~~control~~	1	0	0	1	0				1	0	24	30
CM_MC2	2	0	0	0	0				0	1	21	31
	3	0	0	↓	0				0	0	22	29
	4	0	0	↓	0				0	0	23	30
100	1	0	0	1	0				1	1	24	~~31~~ 30
LC_LCDSSLCC	2	1	1	2	3				7	0	21	30
	3	0	1	2	0				3	0	25	30
	4	1	1	0	0				2	0	26	29
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials												

Comments: (1) See Test Termination Datasheets for abnormality assessment details
(2) Test terminated

Reviewed by: [signature]
Date reviewed: Dec 8, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **Control**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control A	1	19.0	✓		
	2	17.0	✓		
	3	17.5	✓		
	4	19.0	✓		
	5	21.5	✓		
	6	19.5	✓		
	7	19.0	✓		
	8	19.5	✓		
	9	21.0	✓		
	10	19.0	✓		
	11	18.0	✓		
	12	17.5	✓		
	13	17.5	✓		
	14	17.5	✓		
	15	19.0	✓		
	16	18.5	✓		
	17	18.5	✓		
	18	19.5	✓		
	19	18.0	✓		
	20	19.0	✓		
	21	18.5	✓		
	22	19.0	✓		
	23	19.0	✓		
	24	19.0	✓		
	25	18.5	✓		
	26	18.0	✓		
	27	20.5	✓		
	28	19.5	✓		
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.21 g Avg length = 18.8 mm

Number of survivors: 28

Number of deformed/have difficulty swimming: 0 / 0

Initials: YNL / KSL

Reviewed by: [signature]

Date Reviewed: Dec. 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **Control**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control B	1	19.5	✓		
	2	18.0	✓		
	3	20.0	✓		
	4	18.0	✓		
	5	17.0	✓		
	6	17.0	✓		
	7	18.5	✓		
	8	19.5	✓		
	9	17.5	✓		
	10	19.5	✓		
	11	18.0	✓		
	12	19.0	✓		
	13	18.5	✓		
	14	19.0	✓		
	15	18.0	✓		
	16	19.0	✓		
	17	18.5	✓		
	18	19.0	✓		
	19	19.0	✓		
	20	18.0	✓		
	21	18.0	✓		
	22	20.0	✓		
	23	18.0	✓		
	24	18.0	✓		
	25	18.0	✓		
	26	17.5	✓		
	27	18.5	✓		
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.20 g Avg length = 18.5 mm

Number of survivors: 27

Number of deformed/have difficulty swimming: 0 / 0

Initials: YML/RSL

Reviewed by: [signature]

Date Reviewed: Dec. 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **Control**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control C	1	19.0	✓		
	2	20.0	✓		
	3	19.5	✓		
	4	19.5	✓		
	5	19.0	✓		
	6	19.0	✓		
	7	20.0	✓		
	8	20.0	✓		
	9	19.5	✓		
	10	17.5	✓		
	11	19.0	✓		
	12	20.0	✓		
	13	19.0	✓		
	14	19.0	✓		
	15	20.0	✓		
	16	18.0	✓		
	17	19.5	✓		
	18	19.5	✓		
	19	20.0	✓		
	20	19.0	✓		
	21	19.0	✓		
	22	19.0	✓		
	23	19.0	✓		
	24	19.0	✓		
	25	19.5	✓		
	26	19.0	✓		
	27	19.5	✓		
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.15 g Avg length = 19.3 mm

Number of survivors: 27

Number of deformed/have difficulty swimming: 0/0

Initials: YHL/KSL

Reviewed by: [signature]

Date Reviewed: Dec-9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Length, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **Control**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
Control D	1	19.0	✓		
	2	19.5	✓		
	3	19.5	✓		
	4	19.0	✓		
	5	20.5	✓		
	6	17.5	✓		
	7	19.0	✓		
	8	18.5	✓		
	9	19.0	✓		
	10	19.5	✓		
	11	20.0	✓		
	12	20.5	✓		
	13	19.5	✓		
	14	20.5	✓		
	15	20.5	✓		
	16	19.0	✓		
	17	19.0	✓		
	18	18.5	✓		
	19	20.0	✓		
	20	19.5	✓		
	21	17.5	✓		
	22	19.5	✓		
	23	20.5	✓		
	24	19.5	✓		
	25	19.0	✓		
	26	19.5	✓		
	27	20.0	✓		
	28	19.5	✓		
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.22 g Avg length = 19.4 mm

Number of survivors: 28

Number of deformed/have difficulty swimming: 0/0

Initials: YMC/KSL

Reviewed by: [signature]

Date Reviewed: Dec-9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **FR_UFR1**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	18.5	✓		
	2	19.0	✓		
	3	18.0	✓		
	4	18.5	✓		
	5	18.5	✓		
	6	19.0	✓		
	7	17.5	✓		
	8	17.0	✓		
	9	19.5	✓		
	10	19.5	✓		
	11	19.0	✓		
	12	19.5	✓		
	13	18.0	✓		
	14	19.0	✓		
	15	19.0	✓		
	16	19.0	✓		
	17	19.0	✓		
	18	19.5	✓		
	19	19.0	✓		
	20	18.5	✓		
	21	18.0	✓		
	22	19.0	✓		
	23	19.5	✓		
	24	18.0	✓		
	25	19.5	✓		
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.01 g Avg length = 18.7 mm

Number of survivors: 25

Number of deformed/have difficulty swimming: 0 / 0

Initials: YNL/KSL

Reviewed by: [signature]

Date Reviewed: Dec 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **FR_UFR1**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	16.5	✓		
	2	19.0	✓		
	3	20.0	✓		
	4	18.5	✓		
	5	18.0	✓		
	6	19.0	✓		
	7	18.0	✓		
	8	19.0	✓		
	9	19.5	✓		
	10	16.5	✓		
	11	18.5	✓		
	12	20.5	✓		
	13	20.0	✓		
	14	19.0	✓		
	15	18.0	✓		
	16	21.0	✓		
	17	20.0	✓		
	18	20.5	✓		
	19	19.0	✓		
	20	20.0	✓		
	21	19.5	✓		
	22	19.5	✓		
	23	19.0	✓		
	24	18.0	✓		
	25	18.5	✓		
	26	19.5	✓		
	27	20.0	✓		
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.11 g Avg length = 19.1 mm

Number of survivors: 27

Number of deformed/have difficulty swimming: 0/0

Initials: YML/KSL

Reviewed by: [signature]

Date Reviewed: Dec. 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **FR_UFR1**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	18.0	✓		
	2	20.0	✓		
	3	19.0	✓		
	4	20.5	✓		
	5	20.0	✓		
	6	22.5	✓		
	7	18.0	✓		
	8	18.0	✓		
	9	20.0	✓		
	10	19.0	✓		
	11	19.0	✓		
	12	19.5	✓		
	13	19.5	✓		
	14	19.0	✓		
	15	18.5	✓		
	16	19.5	✓		
	17	19.0	✓		
	18	19.0	✓		
	19	20.0	✓		
	20	19.0	✓		
	21	18.5	✓		
	22	19.0	✓		
	23	~~18.5~~ YHL			
	24	~~19.0~~ YHL			
	25	~~20.0~~ YHL			
	26	~~19.5~~ YHL			
	27	~~19.0~~ YHL			
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.87 g Avg length = 19.3 mm

Number of survivors: 22

Number of deformed/have difficulty swimming: 0/0

Initials: YHL/KSL

Reviewed by: [signature]

Date Reviewed: Dec-9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **FR_UFR1**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	18.5	✓		
	2	19.0	✓		
	3	20.0	✓		
	4	19.5	✓		
	5	19.0	✓		
	6	20.5	✓		
	7	19.0	✓		
	8	19.0	✓		
	9	18.5	✓		
	10	19.0	✓		
	11	17.0	✓		
	12	19.5	✓		
	13	19.0	✓		
	14	20.0	✓		
	15	17.5	✓		
	16	17.5	✓		
	17	20.5	✓		
	18	20.0	✓		
	19	18.5	✓		
	20	20.5	✓		
	21	19.5	✓		
	22	18.5	✓		
	23	19.5	✓		
	24	18.5	✓		
	25	19.5	✓		
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.049 g Avg length = 19.1 mm

Number of survivors: 25

Number of deformed/have difficulty swimming: 0/0

Initials: YML/KSL

Reviewed by: [signature]

Date Reviewed: Dec. 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **GH_ER2**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	19.5	✓		
	2	17.0	✓		
	3	18.0	✓		
	4	19.0	✓		
	5	18.0	✓		
	6	18.5	✓		
	7	18.0	✓		
	8	19.5	✓		
	9	19.0	✓		
	10	19.0	✓		
	11	18.0	✓		
	12	18.0	✓		
	13	16.0	✓		
	14	18.5	✓		
	15	18.0	✓		
	16	18.5	✓		
	17	18.0	✓		
	18	18.5	✓		
	19	19.0	✓		
	20	18.5	✓		
	21	19.0	✓		
	22	18.0	✓		
	23	19.0	✓		
	24	19.5	✓		
	25	18.5	✓		
	26	20.0	✓		
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): ~~2.04~~ JS 2.05g Avg length: 18.5 mm

Number of survivors: 26

Number of deformed/have difficulty swimming: 0/0

Initials: YMC/KSL

Reviewed by: [signature]

Date Reviewed: Dec. 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **GH_ER2**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	18.0	✓		
	2	17.5	✓		
	3	16.0	✓		
	4	17.0	✓		
	5	17.0	✓		
	6	18.0	✓		
	7	18.0	✓		
	8	17.5	✓		
	9	18.0	✓		
	10	18.5	✓		
	11	20.0	✓		
	12	18.5	✓		
	13	18.0	✓		
	14	17.0	✓		
	15	16.5	✓		
	16	18.5	✓		
	17	17.0	✓		
	18	18.5	✓		
	19	17.5	✓		
	20	19.0	✓		
	21	19.0	✓		
	22	17.5	✓		
	23	18.5	✓		
	24	18.0	✓		
	25	18.0	✓		
	26	16.5	✓		
	27	16.0	✓		
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.039g Avg length: 17.8 mm

Number of survivors: 27

Number of deformed/have difficulty swimming: 0/0

Initials: YMC/KSL

Reviewed by: [signature]

Date Reviewed: Dec-9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **GH_ER2**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	18.0	✓		
	2	18.0	✓		
	3	18.0	✓		
	4	18.0	✓		
	5	18.5	✓		
	6	18.0	✓		
	7	19.0	✓		
	8	17.5	✓		
	9	19.0	✓		
	10	16.0	✓		
	11	19.0	✓		
	12	19.5	✓		
	13	18.5	✓		
	14	18.5	✓		
	15	19.0	✓		
	16	19.0	✓		
	17	18.0	✓		
	18	18.0	✓		
	19	19.0	✓		
	20	18.0	✓		
	21	17.0	✓		
	22	20.0	✓		
	23	17.5	✓		
	24	20.0	✓		
	25	19.5	✓		
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.03 g Avg length = 18.4 mm

Number of survivors: 25

Number of deformed/have difficulty swimming: 0/0

Initials: YML/KSL

Reviewed by: [signature]

Date Reviewed: Dec 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **GH_ER2**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	18.5	✓		
	2	19.0	✓		
	3	19.0	✓		
	4	19.0	✓		
	5	18.5	✓		
	6	18.5	✓		
	7	19.5	✓		
	8	18.5	✓		
	9	18.5	✓		
	10	20.0	✓		
	11	18.5	✓		
	12	19.0	✓		
	13	19.0	✓		
	14	20.0	✓		
	15	19.5	✓		
	16	20.0	✓		
	17	18.0	✓		
	18	19.0	✓		
	19	19.0	✓		
	20	19.5	✓		
	21	18.0	✓		
	22	18.0	✓		
	23	20.0	✓		
	24	20.0	✓		
	25	20.0	✓		
	26	18.0	✓		
	27	19.5	✓		
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.16 g Avg length = 19.0 mm

Number of survivors: 27

Number of deformed/have difficulty swimming: 0/0

Initials: YHL/KSL

Reviewed by: [signature]

Date Reviewed: Dec. 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **FR_FRCP1**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	18.5	✓		
	2	18.5	✓		
	3	18.0	✓		
	4	17.5	✓		
	5	19.0	✓		
	6	18.5	✓		
	7	17.5	✓		
	8	17.0	✓		
	9	19.0	✓		
	10	19.0	✓		
	11	18.5	✓		
	12	18.0	✓		
	13	19.0	✓		
	14	19.0	✓		
	15	18.5	✓		
	16	18.0	✓		
	17	19.0	✓		
	18	17.0	✓		
	19	17.5	✓		
	20	17.0	✓		
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.61 g Avg length = 18.2 mm

Number of survivors: 20

Number of deformed/have difficulty swimming: 0/0

Initials: YML/KSL

Reviewed by: [signature]

Date Reviewed: Dec 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Sample ID: **FR_FRCP1**

Work Order No.: **15866**

Start Date: **October 27, 2015**

Termination Date: **November 24, 2015**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	20.0	✓		
	2	19.0	✓		
	3	18.5	✓		
	4	18.5	✓		
	5	19.0	✓		
	6	18.0	✓		
	7	17.5	✓		
	8	17.0	✓		
	9	18.0	✓		
	10	18.0	✓		
	11	17.5	✓		
	12	18.0	✓		
	13	20.0	✓		
	14	17.0	✓		
	15	17.5	✓		
	16	18.0	✓		
	17	17.0	✓		
	18	18.5	✓		
	19	17.5	✓		
	20	19.0	✓		
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.6|g Avg length: 18.2 mm

Number of survivors: 20

Number of deformed/have difficulty swimming: 0|0

Initials: YML/KJL

Reviewed by: [signature]

Date Reviewed: Dec. 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **FR_FRCP1**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	19.0	✓		
	2	17.0	✓		
	3	18.0	✓		
	4	18.0	✓		
	5	18.5	✓		
	6	19.5	✓		
	7	18.0	✓		
	8	18.0	✓		
	9	19.0	✓		
	10	18.0	✓		
	11	18.5	✓		
	12	18.5	✓		
	13	18.0	✓		
	14	19.5	✓		
	15	18.0	✓		
	16	17.5	✓		
	17	18.5	✓		
	18	15.5	✓		
	19	18.5	✓		
	20	15.0	~~✓~~	✓	extra body formed on yolksac w/ no head
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.57 g Avg length = 18.2 mm

Number of survivors: 20

Number of deformed/have difficulty swimming: 1/0

Initials: YML/KJL

Reviewed by: [signature]

Date Reviewed: Dec 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **FR_FRCP1**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	18.5	✓		
	2	19.0	✓		
	3	18.5	✓		
	4	18.0	✓		
	5	18.5	✓		
	6	18.5	✓		
	7	18.5	✓		
	8	19.5	✓		
	9	20.0	✓		
	10	17.0	✓		
	11	18.0	✓		
	12	18.0	✓		
	13	18.5	✓		
	14	19.0	✓		
	15	19.5	✓		
	16	17.5	✓		
	17	19.0	✓		
	18	19.0	✓		
	19	19.0	✓		
	20	19.0	✓		
	21	16.0	✓		
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.67g Avg length: 18.5 mm

Number of survivors: 21

Number of deformed/have difficulty swimming: 0/0

Initials: YYL/KSL

Reviewed by: [signature]

Date Reviewed: Dec 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Sample ID: **GH_FR1**

Work Order No.: **15866**

Start Date: **October 27, 2015**

Termination Date: **November 24, 2015**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	18.5	✓		
	2	18.0	✓		
	3	18.0	✓		
	4	18.0	✓		
	5	19.0	✓		
	6	18.0	✓		
	7	18.0	✓		
	8	19.0	✓		
	9	mort 17.5	✓		
	10	17.0	✓		
	11	18.0	✓		
	12	17.0	✓		
	13	17.5	✓		
	14	18.0	✓		
	15	18.0	✓		
	16	17.0	✓		
	17	17.5	✓		
	18	18.5	✓		
	19	20.0	✓		
	20	19.5	✓		
	21	16.5	✓		
	22	19.0	✓		
	23	19.0	✓		
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.79 g Avg length = 18.1 mm

Number of survivors: 23

Number of deformed/have difficulty swimming: 0/0

Initials: YML/KSL

Reviewed by: [signature]

Date Reviewed: Dec 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **GH_FR1**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	18.0	✓		
	2	18.0	✓		
	3	17.5	✓		
	4	17.0	✓		
	5	17.5	✓		
	6	18.5	✓		
	7	18.0	✓		
	8	17.5	✓		
	9	18.0	✓		
	10	16.0	✓		
	11	18.0	✓		
	12	18.5	✓		
	13	18.5	✓		
	14	18.5	✓		
	15	18.0	✓		
	16	19.0	✓		
	17	18.5	✓		
	18	18.0	✓		
	19	18.5	✓		
	20	17.0	✓		
	21	18.5	✓		
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.63g Avg length = 18.0 mm

Number of survivors: 21

Number of deformed/have difficulty swimming: 0 / 0

Initials: YML/KSL

Reviewed by: [signature]

Date Reviewed: Dec. 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Sample ID: **GH_FR1**

Work Order No.: **15866**

Start Date: **October 27, 2015**

Termination Date: **November 24, 2015**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	18.0	✓		
	2	17.5	✓		
	3	18.0	✓		
	4	17.5	✓		
	5	18.0	✓		
	6	16.5	✓		
	7	18.0	✓		
	8	18.0	✓		
	9	18.0	✓		
	10	17.5	✓		
	11	19.0	✓		
	12	18.0	✓		
	13	18.0	✓		
	14	17.5	✓		
	15	18.5	✓		
	16	18.5	✓		
	17	18.5	✓		
	18	18.0	✓		
	19	18.0	✓		
	20	18.0	✓		
	21	17.5	✓		
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.69g Avg length = 17.9 mm

Number of survivors: 21

Number of deformed/have difficulty swimming: 0/0

Initials: YML/KSL

Reviewed by: [signature]

Date Reviewed: Dec 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **GH_FR1**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	17.0	✓		
	2	17.0	✓		
	3	17.0	✓		
	4	17.5	✓		
	5	19.0	✓		
	6	17.0	✓		
	7	19.0	✓		
	8	18.5	✓		
	9	17.5	✓		
	10	18.0	✓		
	11	17.0	✓		
	12	18.0	✓		
	13	17.0	✓		
	14	17.5	✓		
	15	17.0	✓		
	16	18.5	✓		
	17	18.0	✓		
	18	18.0	✓		
	19	18.0	✓		
	20	17.5	✓		
	21	16.5	✓		
	22	17.0	✓		
	23	17.5	✓		
	24	16.0		✓	slight edema
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.85 g Avg length = 17.5 mm

Number of survivors: 24

Number of deformed/have difficulty swimming: 1 / 0

Initials: YML/KSL

Reviewed by: [signature]

Date Reviewed: Dec. 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **GH_ERC**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	16.5	✓		
	2	19.0	✓		
	3	17.0	✓		
	4	19.5	✓		
	5	17.0	✓		
	6	18.5	✓		
	7	18.0	✓		
	8	19.0	✓		
	9	19.0	✓		
	10	17.5	✓		
	11	18.0	✓		
	12	18.5	✓		
	13	18.0	✓		
	14	19.0	✓		
	15	19.0	✓		
	16	17.0	✓		
	17	19.0	✓		
	18	17.5	✓		
	19	18.0	✓		
	20	18.0	✓		
	21	15.0		✓	missing tail fin
	22	15.0		✓	missing tail fin
	23	15.5		✓	missing tail fin, egg casing still attached, swimming slightly sideway
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.74 g Avg length = 17.8 mm

Number of survivors: 23

Number of deformed/have difficulty swimming: 3/1

Initials: YYL/KSL

Reviewed by: [signature]

Date Reviewed: Dec-9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Sample ID: **GH_ERC**

Work Order No.: **15866**

Start Date: **October 27, 2015**

Termination Date: **November 24, 2015**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	17.5	✓		
	2	19.5	✓		
	3	17.5	✓		
	4	18.5	✓		
	5	18.0	✓		
	6	19.0	✓		
	7	18.5	✓		
	8	20.0	✓		
	9	18.5	✓		
	10	19.0	✓		
	11	18.0	✓		
	12	19.0	✓		
	13	18.0	✓		
	14	18.0	✓		
	15	19.0	✓		
	16	18.5	✓		
	17	19.0	✓		
	18	19.5	✓		
	19	17.5	✓		
	20	19.5	✓		
	21	19.5	✓		
	22	19.0	✓		
	23	18.5	✓		
	24	20.5	✓		
	25	20.0	✓		
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.90 g Avg length = 18.8 mm

Number of survivors: 25

Number of deformed/have difficulty swimming: 0/0

Initials: YYL/KSL

Reviewed by: [signature]

Date Reviewed: Dec. 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **GH_ERC**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	18.0	✓		
	2	18.5	✓		
	3	17.0	✓		
	4	18.0	✓		
	5	18.0	✓		
	6	18.5	✓		
	7	19.0	✓		
	8	19.5	✓		
	9	18.0	✓		
	10	18.5	✓		
	11	19.5	✓		
	12	18.0	✓		
	13	18.5	✓		
	14	19.5	✓		
	15	19.0	✓		
	16	19.0	✓		
	17	19.5	✓		
	18	19.5	✓		
	19	19.5	✓		
	20	19.0	✓		
	21	18.0	✓		
	22	18.0	✓		
	23	18.5	✓		
	24	19.0	✓		
	25	18.0	✓		
	26	18.5	✓		
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.98g Avg length = 18.6 mm

Number of survivors: 26

Number of deformed/have difficulty swimming: 0/0

Initials: YML/KSL

Reviewed by: [signature]

Date Reviewed: Dec. 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **GH_ERC**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	19.0	✓		
	2	17.5	✓		
	3	18.0	✓		
	4	20.5	✓		
	5	18.5	✓		
	6	19.0	✓		
	7	18.5	✓		
	8	19.0	✓		
	9	19.0	✓		
	10	18.0	✓		
	11	17.5	✓		
	12	17.0	✓		
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 0.92 g Avg length = 18.5 mm

Number of survivors: 12 ✓

Number of deformed/have difficulty swimming: 0/0

Initials: YYL/KJL

Reviewed by: [signature]

Date Reviewed: Dec. 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **EV_MC2**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	17.0	✓		
	2	18.0	✓		
	3	19.0	✓		
	4	20.0	✓		
	5	18.0	✓		
	6	19.0	✓		
	7	18.0	✓		
	8	20.0	✓		
	9	19.5	✓		
	10	19.0	✓		
	11	19.0	✓		
	12	19.0	✓		
	13	19.5	✓		
	14	18.5	✓		
	15	18.0	✓		
	16	17.0	✓		
	17	18.0	✓		
	18	18.0	✓		
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.40 g Avg length = 18.6 mm

Number of survivors: 18

Number of deformed/have difficulty swimming: 0/0

Initials: YNL/KSL

Reviewed by: [signature]

Date Reviewed: Dec 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Sample ID: **EV_MC2**

Work Order No.: **15866**

Start Date: **October 27, 2015**

Termination Date: **November 24, 2015**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	18.0	✓		
	2	19.0	✓		
	3	19.0	✓		
	4	19.0	✓		
	5	19.0	✓		
	6	17.5	✓		
	7	19.0	✓		
	8	19.0	✓		
	9	18.5	✓		
	10	20.5	✓		
	11	19.5	✓		
	12	19.0	✓		
	13	20.0	✓		
	14	19.0	✓		
	15	20.0	✓		
	16	20.0	✓		
	17	18.0	✓		
	18	18.5	✓		
	19	21.0	✓		
	20	20.5	✓		
	21	20.5	✓		
	22	20.0	✓		
	23	20.0	✓		
	24	19.0	✓		
	25	20.0	✓		
	26	19.5	✓		
	27	19.0	✓		
	28	19.0	✓		
	29	20.0	✓		
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.33g Avg length: 19.3 mm

Number of survivors: 29

Number of deformed/have difficulty swimming: 0/0

Initials: YY-IKJL

Reviewed by: [signature]

Date Reviewed: Dec 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **EV_MC2**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	20.0	✓		
	2	18.5	✓		
	3	18.0	✓		
	4	18.0	✓		
	5	16.5	✓		
	6	19.0	✓		
	7	18.0	✓		
	8	18.0	✓		
	9	18.0	✓		
	10	19.5	✓		
	11	19.5	✓		
	12	17.0	✓		
	13	20.0	✓		
	14	19.5	✓		
	15	17.0	✓		
	16	18.0	✓		
	17	18.5	✓		
	18	20.0	✓		
	19	19.0	✓		
	20	18.5	✓		
	21	18.0	✓		
	22	17.0	✓		
	23	19.0	✓		
	24	18.0	✓		
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.81g Avg length = 18.4 mm

Number of survivors: 24

Number of deformed/have difficulty swimming: 0/0

Initials: YH/KSL

Reviewed by: [signature]

Date Reviewed: Dec 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **EV_MC2**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	19.0	✓		
	2	20.5	✓		
	3	19.5	✓		
	4	19.0	✓		
	5	19.0	✓		
	6	18.0	✓		
	7	17.0	✓		
	8	17.5	✓		
	9	20.5	✓		
	10	18.0	✓		
	11	19.0	✓		
	12	18.5	✓		
	13	17.5	✓		
	14	18.0	✓		
	15	17.0	✓		
	16	20.0	✓		
	17	18.0	✓		
	18	18.0	✓		
	19	16.5	✓		
	20	17.5	✓		
	21	20.0	✓		
	22	19.5	✓		
	23	18.5	✓		
	24	17.5	✓		
	25	19.5	✓		
	26	15.0		✓	missing tail
	27	18.0		✓	~~lordosis~~ kyphosis
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.12g Avg length = 18.4 mm

Number of survivors: 27

Number of deformed/have difficulty swimming: 2/0

Initials: YHL/KSL

Reviewed by: [signature]

Date Reviewed: Dec 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Sample ID: **EV_HC1**

Work Order No.: **15866**

Start Date: **October 27, 2015**

Termination Date: **November 24, 2015**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	18.0	✓		
	2	18.5	✓		
	3	17.5	✓		
	4	19.0	✓		
	5	18.5	✓		
	6	18.5	✓		
	7	18.5	✓		
	8	18.0	✓		
	9	16.5	✓		
	10	20.0	✓		
	11	18.0	✓		
	12	17.5	✓		
	13	19.0	✓		
	14	19.0	✓		
	15	19.0	✓		
	16	19.5	✓		
	17	19.0	✓		
	18	19.5	✓		
	19	18.0	✓		
	20	18.5	✓		
	21	18.5	✓		
	22	18.0	✓		
	23	15.5		✓	yolksac edema, pale colouration
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.83 g Avg length = 18.3 mm

Number of survivors: 23

Number of deformed/have difficulty swimming: 1/0

Initials: YNL/KSL

Reviewed by: [signature]

Date Reviewed: Dec. 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **EV_HC1**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	19.0	✓		
	2	18.0	✓		
	3	17.5	✓		
	4	18.0	✓		
	5	19.5	✓		
	6	19.0	✓		
	7	20.0	✓		
	8	19.0	✓		
	9	20.0	✓		
	10	19.0	✓		
	11	18.0	✓		
	12	18.0	✓		
	13	19.0	✓		
	14	19.0	✓		
	15	18.5	✓		
	16	19.5	✓		
	17	18.0	✓		
	18	18.5	✓		
	19	19.0	✓		
	20	20.0	✓		
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.61g Avg length = 18.8 mm

Number of survivors: 20

Number of deformed/have difficulty swimming: 0/0

Initials: YHL/KSL

Reviewed by: [signature]

Date Reviewed: Dec. 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **EV_HC1**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	18.5	✓		
	2	20.0	✓		
	3	19.5	✓		
	4	19.5	✓		
	5	19.0	✓		
	6	19.5	✓		
	7	20.0	✓		
	8	19.5	✓		
	9	17.5	✓		
	10	20.0	✓		
	11	19.0	✓		
	12	19.0	✓		
	13	19.0 55	✓		
	14	~~18.5~~ 19.0	✓		
	15	18.5	✓		
	16	19.0	✓		
	17	18.0	✓		
	18	19.0	✓		
	19	18.5	✓		
	20	19.0	✓		
	21	20.0	✓		
	22	19.0	✓		
	23	20.0	✓		
	24	14.5		✓	missing tail fin
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.92g Avg length = 18.9 mm

Number of survivors: 24

Number of deformed/have difficulty swimming: 1/0

Initials: YNL/KSL

Reviewed by: [signature]

Date Reviewed: Dec. 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **EV_HC1**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	18.0	✓		
	2	18.5	✓		
	3	19.0	✓		
	4	19.0	✓		
	5	18.0	✓		
	6	18.0	✓		
	7	18.5	✓		
	8	19.0	✓		
	9	17.0	✓		
	10	19.5	✓		
	11	19.0	✓		
	12	19.0	✓		
	13	19.0	✓		
	14	19.0	✓		
	15	19.0	✓		
	16	20.0	✓		
	17	19.0	✓		
	18	19.0	✓		
	19	18.5	✓		
	20	19.0	✓		
	21	19.0	✓		
	22	19.0	✓		
	23	19.5	✓		
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.25 g Avg length: 18.8 mm

Number of survivors: 23

Number of deformed/have difficulty swimming: 0/0

Initials: YYC/KJL

Reviewed by: [signature]

Date Reviewed: Dec 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **CM_MC2**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	19.0	✓		
	2	18.5	✓		
	3	19.0	✓		
	4	17.5	✓		
	5	19.0	✓		
	6	19.0	✓		
	7	19.0	✓		
	8	19.5	✓		
	9	19.0	✓		
	10	19.0	✓		
	11	18.0	✓		
	12	18.5	✓		
	13	19.0	✓		
	14	18.5	✓		
	15	20.5	✓		
	16	18.0	✓		
	17	18.0	✓		
	18	20.0	✓		
	19	19.5	✓		
	20	18.0	✓		
	21	19.0	✓		
	22	18.5	✓		
	23	19.0	✓		
	24	18.0	✓		
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.93g Avg length = 18.8 mm

Number of survivors: 24

Number of deformed/have difficulty swimming: 0/0

Initials: ML/KSL

Reviewed by: [signature]

Date Reviewed: Dec. 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **CM_MC2**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	18.0	✓		
	2	19.0	✓		
	3	20.0	✓		
	4	19.5	✓		
	5	19.0	✓		
	6	19.0	✓		
	7	19.0	✓		
	8	20.0	✓		
	9	20.0	✓		
	10	19.0	✓		
	11	19.0	✓		
	12	19.5	✓		
	13	19.5	✓		
	14	18.5	✓		
	15	20.0	✓		
	16	20.0	✓		
	17	20.5	✓		
	18	19.5	✓		
	19	20.5	✓		
	20	19.0	✓		
	21	20.5	✓		
	22	19.5		✓	Kyphosis, irregular swimming
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.84 g Avg length = 19.5 mm

Number of survivors: Ex 22

Number of deformed/have difficulty swimming: 1/1

Initials: YHLIKSL

Reviewed by: [signature]

Date Reviewed: Dec 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **CM_MC2**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	20.5	✓		
	2 JS	~~19~~ 20.0	✓		
	3	19.5	✓		
	4	18.5	✓		
	5	19.5	✓		
	6	20.5	✓		
	7	18.5	✓		
	8	18.0	✓		
	9	19.5	✓		
	10	20.0	✓		
	11	20.0	✓		
	12	19.0	✓		
	13	20.0	✓		
	14	20.0	✓		
	15	20.0	✓		
	16	19.0	✓		
	17	20.0	✓		
	18	19.0	✓		
	19	19.0	✓		
	20	19.5	✓		
	21	19.5	✓		
	22	20.0	✓		
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.84 g Avg length = 19.5 mm

Number of survivors: 22

Number of deformed/have difficulty swimming: 0/0

Initials: YYUKSL

Reviewed by: [signature]

Date Reviewed: Dec. 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Sample ID: **CM_MC2**

Work Order No.: **15866**

Start Date: **October 27, 2015**

Termination Date: **November 24, 2015**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	19.0	✓		
	2	17.5	✓		
	3	18.0	✓		
	4	18.0	✓		
	5	18.5	✓		
	6	19.5	✓		
	7	18.0	✓		
	8	18.0	✓		
	9	19.0	✓		
	10	18.5	✓		
	11	19.0	✓		
	12	18.5	✓		
	13	19.5	✓		
	14 JS	~~1~~ 20.0	✓		
	15	17.5	✓		
	16	19.0	✓		
	17	17.0	✓		
	18	17.0	✓		
	19	18.5	✓		
	20	17.0	✓		
	21	17.0	✓		
	22	18.5	✓		
	23	19.5	✓		
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): ~~1.86g~~ 1.86g Avg length = 18.3 mm

Number of survivors: 23

Number of deformed/have difficulty swimming: 0/0

Initials: YNL/KJL

Reviewed by: [signature]

Date Reviewed: Dec 9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **LC_LCDSSLCC**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	18.0	✓		
	2	18.0	✓		
	3	18.5	✓		
	4	16.5	✓		
	5	18.0	✓		
	6	17.5	✓		
	7	17.0	✓		
	8	18.0	✓		
	9	18.0	✓		
	10	18.0	✓		
	11	18.0	✓		
	12	16.0	✓		
	13	17.5	✓		
	14	17.0	✓		
	15	17.5	✓		
	16	17.5	✓		
	17	18.0	✓		
	18	19.0	✓		
	19	18.5	✓		
	20	17.5	✓		
	21	17.5	✓		
	22	18.0	✓		
	23	18.0	✓		
	24	18.5	✓		
	25	14.0		✓	missing tail.
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.95g Avg length: 17.6 mm

Number of survivors: 25

Number of deformed/have difficulty swimming: 1/0

Initials: YH/KSL

Reviewed by: [signature]

Date Reviewed: Dec-9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **LC_LCDSSLCC**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	20.0	✓		
	2	19.0	✓		
	3	19.5	✓		
	4	18.5	✓		
	5	18.5	✓		
	6	19.~~0~~5	✓		
	7	20.0	✓		
	8	19.0	✓		
	9	20.0	✓		
	10	20.0	✓		
	11	19.5	✓		
	12	18.0	✓		
	13	20.0	✓		
	14	20.0	✓		
	15	18.5	✓		
	16	18.5	✓		
	17	19.5	✓		
	18	20.0	✓		
	19	19.0	✓		
	20	19.0	✓		
	21	19.5	✓		
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.81g Avg length = 19.3

Number of survivors: 21

Number of deformed/have difficulty swimming: 0/0

Initials: YYL/KSL

Reviewed by: [signature]

Date Reviewed: Dec-9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **LC_LCDSSLCC**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	19.0	✓		
	2	18.0	✓		
	3	19.0	✓		
	4	18.0	✓		
	5	18.0	✓		
	6	18.0	✓		
	7	20.0	✓		
	8	18.5	✓		
	9	18.5	✓		
	10	17.5	✓		
	11	18.5	✓		
	12	17.5	✓		
	13	20.0	✓		
	14	18.0	✓		
	15	19.5	✓		
	16	18.5	✓		
	17	18.0	✓		
	18	19.0	✓		
	19	21.0	✓		
	20	20.0	✓		
	21	19.0	✓		
	22	18.5	✓		
	23	19.5	✓		
	24	19.0	✓		
	25	19.0	✓		
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 204g Avg length = 18.8

Number of survivors: 25

Number of deformed/have difficulty swimming: 0/0

Initials: YY/KSL

Reviewed by: [signature]

Date Reviewed: Dec-9, 2015

Embryo - Alevin Test Termination Data Sheet

Deformities, Lengths, Pooled wet weight

Client: **Teck**

Start Date: **October 27, 2015**

Sample ID: **LC_LCDSSLCC**

Termination Date: **November 24, 2015**

Work Order No.: **15866**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	18.5	✓		
	2	19.5	✓		
	3	19.0	✓		
	4	19.0	✓		
	5	19.0	✓		
	6	19.0	✓		
	7	17.0	✓		
	8	1a + 20.0	✓		
	9	17.5	✓		
	10	19.0	✓		
	11	18.0	✓		
	12	18.5	✓		
	13	20.0	✓		
	14	19.5	✓		
	15	19.0	✓		
	16	19.5	✓		
	17	18.0	✓		
	18	19.0	✓		
	19	18.0	✓		
	20	20.5	✓		
	21	18.5	✓		
	22	19.0	✓		
	23	19.0	✓		
	24	19.0	✓		
	25	17.5	✓		
	26	20.0	✓		
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.16 g Avg length = 18.8mm

Number of survivors: 26

Number of deformed/have difficulty swimming: 0/0

Initials: YY/KSL

Reviewed by: [signature]

Date Reviewed: Dec 9, 2015

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Batch ID:	13-8433-7020	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	24 Nov-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	27d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	05-7863-5358	27 Oct-15	27 Oct-15	16h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	27h (5.5 °C)		
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	40h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	30h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	40h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	40h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	29h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:50	27 Oct-15 10:10	28h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	28h (4.1 °C)		
LC_LCDSSLCC	11-4781-0493	26 Oct-15	27 Oct-15 10:10	40h (2.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	control	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-10-26		

Proportion Normal Summary (Viability)

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	4	0.9247	0.8747	0.9747	0.9	0.9655	0.01571	0.03142	3.4%	0.0%
FR_UFR1	4	0.8322	0.7187	0.9457	0.7333	0.9	0.03567	0.07133	8.57%	10.01%
GH_ER2	4	0.8681	0.8308	0.9054	0.8438	0.9	0.01172	0.02344	2.7%	6.12%
FR_FRCP1	4	0.6667	0.6234	0.71	0.6333	0.7	0.01361	0.02722	4.08%	27.91%
GH_FR1	4	0.7333	0.6721	0.7946	0.7	0.7667	0.01925	0.03849	5.25%	20.7%
GH_ERC	4	0.6884	0.368	1	0.4138	0.8667	0.1007	0.2013	29.25%	25.56%
EV_HC1	4	0.7452	0.704	0.7865	0.7143	0.7667	0.01297	0.02594	3.48%	19.41%
EV_MC2	4	0.7924	0.5694	1	0.6	0.9355	0.07008	0.1402	17.69%	14.31%
CM_MC2	4	0.7507	0.6679	0.8335	0.6774	0.8	0.02601	0.05202	6.93%	18.82%
LC_LCDSSLCC	4	0.8075	0.6769	0.9381	0.7	0.8966	0.04104	0.08208	10.16%	12.68%

Survival Rate Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	4	0.9247	0.8747	0.9747	0.9	0.9655	0.01571	0.03142	3.4%	0.0%
FR_UFR1	4	0.8322	0.7187	0.9457	0.7333	0.9	0.03567	0.07133	8.57%	10.01%
GH_ER2	4	0.8681	0.8308	0.9054	0.8438	0.9	0.01172	0.02344	2.7%	6.12%
FR_FRCP1	4	0.675	0.6485	0.7015	0.6667	0.7	0.008333	0.01667	2.47%	27.0%
GH_FR1	4	0.7417	0.6621	0.8212	0.7	0.8	0.025	0.05	6.74%	19.79%
GH_ERC	4	0.7134	0.3889	1	0.4138	0.8667	0.102	0.2039	28.58%	22.85%
EV_HC1	4	0.7619	0.7055	0.8183	0.7143	0.8	0.01771	0.03542	4.65%	17.61%
EV_MC2	4	0.8085	0.5763	1	0.6	0.9355	0.07295	0.1459	18.05%	12.57%
CM_MC2	4	0.7587	0.6994	0.8181	0.7097	0.8	0.01865	0.03729	4.92%	17.95%
LC_LCDSSLCC	4	0.8158	0.6841	0.9475	0.7	0.8966	0.04138	0.08276	10.14%	11.78%

FR_UFR1 + GH_ER2 are the controls

Dec 11/15

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Proportion Normal Detail (Viability)

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.9333	0.9	0.9	0.9655
FR_UFR1	0.8333	0.9	0.7333	0.8621
GH_ER2	0.8667	0.8438	0.8621	0.9
FR_FRCP1	0.6667	0.6667	0.6333	0.7
GH_FR1	0.7667	0.7	0.7	0.7667
GH_ERC	0.6667	0.8065	0.8667	0.4138
EV_HC1	0.7333	0.7143	0.7667	0.7667
EV_MC2	0.6	0.9355	0.8276	0.8065
CM_MC2	0.8	0.6774	0.7586	0.7667
LC_LCDSSLCC	0.8	0.7	0.8333	0.8966

Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.9333	0.9	0.9	0.9655
FR_UFR1	0.8333	0.9	0.7333	0.8621
GH_ER2	0.8667	0.8438	0.8621	0.9
FR_FRCP1	0.6667	0.6667	0.6667	0.7
GH_FR1	0.7667	0.7	0.7	0.8
GH_ERC	0.7667	0.8065	0.8667	0.4138
EV_HC1	0.7667	0.7143	0.8	0.7667
EV_MC2	0.6	0.9355	0.8276	0.871
CM_MC2	0.8	0.7097	0.7586	0.7667
LC_LCDSSLCC	0.8333	0.7	0.8333	0.8966

Proportion Normal Binomials (Viability)

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	28/30	27/30	27/30	28/29
FR_UFR1	25/30	27/30	22/30	25/29
GH_ER2	26/30	27/32	25/29	27/30
FR_FRCP1	20/30	20/30	19/30	21/30
GH_FR1	23/30	21/30	21/30	23/30
GH_ERC	20/30	25/31	26/30	12/29
EV_HC1	22/30	20/28	23/30	23/30
EV_MC2	18/30	29/31	24/29	25/31
CM_MC2	24/30	21/31	22/29	23/30
LC_LCDSSLCC	24/30	21/30	25/30	26/29

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	28/30	27/30	27/30	28/29
FR_UFR1	25/30	27/30	22/30	25/29
GH_ER2	26/30	27/32	25/29	27/30
FR_FRCP1	20/30	20/30	20/30	21/30
GH_FR1	23/30	21/30	21/30	24/30
GH_ERC	23/30	25/31	26/30	12/29
EV_HC1	23/30	20/28	24/30	23/30
EV_MC2	18/30	29/31	24/29	27/31
CM_MC2	24/30	22/31	22/29	23/30
LC_LCDSSLCC	25/30	21/30	25/30	26/29

FR_UFR1 & GH_ER2 are site controls.

EC
Dec. 11/15

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	12-1778-1955	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Dec-15 11:26	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	13-8433-7020	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	24 Nov-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	27d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	05-7863-5358	27 Oct-15	27 Oct-15	16h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	27h (5.5 °C)		
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	40h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	30h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	40h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	40h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	29h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:50	27 Oct-15 10:10	28h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	28h (4.1 °C)		
LC_LCDSSLCC	11-4781-0493	26 Oct-15	27 Oct-15 10:10	40h (2.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	control	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-10-26		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
Control		FR_UFR1	0.02303	0.0230	Exact	Significant Effect
Control		GH_ER2	0.1102	0.1102	Exact	Non-Significant Effect
Control		FR_FRCP1	8.82E-07	<0.0001	Exact	Significant Effect
Control		GH_FR1	0.000116	0.0001	Exact	Significant Effect
Control		GH_ERC	2.03E-05	<0.0001	Exact	Significant Effect
Control		EV_HC1	0.00048	0.0005	Exact	Significant Effect
Control		EV_MC2	0.007257	0.0073	Exact	Significant Effect
Control		CM_MC2	0.000346	0.0003	Exact	Significant Effect
Control		LC_LCDSSLCC	0.009838	0.0098	Exact	Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
Control	Negative Contr	110	9	119	0.9244	0.07563	0.0%
FR_UFR1		99	20	119	0.8319	0.1681	10.0%
GH_ER2		105	16	121	0.8678	0.1322	6.12%
FR_FRCP1		81	39	120	0.675	0.325	26.98%
GH_FR1		89	31	120	0.7417	0.2583	19.77%
GH_ERC		86	34	120	0.7167	0.2833	22.47%
EV_HC1		90	28	118	0.7627	0.2373	17.49%
EV_MC2		98	23	121	0.8099	0.1901	12.38%
CM_MC2		91	29	120	0.7583	0.2417	17.96%
LC_LCDSSLCC		97	22	119	0.8151	0.1849	11.82%

FR_UFR1 & GHER2 one site controls

Dec. 11/15

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	12-1778-1955	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Dec-15 11:26	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes

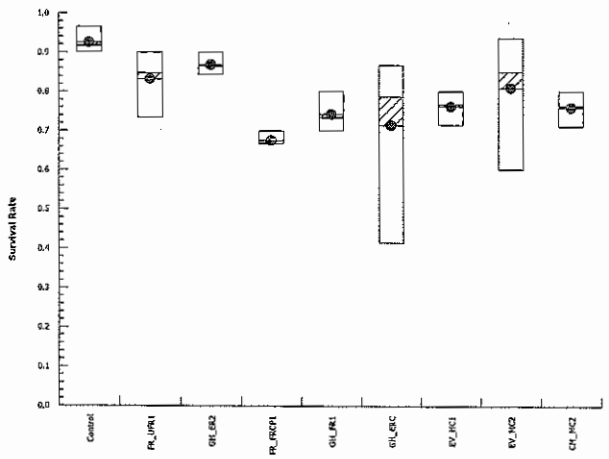
Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.9333	0.9	0.9	0.9655
FR_UFR1	0.8333	0.9	0.7333	0.8621
GH_ER2	0.8667	0.8438	0.8621	0.9
FR_FRCP1	0.6667	0.6667	0.6667	0.7
GH_FR1	0.7667	0.7	0.7	0.8
GH_ERC	0.7667	0.8065	0.8667	0.4138
EV_HC1	0.7667	0.7143	0.8	0.7667
EV_MC2	0.6	0.9355	0.8276	0.871
CM_MC2	0.8	0.7097	0.7586	0.7667
LC_LCDSSLCC	0.8333	0.7	0.8333	0.8966

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	28/30	27/30	27/30	28/29
FR_UFR1	25/30	27/30	22/30	25/29
GH_ER2	26/30	27/32	25/29	27/30
FR_FRCP1	20/30	20/30	20/30	21/30
GH_FR1	23/30	21/30	21/30	24/30
GH_ERC	23/30	25/31	26/30	12/29
EV_HC1	23/30	20/28	24/30	23/30
EV_MC2	18/30	29/31	24/29	27/31
CM_MC2	24/30	22/31	22/29	23/30
LC_LCDSSLCC	25/30	21/30	25/30	26/29

Graphics



FR_UFR1 & GH_ER2 are State controls

Dec 11/15

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	10-8670-2248	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Dec-15 11:26	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	13-8433-7020	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	24 Nov-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	27d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	27h (5.5 °C)	Teck Coal	
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	40h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	30h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	40h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	40h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	29h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:50	27 Oct-15 10:10	28h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	28h (4.1 °C)		
LC_LCDSSLCC	11-4781-0493	26 Oct-15	27 Oct-15 10:10	40h (2.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-10-26		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_ER2	1	1.0000	Exact	Non-Significant Effect
FR_UFR1		FR_FRCP1	0.003705	0.0037	Exact	Significant Effect
FR_UFR1		GH_FR1	0.06087	0.0609	Exact	Non-Significant Effect
FR_UFR1		GH_ERC	0.02376	0.0238	Exact	Significant Effect
FR_UFR1		EV_HC1	0.1221	0.1221	Exact	Non-Significant Effect
FR_UFR1		EV_MC2	0.3914	0.3914	Exact	Non-Significant Effect
FR_UFR1		CM_MC2	0.1057	0.1057	Exact	Non-Significant Effect
FR_UFR1		LC_LCDSSLCC	0.4326	0.4326	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1	Upstream Contr	99	20	119	0.8319	0.1681	0.0%
GH_ER2		105	16	121	0.8678	0.1322	-4.31%
FR_FRCP1		81	39	120	0.675	0.325	18.86%
GH_FR1		89	31	120	0.7417	0.2583	10.85%
GH_ERC		86	34	120	0.7167	0.2833	13.86%
EV_HC1		90	28	118	0.7627	0.2373	8.32%
EV_MC2		98	23	121	0.8099	0.1901	2.65%
CM_MC2		91	29	120	0.7583	0.2417	8.85%
LC_LCDSSLCC		97	22	119	0.8151	0.1849	2.02%

FR_UFR1 + GHER2 are site controls.

Dec 11/15

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	10-8670-2248	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Dec-15 11:26	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes

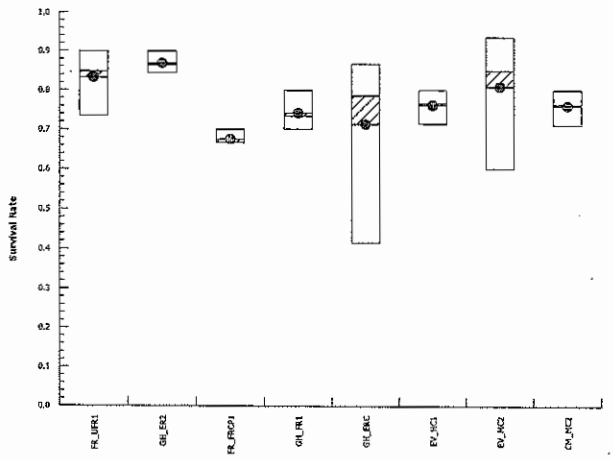
Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	0.8333	0.9	0.7333	0.8621
GH_ER2	0.8667	0.8438	0.8621	0.9
FR_FRCP1	0.6667	0.6667	0.6667	0.7
GH_FR1	0.7667	0.7	0.7	0.8
GH_ERC	0.7667	0.8065	0.8667	0.4138
EV_HC1	0.7667	0.7143	0.8	0.7667
EV_MC2	0.6	0.9355	0.8276	0.871
CM_MC2	0.8	0.7097	0.7586	0.7667
LC_LCDSSLCC	0.8333	0.7	0.8333	0.8966

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	25/30	27/30	22/30	25/29
GH_ER2	26/30	27/32	25/29	27/30
FR_FRCP1	20/30	20/30	20/30	21/30
GH_FR1	23/30	21/30	21/30	24/30
GH_ERC	23/30	25/31	26/30	12/29
EV_HC1	23/30	20/28	24/30	23/30
EV_MC2	18/30	29/31	24/29	27/31
CM_MC2	24/30	22/31	22/29	23/30
LC_LCDSSLCC	25/30	21/30	25/30	26/29

Graphics



FR_UFR1 & GH_ER2 are STte controls

Dec 11/15

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	08-8971-2354	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Dec-15 11:36	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	13-8433-7020	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	24 Nov-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	27d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	40h (4.5 °C)	Teck Coal	
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	30h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	40h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	40h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	29h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:50	27 Oct-15 10:10	28h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	28h (4.1 °C)		
LC_LCDSSLCC	11-4781-0493	26 Oct-15	27 Oct-15 10:10	40h (2.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-10-26		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
GH_ER2		FR_FRCP1	0.000284	0.0003	Exact	Significant Effect
GH_ER2		GH_FR1	0.01019	0.0102	Exact	Significant Effect
GH_ER2		GH_ERC	0.002959	0.0030	Exact	Significant Effect
GH_ER2		EV_HC1	0.02657	0.0266	Exact	Significant Effect
GH_ER2		EV_MC2	0.1471	0.1471	Exact	Non-Significant Effect
GH_ER2		CM_MC2	0.0216	0.0216	Exact	Significant Effect
GH_ER2		LC_LCDSSLCC	0.1736	0.1736	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
GH_ER2	Receiving Wate	105	16	121	0.8678	0.1322	0.0%
FR_FRCP1		81	39	120	0.675	0.325	22.21%
GH_FR1		89	31	120	0.7417	0.2583	14.53%
GH_ERC		86	34	120	0.7167	0.2833	17.41%
EV_HC1		90	28	118	0.7627	0.2373	12.11%
EV_MC2		98	23	121	0.8099	0.1901	6.67%
CM_MC2		91	29	120	0.7583	0.2417	12.61%
LC_LCDSSLCC		97	22	119	0.8151	0.1849	6.07%

GH-ER2 TS a site control

Dec 11/15

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	08-8971-2354	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Dec-15 11:36	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes

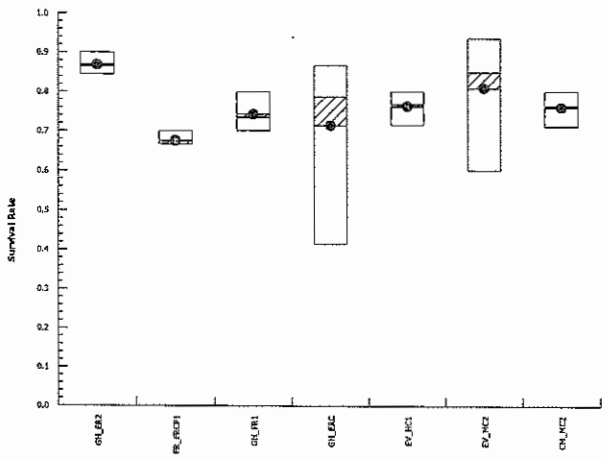
Survival Rate Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_ER2	0.8667	0.8438	0.8621	0.9
FR_FRCP1	0.6667	0.6667	0.6667	0.7
GH_FR1	0.7667	0.7	0.7	0.8
GH_ERC	0.7667	0.8065	0.8667	0.4138
EV_HC1	0.7667	0.7143	0.8	0.7667
EV_MC2	0.6	0.9355	0.8276	0.871
CM_MC2	0.8	0.7097	0.7586	0.7667
LC_LCDSSLCC	0.8333	0.7	0.8333	0.8966

Survival Rate Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_ER2	26/30	27/32	25/29	27/30
FR_FRCP1	20/30	20/30	20/30	21/30
GH_FR1	23/30	21/30	21/30	24/30
GH_ERC	23/30	25/31	26/30	12/29
EV_HC1	23/30	20/28	24/30	23/30
EV_MC2	18/30	29/31	24/29	27/31
CM_MC2	24/30	22/31	22/29	23/30
LC_LCDSSLCC	25/30	21/30	25/30	26/29

Graphics



GH-ER2 is a site control.

Dec-11/15

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	11-4612-1298	**Endpoint:**	Proportion Normal (Vitality)	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Dec-15 11:26	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	13-8433-7020	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	24 Nov-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	27d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	05-7863-5358	27 Oct-15	27 Oct-15	16h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	27h (5.5 °C)		
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	40h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	30h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	40h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	40h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	29h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:50	27 Oct-15 10:10	28h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	28h (4.1 °C)		
LC_LCDSSLCC	11-4781-0493	26 Oct-15	27 Oct-15 10:10	40h (2.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	control	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-10-26		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
Control		FR_UFR1	0.02303	0.0230	Exact	Significant Effect
Control		GH_ER2	0.1102	0.1102	Exact	Non-Significant Effect
Control		FR_FRCP1	4.55E-07	<0.0001	Exact	Significant Effect
Control		GH_FR1	6.55E-05	<0.0001	Exact	Significant Effect
Control		GH_ERC	3.2E-06	<0.0001	Exact	Significant Effect
Control		EV_HC1	0.000160	0.0002	Exact	Significant Effect
Control		EV_MC2	0.002882	0.0029	Exact	Significant Effect
Control		CM_MC2	0.000201	0.0002	Exact	Significant Effect
Control		LC_LCDSSLCC	0.006276	0.0063	Exact	Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
Control	Negative Contr	110	9	119	0.9244	0.07563	0.0%
FR_UFR1		99	20	119	0.8319	0.1681	10.0%
GH_ER2		105	16	121	0.8678	0.1322	6.12%
FR_FRCP1		80	40	120	0.6667	0.3333	27.88%
GH_FR1		88	32	120	0.7333	0.2667	20.67%
GH_ERC		83	37	120	0.6917	0.3083	25.17%
EV_HC1		88	30	118	0.7458	0.2542	19.32%
EV_MC2		96	25	121	0.7934	0.2066	14.17%
CM_MC2		90	30	120	0.75	0.25	18.86%
LC_LCDSSLCC		96	23	119	0.8067	0.1933	12.73%

FR_UFR1 + GH_ER2 are site controls

Dec 11/15

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID: 11-4612-1298 **Endpoint:** Proportion Normal (viability) **CETIS Version:** CETISv1.8.7
Analyzed: 11 Dec-15 11:26 **Analysis:** Single 2x2 Contingency Table **Official Results:** Yes

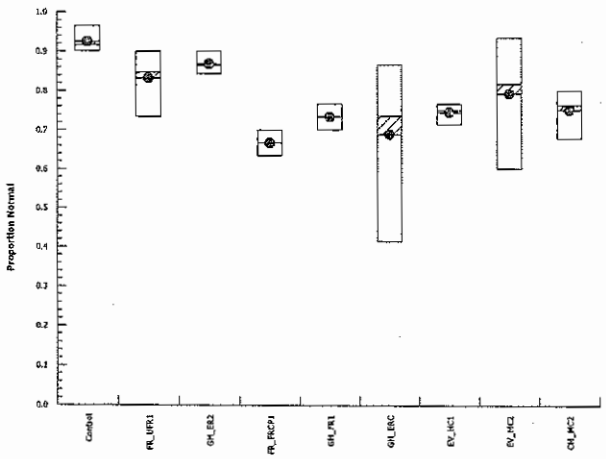
Proportion Normal Detail (viability)

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	0.9333	0.9	0.9	0.9655
FR_UFR1	0.8333	0.9	0.7333	0.8621
GH_ER2	0.8667	0.8438	0.8621	0.9
FR_FRCP1	0.6667	0.6667	0.6333	0.7
GH_FR1	0.7667	0.7	0.7	0.7667
GH_ERC	0.6667	0.8065	0.8667	0.4138
EV_HC1	0.7333	0.7143	0.7667	0.7667
EV_MC2	0.6	0.9355	0.8276	0.8065
CM_MC2	0.8	0.6774	0.7586	0.7667
LC_LCDSSLCC	0.8	0.7	0.8333	0.8966

Proportion Normal Binomials (viability)

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	28/30	27/30	27/30	28/29
FR_UFR1	25/30	27/30	22/30	25/29
GH_ER2	26/30	27/32	25/29	27/30
FR_FRCP1	20/30	20/30	19/30	21/30
GH_FR1	23/30	21/30	21/30	23/30
GH_ERC	20/30	25/31	26/30	12/29
EV_HC1	22/30	20/28	23/30	23/30
EV_MC2	18/30	29/31	24/29	25/31
CM_MC2	24/30	21/31	22/29	23/30
LC_LCDSSLCC	24/30	21/30	25/30	26/29

Graphics



FR_UFR1 + GH_ER2 are site controls

Dec-11/15

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	05-1096-5771	**Endpoint:**	Proportion Normal (viability)	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Dec-15 11:26	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	13-8433-7020	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	24 Nov-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	27d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	27h (5.5 °C)	Teck Coal	
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	40h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	30h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	40h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	40h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	29h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:50	27 Oct-15 10:10	28h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	28h (4.1 °C)		
LC_LCDSSLCC	11-4781-0493	26 Oct-15	27 Oct-15 10:10	40h (2.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-10-26		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_ER2	1	1.0000	Exact	Non-Significant Effect
FR_UFR1		FR_FRCP1	0.00245	0.0024	Exact	Significant Effect
FR_UFR1		GH_FR1	0.04515	0.0452	Exact	Significant Effect
FR_UFR1		GH_ERC	0.008131	0.0081	Exact	Significant Effect
FR_UFR1		EV_HC1	0.07104	0.0710	Exact	Non-Significant Effect
FR_UFR1		EV_MC2	0.2746	0.2746	Exact	Non-Significant Effect
FR_UFR1		CM_MC2	0.08083	0.0808	Exact	Non-Significant Effect
FR_UFR1		LC_LCDSSLCC	0.3682	0.3682	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1	Upstream Contr	99	20	119	0.8319	0.1681	0.0%
GH_ER2		105	16	121	0.8678	0.1322	-4.31%
FR_FRCP1		80	40	120	0.6667	0.3333	19.87%
GH_FR1		88	32	120	0.7333	0.2667	11.85%
GH_ERC		83	37	120	0.6917	0.3083	16.86%
EV_HC1		88	30	118	0.7458	0.2542	10.36%
EV_MC2		96	25	121	0.7934	0.2066	4.63%
CM_MC2		90	30	120	0.75	0.25	9.85%
LC_LCDSSLCC		96	23	119	0.8067	0.1933	3.03%

FR_UFR1 & GH-ER2 are site controls

Dec 11/15

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID: 05-1096-5771 **Endpoint:** Proportion Normal (Viability) **CETIS Version:** CETISv1.8.7
Analyzed: 11 Dec-15 11:26 **Analysis:** Single 2x2 Contingency Table **Official Results:** Yes

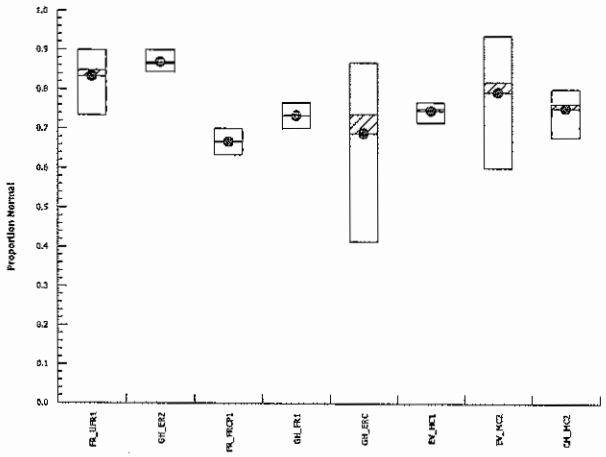
Proportion Normal Detail (Viability)

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	0.8333	0.9	0.7333	0.8621
GH_ER2	0.8667	0.8438	0.8621	0.9
FR_FRCP1	0.6667	0.6667	0.6333	0.7
GH_FR1	0.7667	0.7	0.7	0.7667
GH_ERC	0.6667	0.8065	0.8667	0.4138
EV_HC1	0.7333	0.7143	0.7667	0.7667
EV_MC2	0.6	0.9355	0.8276	0.8065
CM_MC2	0.8	0.6774	0.7586	0.7667
LC_LCDSSLCC	0.8	0.7	0.8333	0.8966

Proportion Normal Binomials (Viability)

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	25/30	27/30	22/30	25/29
GH_ER2	26/30	27/32	25/29	27/30
FR_FRCP1	20/30	20/30	19/30	21/30
GH_FR1	23/30	21/30	21/30	23/30
GH_ERC	20/30	25/31	26/30	12/29
EV_HC1	22/30	20/28	23/30	23/30
EV_MC2	18/30	29/31	24/29	25/31
CM_MC2	24/30	21/31	22/29	23/30
LC_LCDSSLCC	24/30	21/30	25/30	26/29

Graphics



FR_UFR1 & GH_ER2 are Site Controls

Dec-11/15

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	05-4019-1891	**Endpoint:**	Proportion Normal (Viability)	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Dec-15 11:37	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	13-8433-7020	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	24 Nov-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	27d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	40h (4.5 °C)	Teck Coal	
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	30h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	40h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	40h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	29h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:50	27 Oct-15 10:10	28h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	28h (4.1 °C)		
LC_LCDSSLCC	11-4781-0493	26 Oct-15	27 Oct-15 10:10	40h (2.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-10-26		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
GH_ER2		FR_FRCP1	0.000171	0.0002	Exact	Significant Effect
GH_ER2		GH_FR1	0.006849	0.0068	Exact	Significant Effect
GH_ER2		GH_ERC	0.000756	0.0008	Exact	Significant Effect
GH_ER2		EV_HC1	0.01264	0.0126	Exact	Significant Effect
GH_ER2		EV_MC2	0.08495	0.0849	Exact	Non-Significant Effect
GH_ER2		CM_MC2	0.01495	0.0150	Exact	Significant Effect
GH_ER2		LC_LCDSSLCC	0.1341	0.1342	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
GH_ER2	Receiving Wate	105	16	121	0.8678	0.1322	0.0%
FR_FRCP1		80	40	120	0.6667	0.3333	23.17%
GH_FR1		88	32	120	0.7333	0.2667	15.49%
GH_ERC		83	37	120	0.6917	0.3083	20.29%
EV_HC1		88	30	118	0.7458	0.2542	14.06%
EV_MC2		96	25	121	0.7934	0.2066	8.57%
CM_MC2		90	30	120	0.75	0.25	13.57%
LC_LCDSSLCC		96	23	119	0.8067	0.1933	7.04%

GH_ER2 TS a site control

Dec 11/15

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID: 05-4019-1891 **Endpoint:** Proportion Normal (Viability) **CETIS Version:** CETISv1.8.7
Analyzed: 11 Dec-15 11:37 **Analysis:** Single 2x2 Contingency Table **Official Results:** Yes

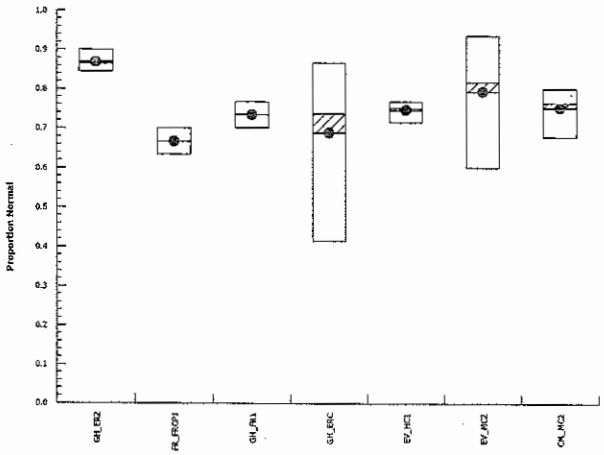
Proportion Normal Detail (Viability)

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_ER2	0.8667	0.8438	0.8621	0.9
FR_FRCP1	0.6667	0.6667	0.6333	0.7
GH_FR1	0.7667	0.7	0.7	0.7667
GH_ERC	0.6667	0.8065	0.8667	0.4138
EV_HC1	0.7333	0.7143	0.7667	0.7667
EV_MC2	0.6	0.9355	0.8276	0.8065
CM_MC2	0.8	0.6774	0.7586	0.7667
LC_LCDSSLCC	0.8	0.7	0.8333	0.8966

Proportion Normal Binomials (Viability)

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_ER2	26/30	27/32	25/29	27/30
FR_FRCP1	20/30	20/30	19/30	21/30
GH_FR1	23/30	21/30	21/30	23/30
GH_ERC	20/30	25/31	26/30	12/29
EV_HC1	22/30	20/28	23/30	23/30
EV_MC2	18/30	29/31	24/29	25/31
CM_MC2	24/30	21/31	22/29	23/30
LC_LCDSSLCC	24/30	21/30	25/30	26/29

Graphics



GH_ER2 IS A STATE control

Dec 11/15

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Batch ID:	19-4944-2338	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	24 Nov-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	27d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	05-7863-5358	27 Oct-15	27 Oct-15	16h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	27h (5.5 °C)		
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	40h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	30h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	40h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	40h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	29h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:50	27 Oct-15 10:10	28h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	28h (4.1 °C)		
LC_LCDSSLCC	11-4781-0493	26 Oct-15	27 Oct-15 10:10	40h (2.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	control	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-10-26		

Length-mm Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	4	19	18.32	19.68	18.5	19.4	0.2121	0.4243	2.23%	0.0%
FR_UFR1	4	19.05	18.65	19.45	18.7	19.3	0.1258	0.2517	1.32%	-0.26%
GH_ER2	4	18.42	17.64	19.21	17.8	19	0.2462	0.4924	2.67%	3.03%
FR_FRCP1	4	18.28	18.04	18.51	18.2	18.5	0.075	0.15	0.82%	3.82%
GH_FR1	4	17.88	17.46	18.29	17.5	18.1	0.1315	0.263	1.47%	5.92%
GH_ERC	4	18.42	17.73	19.12	17.8	18.8	0.2175	0.4349	2.36%	3.03%
EV_HC1	4	18.7	18.27	19.13	18.3	18.9	0.1354	0.2708	1.45%	1.58%
EV_MC2	4	18.67	18	19.35	18.4	19.3	0.2136	0.4272	2.29%	1.71%
CM_MC2	4	19.02	18.09	19.96	18.3	19.5	0.2926	0.5852	3.08%	-0.13%
LC_LCDSSLCC	4	18.62	17.47	19.78	17.6	19.3	0.3614	0.7228	3.88%	1.97%

Mean ~~Dry~~ wet Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	4	79.83	78.02	81.64	78.93	81.48	0.5684	1.137	1.42%	0.0%
FR_UFR1	4	80.99	76.41	85.57	78.15	85	1.439	2.878	3.55%	-1.45%
GH_ER2	4	78.81	74.67	82.94	75.19	81.2	1.3	2.599	3.3%	1.28%
FR_FRCP1	4	79.76	78.24	81.28	78.5	80.5	0.4777	0.9554	1.2%	0.09%
GH_FR1	4	78.25	75.84	80.66	77.08	80.48	0.758	1.516	1.94%	1.98%
GH_ERC	4	76.12	75.45	76.79	75.65	76.67	0.2108	0.4216	0.55%	4.65%
EV_HC1	4	80.13	79.43	80.82	79.57	80.5	0.2171	0.4342	0.54%	-0.37%
EV_MC2	4	78.01	74.77	81.26	75.42	80.34	1.02	2.04	2.62%	2.28%
CM_MC2	4	82.14	79.37	84.91	80.42	83.64	0.869	1.738	2.12%	-2.89%
LC_LCDSSLCC	4	82.22	76.81	87.63	78	86.19	1.7	3.401	4.14%	-2.99%

FR_UFR1 & GH_ER2 are state controls

Dec-11/15

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Length-mm Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	18.8	18.5	19.3	19.4
FR_UFR1	18.7	19.1	19.3	19.1
GH_ER2	18.5	17.8	18.4	19
FR_FRCP1	18.2	18.2	18.2	18.5
GH_FR1	18.1	18	17.9	17.5
GH_ERC	17.8	18.8	18.6	18.5
EV_HC1	18.3	18.8	18.9	18.8
EV_MC2	18.6	19.3	18.4	18.4
CM_MC2	18.8	19.5	19.5	18.3
LC_LCDSSLCC	17.6	19.3	18.8	18.8

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	78.93	81.48	79.63	79.29
FR_UFR1	80.4	78.15	85	80.4
GH_ER2	78.85	75.19	81.2	80
FR_FRCP1	80.5	80.5	78.5	79.52
GH_FR1	77.83	77.62	80.48	77.08
GH_ERC	75.65	76	76.15	76.67
EV_HC1	79.57	80.5	80	80.43
EV_MC2	77.78	80.34	75.42	78.52
CM_MC2	80.42	83.64	83.64	80.87
LC_LCDSSLCC	78	86.19	81.6	83.08

Dec-11/15

CETIS Analytical Report

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	16-0404-1321	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Dec-15 17:11	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	19-4944-2338	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	24 Nov-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	27d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	05-7863-5358	27 Oct-15	27 Oct-15	16h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	27h (5.5 °C)		
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	40h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	30h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	40h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	40h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	29h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:50	27 Oct-15 10:10	28h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	28h (4.1 °C)		
LC_LCDSSLCC	11-4781-0493	26 Oct-15	27 Oct-15 10:10	40h (2.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	control	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-10-26		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	4.29%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		FR_UFR1	-0.2027	1.943	0.479	6	0.5770	CDF	Non-Significant Effect
		GH_ER2	1.769	1.943	0.632	6	0.0636	CDF	Non-Significant Effect
		FR_FRCP1	3.222	1.943	0.437	6	0.0090	CDF	Significant Effect
		GH_FR1	4.508	1.943	0.485	6	0.0020	CDF	Significant Effect
		GH_ERC	1.893	1.943	0.590	6	0.0536	CDF	Non-Significant Effect
		EV_HC1	1.192	1.943	0.489	6	0.1391	CDF	Non-Significant Effect
		EV_MC2	1.08	1.943	0.585	6	0.1609	CDF	Non-Significant Effect
		CM_MC2	-0.06917	1.943	0.702	6	0.5264	CDF	Non-Significant Effect
		LC_LCDSSLCC	0.8948	1.943	0.814	6	0.2027	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.005247	0.5561385	9	2.946	0.0125	Significant Effect
Error	5.662498	0.18875	30			
Total	10.66775		39			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	9.042	21.67	0.4334	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9731	0.9236	0.4480	Normal Distribution

FR_UFR1 + GH_ER2 are STR controls

Dec 11/15

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	16-0404-1321	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Dec-15 17:11	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

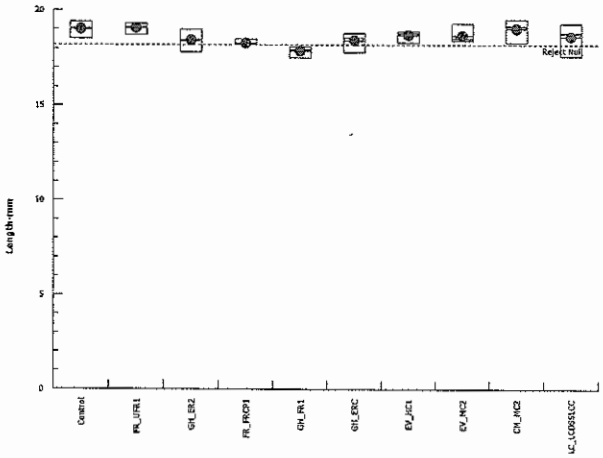
Length-mm Summary

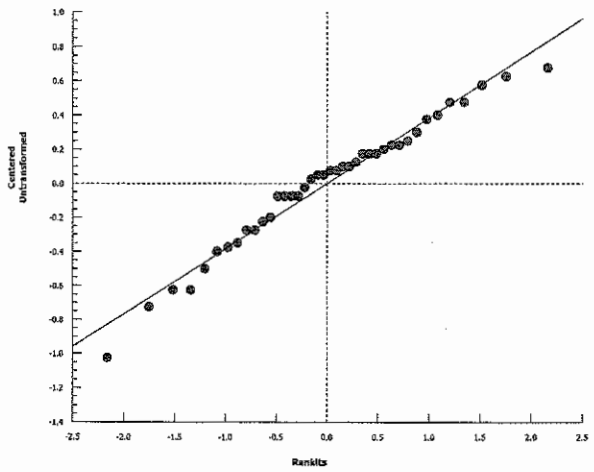
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	19	18.32	19.68	19.05	18.5	19.4	0.2121	2.23%	0.0%
FR_UFR1	4	19.05	18.65	19.45	19.1	18.7	19.3	0.1258	1.32%	-0.26%
GH_ER2	4	18.42	17.64	19.21	18.45	17.8	19	0.2462	2.67%	3.03%
FR_FRCP1	4	18.28	18.04	18.51	18.2	18.2	18.5	0.07499	0.82%	3.82%
GH_FR1	4	17.88	17.46	18.29	17.95	17.5	18.1	0.1315	1.47%	5.92%
GH_ERC	4	18.42	17.73	19.12	18.55	17.8	18.8	0.2175	2.36%	3.03%
EV_HC1	4	18.7	18.27	19.13	18.8	18.3	18.9	0.1354	1.45%	1.58%
EV_MC2	4	18.67	18	19.35	18.5	18.4	19.3	0.2136	2.29%	1.71%
CM_MC2	4	19.02	18.09	19.96	19.15	18.3	19.5	0.2926	3.08%	-0.13%
LC_LCDSSLCC	4	18.62	17.47	19.78	18.8	17.6	19.3	0.3614	3.88%	1.97%

Length-mm Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	18.8	18.5	19.3	19.4
FR_UFR1	18.7	19.1	19.3	19.1
GH_ER2	18.5	17.8	18.4	19
FR_FRCP1	18.2	18.2	18.2	18.5
GH_FR1	18.1	18	17.9	17.5
GH_ERC	17.8	18.8	18.6	18.5
EV_HC1	18.3	18.8	18.9	18.8
EV_MC2	18.6	19.3	18.4	18.4
CM_MC2	18.8	19.5	19.5	18.3
LC_LCDSSLCC	17.6	19.3	18.8	18.8

Graphics





FR_UFR1 + GH_ER2 are STHe controls

Dec 11/15

CETIS Analytical Report

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	00-9531-3102	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Dec-15 11:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	19-4944-2338	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	24 Nov-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	27d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	27h (5.5 °C)	Teck Coal	
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	40h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	30h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	40h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	40h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	29h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:50	27 Oct-15 10:10	28h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	28h (4.1 °C)		
LC_LCDSSLCC	11-4781-0493	26 Oct-15	27 Oct-15 10:10	40h (2.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-10-26		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	3.9%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_ER2	2.26	1.943	0.537	6	0.0323	CDF	Significant Effect
		FR_FRCP1	5.291	1.943	0.285	6	0.0009	CDF	Significant Effect
		GH_FR1	6.456	1.943	0.354	6	0.0003	CDF	Significant Effect
		GH_ERC	2.488	1.943	0.488	6	0.0237	CDF	Significant Effect
		EV_HC1	1.894	1.943	0.359	6	0.0536	CDF	Non-Significant Effect
		EV_MC2	1.513	1.943	0.482	6	0.0906	CDF	Non-Significant Effect
		CM_MC2	0.07849	1.943	0.619	6	0.4700	CDF	Non-Significant Effect
		LC_LCDSSLCC	1.111	1.943	0.744	6	0.1546	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.320553	0.5400691	8	2.847	0.0197	Significant Effect
Error	5.122499	0.1897222	27			
Total	9.443052		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	9.029	20.09	0.3398	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.964	0.9166	0.2850	Normal Distribution

FR_UFR1 + GH_ER2 are site controls

Dec-11/15

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Analysis ID: 00-9531-3102 **Endpoint:** Length-mm **CETIS Version:** CETISv1.8.7
Analyzed: 11 Dec-15 11:43 **Analysis:** Parametric-Two Sample **Official Results:** Yes

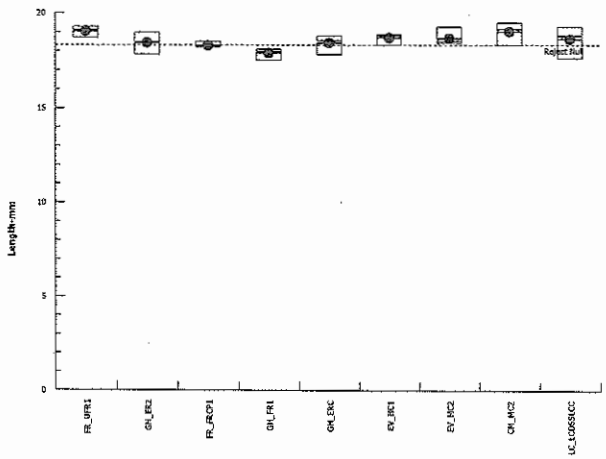
Length-mm Summary

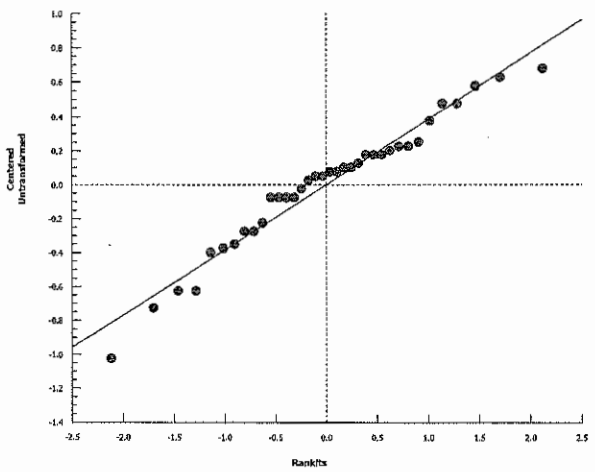
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	19.05	18.65	19.45	19.1	18.7	19.3	0.1258	1.32%	0.0%
GH_ER2	4	18.42	17.64	19.21	18.45	17.8	19	0.2462	2.67%	3.28%
FR_FRCP1	4	18.28	18.04	18.51	18.2	18.2	18.5	0.07499	0.82%	4.07%
GH_FR1	4	17.88	17.46	18.29	17.95	17.5	18.1	0.1315	1.47%	6.17%
GH_ERC	4	18.42	17.73	19.12	18.55	17.8	18.8	0.2175	2.36%	3.28%
EV_HC1	4	18.7	18.27	19.13	18.8	18.3	18.9	0.1354	1.45%	1.84%
EV_MC2	4	18.67	18	19.35	18.5	18.4	19.3	0.2136	2.29%	1.97%
CM_MC2	4	19.02	18.09	19.96	19.15	18.3	19.5	0.2926	3.08%	0.13%
LC_LCDSSLCC	4	18.62	17.47	19.78	18.8	17.6	19.3	0.3614	3.88%	2.23%

Length-mm Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	18.7	19.1	19.3	19.1
GH_ER2	18.5	17.8	18.4	19
FR_FRCP1	18.2	18.2	18.2	18.5
GH_FR1	18.1	18	17.9	17.5
GH_ERC	17.8	18.8	18.6	18.5
EV_HC1	18.3	18.8	18.9	18.8
EV_MC2	18.6	19.3	18.4	18.4
CM_MC2	18.8	19.5	19.5	18.3
LC_LCDSSLCC	17.6	19.3	18.8	18.8

Graphics





FR_UFR1 & GH_ER2 are site controls

Dec 11/15

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	21-2120-3181	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Dec-15 17:12	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	19-4944-2338	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	24 Nov-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	27d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	40h (4.5 °C)	Teck Coal	
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	30h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	40h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	40h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	29h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:50	27 Oct-15 10:10	28h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	28h (4.1 °C)		
LC_LCDSSLCC	11-4781-0493	26 Oct-15	27 Oct-15 10:10	40h (2.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-10-26		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	4.61%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
GH_ER2		FR_FRCP1	0.5828	1.943	0.500	6	0.2906	CDF	Non-Significant Effect
		GH_FR1	1.97	1.943	0.542	6	0.0482	CDF	Significant Effect
		GH_ERC	0	1.943	0.638	6	0.5000	CDF	Non-Significant Effect
		EV_HC1	-0.9787	1.943	0.546	6	0.8172	CDF	Non-Significant Effect
		EV_MC2	-0.767	1.943	0.633	6	0.7639	CDF	Non-Significant Effect
		CM_MC2	-1.569	1.943	0.743	6	0.9161	CDF	Non-Significant Effect
		LC_LCDSSLCC	-0.4573	1.943	0.85	6	0.6682	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.257183	0.4653119	7	2.264	0.0641	Non-Significant Effect
Error	4.9325	0.2055208	24			
Total	8.189683		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	7.797	18.48	0.3508	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9636	0.9081	0.3445	Normal Distribution

GH_ER2 is a State control

Dec 11/15

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	21-2120-3181	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Dec-15 17:12	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

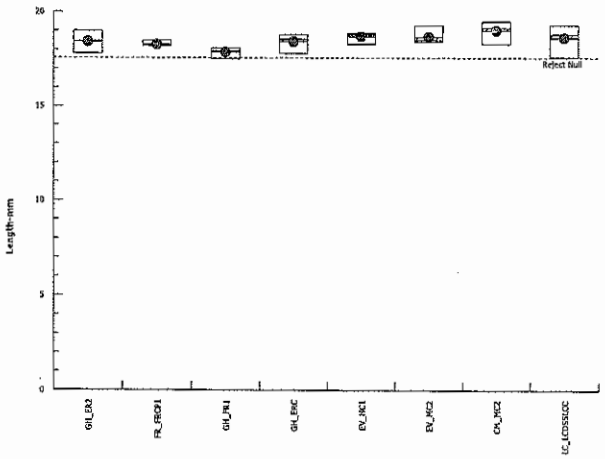
Length-mm Summary

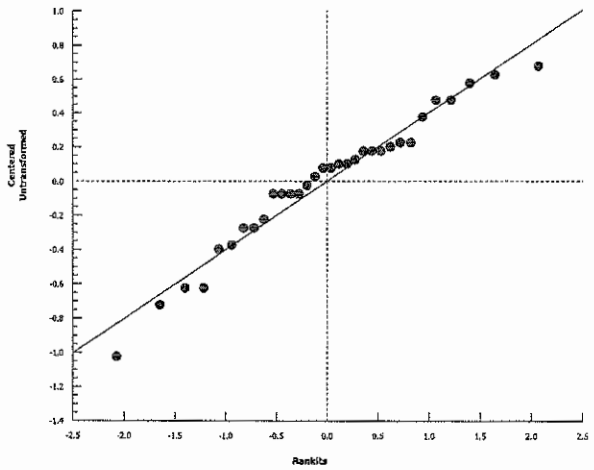
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
GH_ER2	4	18.42	17.64	19.21	18.45	17.8	19	0.2462	2.67%	0.0%
FR_FRCP1	4	18.28	18.04	18.51	18.2	18.2	18.5	0.07499	0.82%	0.81%
GH_FR1	4	17.88	17.46	18.29	17.95	17.5	18.1	0.1315	1.47%	2.99%
GH_ERC	4	18.42	17.73	19.12	18.55	17.8	18.8	0.2175	2.36%	0.0%
EV_HC1	4	18.7	18.27	19.13	18.8	18.3	18.9	0.1354	1.45%	-1.49%
EV_MC2	4	18.67	18	19.35	18.5	18.4	19.3	0.2136	2.29%	-1.36%
CM_MC2	4	19.02	18.09	19.96	19.15	18.3	19.5	0.2926	3.08%	-3.26%
LC_LCDSSLCC	4	18.62	17.47	19.78	18.8	17.6	19.3	0.3614	3.88%	-1.09%

Length-mm Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_ER2	18.5	17.8	18.4	19
FR_FRCP1	18.2	18.2	18.2	18.5
GH_FR1	18.1	18	17.9	17.5
GH_ERC	17.8	18.8	18.6	18.5
EV_HC1	18.3	18.8	18.9	18.8
EV_MC2	18.6	19.3	18.4	18.4
CM_MC2	18.8	19.5	19.5	18.3
LC_LCDSSLCC	17.6	19.3	18.8	18.8

Graphics





CETIS Analytical Report

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	17-4518-7227	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Dec-15 11:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	19-4944-2338	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	24 Nov-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	27d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	05-7863-5358	27 Oct-15	27 Oct-15	16h	Teck Coal	
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	27h (5.5 °C)		
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	40h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	30h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	40h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	40h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	29h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:50	27 Oct-15 10:10	28h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	28h (4.1 °C)		
LC_LCDSSLCC	11-4781-0493	26 Oct-15	27 Oct-15 10:10	40h (2.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	control	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-10-26		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	4.36%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control		FR_UFR1	-0.9462	1.943	2.989	6	0.8097	CDF	Non-Significant Effect
		GH_ER2	0.7216	1.943	2.756	6	0.2489	CDF	Non-Significant Effect
		FR_FRCP1	0.1016	1.943	1.443	6	0.4612	CDF	Non-Significant Effect
		GH_FR1	1.668	1.943	1.841	6	0.0732	CDF	Non-Significant Effect
		GH_ERC	6.125	1.943	1.178	6	0.0004	CDF	Significant Effect
		EV_HC1	-0.4827	1.943	1.182	6	0.6768	CDF	Non-Significant Effect
		EV_MC2	1.556	1.943	2.269	6	0.0854	CDF	Non-Significant Effect
		CM_MC2	-2.223	1.943	2.018	6	0.9660	CDF	Non-Significant Effect
		LC_LCDSSLCC	-1.331	1.943	3.484	6	0.8842	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	134.207	14.91188	9	3.868	0.0024	Significant Effect
Error	115.6438	3.854793	30			
Total	249.8507		39			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	18.45	21.67	0.0303	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9699	0.9236	0.3579	Normal Distribution

FR_UFR1 & GH_ER2 are site controls

Dec 11/15

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test **Nautilus Environmental**

Analysis ID: 17-4518-7227 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.8.7
Analyzed: 11 Dec-15 11:43 **Analysis:** Parametric-Two Sample **Official Results:** Yes

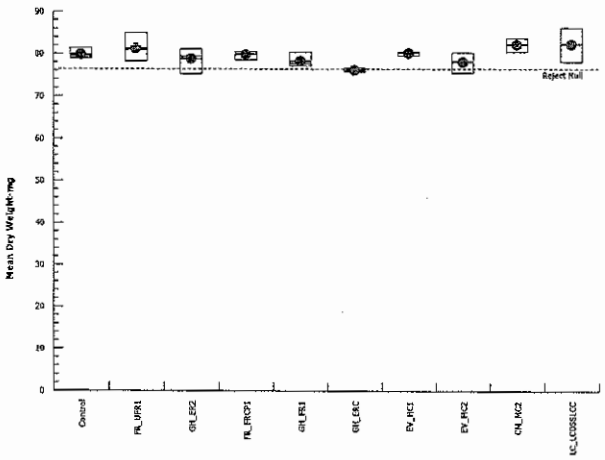
Mean Dry Weight-mg Summary

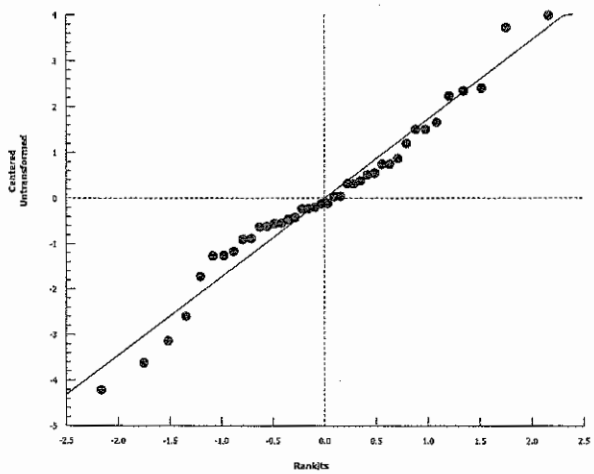
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	4	79.83	78.02	81.64	79.46	78.93	81.48	0.5683	1.42%	0.0%
FR_UFR1	4	81.29	76.74	85.84	81	78.15	85	1.43	3.52%	-1.82%
GH_ER2	4	78.81	74.67	82.94	79.42	75.19	81.2	1.3	3.3%	1.28%
FR_FRCP1	4	79.76	78.24	81.28	80.01	78.5	80.5	0.4777	1.2%	0.09%
GH_FR1	4	78.25	75.84	80.66	77.72	77.08	80.48	0.758	1.94%	1.98%
GH_ERC	4	76.12	75.45	76.79	76.08	75.65	76.67	0.2108	0.55%	4.65%
EV_HC1	4	80.13	79.43	80.82	80.22	79.57	80.5	0.2171	0.54%	-0.37%
EV_MC2	4	78.01	74.77	81.26	78.15	75.42	80.34	1.02	2.62%	2.28%
CM_MC2	4	82.14	79.37	84.91	82.25	80.42	83.64	0.869	2.12%	-2.89%
LC_LCDSSLCC	4	82.22	76.81	87.63	82.34	78	86.19	1.7	4.14%	-2.99%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	78.93	81.48	79.63	79.29
FR_UFR1	80.4	78.15	85	81.6
GH_ER2	78.85	75.19	81.2	80
FR_FRCP1	80.5	80.5	78.5	79.52
GH_FR1	77.83	77.62	80.48	77.08
GH_ERC	75.65	76	76.15	76.67
EV_HC1	79.57	80.5	80	80.43
EV_MC2	77.78	80.34	75.42	78.52
CM_MC2	80.42	83.64	83.64	80.87
LC_LCDSSLCC	78	86.19	81.6	83.08

Graphics





FR_UFR1 & GH_ER2 are STTE controls

Dec-11/15

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	07-6589-1768	**Endpoint:**	Mean ~~Dry~~ Wet Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Dec-15 11:45	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	19-4944-2338	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	24 Nov-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	27d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	12-5022-9170	26 Oct-15 13:03	27 Oct-15 10:10	27h (5.5 °C)	Teck Coal	
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	40h (4.5 °C)		
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	30h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	40h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	40h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	29h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:50	27 Oct-15 10:10	28h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	28h (4.1 °C)		
LC_LCDSSLCC	11-4781-0493	26 Oct-15	27 Oct-15 10:10	40h (2.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_Q_05102015_N (Site		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-10-26		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	5.31%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_ER2	1.283	1.943	3.754	6	0.1234	CDF	Non-Significant Effect
		FR_FRCP1	1.016	1.943	2.929	6	0.1745	CDF	Non-Significant Effect
		GH_FR1	1.876	1.943	3.144	6	0.0549	CDF	Non-Significant Effect
		GH_ERC	3.577	1.943	2.808	6	0.0058	CDF	Significant Effect
		EV_HC1	0.8037	1.943	2.81	6	0.2261	CDF	Non-Significant Effect
		EV_MC2	1.863	1.943	3.413	6	0.0558	CDF	Non-Significant Effect
		CM_MC2	-0.5097	1.943	3.251	6	0.6858	CDF	Non-Significant Effect
		LC_LCDSSLCC	-0.4186	1.943	4.317	6	0.6550	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	134.0683	16.75854	8	4.048	0.0029	Significant Effect
Error	111.7674	4.139534	27			
Total	245.8358		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	17.22	20.09	0.0279	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9713	0.9166	0.4628	Normal Distribution

FR_UFR1 & GH-ER2 are site controls

Dec. 11/15

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	07-6589-1768	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Dec-15 11:45	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

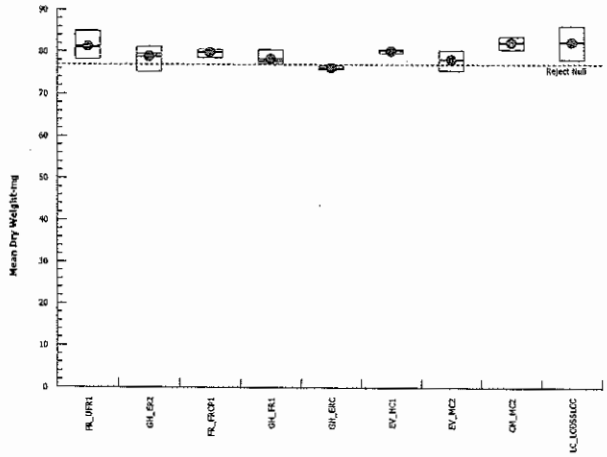
Mean Dry Weight-mg Summary

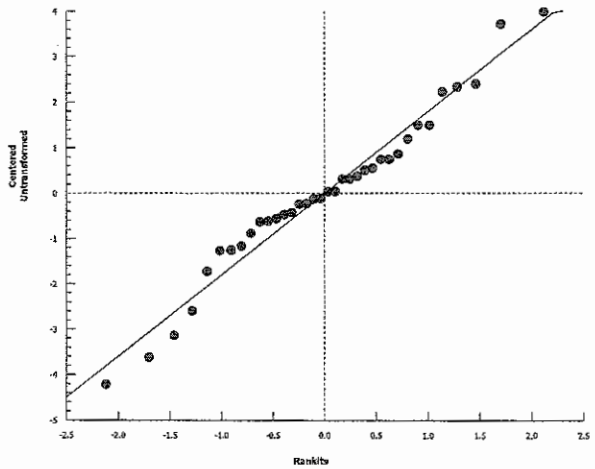
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	4	81.29	76.74	85.84	81	78.15	85	1.43	3.52%	0.0%
GH_ER2	4	78.81	74.67	82.94	79.42	75.19	81.2	1.3	3.3%	3.05%
FR_FRCP1	4	79.76	78.24	81.28	80.01	78.5	80.5	0.4777	1.2%	1.88%
GH_FR1	4	78.25	75.84	80.66	77.72	77.08	80.48	0.758	1.94%	3.74%
GH_ERC	4	76.12	75.45	76.79	76.08	75.65	76.67	0.2108	0.55%	6.36%
EV_HC1	4	80.13	79.43	80.82	80.22	79.57	80.5	0.2171	0.54%	1.43%
EV_MC2	4	78.01	74.77	81.26	78.15	75.42	80.34	1.02	2.62%	4.03%
CM_MC2	4	82.14	79.37	84.91	82.25	80.42	83.64	0.869	2.12%	-1.05%
LC_LCDSSLCC	4	82.22	76.81	87.63	82.34	78	86.19	1.7	4.14%	-1.14%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	80.4	78.15	85	81.6
GH_ER2	78.85	75.19	81.2	80
FR_FRCP1	80.5	80.5	78.5	79.52
GH_FR1	77.83	77.62	80.48	77.08
GH_ERC	75.65	76	76.15	76.67
EV_HC1	79.57	80.5	80	80.43
EV_MC2	77.78	80.34	75.42	78.52
CM_MC2	80.42	83.64	83.64	80.87
LC_LCDSSLCC	78	86.19	81.6	83.08

Graphics





FR_UFR1 & GH_ER2 are STFE controls -

Dec 11/15

CETIS Analytical Report

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	01-5834-7658	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 Dec-15 17:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	19-4944-2338	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	24 Nov-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	27d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
GH_ER2	17-3819-8852	26 Oct-15	27 Oct-15 10:10	40h (4.5 °C)	Teck Coal	
FR_FRCP1	19-5017-0696	26 Oct-15 10:10	27 Oct-15 10:10	30h (4.5 °C)		
GH_FR1	01-2984-4737	26 Oct-15	27 Oct-15 10:10	40h (3.5 °C)		
GH_ERC	14-4322-8198	26 Oct-15	27 Oct-15 10:10	40h (5.5 °C)		
EV_HC1	01-1582-4291	26 Oct-15 11:00	27 Oct-15 10:10	29h (2.5 °C)		
EV_MC2	12-6636-9711	26 Oct-15 11:50	27 Oct-15 10:10	28h (3.5 °C)		
CM_MC2	05-8940-3182	26 Oct-15 12:30	27 Oct-15 10:10	28h (4.1 °C)		
LC_LCDSSLCC	11-4781-0493	26 Oct-15	27 Oct-15 10:10	40h (2.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2015_10_26_N		
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_Q_05102015_N		
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2015_10_26_N		
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2015_10_26_N		
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2015-10-26_N		
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2015-10-26_N		
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2015-10-26_N		
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2015-10-26		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	5.28%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
GH_ER2		FR_FRCP1	-0.6847	1.943	2.691	6	0.7405	CDF	Non-Significant Effect
		GH_FR1	0.37	1.943	2.924	6	0.3620	CDF	Non-Significant Effect
		GH_ERC	2.043	1.943	2.558	6	0.0436	CDF	Significant Effect
		EV_HC1	-0.9996	1.943	2.56	6	0.8220	CDF	Non-Significant Effect
		EV_MC2	0.4802	1.943	3.211	6	0.3240	CDF	Non-Significant Effect
		CM_MC2	-2.131	1.943	3.038	6	0.9615	CDF	Non-Significant Effect
		LC_LCDSSLCC	-1.593	1.943	4.159	6	0.9189	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	121.7888	17.3984	7	4.786	0.0017	Significant Effect
Error	87.24393	3.635164	24			
Total	209.0327		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	16.24	18.48	0.0230	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.968	0.9081	0.4464	Normal Distribution

GH_ER2 is a State control.

Dec 11/15

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID: 01-5834-7658 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.8.7
Analyzed: 09 Dec-15 17:13 **Analysis:** Parametric-Two Sample **Official Results:** Yes

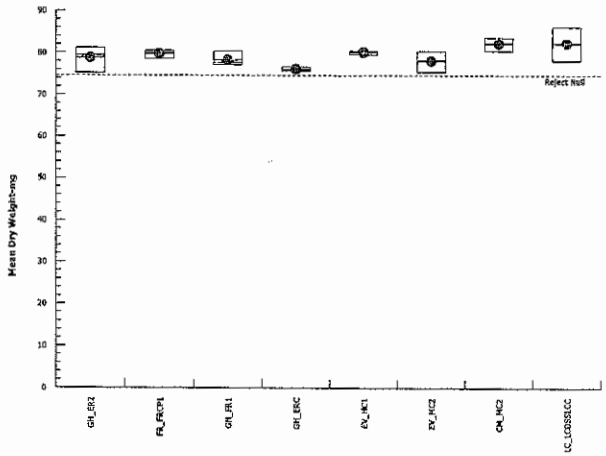
Mean Dry Weight-mg Summary

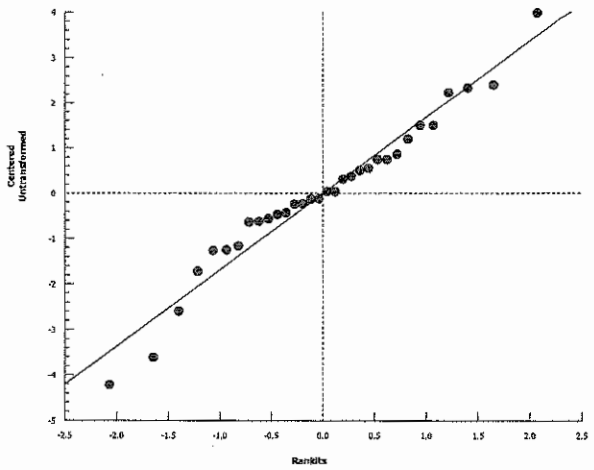
Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
GH_ER2	4	78.81	74.67	82.94	79.42	75.19	81.2	1.3	3.3%	0.0%
FR_FRCP1	4	79.76	78.24	81.28	80.01	78.5	80.5	0.4777	1.2%	-1.2%
GH_FR1	4	78.25	75.84	80.66	77.72	77.08	80.48	0.758	1.94%	0.71%
GH_ERC	4	76.12	75.45	76.79	76.08	75.65	76.67	0.2108	0.55%	3.41%
EV_HC1	4	80.13	79.43	80.82	80.22	79.57	80.5	0.2171	0.54%	-1.67%
EV_MC2	4	78.01	74.77	81.26	78.15	75.42	80.34	1.02	2.62%	1.01%
CM_MC2	4	82.14	79.37	84.91	82.25	80.42	83.64	0.869	2.12%	-4.23%
LC_LCDSSLCC	4	82.22	76.81	87.63	82.34	78	86.19	1.7	4.14%	-4.33%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_ER2	78.85	75.19	81.2	80
FR_FRCP1	80.5	80.5	78.5	79.52
GH_FR1	77.83	77.62	80.48	77.08
GH_ERC	75.65	76	76.15	76.67
EV_HC1	79.57	80.5	80	80.43
EV_MC2	77.78	80.34	75.42	78.52
CM_MC2	80.42	83.64	83.64	80.87
LC_LCDSSLCC	78	86.19	81.6	83.08

Graphics





Dec 11/15

Client: Teck

W.O.#: 15866

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Dechlor	Oct. 26/15	50	0.5	0.6	8		50	0.6	12	EC
Dechlor	Nov. 2/15	↓	0.5	0.6	8		↓	0.4	8	YML
↓	Nov. 9/15	↓	0.6	0.7	10		↓	0.5	10	EC
↓	Nov. 16/15	↓	0.5	0.6	8		↓	0.5	10	YML

Notes:

Reviewed by: [signature]

Date Reviewed: Dec 8, 2015

Client: Teck

W.O.#: 15866

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/L CaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L CaCO_3$)	Technician
FR_UFR1	Oct 27/15	50	7.0	7.2	136		50	9.5	190	KL
↓	Nov 2/15	50	7.6	7.7	150		50	9.8	196	↓
↓	Nov 9/15	50	7.5	7.7	146		50	9.2	184	KL
↓	Nov 16/15	50	7.1	7.2	140		50	8.8	176	KL

Notes:

Reviewed by: [signature]

Date Reviewed: Dec. 8 2015

Client: Teck

W.O.#: 15866

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
GH_ER2	Oct 27/15 KL	50	7.6	7.7	150		50	8.2	164	KL
↓	Nov 2/15	50	7.6	7.7	150		50	8.4	168	↓
↓	Nov 9/15	50	7.6	7.7	150		50	8.8	176	KL
↓	Nov 16/15	50	7.5	7.6	148		50	8.2	164	KL

Notes:

Reviewed by: [signature]

Date Reviewed: Dec. 8, 2015

Client: Teck

W.O.#: 15866

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
FR_FRCP1	~~OCT~~ NOV 2/15	50	10.1	10.2	200		100	6.8	680	KL
↓	NOV 2/15	50	10.0	10.2	196		100	6.0	600	↓
	NOV 9/15	50	11.2	11.4	220		100	6.7	670	KL
↓	NOV 16/15	50	11.2 KL 3	11.6 KL 7	218		100	6.2	620	KL

Notes: ① Sample diluted w/ DI up to 100mL

Reviewed by: KL

Date Reviewed: Dec. 8, 2015

Client: TRC

W.O.#: 15866

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
BHL FR 1	Oct 27/15 KL	50	9.1	9.3	178		10①	5.0	500	KL
	NOV 2/15	50	9.6	9.8	188		10①	5.1	510	↓
	NOV 9/15	50	9.7	9.8	192		10①	4.7	470	KL
↓	NOV 16/15	50	9.7	9.8	192		10①	4.8	480	KL

Notes: ① Sample diluted w/ DI up to 100ml

Reviewed by: [signature]

Date Reviewed: Dec. 8 2015

Client: TECK

W.O.#: 15866

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
GH_ERC	Oct 27/15	50	7.8	7.9	154		50	9.3	.186	KL
	Nov 2/15	50	7.9	8.0	156		50	10.5	210	KL
	Nov 9/15	50	7.9	8.0	156		50	9.8	196	KL
↓	Nov 16/15	50	7.8	7.9	154		50	9.0	180	KL

Notes:

Reviewed by: [signature]

Date Reviewed: Dec. 8 2015

Client: Teck

W.O.#: 15866

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
EV_MC2	Oct 27/15	50	10.5	10.6	208		10①	5.8	580	KL
↓	Nov 2/15	50	8.0	8.2	156		10①	3.2	320	↓
↓	Nov 9/15	50	9.1	9.2	180		10①	4.3	430	KL
↓	Nov 16/15	50	7.0	7.1	138		10①	2.8	280	KL

Notes: ① Sample diluted w/ DI up to 100ml

Reviewed by: KL

Date Reviewed: Dec. 8, 2015

Client: Teck

W.O.#: 15866

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
EV_HC1	Oct 26/15	50	10.3	10.5	202		10①	4.2	420	KL
↓	NOV 2/15	50	9.7	9.9	190		10①	4.5	450	KL
	NOV 9/15	50	10.1	10.3	198		10①	4.3	430	KL
	NOV 16/15	50	9.9	10.0	196		10①	4.5	450	KL

Notes: ① Sample diluted w/ DI up to 100mL

Reviewed by: [signature]

Date Reviewed: Dec-8, 2015

Client: TECK

W.O.#: 15866

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
CML MC2	Oct 27/15	50	10.1	10.3	198		100	4.8	480	KL
↓	Nov 2/15	50	9.1	9.2	180		100	4.6	460	↓
	Nov 9/15	50	10.6	10.8	208		100	4.4	440	KL
	Nov 16/15	50	8.7	8.8	172		100	3.8	380	KL

Notes: ① Sample diluted w/ DI up to 100mL

Reviewed by: [signature]

Date Reviewed: Dec 8, 2015

Client: Teck

W.O.#: 15866

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
LL_LCDSSLCC	Oct 27/15 KL6	50	9.7 ~~10.2~~ KL	9.8 ~~10.3~~ KL	192		100①	4.8	480	KL
↓	Nov 2/15	50	10.2	10.3	202		100①	5.4	540	↓
↓	Nov 9/15	50	10.1	10.3	198		100①	5.5	550	KL
↓	Nov 16/15	50	9.7	9.8	192		100①	4.6	460	KL

Notes: ① Sample diluted w/ DI up to 100mL

Reviewed by: KL

Date Reviewed: Dec 8, 2015

APPENDIX F – Analytical Chemistry

All analytical chemistry for Q4 chronic toxicity has been uploaded to EMS.

APPENDIX G – Chain-of-Custody Forms

COC ID:	20151026-1334	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID	Sample Location	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	28 Day H. azteca pif ✓	~~48 hr Single Concentration Daphnia m.~~ ?	7 Day C. Dubia pif ✓	72 hr P. subcapitata pif	~~96hr Single Concentration R.Trout~~ ?	30-d rainbow trout embryo-alevin pif						Temp °C
FR_FRCP1_Q_05102015_N	FR_FRCP1	WS	2015/10/26	10:10	G			X	X	X	X	X	X						4.5
FR_UFR1_Q_05102015_N	FR_UFR1	WS	2015/10/26	13:03	G			X	X	X	X	X	X						5.5
							WO #	15867		15864	15865		15866						

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Tek FRO Ata Bozzoli	10-26-15 14:00	Nautilus	Oct 27/15
			NY- Nair Yamamoto	@10:10
			2x 4x 20L	

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Ata Bozzoli	Mobile #	
	Sampler's Signature	[signature]	Date/Time	Oct 26 2015 14:00

COC ID:	20151026-1340	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Hydroqual			Email Invoice To	
Project Number				Lab Contact	Elisabeth Henson			Invoice Reports	
Department				Email	elisabeth_henson@golder.com			Email Report To	
Address	PO Box 100			Address				Email Reports	
								Shipping Company	
City	Elkford	State	BC	City		State		Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code		Country		Cooler Count	
Phone Number	1-250-865-5289			Phone Number	403-253-7121			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID	Sample Location	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30 Day Fathead Minnow	
FR_FRCP1_Q_05102015_N	FR_FRCP1	WS	2015/10/26	10:10	G		X	15-1475
FR_UFR1_Q_05102015_N	FR_UFR1	WS	2015/10/26	13:03	G		X	15-1476

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
2015/10/27 5°C 12 x 20L Carboy 1145 No S/I Drop off Good Condition	Teck FRO Aita Bezzola	10-26-15 14:00		

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Aita Bezzola	Mobile #	
	Sampler's Signature	[signature]	Date/Time	Oct 26-2014 - 14:00

Nautilus Burnaby WO# 15868

Chain Of Custody Record

COC ID: Quarterly_FR1_F.Minnow_HydroQual, Re-Fresh #1 | Page: 1 of 1

Turnaround Time: | **Rush:**

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental Laboratories Lt			Send Invoice To			
Project Number				Contact Name	Kryst Pearcy			Address			
Contact Name	Leigh Stickney			Address	8664 Commerce Court						
Address	P.O. BOX 5000							City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number				Shipping Company			
Phone Number	250-865-3274			Email Address				Tracking Number			
Email EDD To	Leigh.Stickney@Teck.com			Quote Number				CC Hardcopy To			
Email Report To	Leigh.Stickney@Teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED											ADDITIONAL INFORMATION
						PRESERV.											Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow Pass/Fail	28 d Hyalella Pass Fail:	72 h P. subcapitata Pass fail	7 d C. dubia Pass fail	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail	30 Day rainbow trout Early Life stage Pass Fail	7 day Rainbow trout Pass Fail	Lemna minor Pass Fail		
GH_ER2_WS_2015_10_26_N	WS	10/26/2015		G	6			X	X	X			X	X	X		
						WO #		158664	158665	158664			158666	158669			

Temp. 4.5°C

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
				Nautilus	Oct 27/15	10:10		Y / N	Y / N	Y / N
				NY - Nan Yamamoto				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				6X20L				Y / N	Y / N	Y / N

Sampler's Name	Leigh Stickney	Mobile #	250 910 0627
Sampler's Signature		Date/Time	

Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Chain Of Custody Record

COC ID: Quarterly_FR1_F.Minnow_HydroQual, Re-Fresh #1 | Page: 1 of 1

Turnaround Time: | **Rush:**

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental Laboratories Lt			Send Invoice To			
Project Number				Contact Name	Kryst Pearcy			Address			
Contact Name	Leigh Stickney			Address	8664 Commerce Court						
Address	P.O. BOX 5000							City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number				Shipping Company			
Phone Number	250-865-3274			Email Address				Tracking Number			
Email EDD To	Leigh.Stickney@Teck.com			Quote Number				CC Hardcopy To			
Email Report To	Leigh.Stickney@Teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow Pass/Fail	28 d Hyallella pass/fail	72 h P. subcapitata pass/fail	7 d C. dubia pass/fail	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail	30 Day rainbow trout Early Life stage Pass Fail			
GH_FR1_WS_2015_10_26_N	WS	10/26/2015		G	2 (1)	WO #		X	X	X			X			
								15867	15865	15864			15866			

ORec'd 4x20-L

Temp. 3.5°C

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
				Nautilus NPC Nan Yamamoto	Oct 27/15	10:10		Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

					Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Name	Leigh Stickney	Mobile #	250 910 0627					
Sampler's Signature		Date/Time						

Chain Of Custody Record

COC ID: Quarterly_FR1_F.Minnow_HydroQual, Re-Fresh #1 | Page: 1 of 1

Turnaround Time: | **Rush:**

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Greenhills Operation			Lab Name	HydroQual Laboratories Ltd.			Send Invoice To	
Project Number				Contact Name	Jacklyn Pool			Address	
Contact Name	Leigh Stickney			Address	#4, 6125 - 12th Street S.E				
Address	P.O. BOX 5000							City	State
				City	Calgary	State	AB	Postal Code	Country
City	Elkford	State	BC	Postal Code	T2H2K1	Country	Canada	Task Code	
Postal Code	V0B1H0	Country	Canada	Phone Number	403.253.7121			Shipping Company	
Phone Number	250-865-3274			Email Address				Tracking Number	
Email EDD To	Leigh.Stickney@Teck.com			Quote Number				CC Hardcopy To	
Email Report To	Leigh.Stickney@Teck.com							CC Hardcopy To	

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Initial - PASS/FAIL
						ANALYSIS	30 d early life stage, fathead minnow Pass/Fail	28 d Hyalella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail				
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.											
GH_FR1_WS_2015_10_26_N	WS	10/26/2015		G	6		X									

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
For both permit requirments and water for special tyreatment testing								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Leigh Stickney	Mobile #	250 910 0627	Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature		Date/Time					

15-1477

2015/10/27 1150

4°C

6x 20L Carboy

drop off

no s/I

Good Condition

Nautilus Burnaby work 15808

Chain Of Custody Record

COC ID: Quarterly_FR1_F.Minnow_HydroQual, Re-Fresh #1 | Page: 1 of 1

Turnaround Time: | **Rush:**

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental Laboratories Lt			Send Invoice To			
Project Number				Contact Name	Kryst Pearcy			Address			
Contact Name	Leigh Stickney			Address	8664 Commerce Court						
Address	P.O. BOX 5000							City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number				Shipping Company			
Phone Number	250-865-3274			Email Address				Tracking Number			
Email EDD To	Leigh.Stickney@Teck.com			Quote Number				CC Hardcopy To			
Email Report To	Leigh.Stickney@Teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow Pass/Fail	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail	30 Day rainbow trout Early Life stage Pass/Fail			Temp °C
GH_ERC_WS_2015_10_26_N	WS	10/26/2015		G	3①				X	X			X			5.5
						30 #			15865	15864			15866			

①One carboy not labelled but was in a spear cooler w/ COC

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
				NY - Nan Yamamoto	Oct 27/15	10:10		Y / N	Y / N	Y / N
				Nautilus				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				3x20L				Y / N	Y / N	Y / N

					Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Name	Leigh Stickney	Mobile #	250 910 0627					
Sampler's Signature		Date/Time						

Nautilus Environmental
8664 Commerce Court
Imperial Square Lake City
Burnaby BC, V5A 4N7

COC # 26102015

Page 1 of 1

Report to:		Report Format / Distribution		Service Requested: (rush - subject to availability)
Company:	TECK COAL LTD (ELKVIEW)	☑ Standard ☐ Other		◉ Regular (Default)
Contact:	Michael Moore	☑ PDF ☑ Excel ☑ Digital ☐ Fax		○ Priority (2-3 Business Days) - 50% Surcharge
Address:	RR1 HWY 3	Email 1:	michael.moore@teck.com	○ Emergency (1 Business Day) - 100% Surcharge
Sparwood, BC, V0B 2G1, Canada		Email 2:	james.boldt@teck.com	○ For Emergency < 1 Day, ASAP or Weekend - Contact ALS
Phone:	250-425-8868 Fax:	Email 3:	casandra.knooihuizen@teck.com	**Analysis Request**
Invoice To:	Same as Report ? ◉ Yes ○ No	Email 4:	cait.good@teck.com	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:	Send all invoices to: dlteckcoalaccountspayable@teck.com	Client / Project Information:		
Contact:	Attn: Accounting	Job #:	Elkview Semi-Annual Toxicity Testing	
Address:	Same as above	PO / AFE:	107517	
		Legal Site Description:		
Phone:	Fax:	Quote #:		
Lab Work Order # (lab use only)		Nautilus Contact: Krysta Pearcy	Sampler: MW/JB	

Sample	Sample Identification	Date (mmm-dd-yy)	Time (hh:mm)	Matrix	TECKCOAL-MONTHLY-VA	Toxcitity 7day/72 hr	T-Se (CCMS)	T-Metal(TECKCOAL-MET-T-VA)	D-Metal(TECKCOAL-MET-D-VA)	EPH	TSS	TURBIDITY	PAH - low level detection	True Color	Toxicity 30-Day & 7-d/72-h	BOD	Number of Containers	Temp °C
	EV_HC1_WS_2015-10-26_N	26-Oct-15	11:00	WS											X		3	2.5
	EV_MC2_WS_2015-10-26_N	26-Oct-15	11:50	WS											X		3	3.5
																	6	

Special Instructions / Regulations / Hazardous Details

wo # 15866 — **Toxicity 30-Day= Rainbow trout embyro-alevin** P/F Toxicity 72-h= 72-h P.subcapitata pF — wo # 15865.
Toxicity 7-Day = 7-d C.dubia pif - wo # 15864.

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)					SHIPMENT VERIFICATION (lab use only)		
Released by: James Boldt	Date & Time: 26/10/2015 ~~12:00:00 AM~~ 12:15PM	Received by: Nautilus NY - Nan Yamamoto	Date: Oct 27/15	Time: 10:10		Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY GENF 18.00 Front

2X 3X20L

Chain Of Custody Record

COC ID: 20140902-1509 | Page: 1 of 2

Turnaround Time:

PROJECT/CLIENT INFO					LABORATORY					OTHER INFO			
Facility Name	Coal Mountain Operation				Lab Name	Nautilus Environmental				Send Invoice To			
Contact Name	Carla Romero				Contact Name	Krysta Pearcy				Address			
Address	2261 Corbin Rd.				Address	8664 commerce Court							
City	Sparwood	Prov.	BC							City		State	
Postal Code	V0B 2G0	Country	Canada		City	Burnaby	State	BC		Postal Code		Country	
Phone Number	250 425 7377				Postal Code	V5A 4N7	Country	Canada		Task Code			
Email EDD To	Carla.Romero@teck.com				Phone Number					Shipping Company			
	Rick.Magliocco@teck.com				Email Address					Tracking Number			
					PO Number					CC Hardcopy To			
										CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
					PRESERV.			•	•	•	•					2 coolers
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia pif	72 h P. subcapitata pif	30 d Rainbow trout Pass/Fail	28 d H. Azteca Pass/Fail				Temp °C
CM_MC2_WS_2015-10-26_N	WS	10/26/2015	12:30	G	4				x	x	x	x				4.1
						30 #			15864	15865	15866	15867				

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
				Nautilus	Oct 27/15	10:10		Y / N	Y / N	Y / N
				NY - Nan Yamamoto				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				4X20 L.				Y / N	Y / N	Y / N

						Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Name	C.Romero/K.Allen		Mobile #	2504257350					
Sampler's Signature				Date/Time	10-26-2015 1230				

Chain Of Custody Record

COC ID: [illegible]

Turnaround Time: Rush:

Page: 1 of 1

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Coal Mountain Operations CMO	Lab Name	HydroQual Laboratories Ltd	Send Invoice To	
Project Number		Contact Name	Jacklyn Pool	Address	
Contact Name	Carla Romero	Address	#4, 6125 - 12th Street S.E		
Address	2261 Corbin Rd			City	State
City	Sparwood State BC	City	Calgary State AB	Postal Code	Country
Postal Code	V0B2G0 Country Canada	Postal Code	T2H2K1 Country Canada	Task Code	
Phone Number	250 425 7350	Phone Number	403.253.7121	Shipping Company	
Email EDD & Report To	Carla.Romero@teck.com	Email Address		Tracking Number	
	Rick.Magliocco@teck.com	Quote Number		CC Hardcopy To	
				CC Hardcopy To	

SAMPLE DETAILS

ANALYSIS REQUESTED

ADDITIONAL INFORMATION

Initial - PASS/FAIL

Seeders

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. ANALYSIS	30 d early life stage, fathead minnow	28 d Hyalella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail					Re-fresh #1
CM_MC2_WS_2015-10-26_N	WS	10/26/2015	12:30	G	6		X										

15-1478

2015/10/[illegible] 1145 5°C No S/E Drop off Good Condit[illegible] mc

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
							Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Sampler's Name	C.Romero/K.Allen	Mobile #	250-425-7350
Sampler's Signature	[signature]	Date/Time	10/26/2015 12:30

Nautilus Burnaby wo# 15868

Chain Of Custody Record

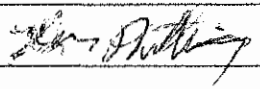
COC ID: Nautilus_2015-10-26_chronic | Page: 1 of 1

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Line Creek Operations			Lab Name	Nautilus Environmental			Send Invoice To			
Contact Name	Jay Jones			Contact Name	Krysta Pearcy			Address			
Address	Box 2003			Address	8664 commerce Court						
City	Sparwood	Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada	City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425-6111			Postal Code	V5A 4N7	Country	Canada	Task Code			
Email EDD To	jay.jones@teck.com			Phone Number				Shipping Company			
	cait.good@teck.com			Email Address	Krysta@NautilusEnvironmental.com			Tracking Number			
				PO Number				CC Hardcopy To			
								CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						ANALYSIS	7-d *C. dubia* dilution series	72-h *P. subcapitata* dilution series	7-d *L. minor* plant growth dilution series	7-d *O. mykiss* development dilution series	30-d *O. mykiss* embryo-alevin (semi-annual) pass/fail					Temp °C	
LC_LCDSSLCC_WS_2015-10-26_N	WS	26-Oct-15		20L	8 ✓		X	X	X	X	X					2.5	
LC_DC1_WS_2015-10-26_N	WS	26-Oct-15		20L	5 ✓		X	X	X	X						2.5	
LC_FRDSDC_WS_2015-10-26_N	WS	26-Oct-15		20L	5 ✓		X	X	X	X						2.5	
LC_DCDS_WS_2015-10-26_N	WS	26-Oct-15		20L	5 ✓		X	X	X	X						3.5	
LC_LC5_WS_2015-10-26_N	WS	26-Oct-15		20L	5 ✓		X	X	X	X						2.5	
							15870	15871	15872	15873	15866						

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	T. Phillips/ Nupqu	26/10/2015		Nautilus	Oct 27/15	10:10		Y / N	Y / N	Y / N
				N4 - Nair Yamamoto.				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

						Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Name	Tyler Phillips	Mobile #	(250) 919-0965						
Sampler's Signature		Date/Time	26-Oct-15						

COC ID:	20151102-1301	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Sample ID	Sa,mple Location	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30 Day Rainbow Trout embryo alevin P/F	28 Day H. azteca (28DAHA) P/F	30d FHM P/F conducted in Calgary								Temp °C
FR_FRCP1_Q_12102015_N	FR_FRCP1	WS	2015/11/02	11:54	G	#NAME?	x	x	x								6.0
FR_UFR1_Q_12102015_N	FR_UFR1	WS	2015/11/02	10:00	G	#NAME?	x	x	x								4.0
						#NAME?											
						#NAME?											
						#NAME?	15866	15867	15868								
						#NAME?											
						#NAME?											
						#NAME?											
						#NAME?											
						#NAME?											
						#NAME?											

WO #

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
= refresh sample =			Nautilus NY - Nai Yamamoto 2×4×20L	Nov-03/15 @ 10:30

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name		Mobile #	
	Sampler's Signature		Date/Time	

COC ID: 20151102-1304 | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Hydroqual			Email Invoice To	
Project Number				Lab Contact	Elisabeth Henson			Invoice Reports	
Department				Email	elisabeth_henson@golder.com			Email Report To	
Address	PO Box 100			Address				Email Reports	
								Shipping Company	
City	Elkford	State	BC	City		State		Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code		Country		Cooler Count	
Phone Number	1-250-865-5289			Phone Number	403-253-7121			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS							ANALYSIS REQUESTED												
Sample ID	Sample Location	Field Matrix	Date	Time (24 hr)	G=Grab C=Comp	# Of Cont.	30 Day Fathead Minnow												
FR_FRCP1_Q_12102015_N	FR_FRCP1	WS	2015/11/02	11:54	G		x												
FR_UFR1_Q_12102015_N	FR_UFR1	WS	2015/11/02	10:00	G		x												
2015/11/03																			
1215																			
8°C																			
12 x 20 L																			
Cardboard																			
No S/E																			

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	D MacDonald	Nov 2 2015		

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	D MacDonald	Mobile #	250 865-5204
	Sampler's Signature		Date/Time	Nov 02 2015

Chain Of Custody Record

COC ID: Quarterly_FR1_F.Minnow_HydroQual, Re-Fresh #1 | Page: 1 of 1

Turnaround Time: | **Rush:**

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental Laboratories Lt			Send Invoice To			
Project Number				Contact Name	Kryst Pearcy			Address			
Contact Name	Leigh Stickney			Address	8664 Commerce Court						
Address	P.O. BOX 5000							City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number				Shipping Company			
Phone Number	250-865-3274			Email Address				Tracking Number			
Email EDD To	Leigh.Stickney@Teck.com			Quote Number				CC Hardcopy To			
Email Report To	Leigh.Stickney@Teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow Pass/Fail	28 d Hyallella Pass Fail;	72 h P. subcapitata Pass fail	7 d C. dubia Pass fail	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail	30 Day rainbow trout Early Life stage Pass Fail	7 day Rainbow trout Pass Fail	Lemna minor Pass /Fail	
GH_ER2_WS_2015_11_02_N	WS	11/2/2015		G	3								X			
											WO # 15866					
											= Refresh sample =					

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
				Nautilus	Nov 03/15	10:30	5.0	Y / N	Y / N	Y / N
				NY - Nan Yamamoto				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				3X20L				Y / N	Y / N	Y / N

Sampler's Name	Leigh Stickney	Mobile #	250 910 0627
Sampler's Signature		Date/Time	

Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Chain Of Custody Record

COC ID: Quarterly_FR1_F.Minnow_HydroQual, Re-Fresh #1 | Page: 1 of 1

Turnaround Time: | **Rush:**

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental Laboratories Lt			Send Invoice To			
Project Number				Contact Name	Kryst Pearcy			Address			
Contact Name	Leigh Stickney			Address	8664 Commerce Court						
Address	P.O. BOX 5000							City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number				Shipping Company			
Phone Number	250-865-3274			Email Address				Tracking Number			
Email EDD To	Leigh.Stickney@Teck.com			Quote Number				CC Hardcopy To			
Email Report To	Leigh.Stickney@Teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV										Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow Pass/Fail	28 d Hyallella P/F	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail	30 Day rainbow trout Early Life stage Pass Fail	X 30d FHM P/F conducted in Calgary		
GH_FR1_WS_2015_11_02_N	WS	11/02/2015		G	4			X					X			

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
=refresh sample =				Nautilus	Nov-3/15	10:30	3.5	Y / N	Y / N	Y / N
				NY - Nan Yamamoto				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				4x20L				Y / N	Y / N	Y / N

Sampler's Name	Leigh Stickney	Mobile #	250 910 0627
Sampler's Signature		Date/Time	

Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Chain Of Custody Record

COC ID: Quarterly_FR1_FMinnow_HydroQual, Re-Fresh #1 | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Greenhills Operation	Lab Name	HydroQual Laboratories Ltd.	Send Invoice To	
Project Number		Contact Name	Jacklyn Pool	Address	
Contact Name	Leigh Stickney	Address	#4, 6125 - 12th Street S.E	City / State	/
Address	P.O. BOX 5000	City / State	Calgary / AB	Postal Code / Country	/
City / State	Elkford / BC	Postal Code / Country	T2H2K1 / Canada	Task Code	
Postal Code / Country	V0B1H0 / Canada	Phone Number	403.253.7121	Shipping Company	
Phone Number	250-865-3274	Email Address		Tracking Number	
Email EDD To	Leigh.Stickney@Teck.com	Quote Number		CC Hardcopy To	
Email Report To	Leigh.Stickney@Teck.com			CC Hardcopy To	

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow Pass/Fail	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail				
GH_FR1_WS_2015_11_02_N	WS	11/02/2015		G	6		X									

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time
For both permit requirments and water for special tyreatment testing						

Sample Receipt Conditions				
	Y / N	Y / N	Y / N	
	Y / N	Y / N	Y / N	
	Y / N	Y / N	Y / N	
	Y / N	Y / N	Y / N	
Temp in °C	Samples on ice?	Sample intact?	Trip Blank?	

Sampler's Name	Leigh Stickney		Mobile #	250 910 0627	
Sampler's Signature				Date/Time	

2015/11/03
1215
8°C
6 x 20 L
Carboy
no s/I
drop off
Good Condition

Chain Of Custody Record

COC ID: Quarterly_FR1_F.Minnow_HydroQual, Re-Fresh #1 | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Greenhills Operation	Lab Name	Nautilus Environmental Laboratories Lt	Send Invoice To	
Project Number		Contact Name	Kryst Pearcy	Address	
Contact Name	Leigh Stickney	Address	8664 Commerce Court		
Address	P.O. BOX 5000			City / State	/
		City / State	Burnaby / BC	Postal Code / Country	/
City / State	Elkford / BC	Postal Code / Country	V5A 4N7 / Canada	Task Code	
Postal Code / Country	V0B1H0 / Canada	Phone Number		Shipping Company	
Phone Number	250-865-3274	Email Address		Tracking Number	
Email EDD To	Leigh.Stickney@Teck.com	Quote Number		CC Hardcopy To	
Email Report To	Leigh.Stickney@Teck.com			CC Hardcopy To	

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow Pass/Fail	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail	30 Day rainbow trout Early Life stage Pass Fail			
GH_ERC_WS_2015_11_02_N	WS	11/02/2015		G	3								X			
											WO# 15866					
										=	refresh sample				=	

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
				Nautilus	Nov-3/15	10:30	5.0	Y / N	Y / N	Y / N
				NY - Nan Yamamoto				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				3x20L				Y / N	Y / N	Y / N

Sampler's Name	Leigh Stickney	Mobile #	250 910 0627
Sampler's Signature		Date/Time	

Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Nautilus Environmental
8664 Commerce Court
Imperial Square Lake City
Burnaby BC, V5A 4N7

COC # 2112015

Page 1 of 1

Report to:		Report Format / Distribution		Service Requested: (rush - subject to availability)
Company:	TECK COAL LTD (ELKVIEW)	☑ Standard ☐ Other		◉ Regular (Default)
Contact:	Michael Moore	☑ PDF ☑ Excel ☑ Digital ☐ Fax		○ Priority (2-3 Business Days) - 50% Surcharge
Address:	RR1 HWY 3	Email 1:	michael.moore@teck.com	○ Emergency (1 Business Day) - 100% Surcharge
Sparwood, BC, V0B 2G1, Canada		Email 2:	james.boldt@teck.com	○ For Emergency < 1 Day, ASAP or Weekend - Contact ALS
Phone:	250-425-8868 Fax:	Email 3:	casandra.knooihuizen@teck.com	**Analysis Request**
Invoice To:	Same as Report ? ◉ Yes ○ No	Email 4:	cait.good@teck.com	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:	Send all invoices to: dlteckcoalaccountspayable@teck.com	**Client / Project Information:**		
Contact:	Attn: Accounting	Job #:	Elkview Semi-Annual Toxicity Testing	
Address:	Same as above	PO / AFE:	107517	
		Legal Site Description:		
Phone:	Fax:	Quote #:		
Lab Work Order # (lab use only)		**Nautilus Contact:** Krysta Pearcy	**Sampler:** JB, MW	

Sample	Sample Identification	Date (mmm-dd-yy)	Time (hh:mm)	Matrix	TECKCOAL-MONTHLY-VA	Toxcitity 7day/72 hr	T-Se (CCMS)	T-Metal(TECKCOAL-MET-T-VA)	D-Metal(TECKCOAL-MET-D-VA)	EPH	TSS	TURBIDITY	PAH - low level detection	True Color	Toxicity 30-Day	BOD	Number of Containers	Temp °C
	EV_HC1_WS_2015-11-02_N	2-Nov-15	12:20	WS											X		3	3.5
	EV_MC2_WS_2015-11-02_N	2-Nov-15	11:30	WS											X		3	4.2
																	6	

Special Instructions / Regulations / Hazardous Details

Toxicity 30-Day= Rainbow trout embyro-alevin P/F - WO # 15866
= refresh sample =

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)		
Released by: James Boldt	Date & Time: 11:00 2/11/2015 0:00	Received by: Nautilus NY - Nan Yamamoto	Date: Nov-3/15	Time: 10:30	Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY GENF 18.00 Front

2x3x20L

Chain Of Custody Record

COC ID:

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Coal Mountain Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Contact Name	Don Sacino			Contact Name	Krysta Pearcy			Address			
Address	2261 Corbin Rd.			Address	8664 commerce Court						
City	Sparwood	Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada	City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425 7377			Postal Code	V5A 4N7	Country	Canada	Task Code			
Email EDD To	Carla.Romero@teck.com			Phone Number				Shipping Company			
	Rick.Magliocco@teck.com			Email Address				Tracking Number			
				PO Number				CC Hardcopy To			
								CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia	72 h P. subcapitata	30 d Rainbow trout embryo-alevin Pass/Fail	28 d H. Azteca Pass/Fail	30d FHM P/F conducted in Calgary			
CM_MC2_WS_2015-11-02_N	WS	11/2/2015	11:30	G	4						x	x	x			
										WO #	15866	15867	15868			

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
= refresh sample =				Nautilus NY - Nan Yamamoto	Nov-3/15	10:30	2.8	Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				4x20L				Y / N	Y / N	Y / N

					Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Name	C.Romero/K.Allen	Mobile #	2504257350					
Sampler's Signature		Date/Time	11-02-2015 11:30 hr					

Chain Of Custody Record

COC ID:

Page: 1 of 1

Turnaround Time:

Rush:

PROJECT/CLIENT INFO						LABORATORY						OTHER INFO	
Facility Name	Coal Mountain Operations CMO					Lab Name	HydroQual Laboratories Ltd.					Send Invoice To	
Project Number						Contact Name	Jacklyn Pool					Address	
Contact Name	Carla Romero					Address	#4, 6125 - 12th Street S.E.						
Address	2261 Corbin Rd											City	State
City	Sparwood	State	BC			City	Calgary	State	AB			Postal Code	Country
Postal Code	V0B2G0	Country	Canada			Postal Code	T2H2K1	Country	Canada			Task Code	
Phone Number	250 425 7350					Phone Number	403 253 7121					Shipping Company	
Email EDD & Report To	Carla.Romero@teck.com					Email Address						Tracking Number	
	Rick.Magliocco@teck.com					Quote Number						CC Hardcopy To	
												CC Hardcopy To	

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	C=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow	28 d Hyalliella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow front pass/fail	48 hr Daphnia pass/Fail				
CM_MC2_WS_2015-11-02_N	WS	11/2/2015	11:45	G	6		X									Re-fresh #2

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time
3 coolers						

Sample Receipt Conditions			
	Y / N	Y / N	Y / N
	Y / N	Y / N	Y / N
	Y / N	Y / N	Y / N
	Y / N	Y / N	Y / N
Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Sampler's Name	C.Romero/K.Allen	Mobile #	250-425-7350		
Sampler's Signature		Date/Time	11/02/2015 11:45 hr		

5/11/03

Chain Of Custody Record

COC ID: Nautilus_2015-11-02_chronic | Page: 1 of 1

Turnaround Time:

PROJECT/CLIENT INFO					LABORATORY					OTHER INFO				
Facility Name	Line Creek Operations				Lab Name	Nautilus Environmental				Send Invoice To				
Contact Name	Jay Jones				Contact Name	Krysta Pearcy				Address				
Address	Box 2003				Address	8664 commerce Court								
City	Sparwood		Prov.	BC						City			State	
Postal Code	V0B 2G0	Country	Canada		City	Burnaby		State	BC	Postal Code		Country		
Phone Number	250 425-6111				Postal Code	V5A 4N7	Country	Canada		Task Code				
Email EDD To	jay.jones@teck.com				Phone Number					Shipping Company				
	cait.good@teck.com				Email Address	Krysta@NautilusEnvironmental.com				Tracking Number				
					PO Number					CC Hardcopy To				
										CC Hardcopy To				

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						ANALYSIS					*O. mykiss* embryo-alevin (semi-annual) pass/fail					Week 2 refresh
Sample ID	Matrix	Date	Time													
LC_LCDSSLCC_WS_2015-11-03_N	WS	02-Nov-15			3						X					
											WO # 15866					
											= refresh sample =					
					#NAME?											
					#NAME?											
					#NAME?											
					#NAME?											

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	T. Phillips/Nupqu	Nov. 2, 2015		Nautilus	Nov 03/15	10:30	5.5	Y / N	Y / N	Y / N
				NY - Nan Yamamoto				Y / N	Y / N	Y / N
				3X20L				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Tyler Phillips	Mobile #	(250) 919-0965	Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature		Date/Time	Nov. 2, 2015				

COC ID:	20151109-1239	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS							ANALYSIS REQUESTED									
Sample ID	Sample Location	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30 Day Rainbow Trout embryo alevin P/F	28 Day H. azteca (28DAHA) P/F	30d FHM P/F test conducted in Calgary - HydroQual							Temp °C
FR_FRCP1_Q_19102015_N	FR_FRCP1	WS	2015/11/09	11:44	G		x	x	x							1.3
FR_UFR1_Q_19102015_N	FR_UFR1	WS	2015/11/09	10:30	G		x	x	x							1.3

ANALYSIS WO #: 15866 | 15867 | 15868

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
= refresh sample =	Tak FRO Nat Bezzola	Nov 9 2015 13:00	Nautilus NY - Nan Yamamoto	Nov 10/15 @ 11:30
			2 x 4 x 20L	

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Nat Bezzola	Mobile #	
	Sampler's Signature		Date/Time	Nov 9 2015 13:00

COC ID:	20151109-1242	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Hydroqual			Email Invoice To	
Project Number				Lab Contact	Elisabeth Henson			Invoice Reports	
Department				Email	elisabeth_henson@golder.com			Email Report To	
Address	PO Box 100			Address				Email Reports	
								Shipping Company	
City	Elkford	State	BC	City		State		Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code		Country		Cooler Count	
Phone Number	1-250-865-5289			Phone Number	403-253-7121			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

15 1475

Sample ID	Sample Location	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30 Day Fathead Minnow
FR_FRCP1_Q_19102015_N	FR_FRCP1	WS	2015/11/09	11:44	G		x
FR_UFR1_Q_19102015_N	FR_UFR1	WS	2015/11/09	10:30	G		x

15-1476

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
2015/11/10 1205 Good Condition MC 12 x 20 L Carboys 8.3°C drop off no S/I	Teck FRO Aita Bezzola	Nov 9 2015 13:00		

NB OF BOTTLES RETURNED/DESCRIPTION

Sampler's Name	Aita Bezzola	Mobile #	
Sampler's Signature	[signature]	Date/Time	Nov 9 2015 13:00

Chain Of Custody Record

COC ID: | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental Laboratories Lt			Send Invoice To			
Project Number				Contact Name	Kryst Pearcy			Address			
Contact Name	Leigh Stickney			Address	8664 Commerce Court						
Address	P.O. BOX 5000							City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number				Shipping Company			
Phone Number	250-865-3274			Email Address				Tracking Number			
Email EDD To	Leigh.Stickney@Teck.com			Quote Number				CC Hardcopy To			
Email Report To	Leigh.Stickney@Teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED											ADDITIONAL INFORMATION
						PRESERV.											Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow Pass/Fail	28 d Hyallella Pass Fail;	72 h P. subcapitata Pass fail	7 d C. dubia Pass fail	96 hr Rainbow tront pass/fail	48 hr Daphnia pass/Fail	30 Day rainbow trout Early Life stage Pass Fail	7 day Rainbow trout Pass Fail	Lemna minor Pass /Fail		
GH_ER2_WS_2015_11_09_N	WS	11/9/2015		G	3								X				
											WO # 15866						
											= refresh sample =						

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions
				Nautilus	Nov10/15	11:30	2.5 Y / N Y / N Y / N
				NY - Nan Yamamoto			Y / N Y / N Y / N
							Y / N Y / N Y / N
				3x20L			Y / N Y / N Y / N

					Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Name	Leigh Stickney	Mobile #	250 910 0627					
Sampler's Signature		Date/Time						

Chain Of Custody Record

COC ID:

Page: 1 of 1

Turnaround Time:

Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental Laboratories Lt			Send Invoice To			
Project Number				Contact Name	Kryst Pearcy			Address			
Contact Name	Leigh Stickney			Address	8664 Commerce Court						
Address	P.O. BOX 5000							City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number				Shipping Company			
Phone Number	250-865-3274			Email Address				Tracking Number			
Email EDD To	Leigh.Stickney@Teck.com			Quote Number				CC Hardcopy To			
Email Report To	Leigh.Stickney@Teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow Pass/Fail	28 d Hyallella P/F	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail	30 Day rainbow trout Early Life stage Pass Fail	30d FHM - P/F Test conducted in Calgary - Hydroqual		
GH_FR1_WS_2015_11_09_N	WS	11/09/2015		G	4			X					X	X		
						WO #		15867					15866	15868		
									= refresh sample =							

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
				Nautilus	Nov 10/15	11:30	2.0	Y / N	Y / N	Y / N
				NY- Nau Yamamoto				Y / N	Y / N	Y / N
				4x20L				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Leigh Stickney	Mobile #	250 910 0627	Temp in °C	Samples on ice? / Sample intact? / Trip Blank?
Sampler's Signature		Date/Time			

Chain Of Custody Record

COC ID: | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	HydroQual Laboratories Ltd.			Send Invoice To			
Project Number				Contact Name	Jacklyn Pool			Address			
Contact Name	Leigh Stickney			Address	#4, 6125 - 12th Street S.E						
Address	P.O. BOX 5000							City		State	
				City	Calgary	State	AB	Postal Code		Country	
City	Elkford	State	BC	Postal Code	T2H2K1	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number	403.253.7121			Shipping Company			
Phone Number	250-865-3274			Email Address				Tracking Number			
Email EDD To	Leigh.Stickney@Teck.com			Quote Number				CC Hardcopy To			
Email Report To	Leigh.Stickney@Teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow Pass/Fail	28 d Hyalella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail				
GH_FRI_WS_2015_11_09_N	WS	11/09/2015		G	6		X									

15-1477

2015/11/10
1205
7.6°C
6x 20L
Cubey
Good Condition
no S/I
drop off MC

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
For both permit requirments and water for special tyreatment testing								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Leigh Stickney	Mobile #	250 910 0627
Sampler's Signature		Date/Time	

Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Chain Of Custody Record

COC ID: | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental Laboratories Lt			Send Invoice To			
Project Number				Contact Name	Kryst Pearcy			Address			
Contact Name	Leigh Stickney			Address	8664 Commerce Court						
Address	P.O. BOX 5000							City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number				Shipping Company			
Phone Number	250-865-3274			Email Address				Tracking Number			
Email EDD To	Leigh.Stickney@Teck.com			Quote Number				CC Hardcopy To			
Email Report To	Leigh.Stickney@Teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow Pass/Fail	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail	30 Day rainbow trout Early Life stage Pass Fail			
GH_ERC_WS_2015_11_09_N	WS	11/09/2015		G	3								X			
												WO # 15866				
											= refresh sample =					

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
				Nautilus	Nov 10/15	11:30	3.0	Y / N	Y / N	Y / N
				NY - Nan Yamamot				Y / N	Y / N	Y / N
				3x20L				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Leigh Stickney	Mobile #	250 910 0627
Sampler's Signature		Date/Time	

Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Nautilus Environmental
8664 Commerce Court
Imperial Square Lake City
Burnaby BC, V5A 4N7

COC # 9112015

Page 1 of 1

Report to:		Report Format / Distribution		Service Requested: (rush - subject to availability)
Company:	TECK COAL LTD (ELKVIEW)	☑Standard ☐Other		◉Regular (Default)
Contact:	Michael Moore	☑PDF ☑Excel ☑Digital ☐Fax		○Priority (2-3 Business Days) - 50% Surcharge
Address:	RR1 HWY 3	Email 1:	michael.moore@teck.com	○Emergency (1 Business Day) - 100% Surcharge
	Sparwood, BC, V0B 2G1, Canada	Email 2:	james.boldt@teck.com	○For Emergency < 1 Day, ASAP or Weekend - Contact ALS
Phone:	250-425-8868 Fax:	Email 3:	casandra.knooihuizen@teck.com	**Analysis Request**
Invoice To:	Same as Report ? ◉Yes ○No	Email 4:	cait.good@teck.com	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:	Send all invoices to: dlteckcoalaccountspayable@teck.com	Client / Project Information:		
Contact:	Attn: Accounting	Job #:	Elkview Semi-Annual Toxicity Testing	
Address:	Same as above	PO / AFE:	107517	
		Legal Site Description:		
Phone:	Fax:	Quote #:		
Lab Work Order # (lab use only)		Nautilus Contact: Krysta Pearcy	Sampler: MW/ MM	

Sample	Sample Identification	Date (mmm-dd-yy)	Time (hh:mm)	Matrix	TECKCOAL-MONTHLY-VA	Toxicity 7day/72 hr	T-Se (CCMS)	T-Metal(TECKCOAL-MET-T-VA)	D-Metal(TECKCOAL-MET-D-VA)	EPH	TSS	TURBIDITY	PAH - low level detection	True Color	Toxicity 30-Day	BOD	Number of Containers	Temp °C
	EV_HC1_WS_2015-11-09_N	9-Nov-15	9:50	WS											X		3	2.5
	EV_MC2_WS_2015-11-09_N	9-Nov-15	11:20	WS											X		3	2.5
																	6	

Special Instructions / Regulations / Hazardous Details

Toxicity 30-Day= Rainbow trout embyro-alevin Q/F - WO # 15866
= refresh sample =

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)		
Released by:	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF
Madison Wassick	9-Nov-15	MW-Min Yamamoto	Nov 10/15	11:30				

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

GENF 18.00 Front

2x3x20L

Chain Of Custody Record

COC ID: 20140902-1509

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Coal Mountain Operation			Lab Name	Nautilus Environmental			Send Invoice To			
Contact Name	Don Sacino			Contact Name	Krysta Pearcy			Address			
Address	2261 Corbin Rd.			Address	8664 commerce Court						
City	Sparwood	Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada	City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425 7377			Postal Code	V5A 4N7	Country	Canada	Task Code			
Email EDD To	Carla.Romero@teck.com			Phone Number				Shipping Company			
	Rick.Magliocco@teck.com			Email Address				Tracking Number			
				PO Number				CC Hardcopy To			
								CC Hardcopy To			

SAMPLE DETAILS / ANALYSIS REQUESTED / ADDITIONAL INFORMATION

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. / ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia	72 h P. subcapitata	30 d Rainbow trout embryo-alevin Pass/Fail	28 d H. Azteca Pass/Fail	30d FHM P/F. test conducted in Calgary - HydroQual				ADDITIONAL INFORMATION
CM_MC2_WS_2015-11-09_N	WS	11/9/2015	12:30	G	6						x	x	x				
										WO #	15866	15867	15868				
										= refresh sample =							

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
3 coolers				Nautilus	Nov 10/15	11:30	2.5	Y / N	Y / N	Y / N
				NY - Nan Yamamoto				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				6x20L				Y / N	Y / N	Y / N
							Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Sampler's Name	C.Romero/K.Allen/D.Sacino	Mobile #	2504257350
Sampler's Signature	Kenny Allen	Date/Time	11-09-2015 12:30

Chain Of Custody Record

COC ID: | Page: 1 of 1

Turnaround Time: | **Rush:**

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Coal Mountain Operations CMO			Lab Name	HydroQual Laboratories Ltd.			Send Invoice To	
Project Number				Contact Name	Jacklyn Pool			Address	
Contact Name	Carla Romero			Address	#4, 6125 - 12th Street S.E				
Address	2261 Corbin Rd							City	State
City	Sparwood	State	BC	City	Calgary	State	AB	Postal Code	Country
Postal Code	V0B2G0	Country	Canada	Postal Code	T2H2K1	Country	Canada	Task Code	
Phone Number	250 425 7350			Phone Number	403.253.7121			Shipping Company	
Email EDD & Report To	Carla.Romero@teck.com			Email Address				Tracking Number	
	Rick.Magliocco@teck.com			Quote Number				CC Hardcopy To	
								CC Hardcopy To	

15-1478

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail				
CM_MC2_WS_2015-11-09_N	WS	11/9/2015	1210	G	8		X									Re-fresh 3

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time
2015/11/10 1205 2x 20 L Carboys 9.2° no S/I good Condition mc drop off						

Sample Receipt Conditions			
	Y / N	Y / N	Y / N
	Y / N	Y / N	Y / N
	Y / N	Y / N	Y / N
	Y / N	Y / N	Y / N
Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Sampler's Name	C.Romero/K.Allen/D.Sacino		Mobile #	250-425-7350	
Sampler's Signature			Date/Time	11/09/2015	12:40 hr

Chain Of Custody Record

COC ID: Nautilus_2015-11-09_chronic

Turnaround Time:

PROJECT/CLIENT INFO					LABORATORY					OTHER INFO				
Facility Name	Line Creek Operations				Lab Name	Nautilus Environmental				Send Invoice To				
Contact Name	Jay Jones				Contact Name	Krysta Pearcy				Address				
Address	Box 2003				Address	8664 commerce Court								
City	Sparwood		Prov.	BC						City			State	
Postal Code	V0B 2G0	Country	Canada		City	Burnaby		State	BC	Postal Code		Country		
Phone Number	250 425-6111				Postal Code	V5A 4N7	Country	Canada		Task Code				
Email EDD To	jay.jones@teck.com				Phone Number					Shipping Company				
	calt.good@teck.com				Email Address	Krysta@NautilusEnvironmental.com				Tracking Number				
					PO Number					CC Hardcopy To				
										CC Hardcopy To				

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
Sample ID	Matrix	Date	Time			ANALYSIS					O. mykiss embryo-alevin (semi-annual) pass/fail					Week 3 refresh
LC_LCDSSLCC_WS_2015-11-09_N	WS	09-Nov-15			3						X					
										wo #15866						
										= refresh sample =						
					#NAME?											
					#NAME?											
					#NAME?											
					#NAME?											

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	T. Phillips/Nupqu	Nov. 9, 2015	17:00	Nautilus	Nov 10/15	11:30	1.5	Y / N	Y / N	Y / N
				N4- Nan Yamamoto				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				3x20L				Y / N	Y / N	Y / N

Sampler's Name	Tyler Phillips	Mobile #	(250) 919-0965	Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature		Date/Time	Nov. 9, 2015				

COC ID:	20151116-1301	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice-To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Sample ID	Sa,mple Location	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	28 Day H. azteca (28DAHA) P/F	3cd FHM P/F - test conducted in Calgary - Hydrocarbon	3cd Rbt EA-P/F								Temp °C
FR_FRCP1_Q_26102015_N	FR_FRCP1	WS	2015/11/16	09:30	G			x	x	x								1.0
FR_UFR1_Q_26102015_N	FR_UFR1	WS	2015/11/16	12:00	G			x	x	x								1.0
							COC #	15867	15868	15866								

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
= refresh sample =	Teck FRO Arta Bezzdi	Nov16 2015 13:00	Nautilus	Nov 17/15
			NY - Nan Yamamoto	@ 10:00
			2 x 4 x 20L	

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Arta Bezzdi	Mobile #	
	Sampler's Signature		Date/Time	Nov 16 2015 13:00

COC ID:	20151116-1303	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Hydroqual			Email Invoice To	
Project Number				Lab Contact	Elisabeth Henson			Invoice Reports	
Department				Email	elisabeth_henson@golder.com			Email Report To	
Address	PO Box 100			Address				Email Reports	
								Shipping Company	
City	Elkford	State	BC	City		State		Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code		Country		Cooler Count	
Phone Number	1-250-865-5289			Phone Number	403-253-7121			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID 15-1475	Sa,mple Location	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30 Day Fathead Minnow
FR_FRCP1_Q_26102015_N	FR_FRCP1	WS	2015/11/16	09:30	G		x
FR_UFR1_Q_26102015_N	FR_UFR1	WS	2015/11/16	12:00	G		x
15-1476							

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
2015/11/17 12°C Good Condition drop off 1100 12x 20 L Carbuys no S/I	TeKFRO A.t. Bezzola	Nov16 2015 13:00		

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	A.t. Bezzola	Mobile #	
	Sampler's Signature	[signature]	Date/Time	Nov 16 2015 13:00

Chain Of Custody Record

COC ID:

Page: 1 of 1

Turnaround Time:

Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental Laboratories Lt			Send Invoice To			
Project Number				Contact Name	Kryst Pearcy			Address			
Contact Name	Leigh Stickney			Address	8664 Commerce Court						
Address	P.O. BOX 5000							City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number				Shipping Company			
Phone Number	250-865-3274			Email Address				Tracking Number			
Email EDD To	Leigh.Stickney@Teck.com			Quote Number				CC Hardcopy To			
Email Report To	Leigh.Stickney@Teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow Pass/Fail	28 d Hyallella Pass Fail;	72 h P. subcapitata Pass fail	7 d C. dubia Pass fail	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail	30 Day rainbow trout Early Life stage Pass Fail	7 day Rainbow trout Pass Fail	Lemna minor Pass /Fail	
GH_ER2_WS_2015_11_16_N	WS	11/16/2015		G	3								X			
												30 # 158866				

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
- refresh sample -				Nautilus	Nov 17/15	10:00	2.5	Y / N	Y / N	Y / N
				NY - Nan Yamamoto				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				3x20L				Y / N	Y / N	Y / N

Sampler's Name	Leigh Stickney	Mobile #	250 910 0627
Sampler's Signature		Date/Time	

Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Chain Of Custody Record

COC ID:

Page: 1 of 1

Turnaround Time: **Rush:**

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Greenhills Operation	Lab Name	Nautilus Environmental Laboratories Lt	Send Invoice To	
Project Number		Contact Name	Kryst Pearcy	Address	
Contact Name	Leigh Stickney	Address	8664 Commerce Court		
Address	P.O. BOX 5000			City	State
		City	Burnaby State BC	Postal Code	Country
City	Elkford State BC	Postal Code	V5A 4N7 Country Canada	Task Code	
Postal Code	V0B1H0 Country Canada	Phone Number		Shipping Company	
Phone Number	250-865-3274	Email Address		Tracking Number	
Email EDD To	Leigh.Stickney@Teck.com	Quote Number		CC Hardcopy To	
Email Report To	Leigh.Stickney@Teck.com			CC Hardcopy To	

SAMPLE DETAILS / **ANALYSIS REQUESTED** / **ADDITIONAL INFORMATION**

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. / ANALYSIS	30 d early life stage, fathead minnow Pass/Fail	28 d Hyallella P/F	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail	30 Day rainbow trout Early Life stage Pass Fail	30d FHM P/F Test conducted in Calgary - Hydroqual			ADDITIONAL INFORMATION Initial - PASS/FAIL
GH_FR1_WS_2015_16_09_N	WS	11/16/2015		G	4			X					X	X			
							WC #	15867					15866	15868			

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
= refresh sample =				Nautilus	Nov 17/15	10:00	2.0	Y / N	Y / N	Y / N
				NY - Nan Yamamoto				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				4x 20L				Y / N	Y / N	Y / N

Sampler's Name	Leigh Stickney	Mobile #	250 910 0627	Temp in °C	Samples on ice? / Sample intact? / Trip Blank?
Sampler's Signature		Date/Time			

Chain Of Custody Record

COC ID:

Page: 1 of 1

Turnaround Time: Rush:

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Greenhills Operation	Lab Name	HydroQual Laboratories Ltd.	Send Invoice To	
Project Number		Contact Name	Jacklyn Pool	Address	
Contact Name	Leigh Stickney	Address	#4, 6125 - 12th Street S.E		
Address	P.O. BOX 5000			City	State
		City	Calgary State AB	Postal Code	Country
City	Elkford State BC	Postal Code	T2H2K1 Country Canada	Task Code	
Postal Code	V0B1H0 Country Canada	Phone Number	403.253.7121	Shipping Company	
Phone Number	250-865-3274	Email Address		Tracking Number	
Email EDD To	Leigh.Stickney@Teck.com	Quote Number		CC Hardcopy To	
Email Report To	Leigh.Stickney@Teck.com			CC Hardcopy To	

15-1477

SAMPLE DETAILS						ANALYSIS REQUESTED											ADDITIONAL INFORMATION
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. / ANALYSIS	30 d early life stage, fathead minnow Pass/Fail	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail					Initial - PASS/FAIL
GH_FR1_WS_2015_11_16_N	WS	11/16/2015		G	6		X										

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
For both permit requirments and water for special tyreatment testing								Y / N	Y / N	Y / N
2015/11/17 1100								Y / N	Y / N	Y / N
6 x 20 L Carboy								Y / N	Y / N	Y / N
Good Condition								Y / N	Y / N	Y / N
no s/t 7°C							Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Sampler's Name	Leigh Stickney	Mobile #	250 910 0627
Sampler's Signature		Date/Time	

Chain Of Custody Record

COC ID:

Turnaround Time: Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental Laboratories Lt			Send Invoice To			
Project Number				Contact Name	Kryst Pearcy			Address			
Contact Name	Leigh Stickney			Address	8664 Commerce Court						
Address	P.O. BOX 5000							City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number				Shipping Company			
Phone Number	250-865-3274			Email Address				Tracking Number			
Email EDD To	Leigh.Stickney@Teck.com			Quote Number				CC Hardcopy To			
Email Report To	Leigh.Stickney@Teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow Pass/Fail	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail	30 Day rainbow trout Early Life stage Pass Fail			
GH_ERC_WS_2015_11_16_N	WS	11/16/2015		G	3								X			

wo # 15866

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
=refresh sample=				Nautilus	Nov 17/15	10:00	3.3	Y / N	Y / N	Y / N
				WY - Nan Yamamoto				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				3x20L				Y / N	Y / N	Y / N

Sampler's Name	Leigh Stickney	Mobile #	250 910 0627
Sampler's Signature		Date/Time	

Temp in °C | Samples on ice? | Sample intact? | Trip Blank?

Nautilus Environmental
8664 Commerce Court
Imperial Square Lake City
Burnaby BC, V5A 4N7

COC # 16112015

Page 1 of 1

Report to:		Report Format / Distribution				Service Requested: (rush - subject to availability)
Company:	TECK COAL LTD (ELKVIEW)	☑Standard	☐Other			◉Regular (Default)
Contact:	Michael Moore	☑PDF	☑Excel	☑Digital	☐Fax	○Priority (2-3 Business Days) - 50% Surcharge
Address:	RR1 HWY 3	Email 1:	michael.moore@teck.com			○Emergency (1 Business Day) - 100% Surcharge
Sparwood, BC, V0B 2G1, Canada		Email 2:	james.boldt@teck.com			○For Emergency < 1 Day, ASAP or Weekend - Contact ALS
Phone:	250-425-8868 Fax:	Email 3:	casandra.knooihuizen@teck.com			**Analysis Request**
Invoice To:	Same as Report ? ◉Yes ○No	Email 4:	cait.good@teck.com			Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:	Send all invoices to: dlteckcoalaccountspayable@teck.com	**Client / Project Information:**				
Contact:	Attn: Accounting	Job #:	Elkview Semi-Annual Toxicity Testing			
Address:	Same as above	PO / AFE:	107517			
		Legal Site Description:				
Phone:	Fax:	Quote #:				
Lab Work Order # (lab use only)		**Nautilus Contact:** Krysta Pearcy		**Sampler:**	MW/MM	

Sample	Sample Identification	Date (mmm-dd-yy)	Time (hh:mm)	Matrix	TECKCOAL-MONTHLY-VA	Toxicity 7day/72 hr	T-Se (CCMS)	T-Metal(TECKCOAL-MET-T-VA)	D-Metal(TECKCOAL-MET-D-VA)	EPH	TSS	TURBIDITY	PAH - low level detection	True Color	Toxicity 30-Day EA P/F	BOD	Number of Containers
	EV_HC1_WS_2015-11-16_N	16-Nov-15	9:55	WS											X		3
	EV_MC2_WS_2015-11-16_N	16-Nov-15	10:55	WS											X		3
													330#	5866			
																	6

3.3 Temp °C
2.2

Special Instructions / Regulations / Hazardous Details

Toxicity 30-Day= Rainbow trout embyro-alevin P/F - refresh sample -

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)					SHIPMENT VERIFICATION (lab use only)		
Released by:	Date & Time:	Received by:	Date:	Time:		Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF
Madison Wassick	16-Nov-15 12:30	NY - Nan Yamamoto	NOV 17/15	10:00					

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

GENF 18.00 Front

2 x 3 x 20L

Chain Of Custody Record

COC ID: 20140902-1509 | Page: 1 of 1

Turnaround Time:

PROJECT/CLIENT INFO					LABORATORY					OTHER INFO				
Facility Name	Coal Mountain Operation				Lab Name	Nautilus Environmental				Send Invoice To				
Contact Name	Don Sacino				Contact Name	Krysta Pearcy				Address				
Address	2261 Corbin Rd.				Address	8664 commerce Court								
City	Sparwood	Prov.	BC							City		State		
Postal Code	V0B 2G0	Country	Canada		City	Burnaby	State	BC		Postal Code		Country		
Phone Number	250 425 7377				Postal Code	V5A 4N7	Country	Canada		Task Code				
Email EDD To	Carla.Romero@teck.com				Phone Number					Shipping Company				
	Rick.Magliocco@teck.com				Email Address					Tracking Number				
					PO Number					CC Hardcopy To				
										CC Hardcopy To				

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	96 hr Rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail	7 d C. dubia	72 h P. subcapitata	30 d Rainbow trout embryo-alevin Pass/Fail	28 d H. Azteca Pass/Fail	30d FHM P/F test conducted in Calgary - Hydroxuel			
CM_MC2_WS_2015-11-16_N	WS	11/16/2015	12:00	G	6						x	x	x			
										WO #	15866	15867	15868			

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
= refresh sample =				Nautilus NY- Nan Yamamoto	Nov 17/15	10:00	2.0	Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				6x20L				Y / N	Y / N	Y / N

						Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Name	C.Romero/K.Allen/D.Sacino	Mobile #	2504257350						
Sampler's Signature		Date/Time	11-16-2015	12:00	hr				

Chain Of Custody Record

COC ID:

Page: 1 of 1

Turnaround Time: Rush:

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Coal Mountain Operations CMO	Lab Name	HydroQual Laboratories Ltd.	Send Invoice To	
Project Number		Contact Name	Jacklyn Pool	Address	
Contact Name	Carla Romero	Address	#4, 6125 - 12th Street S.E		
Address	2261 Corbin Rd			City	State
City	Sparwood State BC	City	Calgary State AB	Postal Code	Country
Postal Code	V0B2G0 Country Canada	Postal Code	T2H2K1 Country Canada	Task Code	
Phone Number	250 425 7350	Phone Number	403.253.7121	Shipping Company	
Email EDD & Report To	Carla.Romero@teck.com	Email Address		Tracking Number	
	Rick.Magliocco@teck.com	Quote Number		CC Hardcopy To	
				CC Hardcopy To	

15-1478

SAMPLE DETAILS						ANALYSIS REQUESTED											ADDITIONAL INFORMATION
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. ANALYSIS	30 d early life stage, fathead minnow	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail					Initial - PASS/FAIL
CM_MC2_WS_2015-11-16_N	WS	11/16/2015	12:00	G	8		X										Re-fresh #4

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
2015/11/17 8°C 1400 8x 20 L carboys drop off No S/I Good condition MC								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
							Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Sampler's Name	C.Romero/K.Allen/D.Sacino	Mobile #	250-425-7350
Sampler's Signature	[signature]	Date/Time	11/16/2015 12:40 hr

Chain Of Custody Record

COC ID: Nautilus_2015-11-16_chronic | Page: 1 of 1

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Line Creek Operations			Lab Name	Nautilus Environmental			Send Invoice To			
Contact Name	Jay Jones			Contact Name	Krysta Pearcy			Address			
Address	Box 2003			Address	8664 commerce Court						
City	Sparwood	Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada	City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425-6111			Postal Code	V5A 4N7	Country	Canada	Task Code			
Email EDD To	jay.jones@teck.com			Phone Number				Shipping Company			
	cait.good@teck.com			Email Address	Krysta@NautilusEnvironmental.com			Tracking Number			
				PO Number				CC Hardcopy To			
								CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED											ADDITIONAL INFORMATION
						ANALYSIS					O. *mykiss* embryo-alevin (semi-annual) pass/fail						
Sample ID	Matrix	Date	Time														Week 4 refresh
LC_LCDSSLCC_WS_2015-11-16_N	**WS**	**16-Nov-15**	12:50		**3**						**X**						
											490 # 15866						
					-												

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
= refresh sample =	M. Calabrese/ Nupqu	Nov. 16, 2015		Nautilus NY - Wan Yamamoto	Nov 17/15 @ 10:00		2.5	Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				3x20L				Y / N	Y / N	Y / N

					Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Name	**Mariana Calabrese**	**Mobile #**	647-244-7245					
Sampler's Signature	M Calab	**Date/Time**	**2015-11-16 17:00**					

COC ID: 20151123-1147 TURNAROUND TIME:

PROJECT/CLIENT INFO				LABORATORY				O
Facility Name	Fording River Operation			Lab Name	Hydroqual			Email Invoice To
Project Number				Lab Contact	Elisabeth Henson			Invoice Reports
Department				Email	elisabeth_henson@golder.com			Email Report To
Address	PO Box 100			Address				Email Reports
								Shipping Company
City	Elkford	State	BC	City		State		Tracking Number
Postal Code	V0B 1H0	Country	Canada	Postal Code		Country		Cooler Count
Phone Number	1-250-865-5289			Phone Number	403-253-7121			Cooler Description
Project Manager				Quote Number				Sampler 2
Email Address				PO Number				Sampler 3

SAMPLE DETAILS							ANALYSIS REQUESTED		
Sample ID	Sa,mple Location	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30 Day Fathead Minnow		
FR_FRCP1_Q_02112015_N	FR_FRCP1	WS	2015/11/23	12:15	G		X	15-1475	
FR_UFR1_Q_02112015_N	FR_UFR1	WS	2015/11/23	10:39	G		X	15-1476	

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
2015/11/24 1130 drop off 2x 20 L Carboy Good Condition NO S/I 10°C	~~Name~~ Kate Bezzola Tech FRO	Nov 23 2015	14:00	

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Kate Bezzola	Mobile #	
	Sampler's Signature		Date/Time	Nov 23 2015 14:00

Chain Of Custody Record

COC ID: | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Greenhills Operation			Lab Name	HydroQual Laboratories Ltd.			Send Invoice To	
Project Number				Contact Name	Jacklyn Pool			Address	
Contact Name	Leigh Stickney			Address	#4, 6125 - 12th Street S.E				
Address	P.O. BOX 5000							City	State
				City	Calgary	State	AB	Postal Code	Country
City	Elkford	State	BC	Postal Code	T2H2K1	Country	Canada	Task Code	
Postal Code	V0B1H0	Country	Canada	Phone Number	403.253.7121			Shipping Company	
Phone Number	250-865-3274			Email Address				Tracking Number	
Email EDD To	Leigh.Stickney@Teck.com			Quote Number				CC Hardcopy To	
Email Report To	Leigh.Stickney@Teck.com							CC Hardcopy To	

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow Pass/Fail	28 d Hyalella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail				
15-1477																
GH_FR1_WS_2015_11_23_N	WS	11/23/2015	10:00	G	6		X									

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
For both permit requirments and water for special tyreatment testing								Y / N	Y / N	Y / N
2015/11/24 1130								Y / N	Y / N	Y / N
Ex Air Calgary								Y / N	Y / N	Y / N
drop off lab								Y / N	Y / N	Y / N
not MC										

Sampler's Name	Leigh Stickney	Mobile #	250 910 0627	Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature		Date/Time					

Chain Of Custody Record

COC ID: | Page:

Turnaround Time: | Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Coal Mountain Operations CMO			Lab Name	HydroQual Laboratories Ltd.			Send Invoice To	
Project Number				Contact Name	Jacklyn Pool			Address	
Contact Name	Carla Romero			Address	#4, 6125 - 12th Street S.E				
Address	2261 Corbin Rd							City	State
City	Sparwood	State	BC	City	Calgary	State	AB	Postal Code	Country
Postal Code	V0B2G0	Country	Canada	Postal Code	T2H2K1	Country	Canada	Task Code	
Phone Number	250 425 7350			Phone Number	403.253.7121			Shipping Company	
Email EDD & Report To	Carla.Romero@teck.com			Email Address				Tracking Number	
	Rick.Magliocco@teck.com			Quote Number				CC Hardcopy To	
								CC Hardcopy To	

15-1478

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow	28 d Hyalella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail				
CM_MC2_WS_2015-11-23_N	WS	11/23/2015	12:10	G	10		X									Re-fresh 5

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
2015/11/24 1130								Y / N	Y / N	Y / N
box 10 x 20L Calgary								Y / N	Y / N	Y / N
no S/E drop off								Y / N	Y / N	Y / N
Mc								Y / N	Y / N	Y / N

Sampler's Name	C.Romero/K.Allen/D.Sacino	Mobile #	250-425-7350	Temp in °C	Samples on ice? / Sample intact? / Trip Blank?
Sampler's Signature		Date/Time	11/23/2015 12:10 h		

Section B-5: 2nd Quarter 2015 Line Creek Operation Samples

Nautilus Environmental

Toxicity testing on Line Creek Operation samples with *Ceriodaphnia dubia*, *Oncorhynchus mykiss*, *Lemna minor* and *Pseudokirchneriella subcapitata*

2nd Quarter, 2015

Final Report

Report date: October 28, 2015

Submitted to:

Teck Coal Ltd.
Sparwood, BC

8664 Commerce Court
Burnaby, BC
V5A 4N7

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APPENDIX F – Chain-of-Custody Forms

SIGNATURE PAGE

Krystal Pearcy, B.Sc.
Testing Manager

James Elphick, R.P.Bio.
Senior Reviewer

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

1.0 INTRODUCTION

Nautilus Environmental conducted toxicity tests for Teck Coal Ltd. on samples collected from the Line Creek Operation. Test types included survival and reproduction of a cladoceran (*Ceriodaphnia dubia*), embryo development of rainbow trout (*Oncorhynchus mykiss*), population growth of a unicellular green alga (*Pseudokirchneriella subcapitata*) and growth of a freshwater plant (*Lemna minor*). Table 1 outlines the toxicity tests that were conducted on each sample and Figure 1 shows the locations of sample sites. Samples were transported in 20-L plastic containers in coolers containing ice packs. Samples were received at temperatures ranging from 6.0 to 8.0°C and were stored in the dark at 4 ± 2°C prior to testing.

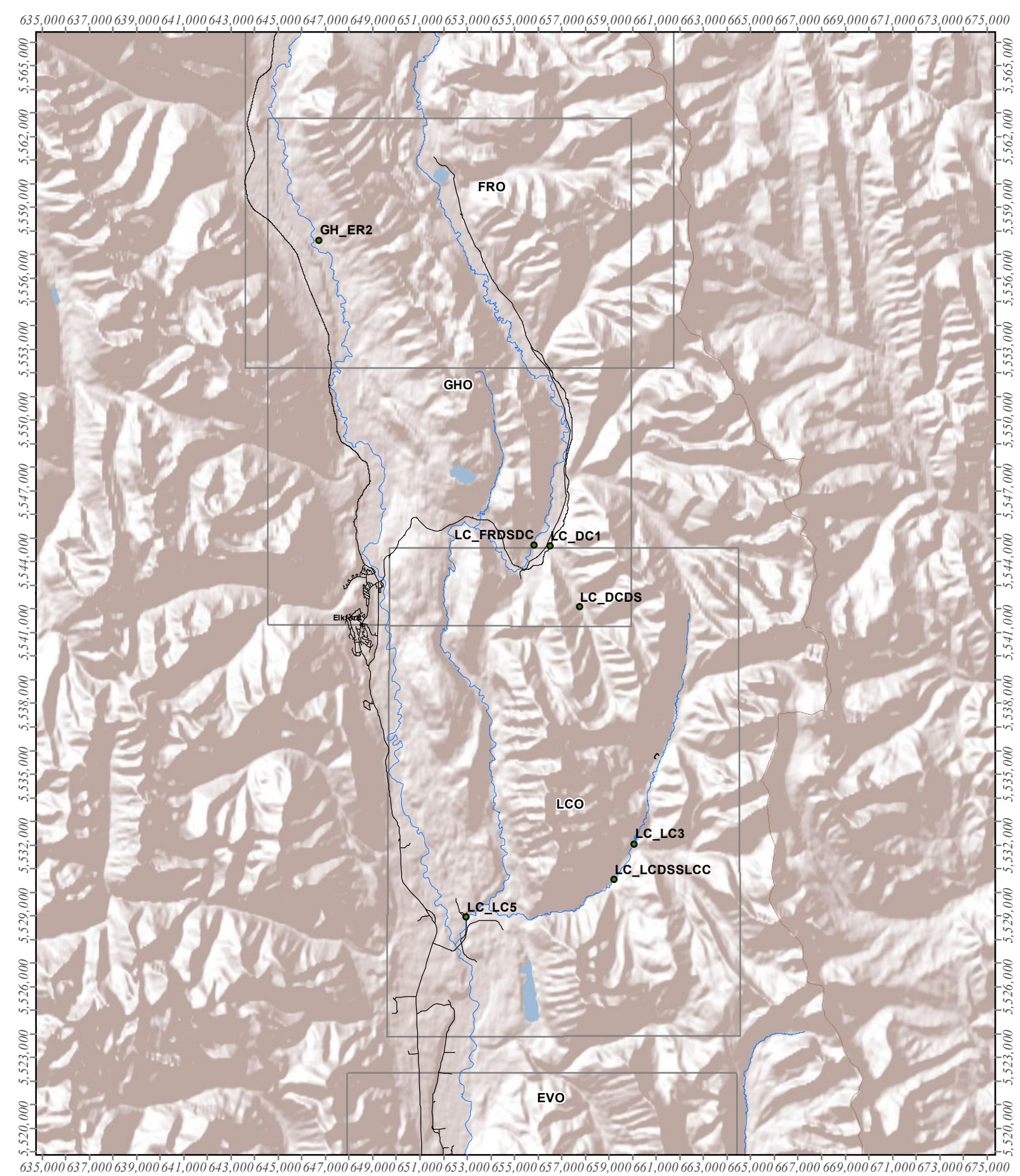
Table 1. Summary of toxicity testing program.

Sample ID	EMS #	Species Tested	Sample Collection Dates
GH_ER2*	200389	*C. dubia*, *O. mykiss*, and *P. subcapitata*	April 28 and May 5, 2015
LC_LCDSSLCC	297110	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 28 and May 5, 2015
LC_LC3	200337	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 28 and May 5, 2015
LC_DC1	E288270	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 28 and May 5, 2015
LC_FRDSDC	E288272	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 28 and May 5, 2015
LC_DCDS	E295210	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 28 and May 5, 2015
LC_LC5	200028	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 28 and May 5, 2015

*Reference site. Conducted as a single concentration toxicity test.

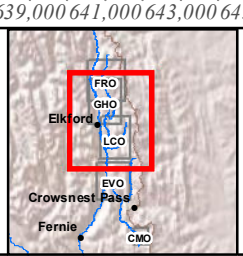
The Line Creek Operation samples were tested using serial dilutions of the sample with control water. Sample GH_ER2 was tested using only a single (100%) concentration with no dilution. GH_ER2 is an upstream reference location that is not required as part of the Line Creek Operation testing program, but the data for this sample were included here as a basis for comparison to Line Creek Operation mine-influenced samples.

This report describes the results of the toxicity tests. Copies of laboratory data sheets and printouts of statistical analyses are provided in Appendices A through D. Results of analytical chemistry that was performed on the samples tested in this program are provided in Appendix E. These samples were collected by Teck personnel at the same time the samples were collected for toxicity testing. The chain-of-custody forms are provided in Appendix F.



Teck

Teck does not except responsibility for errors, omissions, or the positional accuracy of this information. Information is for planning purposes only and is subject to change. It



Chronic Toxicity Monitoring Locations

- Monitoring Locations
- Roads
- Rivers

N

0 1,400 2,800 5,600 Meters

DATE:	MINE OPERATION:
10/19/2015	Line Creek
SCALE:	COORDINATE SYSTEM:
1:200,000	NAD 1983 UTM Zone 11N

2.0 METHODS

Methods for the toxicity tests are summarized in Tables 2 through 5. Testing was conducted according to procedures described by Environment Canada protocols (1998, 2007a, 2007b and 2007c). Statistical analyses for the tests were performed using CETIS (Tidepool Scientific Software, 2013).

Table 2. Summary of test conditions: *Ceriodaphnia dubia* survival and reproduction test.

Test organism	*Ceriodaphnia dubia*
Test organism source	In-house culture
Test organism age	<24 h old neonates produced within 12 h
Test type	Static-renewal
Test duration	7 ± 1 day
Test vessel	20 mL test tube
Test volume	15 mL
Test replicates	10
Number of organisms	1 per replicate
Control water	20% Perrier water
Test solution renewal	Daily
Test temperature	25 ± 1°C
Feeding	*Pseudokirchneriella subcapitata* and YCT
Light intensity	100 to 600 lux at water surface
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test protocol	Environment Canada (2007a)
Statistical software	CETIS
Test endpoint	Survival and reproduction
Test acceptability criteria for controls	≥80% survival; ≥15 young per surviving control producing three broods; ≥60% of controls producing three or more broods
Reference toxicant	Sodium chloride

Table 3. Summary of test conditions: rainbow trout (*Oncorhynchus mykiss*) embryo viability test.

Test organism	*Oncorhynchus mykiss*
Test organism source	Vancouver Island Trout Hatchery, Duncan, BC
Test organism age	<30 min post fertilization, <24 h old gametes
Test type	Static renewal
Test duration	7 days
Test vessel	2 L plastic containers
Test volume	2 L
Test replicates	4
No. of organisms	30 eggs per replicate
Control water	Dechlorinated tapwater (hardness ~12 mg/L $CaCO_3$)
Test solution renewal	Daily
Test temperature	14 ± 1°C
Feeding	None
Light intensity	Dark
Photoperiod	24 hours dark
Aeration	6.5 ± 1 mL/min/L
Test protocol	Environment Canada (1998); Canaria et al. (1999)
Statistical software	CETIS
Test endpoint	Embryo viability
Test acceptability criteria for controls	Embryo viability ≥70%
Reference toxicant	Sodium dodecyl sulphate

Table 4. Summary of test conditions: *Lemna minor* growth inhibition test.

Test organism	*Lemna minor*, strain CPCC# 490
Test organism source	In-house culture, obtained from Canadian Phycological Culture Centre, and originally isolated from Wainfleet, Stinking Barn, Niagara Peninsula, Ontario, Canada
Test organism age	7-to 10-day old
Test type	Static
Test duration	7 days
Test vessel	250 mL glass containers
Test volume	100 mL
Test replicates	4
No. of organisms	Two 3-frond plants per replicate
Control water	Deionized water with added nutrients
Test solution renewal	None
Test temperature	25 ± 2°C
Feeding	None
Light intensity	4000 to 5600 lux full spectrum light
Photoperiod	24 hours light
Aeration	None
Test protocol	Environment Canada (2007b)
Statistical software	CETIS
Test endpoint	Number of fronds and dry weight
Test acceptability criteria for controls	≥ 8-fold increase in number of fronds
Reference toxicant	Potassium chloride

Table 5. Summary of test conditions: *Pseudokirchneriella subcapitata* growth inhibition test.

Test organism	*Pseudokirchneriella subcapitata*, strain UTCC #37
Test organism source	In-house culture, obtained from Canadian Phycological Culture Centre, and originally isolated from Nitelva River, Norway.
Test organism age	3-to 7-day old culture in logarithmic growth phase
Test type	Static
Test duration	72 hours
Test vessel	Microplate
Test volume	220 µL
Test replicates	4 for samples; 8 for control
Number of organisms	10, 000 cells/mL
Control water	Deionized water with added nutrients
Test solution renewal	None
Test temperature	24 ± 2°C
Feeding	None
Light intensity	3600 to 4400 lux
Photoperiod	24 hours light
Sample filtration	Through a preconditioned membrane filter of 0.45 µm using a vacuum pump
Aeration	None
pH adjustment	None
Test protocol	Environment Canada (2007c)
Statistical software	CETIS
Test endpoint	Algal cell growth inhibition
Test acceptability criteria for controls	>16-fold increase in number of algal cells; CV ≤20%; no trend when analyzed using Mann-Kendall test
Reference toxicant	Zinc

3.0 RESULTS

The results of the toxicity tests and associated statistical analyses are provided in Appendices A through D, with the exception of data for sample GH-ER2, which are reproduced here, but the raw data are provided a separate report (Nautilus Environmental, 2015).

Results of the toxicity tests using *C. dubia* are provided in Table 6. There were no adverse effects on survival of *C. dubia* in the samples; the LC50 values were >100%. A small reduction in reproduction was observed in one of the six samples (LC_FRDSDC) tested with *C. dubia;* the IC25 was 93.4% and the IC50 was >100% for this sample. No adverse effects were observed with this species with the other samples.

Results of the toxicity tests using *O. mykiss* are provided in Table 7. There were no adverse effects on embryo viability in the samples; the EC25 and EC50 values were >100%.

Results of the toxicity tests using *L. minor* are provided in Table 8; the highest test concentraton was 97% as a result of dilution associated with addition of nutrients. There were no adverse effects on *L. minor* dry weight in the samples; the IC25 and IC50 values were >97%. An adverse effect on frond count was observed in one of the six samples (LC_LC3); the IC25 was 75.9% and the IC50 was >97%. There were no adverse effects in the remaining samples.

Results of the toxicity tests using *P. subcapitata* are provided in Tables 9; the highest test concentraton was 95.2% as a result of dilution associated with addition of nutrients. The algae exhibited growth enhancement in all samples. Consequently, the IC25 and IC50 values for cell yield were >95.2% in the samples.

For reference sample GH_ER2, which was only tested at full strength with *C. dubia*, *O. mykiss* and *P. subcapitata*, there were no significant differences in the results compared to the laboratory controls.

Table 6. Results: *Ceriodaphnia dubia* survival and reproduction test.

Concentration (% v/v)	GH_ER2		LC_LCDSSLCC		LC_LC3		LC_DC1	
	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)
Control	100	22.2 ± 1.5	100	19.7 ± 2.0	100	21.8 ± 1.4	90	18.9 ± 3.4
1.56	NT	NT	100	20.6 ± 2.1	100	21.0 ± 3.0	100	21.2 ± 1.3
3.12	NT	NT	100	18.6 ± 2.3	100	20.5 ± 1.1	100	19.7 ± 2.2
6.25	NT	NT	100	20.2 ± 1.0	100	20.7 ± 1.3	100	20.9 ± 2.8
12.5	NT	NT	100	21.0 ± 1.9	100	20.3 ± 2.8	100	21.4 ± 3.3
25	NT	NT	100	19.6 ± 2.8	100	19.4 ± 2.4	100	19.3 ± 2.8
50	NT	NT	100	18.5 ± 2.9	90	16.3 ± 6.3	100	20.5 ± 2.1
100	100	20.7 ± 2.3	100	18.1 ± 2.6	90	16.8 ± 2.0	100	20.5 ± 2.4
Test endpoint (% v/v)								
LC50	--	--	>100	--	>100	--	>100	--
IC25	--	--	--	>100	--	>100	--	>100
IC50	--	--	--	>100	--	>100	--	>100

NT = Not Tested, SD = Standard Deviation, LC = Lethal Concentration, IC = Inhibition Concentration.

Table 6. (continued) Results: *Ceriodaphnia dubia* survival and reproduction test.

Concentration (% v/v)	LC_FRDSDC		LC_DCDS		LC_LC5	
	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)
Control	100	20.9 ± 1.3	90	17.1 ± 6.3	90	17.4 ± 6.7
1.56	100	19.9 ± 3.4	100	19.0 ± 3.9	90	16.6 ± 6.4
3.12	100	19.3 ± 4.2	100	18.7 ± 4.0	100	20.2 ± 1.5
6.25	90	18.6 ± 3.6	100	20.5 ± 1.4	100	16.7 ± 5.6
12.5	100	20.1 ± 1.5	100	17.4 ± 4.9	100	18.2 ± 3.6
25	100	18.0 ± 4.5	100	16.5 ± 3.8	100	18.5 ± 3.3
50	100	20.2 ± 1.8	90	15.6 ± 5.1	90	16.7 ± 4.2
100	100	15.3 ± 5.9	100	14.8 ± 3.1	100	16.1 ± 3.1
Test endpoint (% v/v [with 95% CL])						
LC50	>100	--	>100	--	>100	--
IC25	--	93.4 (68.4 – 100)	--	>100	--	>100
IC50	--	>100	--	>100	--	>100

SD = Standard Deviation, LC = Lethal Concentration, IC = Inhibition Concentration, CL = Confidence Limits.

Table 7. Results: rainbow trout embryo (*Oncorhynchus mykiss*) viability test.

Concentration (% v/v)	Embryo Viability (Mean ± SD)						
	GH_ER2	**LC_LCDSSLCC**	**LC_LC3**	**LC_DC1**	**LC_FRDSDC**	**LC_DCDS**	**LC_LC5**
Control	91.7 ± 1.9	91.3 ± 4.5	95.7 ± 1.6	97.5 ± 3.2	95.5 ± 4.7	95.8 ± 6.3	87.4 ± 3.1
6.25	NT	84.4 ± 5.9	97.4 ± 3.3	96.7 ± 2.7	95.7 ± 1.9	89.0 ± 4.2	91.5 ± 3.5
12.5	NT	81.4 ± 7.7	92.9 ± 6.5	97.5 ± 1.7	93.2 ± 4.8	94.2 ± 5.0	86.7 ± 9.4
25	NT	89.1 ± 4.9	95.7 ± 3.3	97.5 ± 1.7	94.8 ± 4.5	90.8 ± 7.4	90.0 ± 6.7
50	NT	86.7 ± 3.5	97.4 ± 1.7	98.3 ± 1.9	96.4 ± 2.9	92.5 ± 4.2	87.4 ± 6.8
100	95.0 ± 4.3	87.2 ± 3.7	96.5 ± 4.9	98.3 ± 1.9	94.7 ± 3.5	97.5 ± 1.7	91.7 ± 3.3
Test endpoint (% v/v)							
EC25	-	>100	>100	>100	>100	>100	>100
EC50	-	>100	>100	>100	>100	>100	>100

NT = Not Tested, SD = Standard Deviation, EC = Effective Concentration.

Table 8. Results: *Lemna minor* growth inhibition test.

Concentration (% v/v)	LC_LCDSSLCC		LC_LC3		LC_DC1	
	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Control	82.0 ± 14.2	5.6 ± 1.1	67.8 ± 16.6	5.2 ± 1.4	84.0 ± 5.0	6.4 ± 0.6
1.5	75.2 ± 8.4	5.4 ± 0.7	85.2 ± 9.5	6.5 ± 0.8	74.2 ± 18.4	6.0 ± 1.0
3.0	88.0 ± 9.5	6.2 ± 0.8	80.2 ± 8.7	6.4 ± 0.5	83.8 ± 13.0	6.9 ± 0.3
6.1	78.0 ± 10.4	5.7 ± 0.5	75.0 ± 11.9	6.1 ± 0.9	88.8 ± 11.5	6.5 ± 1.2
12.1	92.0 ± 11.2	6.6 ± 0.7	82.5 ± 8.3	6.8 ± 0.8	97.0 ± 14.2	7.6 ± 1.3
24.2	99.0 ± 8.0	7.2 ± 0.5	76.0 ± 7.4	6.1 ± 0.4	95.2 ± 11.5	7.4 ± 0.5
48.5	87.0 ± 16.0	6.6 ± 0.9	72.0 ± 7.0	5.6 ± 0.7	93.8 ± 9.5	6.6 ± 0.5
97	69.0 ± 4.1	6.1 ± 0.5	47.8 ± 3.2	5.6 ± 0.5	91.2 ± 16.4	7.4 ± 1.3
Test endpoint (% v/v [with 95% CL])						
IC25	>97	>97	75.9 (57.9 – 96.9)	>97	>97	>97
IC50	>97	>97	>97	>97	>97	>97

SD = Standard Deviation, IC = Inhibition Concentration, CL = Confidence Limits.

Table 8. (continued) Results: *Lemna minor* growth inhibition test.

Concentration (% v/v)	LC_FRDSDC		LC_DCDS		LC_LC5	
	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Control	93.8 ± 9.9	7.6 ± 0.9	81.8 ± 15.8	5.7 ± 1.0	84.8 ± 17.4	6.3 ± 1.2
1.5	93.5 ± 7.9	7.7 ± 0.7	93.5 ± 11.1	6.8 ± 1.1	87.0 ± 6.5	6.6 ± 0.3
3.0	87.0 ± 18.2	7.0 ± 1.3	93.5 ± 8.2	6.6 ± 0.5	81.5 ± 18.1	6.4 ± 1.4
6.1	93.5 ± 8.1	7.4 ± 0.5	90.0 ± 16.8	6.5 ± 1.2	85.2 ± 17.6	6.6 ± 1.2
12.1	83.0 ± 13.8	6.5 ± 0.9	88.5 ± 15.0	6.3 ± 0.8	85.5 ± 15.5	6.5 ± 1.2
24.2	100.5 ± 11.0	7.6 ± 0.8	90.0 ± 8.0	6.7 ± 0.7	89.5 ± 5.1	6.9 ± 0.2
48.5	97.0 ± 11.2	7.4 ± 1.4	88.5 ± 13.1	6.4 ± 0.9	71.2 ± 4.1	5.6 ± 0.4
97	89.2 ± 2.5	7.4 ± 0.5	103.0 ± 4.2	7.4 ± 0.4	74.0 ± 15.1	6.2 ± 1.3
Test endpoint (% v/v)						
IC25	>97	>97	>97	>97	>97	>97
IC50	>97	>97	>97	>97	>97	>97

SD = Standard Deviation, IC = Inhibition Concentration.

Table 9. Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Concentration (% v/v)	GH_ER2		LC_LCDSSLCC		LC_LC3		LC_DC1	
	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)
Control	35.0 ± 1.3	--	34.8 ± 2.8	--	33.4 ± 2.6	--	33.9 ± 2.7	--
1.5	NT	NT	44.5 ± 3.4*	28.1	36.0 ± 2.6	7.9	36.8 ± 2.6	8.5
3.0	NT	NT	63.5 ± 3.9*	82.7	55.0 ± 3.2*	64.8	46.8 ± 1.7*	38.0
6.0	NT	NT	87.0 ± 5.2*	150.4	86.8 ± 5.0*	159.9	71.8 ± 5.9*	111.8
11.9	NT	NT	109.8 ± 5.9*	215.8	107.3 ± 9.2*	221.3	83.5 ± 5.3*	146.5
23.8	NT	NT	114.3 ± 12.0*	228.8	103.0 ± 9.7*	208.6	106.3 ± 8.7*	213.7
47.6	NT	NT	118.8 ± 8.6*	241.7	100.5 ± 6.8*	201.1	113.8 ± 6.6*	235.8
95.2	102.4 ± 5.7*	192.5	69.2 ± 5.7*	99.3	65.0 ± 6.3*	94.8	121.8 ± 7.8*	259.4
Test endpoint (% v/v)								
IC25	--	--	>95.2	--	>95.2	--	>95.2	--
IC50	--	--	>95.2	--	>95.2	--	>95.2	--

NT = Not Tested, SD = Standard Deviation, IC = Inhibition Concentration.
*Indicates cell yield that were significantly greater than the control.

Table 9. (continued) Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Concentration (% v/v)	LC_FRDSDC		LC_DCDS		LC_LC5	
	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)
Control	32.0 ± 2.2	--	35.1 ± 3.1	--	33.2 ± 3.0	--
1.5	36.0 ± 3.4	12.5	39.0 ± 4.4	11.0	62.5 ± 4.5*	88.0
3.0	48.0 ± 4.2*	50.0	57.8 ± 4.3*	64.4	79.5 ± 3.3*	139.1
6.0	64.2 ± 7.1*	100.8	69.0 ± 5.9*	96.4	106.5 ± 11.1*	220.3
11.9	85.2 ± 7.6*	166.4	85.2 ± 6.2*	142.7	116.3 ± 10.2*	249.6
23.8	100.5 ± 12.6*	214.1	119.0 ± 12.4*	238.8	115.5 ± 5.6*	247.4
47.6	83.5 ± 8.9*	160.9	139.3 ± 10.9*	296.4	90.2 ± 5.7*	171.4
95.2	72.8 ± 3.0*	127.3	132.5 ± 5.4*	277.2	72.8 ± 7.2*	118.8
Test endpoint (% v/v)						
IC25	>95.2	--	>95.2	--	>95.2	--
IC50	>95.2	--	>95.2	--	>95.2	--

SD = Standard Deviation, IC = Inhibition Concentration.
*Indicates cell yield that were significantly greater than the control.

4.0 QA/QC

The health history of the test organisms used in the exposures was acceptable and met the requirements of the Environment Canada protocols. The tests met all control acceptability criteria and water quality parameters remained within ranges specified in the protocols throughout the tests. There were no deviations from the test methodologies. Uncertainty associated with these tests is best described by the standard deviation around the mean and/or the confidence intervals around the point estimates.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 10. Results for these tests fell within the acceptable range for organism performance of mean and two standard deviations, based on historical results obtained by the laboratory with these tests. Thus, the sensitivity of the organisms used in these tests was considered appropriate.

Table 10. Reference toxicant test results.

Test Species	Endpoint	Historical Mean (2 SD Range)	CV (%)	Test Date
C. dubia	Survival (LC50): 2.1 g/L NaCl	2.0 (1.6 – 2.4)	11	April 22, 2015
	Reproduction (IC50): 1.4 g/L NaCl	1.5 (1.2 – 1.9)	14	
O.mykiss	Embryo viability (EC50): 6.7 mg/L SDS	4.1 (2.2 – 7.6)	36	April 29, 2015
L. minor	Number of fronds (IC50): 4.1 g/L KCl	4.1 (3.1 – 5.4)	15	May 20, 2015
P. subcapitata	Growth (IC50) 38.6 µg/L Zn	26.4 (13.6 – 51.1)	39	May 5, 2015

SD = Standard Deviation, CV = Coefficient of Variation, IC = Inhibition Concentration, EC= Effective Concentration, LC = Lethal Concentration.

5.0 REFERENCES

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6.0 END OF REPORT

APPENDIX A – *Ceriodaphnia dubia* Toxicity Test Data

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 15376

Start Date/Time: May 6/15 @ 1300h
Set up by: MLT

Sample Information:

Sample ID: LC_LCDSSLCC_WS_2015-05-06_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 4 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 042415A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 27
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: 1,2,3,4,5,6,7,8,9,10,11,14,16

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd128
Stock Solution ID: 15Na02
Date Initiated: April 22/15

7-d LC50 (95% CL): 2.1 (2.0 - 2.2) g/L NaCL
7-d IC50 (95% CL): 1.4 (0.9 - 1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.6-2.4) g/L NaCL CV (%): 11
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-1.9) g/L NaCL CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]
Date reviewed: June 2/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: LC_LCOSSLCC_WS_2015-05-01
Work Order #: 15376
Start Date & Time: May 6/15 @ 1300h
Stop Date & Time: May 12/15 @ 1500h
Test Species: *Ceriodaphnia dubia*

Concentration: control

	Days														
	0	1		2		3		4		5		Final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.5	25.0	24.0	24.0			
DO (mg/L)	8.1	9.0	8.0	7.8	8.2	7.6	8.2	7.9	8.1	7.6	8.2	7.8			
pH	8.0	7.7	7.9	7.6	8.0	8.1	8.1	7.9	8.0	7.7	8.0	7.7			
Cond. (µS/cm)	218	209		213		218		223		220		224			
Initials	MP	EMM		JW		EMM		MLT		EMM		MLT			

Concentration: 1.56% (v/v)

	Days														
	0	1		2		3		4		5		Final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.5	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.5	25.0	24.0	24.0			
DO (mg/L)	7.9	7.8	8.1	7.8	8.4	7.7	8.2	7.5	8.1	7.6	8.2	7.8			
pH	7.9	7.8	7.9	7.7	8.3	7.8	8.1	7.7	8.0	7.7	8.0	7.7			
Cond. (µS/cm)	225	212		215		219		227		221		229			
Initials	MP	EMM		JW		EMM		MLT		EMM		MLT			

Concentration: 12.5% (v/v)

	Days														
	0	1		2		3		4		5		Final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.5	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.5	25.0	24.0	24.0			
DO (mg/L)	7.9	7.8	8.2	7.7	8.4	7.7	8.2	7.5	8.1	7.7	8.2	7.8			
pH	7.9	7.9	7.9	7.8	8.3	7.9	8.2	7.9	8.1	7.9	8.0	7.7			
Cond. (µS/cm)	260	249		252		260		269		264		261			
Initials	MP	EMM		JW		EMM		MLT		EMM		MLT			

Concentration: 100% (v/v)

	Days														
	0	1		2		3		4		5		Final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	25.0	24.0	24.0	25.0	25.0	25.0	24.0	25.0	24.5	25.0	24.0	24.0			
DO (mg/L)	7.9	7.8	8.2	7.9	8.2	7.5	8.2	7.6	8.1	7.7	8.2	7.8			
pH	8.0	7.9	8.0	7.9	8.3	8.2	8.2	8.1	8.1	8.0	8.1	7.9			
Cond. (µS/cm)	518	521		522		524		536		526		527			
Initials	MP	EMM		JW		EMM		MLT		EMM		MLT			

	Control	100% (v/v)		
Hardness*	100	268		
Alkalinity*	90	166		

* mg/L as CaCO3

Analysts: EMM, MLT, AWD, EC, JW
Reviewed by:
Date reviewed: June 2/15

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L) ; pH = 6 to 8.5

Sample Description: clear, some ppt present

Comments: **Broodboard Used:** BB042415A test tubes (1-11, 14, 16)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: LC_LCOSSLCC_WS_2015-05-06_N
Work Order: 15376

Start Date & Time: May 6/15 @1300h
Stop Date & Time: May 12/15 @ 1500h
Set up by: MLT

%(w/v)

Days	Concentration: Control										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	4	3	3	4	3	3	5	3	3	A
5	6	5	7	7	7	8	7	✓	7	7	JW
6	11	9	10	11	11	10	11	10	10	9	MLT
7											
8											
Total	20	18	20	21	22	21	21	15	20	19	MLT

Days	Concentration: 1.56										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	2	2	3	2	3	3	2	3	2	3	A
5	6	7	9	8	8	8	8	7	8	7	JW
6	9	9	11	11	11	12	11	10	12	9	MLT
7											
8											
Total	17	18	23	21	22	23	21	20	22	19	MLT

Days	Concentration: 3.12										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	2	3	3	3	✓	2	3	2	3	A
5	✓	7	7	7	6	6	7	7	7	7	JW
6	11	9	10	10	11	9	11	9	11	10	MLT
7											
8											
Total	14	18	20	20	20	15	20	19	20	20	MLT

Days	Concentration: 6.25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	3	2	3	2	✓	3	M 3	2	2	A
5	8	6	8	7	8	8	7	7	8	7	JW
6	10	10	9	11	11	12	12	9	10	11	MLT
7											
8											
Total	21	19	19	21	21	20	22	19	20	20	MLT

Days	Concentration: 12.5										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	2	3	3	2	2	3	3	✓	2	2	A
5	9	9	7	7	8	8	7	6	7	8	JW
6	11	11	10	10	11	12	12	11	12	12	MLT
7											
8											
Total	22	23	20	19	21	23	22	17	21	22	MLT

Days	Concentration: 25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	3	3	✓	2	3	3	2	2	5	A
5	7	9	8	5	7	8	7	9	8	✓	JW
6	9	10	10	10	9	9	12	11	12	10	MLT
7											
8											
Total	19	22	21	15	18	20	22	22	22	15	MLT

Days	Concentration: 50										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	3	2	3	✓	3	3	2	3	3	A
5	7	8	7	7	5	✓	✓	8	7	8	JW
6	9	9	10	12	11	12	10	10	11	9	MLT
7											
8											
Total	19	20	19	22	16	15	13	20	21	20	MLT

Days	Concentration: 100										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	3	4	3	2	3	2	3	3	3	A
5	5	6	7	7	✓	7	8	4	4	7	JW
6	10	9	9	11	10	10	10	9	10	9	MLT
7											
8											
Total	18	18	20	21	12	20	20	16	17	19	MLT

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: clear, some ppt present

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]

Date reviewed: June 2/15

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	02-5469-3560	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-4795-0276	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	06 May-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	12 May-15 15:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	08-2003-7136	**Code:**	30E0C610	**Client:**	Teck Coal
Sample Date:	05 May-15 14:34	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	22h (7 °C)	**Station:**	LC_LCDSSLCC_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1908769	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

June 2/15

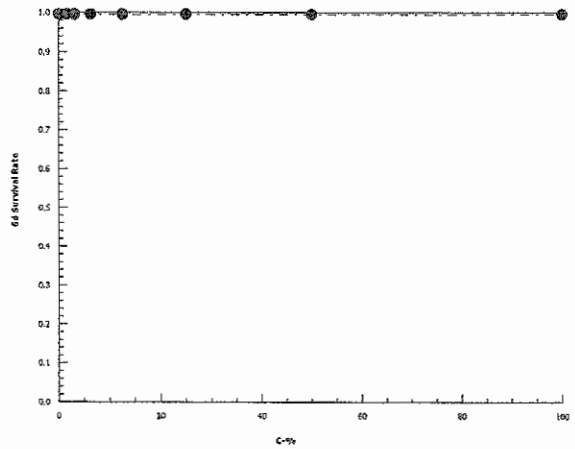
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	02-5469-3560	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



June 2/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	04-4727-2928	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-4795-0276	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	06 May-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	12 May-15 15:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	08-2003-7136	**Code:**	30E0C610	**Client:**	Teck Coal
Sample Date:	05 May-15 14:34	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	22h (7 °C)	**Station:**	LC_LCDSSLCC_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1493458	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	33.41	2.905	78.93	2.993	1.267	34.43
IC10	94.14	22.65	N/A	1.062	NA	4.414
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	19.7	15	22	0.6333	2.003	10.17%	0.0%
1.56		10	20.6	17	23	0.6532	2.066	10.03%	-4.57%
3.12		10	18.6	14	20	0.718	2.271	12.21%	5.58%
6.25		10	20.2	19	22	0.3266	1.033	5.11%	-2.54%
12.5		10	21	17	23	0.5963	1.886	8.98%	-6.6%
25		10	19.6	15	22	0.8844	2.797	14.27%	0.51%
50		10	18.5	13	22	0.9098	2.877	15.55%	6.09%
100		10	18.1	12	21	0.836	2.644	14.61%	8.12%

Reproduction Detail

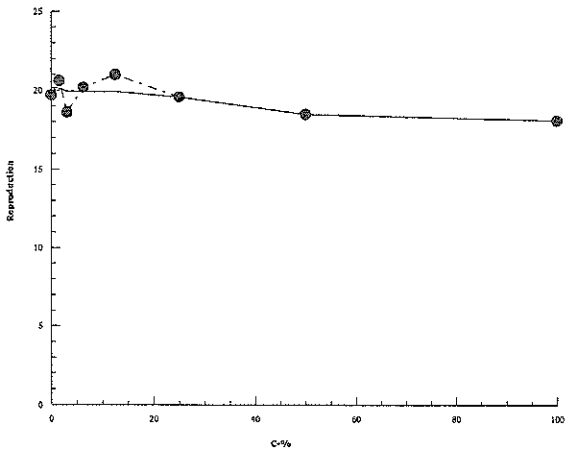
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	20	18	20	21	22	21	21	15	20	19
1.56		17	18	23	21	22	23	21	20	22	19
3.12		14	18	20	20	20	15	20	19	20	20
6.25		21	19	19	21	21	20	22	19	20	20
12.5		22	23	20	19	21	23	22	17	21	22
25		19	22	21	15	18	20	22	22	22	15
50		19	20	19	22	16	15	13	20	21	20
100		18	18	20	21	12	20	20	16	17	19

June 2/15

Ceriodaphnia 7-d Survival and Reproduction Test | **Nautilus Environmental**

Analysis ID:	04-4727-2928	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 2/15

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 15376

Start Date/Time: May 6/15 @ 1250h
Set up by: MLT

Sample Information:

Sample ID: LC_LC3_WS_2015-05-06_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 1x20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 042415B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 34
Mortality (%) in previous 7 d: 10
Individual female # used ≥8 young on test day: 21,22,23,24,25,26,28,30,31,35,36,37,38,39

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd128
Stock Solution ID: 15Na02
Date Initiated: April 22/15

7-d LC50 (95% CL): 2.1 (2.0 - 2.2) g/L NaCL
7-d IC50 (95% CL): 1.4 (0.9 - 1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.6-2.4) g/L NaCL CV (%): 11
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-1.9) g/L NaCL CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]
Date reviewed: June 2/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: LC_LC3_WS_2015-05-06_N
Work Order #: 153716

Start Date & Time: May 6/15 @ 1250h
Stop Date & Time: May 13/15 @ 1020h
Test Species: *Ceriodaphnia dubia*

Concentration: Control

	Days													
	0	1		2		24.5 3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	~~25.5~~	24.0	25.0	25.0	25.0	24.0	24.5	24.0	25.0
DO (mg/L)	8.1	7.9	8.0	7.8	8.2	7.9	8.2	7.4	8.1	7.4	8.2	7.2	8.0	7.5
pH	8.0	7.7	7.9	7.7	8.0	7.9	8.1	7.7	8.0	7.6	8.0	7.6	~~7.8~~ 7.9	7.7
Cond. (µS/cm)	218	209		213		218		223		220		217		219
Initials	KLP	EMM		JW				MLT		EMM		JW		EMM

Concentration: 1.56% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.5	24.5	24.0	25.0	24.5	25.0	24.0	24.5	24.0	25.0
DO (mg/L)	7.9	7.9	8.2	7.8	8.3	7.9	8.1	7.5	8.1	7.5	8.1	7.3 ④	~~7.8~~ 7.7	7.6
pH	7.9	7.7	8.0	7.8	8.3	7.9	8.1	7.9	8.0	~~7.7~~	8.0	7.7	7.7	7.7
Cond. (µS/cm)	224	213		221		229		234		229		230		230
Initials	KLP	EMM		JW		EMM		MLT		EMM		KS/MLT		EMM

④ 8.1

Concentration: 12.5% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.5	24.5	24.0	25.0	24.5	25.0	24.0	24.5	24.0	25.0
DO (mg/L)	7.9	7.9	8.2	7.8	8.2	7.9	8.1	7.5	8.0	7.5	8.1	7.5 ④	~~7.4~~ 7.7	7.6
pH	7.9	7.8	8.0	7.8	8.3	8.0	8.2	8.0	8.0	~~7.7~~	8.0	7.7	7.7	7.7
Cond. (µS/cm)	287	277		286		292		307		298		294		290
Initials	KLP	EMM		JW		EMM		MLT		EMM		KS/MLT		EMM

④ 8.1

Concentration: 100% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	25.0	24.5	24.0	25.0	24.5	25.0	24.0	24.5	24.0	25.0
DO (mg/L)	8.0	7.9	8.2	7.8	8.2	7.9	8.2	7.5	8.0	7.6	8.1	7.4 ④	~~8.1~~ 7.9	7.9
pH	7.9	7.9	7.9	8.0	8.1	8.2	8.1	8.2	8.0	8.1	8.0	8.0	7.7	7.9
Cond. (µS/cm)	749	751		759		760		772		760		754		728
Initials	KLP	EMM		EMM		EMM		MLT		EMM		KS/MLT		EMM

④ 8.2

	Control	100% (v/v)	
Hardness*	100	470	
Alkalinity*	90	182	

* mg/L as CaCO3

Analysts: EMM, MLT, AWD, EC, JW
Reviewed by:
Date reviewed: June 2/15

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L) ; pH = 6 to 8.5

Sample Description: Clear

Comments: **Broodboard Used:** BB042415B (21-26, 28, 30, 31, 35-39)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: LC_LC3-WS_2015-05-06_N
Work Order: 15376

Start Date & Time: May 6/15 @1250h
Stop Date & Time: May 13/15 @ 1020h
Set up by: MLT

% (v/v)

Days	Concentration: Control										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
4	3	3	4	3	4	3	3	3	4	4	AD
5	8	8	7	7	8	8	7	7	6	9	FMM
6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JW
7	11	10	10	11	13	12	12	11	10	9	FMM
8											
Total	22	21	21	21	25	23	22	21	20	22	FMM

Days	Concentration: 1.56										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
4	2	3	3	4	4	3	2	3	3	3	AD
5	8	8	7	4	4	8	7	7	6	6	FMM
6	✓	✓	✓	9	✓	✓	✓	✓	✓	✓	JW
7	9	12	11	13	11	13	11	10	12	12	FMM
8											
Total	19	23	21	26	15	24	20	20	21	21	FMM

Days	Concentration: 3.12										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
4	3	4	3	2	3	2	3	2	3	3	AD
5	8	7	7	6	6	7	7	6	5	6	FMM
6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JW
7	10	11	11	13	13	10	10	11	12	11	FMM
8											
Total	21	22	21	21	22	19	20	19	20	20	FMM

Days	Concentration: 6.25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
4	3	3	2	3	3	2	3	2	3	2	AD
5	8	7	6	7	8	7	7	6	6	5	FMM
6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JW
7	11	10	12	10	11	11	13	11	12	13	FMM
8											
Total	22	20	20	20	22	20	23	19	21	20	FMM

Days	Concentration: 12.5										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
4	2	3	4	4	3	4	3	3	2	✓	AD
5	8	9	7	7	7	8	7	9	8	5	FMM
6	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	JW
7	11	10	11	9	12	10	9	10	10	✓	FMM
8											
Total	21	22	22	20	24 or 22	22	19	22	20	13	FMM

Days	Concentration: 25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
4	2	3	3	✓	4	✓	3	2	3	3	AD
5	8	9	8	6	8	6	✓	6	8	7	FMM
6	✓	✓	✓	11	✓	✓	7	✓	✓	✓	JW
7	10	9	9	✓	12	9	10	10	9	9	FMM
8											
Total	20	21	20	17	24	15	20	18	20	19	FMM

Days	Concentration: 50										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
4	✓	3	3	3	3	X	3	2	3	2	AD
5	4	6	8	7	7	|	7	8	8	6	FMM
6	3	✓	✓	✓	✓	|	✓	✓	✓	✓	JW
7	6	10	10	8	9	|	11	8	9	6	FMM
8											
Total	13	19	21	18	19	0X	21	18	20	14	FMM

Days	Concentration: 100										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
4	2	✓	3	2	2	2	3	3	2	3	AD
5	7	4	8	✓	7	6	6	6	7	6	FMM
6	✓	9	✓	6	✓	✓	✓	✓	✓	✓	JW
7	8	✓	9	10	8X	7	8	10	7	7	FMM
8					↓						
Total	17	13	20	18	17X	15	17	19	16	16	FMM

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											EL — MLT
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: clear

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]

Date reviewed: June 2/15

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	15-8401-8701	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:58	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-9635-6863	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	06 May-15 12:50	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	13 May-15 10:20	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 22h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	01-8455-4594	**Code:**	B001462	**Client:**	Teck Coal
Sample Date:	05 May-15 14:49	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	22h (6.8 °C)	**Station:**	LC_LC3_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1550163	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	35.41	29.77	N/A	2.824	NA	3.359
EC10	100	35.41	N/A	1	NA	2.824
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
100		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	0	1	1	1	1
100		1	1	1	1	0	1	1	1	1	1

June 2/15

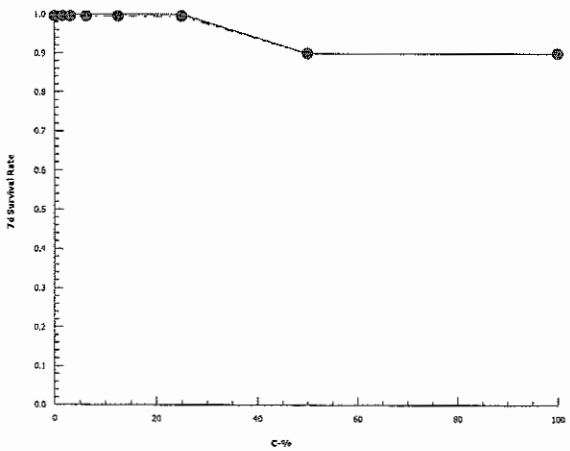
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 15-8401-8701 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 22 May-15 13:58 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1

Graphics



June 2/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	01-6776-7010	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-9635-6863	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	06 May-15 12:50	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	13 May-15 10:20	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 22h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	01-8455-4594	**Code:**	B001462	**Client:**	Teck Coal
Sample Date:	05 May-15 14:49	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	22h (6.8 °C)	**Station:**	LC_LC3_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	154583	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	2.615	0.6822	25.39	38.25	3.939	146.6
IC10	21.15	6.812	35.56	4.728	2.812	14.68
IC15	30.94	18.66	60.72	3.232	1.647	5.359
IC20	40.32	27.88	N/A	2.48	NA	3.586
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	21.8	20	25	0.4422	1.398	6.42%	0.0%
1.56		10	21	15	26	0.9428	2.981	14.2%	3.67%
3.12		10	20.5	19	22	0.3416	1.08	5.27%	5.96%
6.25		10	20.7	19	23	0.3958	1.252	6.05%	5.05%
12.5		10	20.3	13	22	0.8825	2.791	13.75%	6.88%
25		10	19.4	15	24	0.763	2.413	12.44%	11.01%
50		10	16.3	0	21	2	6.325	38.81%	25.23%
100		10	16.8	13	20	0.6289	1.989	11.84%	22.94%

Reproduction Detail

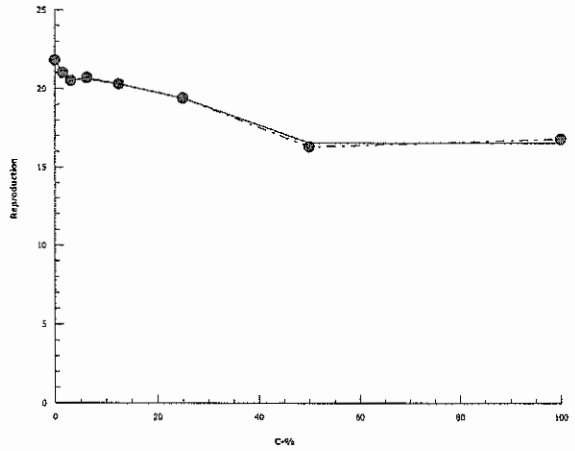
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	22	21	21	21	25	23	22	21	20	22
1.56		19	23	21	26	15	24	20	20	21	21
3.12		21	22	21	21	22	19	20	19	20	20
6.25		22	20	20	20	22	20	23	19	21	20
12.5		21	22	22	20	22	22	19	22	20	13
25		20	21	20	17	24	15	20	18	20	19
50		13	19	21	18	19	0	21	18	20	14
100		17	13	20	18	17	15	17	19	16	16

June 2/15

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	01-6776-7010	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 153716

Start Date/Time: May 6/15 @ 1310h
Set up by: MLT

Sample Information:

Sample ID: LC_DCI_WS_2015-05-05_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 1x20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 042415B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 34
Mortality (%) in previous 7 d: 10
Individual female # used ≥8 young on test day: 21,22,23,24,25,26,28,30,31,35,36,37,38,39

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd128
Stock Solution ID: 15Na02
Date Initiated: April 22/15

7-d LC50 (95% CL): 2.1 (2.0 - 2.2) g/L NaCl
7-d IC50 (95% CL): 1.4 (0.9 - 1.7) g/L NaCl

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.6-2.4) g/L NaCl CV (%): 11
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-1.9) g/L NaCl CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]
Date reviewed: June 2/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: LC_OC1_WS_2015-05-05_N
Work Order #: 15376

Start Date & Time: May 6/15 @ 1310h
Stop Date & Time: May 13/15 @ 1100h
Test Species: *Ceriodaphnia dubia*

Concentration: control

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.5	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	8.1	7.8	8.0	7.8	8.2	7.7	8.2	7.4	8.1	7.7	8.2	7.7	8.0	7.5
pH	8.0	7.8	7.9	7.6	8.0	7.7	8.1	7.7	8.0	7.7	8.0	7.6	7.8	7.7
Cond. (µS/cm)	218	209		213		218		223		220		217		221
Initials	KLP	EMM		JW		EMM		MLT		EMM		KS/MLT		EMM

Concentration: 1.56% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.5	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	7.8	7.9	8.0	7.8	8.3	7.7	8.3	7.6	8.1	7.8	8.1	7.6	7.9	7.5
pH	7.9	7.8	7.9	7.7	8.3	7.8	8.1	7.9	8.0	7.7	8.0	7.7	7.8	7.7
Cond. (µS/cm)	218	208		211		218		223		222		222		230
Initials	KLP	EMM		JW		EMM		MLT		EMM		KS/MLT		EMM

① 8.1

Concentration: 12.5% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.5	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	7.9	7.9	8.1	7.8	8.2	7.6	8.2	7.5	8.0	7.8	8.2	7.6	7.7	7.5
pH	7.9	7.8	7.9	7.7	8.3	7.8	8.2	8.0	8.0	7.7	8.0	7.7	7.8	7.7
Cond. (µS/cm)	220	210		214		219		226		224		222		220
Initials	KLP	EMM		JW		EMM		MLT		EMM		KS/MLT		EMM

② 8.2

Concentration: 100% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	25.0	25.0	24.0	25.0	24.5	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	7.9	7.9	8.1	7.8	8.3	7.6	8.3	7.4	8.0	7.8	8.1	7.8	7.8	7.4
pH	7.8	7.8	7.9	7.9	8.3	8.1	8.3	8.2	8.1	8.0	8.1	7.8	7.8	7.8
Cond. (µS/cm)	227	226		228		232		233		231		228		225
Initials	KLP	EMM		JW		EMM		MLT		EMM		KS/MLT		EMM

③ 8.2 ④ 7.6

	Control	100% (v/v)		
Hardness*	100	144		
Alkalinity*	90	100		

Analysts: EMM, MLT, AWD, EC
Reviewed by: [redacted]
Date reviewed: June 2/15

* mg/L as CaCO3
WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L) ; pH = 6 to 8.5
Sample Description: Clear

Comments: **Broodboard Used:** BB042415B test tubes (21-26, 28, 30, 31, 35-39)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: LL_OC1_WS_2015-05-05_N
Work Order: 15376

Start Date & Time: May 6/15 @ 1310h
Stop Date & Time: May 13/15 @ 1100h
Set up by: MLJ

% (v/v)

Days	Concentration: Control										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	4	3	4	3	3	4	3	3	3	Δ
5	6	6	6	8	X	7	8	6	6	7	FMM
6	✓	✓	✓	✓	|	✓	✓	✓	✓	✓	MLJ
7	10	8	10	10	|	9	10	10	11	11	FMM
8									MLJ		
Total	19	18	19	22	10X	19	22	19	19	21	FMM
									20		

Days	Concentration: 1.56										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	3	2	3	3	2	2	3	3	3	Δ
5	6	9	7	8	8	9	7	7	6	9	FMM
6	✓	✓	✓	10	✓	✓	✓	✓	10	✓	MLJ
7	12	10	12	✓	11	11	10	12	13	11	FMM
8											
Total	21	22	21	21	22	22	19	22	19	23	FMM

Days	Concentration: 3.12										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	2	2	3	2	✓	3	2	3	3	Δ
5	8	7	7	✓	6	4	8	6	6	7	FMM
6	✓	✓	✓	6	✓	11	✓	✓	✓	✓	MLJ
7	9	9	10	11	12	✓	12	11	13	11	FMM
8											
Total	20	18	19	20	20	15	23	19	22	21	FMM

Days	Concentration: 6.25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	3	2	2	3	✓	3	2	3	3	Δ
5	6	8	6	7	8	5	8	5	8	8	FMM
6	✓	✓	✓	9	✓	✓	✓	12	✓	✓	MLJ
7	11	12	11	✓	12	11	13	✓	12	13	FMM
8											
Total	20	23	19	18	25	16	24	19	23	24	FMM

Days	Concentration: 12.5										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	2	3	3	2	3	3	✓	2	3	Δ
5	8	8	✓	6	7	9	✓	6	5	7	FMM
6	✓	✓	7	✓	9	✓	8	12	✓	✓	MLJ
7	13	11	10	11	10	11	12	10	9	11	FMM
8											
Total	24	21	20	20	18	23	23	28	16	21	FMM

Days	Concentration: 25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	3	2	3	2	✓	3	3	✓	✓	Δ
5	6	6	7	✓	8	6	7	7	6	5	FMM
6	10	✓	✓	7	✓	✓	✓	✓	11	✓	MLJ
7	✓	11	14	11	12	10	11	10	✓	9	FMM
8											
Total	19	20	23	21	22	16	21	20	17	14	FMM

Days	Concentration: 50										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	3	✓	3	2	3	3	3	✓	Δ	Δ
5	6	8	6	7	✓	8	✓	7	6	8	FMM
6	✓	✓	✓	10	8	✓	6	✓	12	✓	MLJ
7	11	11	10	✓	12	11	12	13	✓	10	FMM
8										MLJ	
Total	20	22	16	20	22	22	21	23	18	18	FMM
										21	

Days	Concentration: 100										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	2	✓	2	3	2	✓	2	2	3	Δ
5	7	7	6	✓	7	7	5	7	8	8	FMM
6	✓	✓	12	8	✓	✓	10	✓	✓	✓	MLJ
7	11	14	✓	12	10	12	✓	13	11	11	FMM
8						MLJ					
Total	21	23	18	22	20	22-15	22	21	22		FMM
						21					

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: Clear

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]

Date reviewed: June 2/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	16-2250-0354	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 12:29	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-2196-4899	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Mimi Tran
Start Date:	06 May-15 13:10	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	13 May-15 11:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 22h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	10-1375-8269	**Code:**	3C6CB93D	**Client:**	Teck Coal
Sample Date:	05 May-15 11:41	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	25h (6.3 °C)	**Station:**	LC_DC1_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	297228	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
1.56		10	1	1	1	0	0	0.0%	-11.11%	10	10
3.12		10	1	1	1	0	0	0.0%	-11.11%	10	10
6.25		10	1	1	1	0	0	0.0%	-11.11%	10	10
12.5		10	1	1	1	0	0	0.0%	-11.11%	10	10
25		10	1	1	1	0	0	0.0%	-11.11%	10	10
50		10	1	1	1	0	0	0.0%	-11.11%	10	10
100		10	1	1	1	0	0	0.0%	-11.11%	10	10

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	0	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

June 2/15

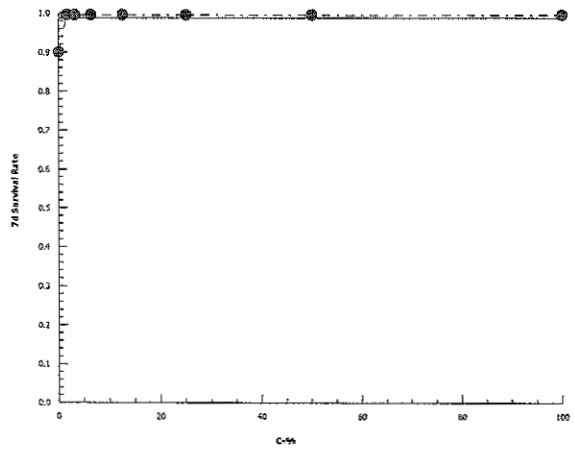
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	16-2250-0354	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 12:29	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



June 2/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	05-5473-8212	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 12:36	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-2196-4899	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Mimi Tran
Start Date:	06 May-15 13:10	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	13 May-15 11:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 22h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	10-1375-8269	**Code:**	3C6CB93D	**Client:**	Teck Coal
Sample Date:	05 May-15 11:41	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	25h (6.3 °C)	**Station:**	LC_DC1_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1734800	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>100	N/A	N/A	<1	NA	NA
IC10	>100	N/A	N/A	<1	NA	NA
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	18.9	10	22	1.08	3.414	18.06%	0.0%
1.56		10	21.2	19	23	0.4163	1.317	6.21%	-12.17%
3.12		10	19.7	15	23	0.7	2.214	11.24%	-4.23%
6.25		10	20.9	16	24	0.9	2.846	13.62%	-10.58%
12.5		10	21.4	16	28	1.056	3.34	15.61%	-13.23%
25		10	19.3	14	23	0.895	2.83	14.67%	-2.12%
50		10	20.5	16	23	0.6708	2.121	10.35%	-8.47%
100		10	20.5	15	23	0.7491	2.369	11.56%	-8.47%

Reproduction Detail

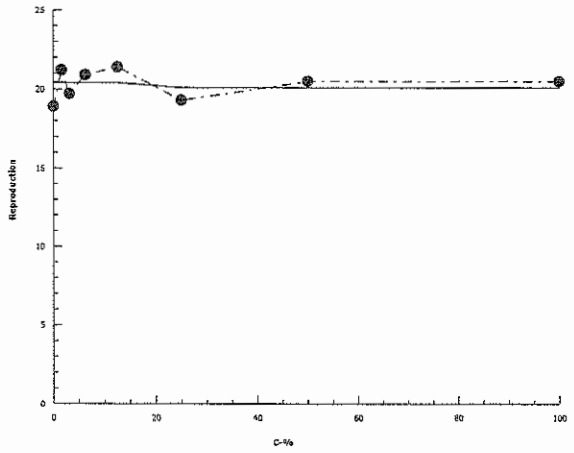
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	19	18	19	22	10	19	22	19	20	21
1.56		21	22	21	21	22	22	19	22	19	23
3.12		20	18	19	20	20	15	23	19	22	21
6.25		20	23	19	18	23	16	24	19	23	24
12.5		24	21	20	20	18	23	23	28	16	21
25		19	20	23	21	22	16	21	20	17	14
50		20	22	16	20	22	22	21	23	18	21
100		21	23	18	22	20	21	15	22	21	22

June 2/15

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	05-5473-8212	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 12:36	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 2/15

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 15376

Start Date/Time: May 6/15 @ 1240h
Set up by: MLT

Sample Information:

Sample ID: LC_FRDSDC_WS_2015-05-05_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 1x20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 042415A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 27
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: 1,2,3,4,5,6,7,8,9,10,11,14,16

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd128
Stock Solution ID: 15Na02
Date Initiated: April 22/15

7-d LC50 (95% CL): 2.1 (2.0 - 2.2) g/L NaCL
7-d IC50 (95% CL): 1.4 (0.9 - 1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.6-2.4) g/L NaCL CV (%): 11
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-1.9) g/L NaCL CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		93.4 (68.4 - 100)
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]
Date reviewed: June 2/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: LC_FROSK_WS_2015-05-05_N
Work Order #: 15376

Start Date & Time: May 6/15 @ 1240h
Stop Date & Time: May 12/15 @ ~~1300h~~ 1600h MLT
Test Species: *Ceriodaphnia dubia*

Concentration: Control

	Days														
	0	1		2		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	JW old	new		final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	25.0	24.5	24.0	24.5			
DO (mg/L)	8.1	7.9	8.0	7.8	8.2	7.6	8.2	7.4	8.1	7.9	8.2	6.9			
pH	8.0	7.7	7.9	7.7	8.0	7.7	8.1	7.8	8.0	7.6	8.0	7.5			
Cond. (µS/cm)	218	209		213		218		223		220		216			
Initials	KLP	EMM		EMM		MD		MLT		EMM		JW			JW

Concentration: 1.56% (v/v)

	Days														
	0	1		2		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	JW old	new		final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.5	24.5	24.0	24.5			
DO (mg/L)	7.8	8.0	7.9	7.8	8.3	7.6	8.1	7.7	8.1	7.7	8.2	7.1			
pH	8.0	7.7	8.0	7.8	8.3	8.0	8.0	7.9	8.0	7.7	8.1	7.6			
Cond. (µS/cm)	225	214		218		EMM ~~210~~ 225		230		228		223			
Initials	KLP	EMM		JW		MD		MLT		EMM		JW			JW

Concentration: 12.5% (v/v)

	Days														
	0	1		2		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	JW old	new		final
Temperature (°C)	24.5	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.5	24.5	24.0	24.5			
DO (mg/L)	7.8	7.9	8.0	7.8	8.2	7.6	8.2	7.6	8.1	7.8	8.2	7.2			
pH	8.0	7.7	8.0	7.9	8.3	8.0	8.0	8.0	8.0	7.8	8.0	7.6			
Cond. (µS/cm)	261	250		255		264		270		269		261			
Initials	KLP	EMM		EMM		MD		MLT		EMM		JW			JW

Concentration: 100% (v/v)

	Days														
	0	1		2		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	JW old	new		final
Temperature (°C)	25.0	24.0	24.0	25.0	25.0	25.0	24.0	25.0	24.5	24.5	24.0	24.5			
DO (mg/L)	7.9	8.0	8.0	7.8	~~8.2~~ 7.6	8.2	8.2	7.6	8.2	7.7	8.3	7.2			
pH	8.0	7.9	8.1	8.0	8.2	8.2	8.2	8.1	8.1	8.0	8.1	7.8			
Cond. (µS/cm)	551	550		550		552		564		554		542			
Initials	KLP	EMM		JW		MD		MLT		EMM		JW			JW

	Control	100% (v/v)		
Hardness*	100	288		
Alkalinity*	90	166		

* mg/L as CaCO3

Analysts: EMM, MLT, AWD, EC, JW

Reviewed by:

Date reviewed: June 2/15

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L) ; pH = 6 to 8.5

Sample Description: clear

Comments: **Broodboard Used:** BB042415A (Test tubes 1-11, 14, ~~16~~ MD 14, 16)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: LC ~~FRDSOC~~ FRDSOC_WS_2015-05-05_N
Work Order: 15376

Start Date & Time: May 6/15 @1240h
Stop Date & Time: May 12/15 @ ~~1300h~~ 1600h
Set up by: MLT MLT

% (v/v)

Days	Concentration: Control										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	4	3	3	2	3	3	3	3	3	⇨
5	8	7	8	7	7	7	7	7	7	7	JW
6	11	10	12	11	11	10	11	11	11	8	JW
7											
8											
Total	22	21	23	21	21	20	21	21	21	18	JW

Days	Concentration: 1.56										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	2	✓	✓	3	3	3	2	3	2	⇨
5	9	8	8	5	7	8	7	8	✓	7	JW
6	11	10	12	9	12	13	11	11	11	11	JW
7											
8											
Total	23	20	20	14	22	24	21	21	14	20	JW

Days	Concentration: 3.12										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	3	2	3	2	3	3	2	3	3	⇨
5	7	7	8	5	8	6	7	8	6	7	JW
6	11	12	7	✓	11	11	11	11	11	12	JW
7											
8											
Total	21	22	17	8	21	20	21	21	20	22	JW

Days	Concentration: 6.25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	3	2	3	3	3	2	2	3	✓	⇨
5	✓	8	6	7	9X	7	8	8	6	4	JW
6	12	11	12	12	1	10	12	10	10	10	JW
7					1						
8					1						
Total	15	22	20	22	12X	20	22	20	19	14	JW

Days	Concentration: 12.5										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	2	2	3	2	3	3	2	2	3	3	⇨
5	7	8	6	7	8	6	6	8	8	8	JW
6	12	10	11	9	12	10	10	11	9	10	JW
7											
8											
Total	21	20	20	18	23	19	18	21	20	21	JW

Days	Concentration: 25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	2	2	3	3	3	3	3	3	3	3	⇨
5	6	8	8	8	7	7	6	6	✓	8	JW
6	9	11	10	10	10	9	✓	X 10	8	11	JW
7											
8											
Total	17	21	21	21	20	19	9	19	11	22	JW

Days	Concentration: 50										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	2	3	2	3	3	3	2	2	/	3	⇨
5	6	8	7	6	8	7	6	9	7	7	JW
6	10	11	10	11	11	9	10	12	13	11	JW
7											
8											
Total	18	22	19	20	22	19	18	23	20	21	JW

Days	Concentration: 100										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	2	3	✓	3	2	3	2	2	3	⇨
5	✓	7	6	4	6	3	5	8	8	6	JW
6	5	10	10	11	10	11	✓	11	12	✓	JW
7											
8											
Total	5	19	19	15	19	16	8	21	22	9	JW

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: clear
Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: EL
Date reviewed: June 2/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-4947-4808	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:55	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	20-2702-3340	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Mimi Tran
Start Date:	06 May-15 12:40	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	12 May-15 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	20-4735-3291	**Code:**	7A0821CB	**Client:**	Teck Coal
Sample Date:	05 May-15 13:32	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	23h (6 °C)	**Station:**	LC_FRDSDC_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	82165	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	0	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

June 2/15

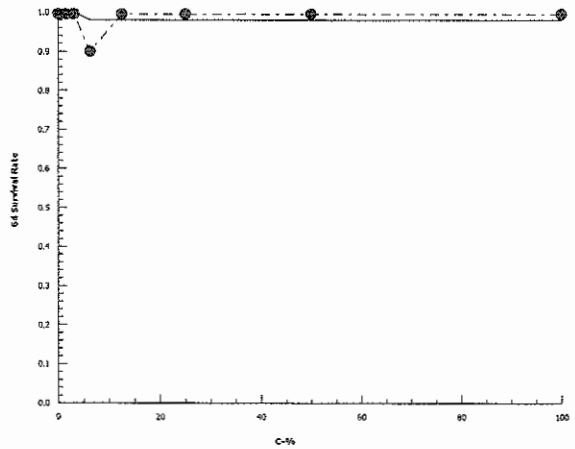
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-4947-4808	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:55	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



June 2/15

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	20-6981-3209	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:33	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	20-2702-3340	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Mimi Tran
Start Date:	06 May-15 12:40	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	12 May-15 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	20-4735-3291	**Code:**	7A0821CB	**Client:**	Teck Coal
Sample Date:	05 May-15 13:32	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	23h (6 °C)	**Station:**	LC_FRDSDC_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1509842	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	1.659	0.5895	52.2	60.29	1.916	169.6
IC10	52.73	1.527	74.61	1.896	1.34	65.5
IC15	63.84	22.52	N/A	1.566	NA	4.44
IC20	77.24	57.99	N/A	1.295	NA	1.725
IC25	93.41	68.41	N/A	1.071	NA	1.462
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	20.9	18	23	0.4069	1.287	6.16%	0.0%
1.56		10	19.9	14	24	1.069	3.381	16.99%	4.79%
3.12		10	19.3	8	22	1.334	4.218	21.85%	7.66%
6.25		10	18.6	12	22	1.147	3.627	19.5%	11.0%
12.5		10	20.1	18	23	0.4819	1.524	7.58%	3.83%
25		10	18	9	22	1.414	4.472	24.85%	13.88%
50		10	20.2	18	23	0.5538	1.751	8.67%	3.35%
100		10	15.3	5	22	1.88	5.945	38.86%	26.79%

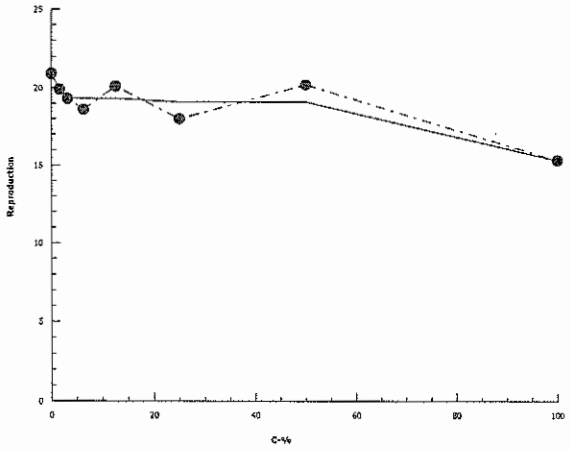
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	22	21	23	21	21	20	21	21	21	18
1.56		23	20	20	14	22	24	21	21	14	20
3.12		21	22	17	8	21	20	21	21	20	22
6.25		15	22	20	22	12	20	22	20	19	14
12.5		21	20	20	18	23	19	18	21	20	21
25		17	21	21	21	20	19	9	19	11	22
50		18	22	19	20	22	19	18	23	20	21
100		5	19	19	15	19	16	8	21	22	9

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID:	20-6981-3209	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:33	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 2/15

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 15376

Start Date/Time: May 6/15 @ 1320h
Set up by: MLT

Sample Information:

Sample ID: LC_DCDS_WS_2015-05-05_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 1X20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: D042815A, D042815B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 17
Mortality (%) in previous 7 d: 5
Individual female # used ≥8 young on test day 1,3,4,6,7,10,11,12,13,14,15,16,17,18,22,23,24,31,33,34,35,36,

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd128
Stock Solution ID: 15NaCl02
Date Initiated: April 22/15

7-d LC50 (95% CL): 2.1 (2.0 - 2.2) g/L NaCl
7-d IC50 (95% CL): 1.4 (0.9 - 1.7) g/L NaCl

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.6-2.4) g/L NaCl CV (%): 11
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-1.9) g/L NaCl CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]
Date reviewed: June 2/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: LC-DCDS_WS_2015-05-05_N
Work Order #: 15376
Start Date & Time: May 6/15 @ 13:20h
Stop Date & Time: May 12/15 @ 15:00h
Test Species: *Ceriodaphnia dubia*

Concentration: control	Days														
	0	1		2		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	old	new		final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	23.5	25.0	24.0	25.0			
DO (mg/L)	8.1	7.9	8.0	7.9	8.2	7.7	8.2	7.9	8.1	7.5	8.2	7.3			
pH	8.0	7.7	7.9	7.6	8.0	7.7	8.1	7.7	8.0	7.7	8.0	7.6			
Cond. (µS/cm)	218	209		213		218		223		220		231			
Initials	KLP	EMM		JW		EMM		MLT		EMM		JW			

Concentration: 1.56% (v/v)	Days														
	0	1		2 24.0		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	old	new		final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.5	25.0	24.0	25.0			
DO (mg/L)	7.9	7.8	8.0	8.0	8.3	7.6	8.1	7.5	8.1	7.5	8.2	7.3			
pH	7.9	7.7	7.9	7.7	8.3	7.7	7.8	7.9	8.0	7.9	8.0	7.6			
Cond. (µS/cm)	217	212		211		219		223		220		231			
Initials	KLP	EMM		JW		EMM		MLT		EMM		JW			

Concentration: 12.5% (v/v)	Days														
	0	1		2		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	old	new		final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.5	25.0	24.0	25.0			
DO (mg/L)	7.9	7.9	7.9	7.9	8.3	7.7	8.2	7.6	8.0	7.6	8.2	7.4			
pH	7.8	7.7	7.9	7.7	8.3	7.6	7.8	7.9	8.1	7.9	8.0	7.6			
Cond. (µS/cm)	215	207		211		216		220		218		229			
Initials	KLP	EMM		JW		EMM		MLT		EMM		JW			

Concentration: 100% (v/v)	Days														
	0	1		2		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	old	new		final
Temperature (°C)	24.0	24.0	24.0	25.0	24.5	25.0	24.0	25.0	24.5	25.0	24.0	25.0			
DO (mg/L)	7.9	7.8	7.9	7.8	8.3	7.7	8.2	7.6	8.0	7.6	8.2	7.3			
pH	7.7	7.7	7.8	7.7	8.2	7.6	7.9	7.8	8.0	7.8	8.0	7.6			
Cond. (µS/cm)	189	187		189		189		189		191		202			
Initials	KLP	EMM		JW		EMM		MLT		EMM		JW			

	Control	100% (v/v)		
Hardness*	150	90		
Alkalinity*	90	92		

* mg/L as CaCO3

Analysts: EMM, MLT, AWD, EC, JW

Reviewed by: EC

Date reviewed: June 2/15

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L) ; pH = 6 to 8.5

Sample Description: clear, some ppt present

Comments: **Broodboard Used:** BB042815 A+B (1,3,4,6,7,10,11-18,22-24,31,33-36,39)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: LC DCDS_WS_2015-05-05_N
Work Order: 15376

Start Date & Time: May 6/15 @ 1320h
Stop Date & Time: May 12/15 @ 1500h
Set up by: MLT

% (v/v)

Concentration: Control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	fmm
3	✓	X	✓	3	✓	✓	✓	✓	✓	3	fmm
4	4	↓	3	✓	3	3	3	3	3	✓	A
5	8		9	6	7	7	7	8	8	6	fmm
6	10		8	9	10	9	9	10	4	8	JW
7											
8											
Total	22	0X	20	18	20	19	19	21	15	17	MLT

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	fmm
3	✓	✓	✓	2	✓	✓	✓	✓	✓	✓	fmm
4	3	3	2	✓	3	2	3✓	3	3	3	A
5	6	8	6	7	7	6	3	7	8	8	fmm
6	11	12	9	12	10	10	6	10	11	9	JW
7											
8											
Total	20	23	17	21	20	18	9	20	22	20	MLT

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	fmm
3	✓	✓	✓	✓	3	✓	✓	✓	✓	✓	fmm
4	3	2	3	2	✓	3	2	2	3	3	A
5	6	7	7	5	8	6	6	7	8	7	fmm
6	12	9	11	11	9	11	✓	10	11	10	JW
7											
8											
Total	21	18	21	18	20	20	8	19	22	20	MLT

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	fmm
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	fmm
4	3	2	3	3	3	3	4	3	3	2	A
5	8	6	8	9	8	7	8	7	6	6	fmm
6	11	10	10	10	10	10	10	11	10	11	JW
7											
8											
Total	22	18	21	22	21	20	22	21	19	19	MLT

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	fmm
3	✓	4	✓	✓	✓	✓	✓	✓	✓	✓	fmm
4	✓	✓	3	2	3	3	3	3	3	3	A
5	5	8	7	6	7	8	7	6	7	7	fmm
6	10	11	11	✓	10	8	✓	11	10	8	JW
7											
8	MLT										
Total	15 15	23	21	8	20	19	10	20	20	18	MLT

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	fmm
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	fmm
4	3	4	✓	2	3	3	3	✓	2	4	A
5	8	8	4	6	6	7	8	4	6	7	fmm
6	10	✓	11	10	9	12	✓	10	6	9	JW
7											
8											
Total	21	12	15	18	18	22	11	14	14	20	MLT

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	fmm
3	✓	✓	✓	3	✓	✓	✓	✓	2	✓	fmm
4	3	2	✓	✓	3	3	2	2	✓	✓	A
5	6	7	4	8	9		7	7	6	9	fmm
6	9	11	9	9	2		10	8	10	10	JW
7											
8		20									
Total	18	18 MLT	13	20	14	3X	19	17	18	14	MLT

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	fmm
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	fmm
4	4	2	3	3	✓	3	2	2	2	✓	A
5	8	7	6	6	4	6	6	7	6	5	fmm
6	✓	8	4	9	8	✓	9	8	10	10	JW
7											
8											
Total	12	17	13	18	12	9	17	17	18	15	MLT

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: clear, some ppt present

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]

Date reviewed: June 2/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-1122-9588	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-0889-2617	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Mimi Tran
Start Date:	06 May-15 13:20	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	12 May-15 15:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	12-7328-6829	**Code:**	4BE4D0AD	**Client:**	Teck Coal
Sample Date:	05 May-15 11:14	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	26h (7.8 °C)	**Station:**	LC_DCDS_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2019556	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
1.56		10	1	1	1	0	0	0.0%	-11.11%	10	10
3.12		10	1	1	1	0	0	0.0%	-11.11%	10	10
6.25		10	1	1	1	0	0	0.0%	-11.11%	10	10
12.5		10	1	1	1	0	0	0.0%	-11.11%	10	10
25		10	1	1	1	0	0	0.0%	-11.11%	10	10
50		10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
100		10	1	1	1	0	0	0.0%	-11.11%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	0	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	0	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

June 2/15

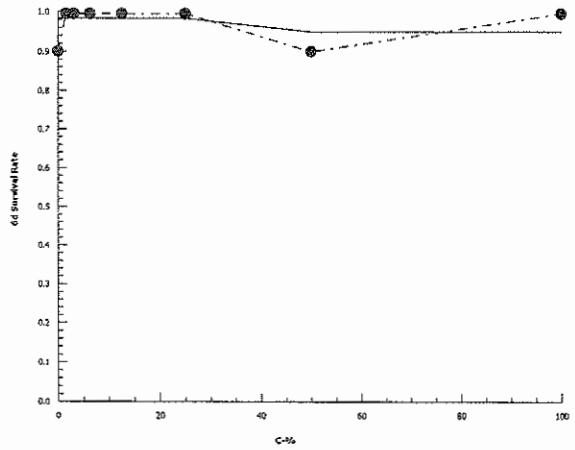
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-1122-9588	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



June 2/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-3209-1811	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:15	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-0889-2617	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Mimi Tran
Start Date:	06 May-15 13:20	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	12 May-15 15:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	12-7328-6829	**Code:**	4BE4D0AD	**Client:**	Teck Coal
Sample Date:	05 May-15 11:14	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	26h (7.8 °C)	**Station:**	LC_DCDS_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1632692	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	9.931	3.023	42.54	10.07	2.351	33.08
IC10	17.84	8.482	72.8	5.606	1.374	11.79
IC15	36.77	10.48	N/A	2.72	NA	9.542
IC20	79.89	12.41	N/A	1.252	NA	8.056
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	17.1	0	22	2.002	6.332	37.03%	0.0%
1.56		10	19	9	23	1.238	3.916	20.61%	-11.11%
3.12		10	18.7	8	22	1.257	3.974	21.25%	-9.36%
6.25		10	20.5	18	22	0.4534	1.434	6.99%	-19.88%
12.5		10	17.4	8	23	1.551	4.904	28.18%	-1.75%
25		10	16.5	11	22	1.213	3.837	23.25%	3.51%
50		10	15.6	3	20	1.614	5.103	32.71%	8.77%
100		10	14.8	9	18	0.9866	3.12	21.08%	13.45%

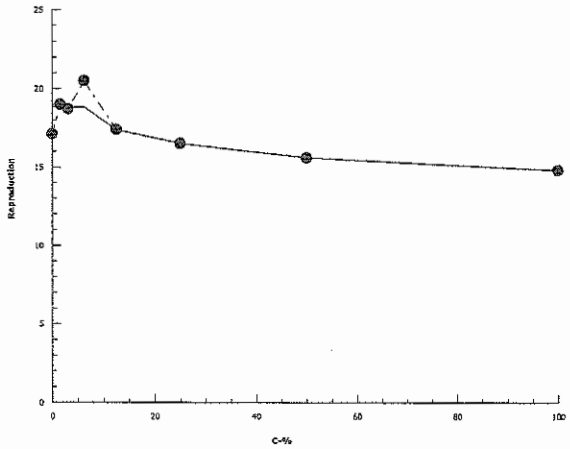
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	22	0	20	18	20	19	19	21	15	17
1.56		20	23	17	21	20	18	9	20	22	20
3.12		21	18	21	18	20	20	8	19	22	20
6.25		22	18	21	22	21	20	22	21	19	19
12.5		15	23	21	8	20	19	10	20	20	18
25		21	12	15	18	18	22	11	14	14	20
50		18	20	13	20	14	3	19	17	18	14
100		12	17	13	18	12	9	17	17	18	15

June 2/15

Analysis ID:	03-3209-1811	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:15	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 15376

Start Date/Time: May 6/15 @ 1230h
Set up by: MLT

Sample Information:

Sample ID: LC_LC5_WS_2015-05-06_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 1x20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 042815A , 042815B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 17
Mortality (%) in previous 7 d: 5
Individual female # used ≥8 young on test day 1,3,4,6,7,10,11,12,13,14,15,16,17,18,22,23,24,31,33,34,35,36,3

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd128
Stock Solution ID: 15Na02
Date Initiated: April 22/15

7-d LC50 (95% CL): 2.1 (2.0 - 2.2) g/L NaCL
7-d IC50 (95% CL): 1.4 (0.9 - 1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.6 - 2.4) g/L NaCL CV (%): 11
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2 - 1.9) g/L NaCL CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]
Date reviewed: June 2/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: LC_LC5_WS_2015-05-06_N
Work Order #: 15376

Start Date & Time: May 6/15 @ 1230h
Stop Date & Time: May 12/15 @ ~~1300h~~ 1600h MLT
Test Species: *Ceriodaphnia dubia*

Concentration: Control	Days														
	0	1		2		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	old	new		final
Temperature (°C)	24.0	24.0	24.0	24.0	24.0	25.0	24.0	~~25.0~~	~~24.5~~	25.0	24.0	25.0			
DO (mg/L)	8.1	8.0	8.0	8.0	8.2	7.6	8.2	7.4	8.1	7.7	8.2	7.8			
pH	8.0	7.5	7.9	7.2	8.0	7.9	8.1	7.7	8.0	7.7	8.0	7.7			
Cond. (µS/cm)	218	209		213		218		223		220		218			
Initials	KLP	EMM		JW		EMM		~~AMLT~~ MLT		EMM		MLT			

① 25.0

Concentration: 1.56% (v/v)	Days														
	0	1		2		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	old	new		final
Temperature (°C)	24.5	24.0	24.0	24.0	24.0	25.0	24.0	~~25.0~~	~~24.5~~	25.0	24.0	25.0			
DO (mg/L)	7.8	8.1	8.1	8.0	8.2	7.6	8.2	~~7.5~~	8.1	7.6	8.1	7.8			
pH	7.9	7.5	7.9	7.7	8.2	8.0	8.1	~~7.8~~	8.0	7.8	8.0	7.7			
Cond. (µS/cm)	228	215		218		223		226		222		221			
Initials	KLP	EMM		JW		EMM		~~AMLT~~ MLT		EMM		MLT			

Concentration: 12.5% (v/v)	Days														
	0	1		2		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	old	new		final
Temperature (°C)	25.0	24.0	24.0	24.0	24.5	25.0	24.0	~~25.0~~	~~24.5~~	25.0	24.0	25.0			
DO (mg/L)	7.8	8.0	8.1	7.8	~~8.2~~ 8.2	7.5	8.2	~~7.4~~	8.1	7.6	~~8.2~~ 8.2	7.8			
pH	7.9	7.7	7.9	7.8	8.2	8.1	8.2	~~7.9~~	8.1	7.9	~~8.1~~ 8.1	7.7			
Cond. (µS/cm)	267	257		238		260		270		265		262			
Initials	KLP	EMM		JW		EMM		~~AMLT~~ MLT		EMM		MLT			

Concentration: 100% (v/v)	Days														
	0	1		2		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	old	new		final
Temperature (°C)	25.0	24.0	24.0	24.0	24.5	25.0	24.0	~~25.0~~	~~24.5~~	25.0	24.0	25.0			
DO (mg/L)	8.0	8.0	8.2	7.8	~~8.3~~ 8.3	7.6	8.3	~~7.5~~	8.1	7.6	8.2	7.8			
pH	7.9	7.9	8.1	8.0	8.3	8.2	8.3	~~8.1~~	8.2	8.0	8.2	8.0			
Cond. (µS/cm)	564	561		564		563		574		566		556			
Initials	KLP	EMM		EC		EMM		~~AMLT~~ MLT		EMM		MLT			

	Control	100% (v/v)		
Hardness*	100	282		
Alkalinity*	90	364		

* mg/L as CaCO3

Analysts: EMM, MLT, AWD, EC
Reviewed by: [signature]
Date reviewed: June 7/15

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L) ; pH = 6 to 8.5

Sample Description: clear

Comments: **Broodboard Used:** BB 042815 A+B (1,3,4,6,7,10,11-18,22-24,31,33-36,39)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: LC_165_WS_2015-05-06_N
Work Order: 15376

Start Date & Time: May 6/15 @ 1230h
Stop Date & Time: May 12/15 @ ~~1300h~~ 1600h MG
Set up by: MLT

% (v/v)

Days	Concentration: Control										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
3	✓	4	✓	✓	✓	✓	✓	✓	3	✓	MLT
4	4	✓	3	3	3	3	3	4	✓	X	A
5	6	6	7	✓	7	7	8	6	7	|	FMM
6	10	11	10	9	12	9	10	9	10	|	MLT
7											
8											
Total	20	21	20	12	22	19	21	19	20	3X	MLT

Days	Concentration: 1.56										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
3	✓	✓	✓	✓	✓	✓	✓	X	✓	4	MLT
4	3	4	4	✓	3	2	4	|	3	✓	A
5	6	7	✓	4	7	6	8	|	7	6	FMM
6	10	10	11	10	9	8	10	|	9	11	MLT
7											
8											
Total	19	21	15	14	19	16	22	0X	19	21	MLT

Days	Concentration: 3.12										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
3	4	✓	✓	3	3	✓	3	4	✓	✓	MLT
4	✓	3	3	✓	✓	3	✓	✓	3	3	A
5	7	6	6	7	6	6	7	7	5	8	FMM
6	9	9	11	9	12	12	11	11	10	11	MLT
7											
8											
Total	20	18	20	19	21	21	21	22	18	22	MLT

Days	Concentration: 6.25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
3	✓	4	✓	✓	✓	✓	✓	✓	3	✓	MLT
4	4	✓	3	3	2	3	2	2	✓	3	A
5	8	7	6	6	5	✓	7	6	7	8	FMM
6	10	10	9	✓	✓	8	9	10	10	11	MLT
7											
8											
Total	22	22	18	9	7	11	18	18	20	22	MLT

Days	Concentration: 12.5										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
3	✓	✓	✓	3	✓	✓	✓	✓	4	✓	MLT
4	✓	2	3	✓	2	3	2	3	✓	3	A
5	4	6	7	6	✓	✓	7	7	8	7	FMM
6	12	10	12	11	12	8	10	9	10	11	MLT
7											
8											
Total	16	18	22	20	14	11	19	19	22	21	MLT

Days	Concentration: 25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
3	✓	✓	✓	✓	✓	✓	✓	3	✓	✓	MLT
4	3	3	3	✓	✓	3	2	✓	3	2	A
5	6	✓	8	6	4	8	6	6	9	7	FMM
6	9	9	11	11	11	10	11	10	11	10	MLT
7											
8											
Total	18	12	22	17	15	21	19	19	23	19	MLT

Days	Concentration: 50										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
4	✓	4	3	~~3~~	3	✓	4	2	3	✓	A
5	4	✓	7	✓	8	4	8	7	7	4	FMM
6	11	12	9	10	10	11	12	11	0X	10	MLT
7									|		
8											
Total	15	16	19	13	21	15	24	20	10X	14	MLT

Days	Concentration: 100										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
4	4	✓	2	4	3	✓	✓	3	3	✓	A
5	✓	6	5	✓	8	6	5	8	✓	5	FMM
6	11	11	13	12	✓	10	10	11	10	11	MLT
7											
8											
Total	15	17	20	16	11	16	15	22	13	16	MLT

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: Clear

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]

Date reviewed: June 2/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	04-6000-7899	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 12:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-8758-6864	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Mimi Tran
Start Date:	06 May-15 13:20	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	12 May-15 15:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	11-8749-7839	**Code:**	46C7C76F	**Client:**	Teck Coal
Sample Date:	05 May-15 14:02	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	23h (6.8 °C)	**Station:**	LC_LC5_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	186908	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
1.56		10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
3.12		10	1	1	1	0	0	0.0%	-11.11%	10	10
6.25		10	1	1	1	0	0	0.0%	-11.11%	10	10
12.5		10	1	1	1	0	0	0.0%	-11.11%	10	10
25		10	1	1	1	0	0	0.0%	-11.11%	10	10
50		10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
100		10	1	1	1	0	0	0.0%	-11.11%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	0
1.56		1	1	1	1	1	1	1	0	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	0	1
100		1	1	1	1	1	1	1	1	1	1

June 7/15

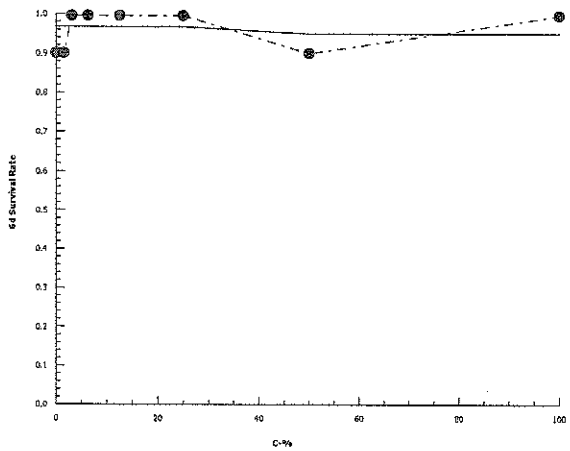
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	04-6000-7899	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 12:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



June 2/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	08-6980-2188	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-8758-6864	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Mimi Tran
Start Date:	06 May-15 13:20	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	12 May-15 15:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	11-8749-7839	**Code:**	46C7C76F	**Client:**	Teck Coal
Sample Date:	05 May-15 14:02	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	23h (6.8 °C)	**Station:**	LC_LC5_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	873476	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	37.4	0.4757	N/A	2.674	NA	210.2
IC10	83.18	1.178	N/A	1.202	NA	84.9
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	17.4	0	22	2.12	6.703	38.52%	0.0%
1.56		10	16.6	0	22	2.029	6.415	38.65%	4.6%
3.12		10	20.2	18	22	0.4667	1.476	7.31%	-16.09%
6.25		10	16.7	7	22	1.783	5.638	33.76%	4.02%
12.5		10	18.2	11	22	1.133	3.584	19.69%	-4.6%
25		10	18.5	12	23	1.035	3.274	17.7%	-6.32%
50		10	16.7	10	24	1.334	4.218	25.26%	4.02%
100		10	16.1	11	22	0.9939	3.143	19.52%	7.47%

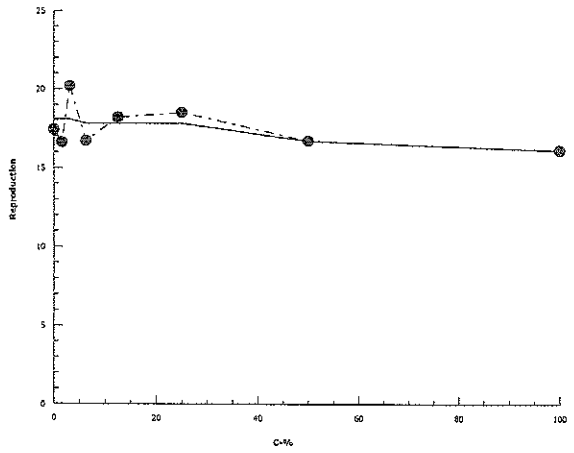
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	20	21	20	12	22	19	21	19	20	0
1.56		19	21	15	14	19	16	22	0	19	21
3.12		20	18	20	19	21	21	21	22	18	22
6.25		22	22	18	9	7	11	18	18	20	22
12.5		16	18	22	20	14	11	19	19	22	21
25		18	12	22	17	15	21	19	19	23	19
50		15	16	19	13	21	15	24	20	10	14
100		15	17	20	16	11	16	15	22	13	16

June 2/15

Analysis ID:	08-6980-2188	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA:_____

Client: Teck Coal

W.O.#: 15376

Hardness and Alkalinity Datasheet

	Alkalinity					Hardness			
Sample ID	Sample Date May 6/15	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity (mg/L$CaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness (mg/L $CaCO_3$)	Technician
LC-FRD SDC	~~50.0~~ KS ~~May 6/15~~ MLT KS	~~8.~~ KS 50.0	8.5	8.7	166	50.0	14.4	288	KS
LC-LC3	May 6/15	50.0	9.3	9.5	182	10.0 ①	4.7	470	KS
LC-LC5	May 6/15	50.0	18.4	18.6	364	50.0	14.1	282	KS
LC-LCDSSLCC	May 6/15	50.0	~~8.9~~ KS 8.4	8.5	166	50.0	13.4	268	KS
LC-DC1	May 6/15	50.0	5.1	5.2	100	50.0	7.2	144	KS
LC-DCDS	May 6/15	50.0	4.8	5.0	92	10 ①	0.9	90	KS
20% Derrier Control	May 6/15	50	MLT ~~4.6~~ 4.6	4.7	90	50	5.0	100	MLT

Notes: ① Diluted to 100.0mL with D.I. water

Reviewed by: [signature]

Date Reviewed: June 2/15

APPENDIX B – Rainbow Trout Embryo *(Oncorhynchus mykiss)* Toxicity Test Data

Rainbow Trout Embryo Summary Sheet

Client: Teck Coal (Line Creek) Start Date/Time: April 29, 2015 @ 1545

Work Order No.: 15365 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_LCDSSLCC_WS-2015-28-N
Sample Date: April 28, 2015
Date Received: April 29, 2015
Sample Volume: 8 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 6

Test Organism Information:

Batch No.: 042915
Source: Vancouver Island Trout Hatchery, Duncan, B.C.
Loading Density: 1.44 g/L

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE74
Stock Solution ID: 14504
Date Initiated: April 29 2015
7-d EC50 (95% CL): 6.7 (6.5-7.0) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.2-7.6) mg/L SDS
Reference Toxicant CV (%): ~~37~~ 36

Test Results:

	Sample ID		
	LC_LCDSSLCC_WS-2015-28-N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: Date reviewed: June 2/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck (Line Creek) **Start Date & Time:** April 29/15 @ 1545 h
Sample ID: LC_LCDSSLLC_WS-2015-28_N **Stop Date & Time:** May 6/15 @ 1100 h
Work Order #: 15365 **Test Species:** *Oncorhynchus mykiss*

% (v/v) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.0	9.9	10.0	10.1	10.2	10.0	10.2	10.0	10.0	9.8	10.1	9.9	10.1
pH	6.8	7.2	7.1	7.2	7.2	7.2	7.1	7.2	7.1	6.9	7.1	7.0	7.2	7.1
Cond. (µS/cm)	28	28		28		28		28		29		28		33
Initials	A	SSD		SSD		A		A		SSD		EC		YML

6.25 Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.2	10.2	9.8	10.1	10.1	10.2	10.1	10.1	10.1	10.0	9.9	10.0	10.0	10.1
pH	7.3	7.5	7.3	7.6	7.3	7.4	7.5	7.5	7.6	7.3	7.5	7.2	7.4	7.5
Cond. (µS/cm)	63	74		61		70		71		74		66		70
Initials	A	SSD		SSD		A		A		SSD		EC		YML

25 Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.2	9.9	10.1	10.1	10.1	10.0	10.1	10.0	10.0	10.0	9.9	10.0	10.1
pH	7.3	7.5	7.4	7.6	7.4	7.6	7.7	7.4	7.9	7.6	7.6	7.6	7.7	7.8
Cond. (µS/cm)	189	188		175		189		185		192		181		183
Initials	A	SSD		SSD		A		A		SSD		EC		YML

100 Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.2	9.9	10.1	10.1	10.1	10.0	10.2	10.1	9.9	10.0	9.9	10.0	10.1
pH	8.1	8.2	8.1	8.2	8.0	8.1	8.1	8.1	8.2	8.1	8.1	8.1	8.3	8.2
Cond. (µS/cm)	616	621		637		635		638		616		620		623
Initials	A	SSD		SSD		A		A		SSD		EC		YML

DO meter: DO - 1/3 **pH meter:** pH 1/3 **Conductivity meter:** C - 1/3

	Control	100%		
Hardness*	10	322		
Alkalinity*	0	176		

* mg/L as CaCO3

Analysts: AW, SSD, EC, YML

Reviewed by: [signature]

Date reviewed: June 2/15

Sample Description: clear

Comments:

Embryo-~~Alevin-Fry~~ Toxicity Test
Daily Mortality

Client: Teck (Line Creek) **Start Date & Time:** April 29/15 @ 1545h
Sample ID: LC-LCD SS LCC-WS-2015-28-N **Stop Date:** May 6/15 @ 1100
Work Order #: 15365 **Test Species:** O. mykiss

Treatments (%)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs/ ~~Embryos~~ ~~Alevins~~ Embryos	Total Undeveloped/ Unhatched Embryos	Total No. ~~Alevins~~ Embryos	Total Exposed
Control	1	0	0	0	0	0	0	1	1	2	25	28
	2							1	1	1	27	29
	3							1	1	3	25	29
	4							0	0	1	27	28
6.25	1						1	2	3	2	23	28
	2						0	1	1	1	27	29
	3							1	1	5	24	30
	4							1	1	4	23	28
12.5	1						1	2	3	1	24	28
	2						1	0	1	3	26	30
	3						0	0	0	5	25	30
	4							2	2	7	21	30
25	1							1	1	3	26	30
	2							1	1	3	27	31
	3						1	1	2	2	25	29
	4						1	0	1	0	27	29
50	1						0	0	0	4	24	28
	2						0	0	0	3	26	29
	3						1	0	1	2	25	28
	4						1	1	2	3	23	28
100	1						0	1	1	3	26	30
	2						0	0	0	3	26	29
	3						1	1	2	1	29	31
	4						1	1	2	3	23	28
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SD	EC	A	A	EC	EC					

Comments: _____

Reviewed by: _____ **Date reviewed:** June 2/15

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	04-6211-7754	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	04-7028-9446	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	06 May-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	05-7061-6078	**Code:**	2202E90E	**Client:**	Teck Coal
Sample Date:	28 Apr-15 10:27	**Material:**	Water Sample	**Project:**	
Receive Date:	29 Apr-15 07:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	29h (8 °C)	**Station:**	LC_LCDSSLCC_WS_2015-28_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1813744	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	4.189	0.267	N/A	23.87	NA	374.5
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9126	0.8621	0.9643	0.02228	0.04455	4.88%	0.0%	104	114
6.25		4	0.8435	0.8	0.931	0.02962	0.05924	7.02%	7.57%	97	115
12.5		4	0.8143	0.7	0.8667	0.03873	0.07747	9.51%	10.77%	96	118
25		4	0.891	0.8621	0.9643	0.0245	0.04899	5.5%	2.36%	105	118
50		4	0.867	0.8214	0.8966	0.0176	0.03519	4.06%	4.99%	98	113
100		4	0.872	0.8214	0.9032	0.01863	0.03725	4.27%	4.45%	103	118

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.8929	0.931	0.8621	0.9643
6.25		0.8214	0.931	0.8	0.8214
12.5		0.8571	0.8667	0.8333	0.7
25		0.8667	0.871	0.8621	0.9643
50		0.8571	0.8966	0.8929	0.8214
100		0.8667	0.8966	0.9032	0.8214

Proportion Normal Binomials

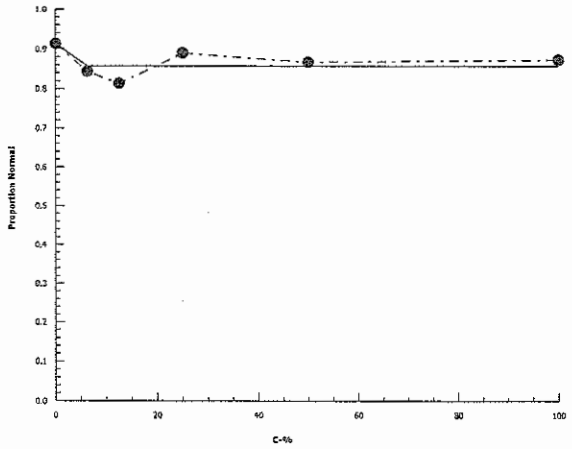
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	25/28	27/29	25/29	27/28
6.25		23/28	27/29	24/30	23/28
12.5		24/28	26/30	25/30	21/30
25		26/30	27/31	25/29	27/28
50		24/28	26/29	25/28	23/28
100		26/30	26/29	28/31	23/28

June 2/15

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	04-6211-7754	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Jike 2/15

Rainbow Trout Embryo Summary Sheet

Client: Teck Coal (Line Creek) Start Date/Time: April 29, 2015 @ 1545h

Work Order No.: 15365 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_LC3_2015-04-28_N
Sample Date: April 28, 2015
Date Received: April 29, 2015
Sample Volume: 3 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 6

Test Organism Information:

Batch No.: 042915
Source: Vancouver Island Trout Hatchery, Duncan, B.C.
Loading Density: 1.44 g/L

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE74
Stock Solution ID: 14504
Date Initiated: April 29 2015
7-d EC50 (95% CL): 6.7 (6.5-7.0) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.2-7.6) mg/L SDS
Reference Toxicant CV (%): ~~37~~ 36

Test Results:

	Sample ID		
	LC_LC3_2015-04-28_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: Date reviewed: June 2/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck (Line Creek) inc **Start Date & Time:** April 29/15 @ 1545
Sample ID: LC - LC3 WS-2015-04-28.N **Stop Date & Time:** May 6/15 @ 1100
Work Order #: 15365 **Test Species:** *Oncorhynchus mykiss*

% (v/v) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.0	9.8	10.0	9.9	10.2	10.0	10.2	10.1	10.0	10.0	10.1	10.0	10.0
pH	6.8	7.2	7.2	7.2	7.2	7.2	7.1	7.2	7.1	6.9	7.2	7.0	7.4	7.3
Cond. (µS/cm)	28	29		26		28		28		29		28		33
Initials	A	SSD		SSD		A		A		SSD		CL		YML

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.2	10.2	9.9	10.1	9.9	10.1	10.0	10.2	10.1	10.1	9.9	10.0	10.0	10.0
pH	6.9	7.0	7.2	7.6	7.4	7.3	7.4	7.4	7.5	7.2	7.5	7.2	7.15	7.4
Cond. (µS/cm)	67	72		78		79		80		78		79		79
Initials	A	SSD		SSD		A		A		SSD		CL		YML

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.2	10.2	9.9	10.1	10.1	10.1	9.9	10.2	10.1	10.1	10.0	10.1	10.1	10.0
pH	7.1	7.2	7.3	7.6	7.5	7.6	7.5	7.5	7.7	7.7	7.6	7.6	7.7	7.7
Cond. (µS/cm)	247	255		235		241		238		257		245		254
Initials	A	SSD		SSD		A		A		SSD		CL		YML

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.2	10.3	9.9	10.1	10.1	10.1	10.0	10.1	10.2	10.1	10.0	10.2	10.1	9.8
pH	7.6	7.7	8.0	7.9	8.0	8.0	8.0	8.1	8.2	7.9	8.1	7.9	8.2	8.2
Cond. (µS/cm)	815	819		825		824		825		822		823		852
Initials	A	SSD		SSD		A		A		SSD		CL		YML

DO meter: DO - 1/3 **pH meter:** pH 1/3 **Conductivity meter:** C - 1/3

	Control	100%		
Hardness*	10	460		
Alkalinity*	6	184		

Analysts: AM, SSD, EG, YML
Reviewed by:
Date reviewed: June 2/15

* mg/L as CaCO3

Sample Description: clear

Comments:

Embryo-~~Alevin-Fry~~ Toxicity Test
Daily Mortality

Client: Teck (Line Creek) **Start Date & Time:** April 29/15 @ 1545
Sample ID: LC LC3-~~S~~-2015-04-28-N **Stop Date:** May 6/15 @ 1100
Work Order #: 15365 **Test Species:** O. mykiss

Treatments (%)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/ ~~Embryos~~ ~~Alevins~~	Total Undeveloped/ Unhatched Embryos	Total No. ~~Alevins~~ Embryos	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	0	0	0	0	0	0	0	1	30	31
	2	↓	↓	↓	↓	↓	↓	0	0	1	27	28
	3	↓	↓	↓	↓	↓	↓	1	1	0	27	28
	4	↓	↓	↓	↓	↓	↓	0	0	2	28	30
6.25	1	↓	↓	↓	↓	↓	↓	↓	0	0	29	29
	2	↓	↓	↓	↓	↓	↓	↓	0	0	28	28
	3	↓	↓	↓	↓	↓	↓	↓	0	1	27	28
	4	↓	↓	↓	↓	↓	↓	↓	0	2	27	29
12.5	1	↓	↓	↓	↓	↓	↓	↓	0	4	~~28~~ 24	28
	2	↓	↓	↓	↓	↓	↓	↓	0	0	30	30
	3	↓	↓	↓	↓	↓	↓	↓	0	1	28	29
	4	↓	↓	↓	↓	↓	↓	↓	1	2	~~28~~ 25	28
25	1	↓	↓	↓	↓	↓	↓	0	0	0	29	29
	2	↓	↓	↓	↓	↓	1	↓	1	1	27	~~28~~ 29
	3	↓	↓	↓	↓	↓	0	↓	0	1	27	28
	4	↓	↓	↓	↓	↓	↓	↓	0	2	27	29
50	1	↓	↓	↓	↓	↓	↓	↓	0	0	28	28
	2	↓	↓	↓	↓	↓	↓	↓	0	1	30	31
	3	↓	↓	↓	↓	↓	↓	↓	0	1	27	28
	4	↓	↓	↓	↓	↓	↓	↓	0	1	28	29
100	1	↓	↓	↓	↓	↓	↓	↓	0	0	30	30
	2	↓	↓	↓	↓	~~SD~~ 1	↓	↓	1	0	27	28
	3	↓	↓	↓	↓	↓	↓	↓	0	0	28	28
	4	↓	↓	↓	↓	↓	↓	1	1	2	26	29
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	SSD	AS	AS	SSD	CS,D	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Comments: _____

Reviewed by: _____ **Date reviewed:** June 2/15

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	18-8917-5162	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:56	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	01-3747-5206	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	06 May-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	05-8517-3447	**Code:**	22E109C7	**Client:**	Teck Coal
Sample Date:	28 Apr-15 15:06	**Material:**	Water Sample	**Project:**	
Receive Date:	29 Apr-15 07:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	25h (8 °C)	**Station:**	LC_LC3_2015-04-28_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	460580	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9574	0.9333	0.9677	0.008067	0.01613	1.69%	0.0%	112	117
6.25		4	0.9738	0.931	1	0.01656	0.03313	3.4%	-1.72%	111	114
12.5		4	0.9289	0.8571	1	0.03272	0.06543	7.04%	2.98%	107	115
25		4	0.9566	0.931	1	0.01646	0.03291	3.44%	0.09%	110	115
50		4	0.9744	0.9643	1	0.008568	0.01714	1.76%	-1.77%	113	116
100		4	0.9652	0.8966	1	0.02438	0.04877	5.05%	-0.81%	111	115

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.9677	0.9643	0.9643	0.9333
6.25		1	1	0.9643	0.931
12.5		0.8571	1	0.9655	0.8929
25		1	0.931	0.9643	0.931
50		1	0.9677	0.9643	0.9655
100		1	0.9643	1	0.8966

Proportion Normal Binomials

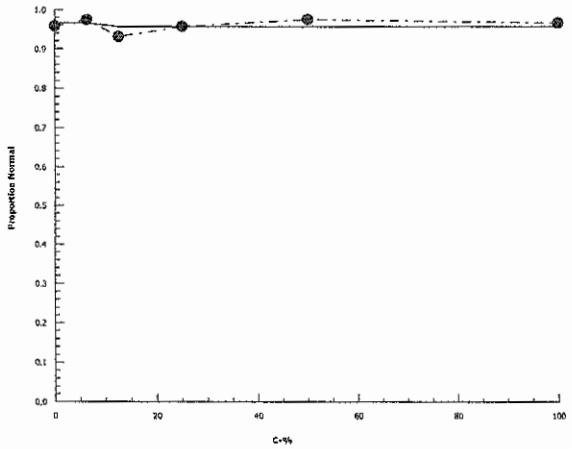
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	30/31	27/28	27/28	28/30
6.25		29/29	28/28	27/28	27/29
12.5		24/28	30/30	28/29	25/28
25		29/29	27/29	27/28	27/29
50		28/28	30/31	27/28	28/29
100		30/30	27/28	28/28	26/29

June 2/15

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	18-8917-5162	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:56	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 2/15

Rainbow Trout Embryo Summary Sheet

Client: Teck Coal (Line Creek) Start Date/Time: April 29, 2015 @ 1545 h

Work Order No.: 15365 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_DC1_WS_2015-04-28_N
Sample Date: April 28, 2015
Date Received: April 29, 2015
Sample Volume: 3 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 6

Test Organism Information:

Batch No.: 042915
Source: Vancouver Island Trout Hatchery, Duncan, B.C.
Loading Density: 1.44 g/L

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE74
Stock Solution ID: 14504
Date Initiated: April 29 2015
7-d EC50 (95% CL): 6.7 (6.5 - 7.0) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.2 - 7.6) mg/L SDS
Reference Toxicant CV (%): 37 36

Test Results:

	Sample ID		
	LC_DC1_WS_2015-04-28_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: Date reviewed: June 2/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck (Line Creek)
Sample ID: LC_DC1_WS_2015-04-28-N
Work Order #: 15365

Start Date & Time: April 29/15 @ 1545 h
Stop Date & Time: May 6/15 @ 1100 h
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.0	10.0	10.0	9.9	10.2	10.0	10.2	10.1	10.0	10.0	10.1	10.1	9.9
pH	6.8	7.2	7.2	7.2	7.3	7.2	7.1	7.2	7.2	6.9	7.1	7.0	7.2	7.1
Cond. (µS/cm)	28	28		28		28		28		29		28		30
Initials	AS	SSD		SSD		AS		AS		SSD		GL		[illegible]

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.2	10.1	10.1	10.0	10.1	10.1	10.2	10.1	10.0	10.1	10.1	10.1	9.9
pH	6.9	7.1	7.3	7.5	7.4	7.4	7.5	7.4	7.5	7.2	7.5	7.1	7.4	7.4
Cond. (µS/cm)	44	41		36		39		43		44		44		47
Initials	AS	SSD		SSD		AS		AS		SSD		GL		[illegible]

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.3	10.0	10.1	10.0	10.2	9.9	10.1	10.2	10.0	10.1	10.1	10.1	9.9
pH	7.0	7.2	7.5	7.6	7.4	7.4	7.6	7.5	7.7	7.4	7.6	7.4	7.7	7.7
Cond. (µS/cm)	80	80		~~7.6~~ 76		82		83		82		84		84
Initials	AS	SSD		SSD		AS		AS		SSD		GL		[illegible]

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.2	10.3	10.0	10.1	10.1	10.2	10.0	10.1	10.1	9.8	10.1	10.0	10.1	9.8
pH	7.8	7.5	8.0	8.2	7.9	8.0	8.1	8.1	8.2	7.9	8.0	7.9	~~8.1~~ 8.1	8.1
Cond. (µS/cm)	238	241		239		240		241		238		241		~~[illegible]~~ 241
Initials	AS	SSD		SSD		AS		AS		SSD		GL		[illegible]

DO meter: DO-1/3 **pH meter:** pH 1/3 **Conductivity meter:** C-1/3

	Control	100%		
Hardness*	10	124		
Alkalinity*	6	126		

* mg/L as CaCO3

Analysts: AWS, SSD, EC, YYC

Reviewed by: [illegible]

Date reviewed: June 2/15

Sample Description: Clear

Comments:

Embryo-~~Alevin-Fry~~ Toxicity Test
Daily Mortality

Client: Teck (Line Creek)
Sample ID: LC_DC1_WS_2015-04-28-N
Work Order #: 15365

Start Date & Time: April 29/15 @ 1545 h
Stop Date: May 6/15 @ 1100 h
Test Species: O. mykiss

Treatments (%) (v/v)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs/ Embryos ~~Alevins~~	Total Undeveloped/ Unhatched Embryos	Total No. ~~Alevins~~ Embryos	Total Exposed
Control	1	0	0	0	0	0	0	0	0	0	30	30
	2	↓	↓	↓	↓	↓	↓	↓	0	2	28	30
	3								0	1	29	30
	4								0	0	30	30
6.25	1							0	0	1	29	30
	2							1	1	0	29	30
	3							0	0	2	28	30
	4						1	↓	0	0	30	30
12.5	1						0		0	0	29	29
	2						1		1	0	29	30
	3						0		0	1	29	30
	4						1		1	0	29	30
25	1						0		0	1	29	30
	2						1		0	1	29	30
	3						↓		0	0	30	30
	4								0	1	29	30
50	1								0	0	30	30
	2								0	1	29	30
	3								0	0	30	30
	4								0	1	29	30
100	1							↓	0	0	30	30
	2							1	1	0	29	30
	3							0	0	0	30	30
	4	↓	↓	↓	↓	↓	↓	0	0	1	29	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	[illegible]	[illegible]	[illegible]	BC	BC	MMC	MMC	MMC	MMC	MMC

Comments: _____

Reviewed by: _____ **Date reviewed:** June 2/15

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	20-4603-2369	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:50	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	02-6011-7379	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	06 May-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	03-2035-3463	**Code:**	131834B7	**Client:**	Teck Coal
Sample Date:	28 Apr-15 09:49	**Material:**	Water Sample	**Project:**	
Receive Date:	29 Apr-15 07:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	30h (8 °C)	**Station:**	LC_DC1_WS_2015-04-28_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1705437	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.975	0.9333	1	0.01596	0.03191	3.27%	0.0%	117	120
6.25		4	0.9667	0.9333	1	0.01361	0.02722	2.82%	0.85%	116	120
12.5		4	0.975	0.9667	1	0.008333	0.01667	1.71%	0.0%	116	119
25		4	0.975	0.9667	1	0.008333	0.01667	1.71%	0.0%	117	120
50		4	0.9833	0.9667	1	0.009622	0.01924	1.96%	-0.85%	118	120
100		4	0.9833	0.9667	1	0.009622	0.01924	1.96%	-0.85%	118	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	0.9333	0.9667	1
6.25		0.9667	0.9667	0.9333	1
12.5		1	0.9667	0.9667	0.9667
25		0.9667	0.9667	1	0.9667
50		1	0.9667	1	0.9667
100		1	0.9667	1	0.9667

Proportion Normal Binomials

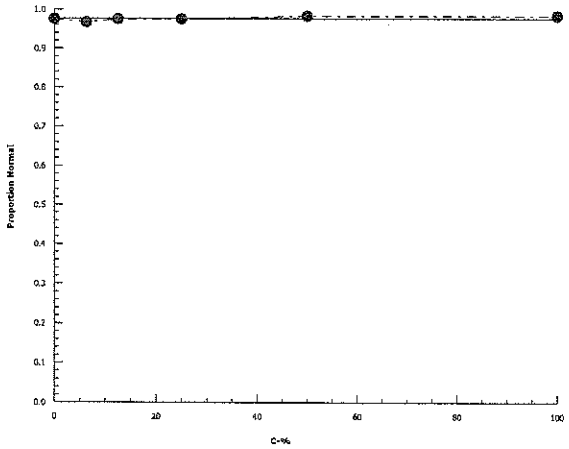
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	30/30	28/30	29/30	30/30
6.25		29/30	29/30	28/30	30/30
12.5		29/29	29/30	29/30	29/30
25		29/30	29/30	30/30	29/30
50		30/30	29/30	30/30	29/30
100		30/30	29/30	30/30	29/30

June 2/15

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	20-4603-2369	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:50	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 2/15

Rainbow Trout Embryo Summary Sheet

Client: Teck Coal (Line Creek) Start Date/Time: April 29, 2015 @ 1545h

Work Order No.: 15365 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_FRDSDC_WS_2015-04-28_N
Sample Date: April 28, 2015
Date Received: April 29, 2015
Sample Volume: 3 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 6

Test Organism Information:

Batch No.: 042915
Source: Vancouver Island Trout Hatchery, Duncan, B.C.
Loading Density: 1.44 g/L

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE74
Stock Solution ID: 14504
Date Initiated: April 29 2015
7-d EC50 (95% CL): 6.7 (6.5 - 7.0) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.2 - 7.6) mg/L SDS
Reference Toxicant CV (%): 37.36

Test Results:

	Sample ID		
	LC_FRDSDC_WS_2015-04-28_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: Date reviewed: June 2/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck (Line Creek) **Start Date & Time:** April 29/15 @ 1545 h
Sample ID: LC-FROSDC_WS_ **Stop Date & Time:** May 6/15 @ 1000 h
Work Order #: 15365 2015-04-28-N **Test Species:** *Oncorhynchus mykiss*

% (v/v) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.0	10.0	10.0	10.0	10.2	10.1	10.2	10.1	10.0	10.0	10.1	10.0	10.0
pH	6.8	7.2	7.2	7.2	7.2	7.2	7.0	7.2	7.1	6.9	7.1	7.0	7.2	7.2
Cond. (µS/cm)	28	28		28		28		28		29		28		32
Initials	A	SSD		SSD		A		A		SSD		EC		YML

6.25 Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.2	10.0	10.1	10.1	10.2	10.1	10.1	10.1	10.1	10.0	10.1	10.0	9.9
pH	6.8	7.0	7.2	7.2	7.4	7.3	7.4	7.2	7.5	7.4	7.5	7.2	7.4	7.5
Cond. (µS/cm)	63	71		58		66		70		71		70		69
Initials	A	SSD		SSD		A		A		SSD		EC		YML

25 Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.2	9.9	10.1	10.1	10.1	10.2	10.2	10.1	10.1	10.1	10.1	10.0	9.9
pH	7.1	7.2	7.4	7.5	7.5	7.6	7.7	7.7	8.0	7.6	7.6	7.6	7.5	7.7
Cond. (µS/cm)	193	195		193		196		198		198		194		197
Initials	A	SSD		SSD		A		A		SSD		EC		YML

100 Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	15.0	14.0	14.0	14.0	14.5
DO (mg/L)	10.2	10.2	10.0	10.1	10.1	10.1	DV	10.2	10.1	10.0	10.0	10.0	10.0	9.8
pH	7.9	~~8.0~~	8.0	8.1	8.0	8.1	8.0	8.1	8.3	8.1	8.2	8.1	~~8.2~~ 8.2	8.2
Cond. (µS/cm)	624	626		627		627		628		628		633		630
Initials	A	SSD		SSD		A		A		SSD		EC		YML

DO meter: DO-1/3 **pH meter:** pH 1/3 **Conductivity meter:** C-1/3

	Control	100%		
Hardness*	10	290		
Alkalinity*	6	174		

* mg/L as CaCO3

Analysts: AW, SSD, EC, YML
Reviewed by: EC
Date reviewed: June 2/15

Sample Description: clear

Comments:

Embryo-~~Alevin-Fry~~ Toxicity Test
Daily Mortality

Client: Teck (Line Creek) **Start Date & Time:** April 29/15 @ 1545 h
Sample ID: LC_FRDSDC_WS_2015-04-28-N **Stop Date:** May 6/15 @ 1000 h
Work Order #: 15365 **Test Species:** O. mykiss

Treatments (%)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs/ Embryos ~~Alevins~~	Total Undeveloped/ Unhatched Embryos	Total No. Alevins Embryos	Total Exposed
control	1	0	0	0	0	0	0	0	0	3	24	27
	2	↓	↓	↓	↓	↓	↓	↓	0	1	28	29
	3	↓	↓	↓	↓	↓	↓	↓	0	1	27	28
	4	↓	↓	↓	↓	↓	↓	↓	0	0	29	29
6.25	1	↓	↓	↓	↓	↓	↓	↓	0	1	28	29
	2	↓	↓	↓	↓	↓	↓	↓	0	1	28	29
	3	↓	↓	↓	↓	↓	1	↓	1	0	29	~~29~~ 30
	4	↓	↓	↓	↓	↓	0	↓	0	2	26	28
12.5	1	↓	↓	↓	↓	↓	0	1	1	1	27	~~28~~ 29
	2	↓	↓	↓	↓	↓	↓	0	0	0	29	29
	3	↓	↓	↓	↓	↓	↓	1	1	2	26	~~28~~ 29
	4	↓	↓	↓	↓	↓	↓	0	0	3	27	30
25	1	↓	↓	↓	↓	↓	↓	↓	0	2	26	28
	2	↓	↓	↓	↓	↓	↓	↓	0	1	29	30
	3	↓	↓	↓	↓	↓	↓	↓	0	0	29	29
	4	↓	↓	↓	↓	↓	↓	↓	0	3	26	29
50	1	↓	↓	↓	↓	↓	0	↓	0	0	28	28
	2	↓	↓	↓	↓	↓	↓	↓	0	2	26	28
	3	↓	↓	↓	↓	↓	↓	1	1	0	27	28
	4	↓	↓	↓	↓	↓	↓	0	0	1	27	28
100	1	↓	↓	↓	↓	↓	DOA 1	↓	1	1	27	29
	2	↓	↓	↓	↓	↓	1	↓	1	1	26	28
	3	↓	↓	↓	↓	↓	1	↓	0	1	26	28
	4	↓	↓	↓	↓	↓	0	↓	0	0	28	28
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	SSD	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Comments: _____

Reviewed by: [signature] **Date reviewed:** June 2/15

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	08-7098-8922	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:54	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	06-7725-0504	**Test Type:**	Development	**Analyst:**	
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	06 May-15 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 18h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	08-8445-6912	**Code:**	34B7BDD0	**Client:**	Teck Coal
Sample Date:	28 Apr-15 09:19	**Material:**	Water Sample	**Project:**	
Receive Date:	29 Apr-15 07:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	30h (8 °C)	**Station:**	LC_FRDSDC_WS_2015-04-28_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	835249	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9547	0.8889	1	0.02344	0.04688	4.91%	0.0%	108	113
6.25		4	0.9566	0.9286	0.9667	0.009336	0.01867	1.95%	-0.2%	111	116
12.5		4	0.9319	0.8966	1	0.02399	0.04798	5.15%	2.39%	109	117
25		4	0.9479	0.8966	1	0.0225	0.04501	4.75%	0.7%	110	116
50		4	0.9643	0.9286	1	0.01458	0.02916	3.02%	-1.01%	108	112
100		4	0.947	0.9286	1	0.01766	0.03532	3.73%	0.8%	107	113

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.8889	0.9655	0.9643	1
6.25		0.9655	0.9655	0.9667	0.9286
12.5		0.931	1	0.8966	0.9
25		0.9286	0.9667	1	0.8966
50		1	0.9286	0.9643	0.9643
100		0.931	0.9286	0.9286	1

Proportion Normal Binomials

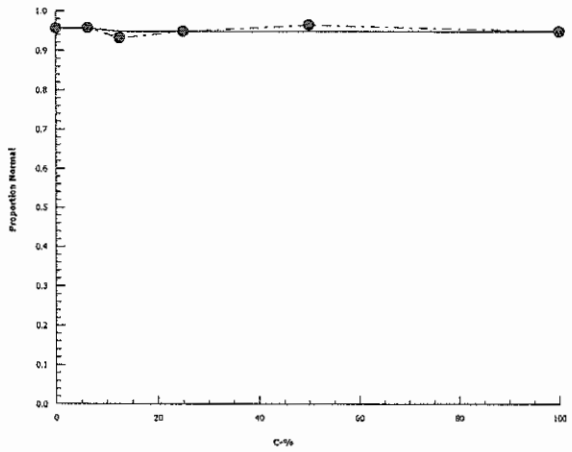
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	24/27	28/29	27/28	29/29
6.25		28/29	28/29	29/30	26/28
12.5		27/29	29/29	26/29	27/30
25		26/28	29/30	29/29	26/29
50		28/28	26/28	27/28	27/28
100		27/29	26/28	26/28	28/28

EC
June 2/15

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	08-7098-8922	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:54	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 2/15

Rainbow Trout Embryo Summary Sheet

Client: Teck Coal (Line Creek) Start Date/Time: April 29, 2015 @ 1545h

Work Order No.: 15365 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_DCDS_WS_2015-04-28_N
Sample Date: April 28, 2015
Date Received: April 29, 2015
Sample Volume: 3 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 6

Test Organism Information:

Batch No.: 042915
Source: Vancouver Island Trout Hatchery, Duncan, B.C.
Loading Density: 1.44 g/L

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE74
Stock Solution ID: 14504
Date Initiated: April 29 2015
7-d EC50 (95% CL): 6.7 (6.5-7.0) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.2-7.6) mg/L SDS
Reference Toxicant CV (%): 37 36

Test Results:

	Sample ID		
	LC_DCDS_WS_2015-04-28_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: Date reviewed: June 2/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck (Line Creek) **Start Date & Time:** April 29/15 @ 1545 h
Sample ID: LC_DCDS_WS_2015-04-28_N **Stop Date & Time:** May 6/15 @ 1100 h
Work Order #: 15365 **Test Species:** *Oncorhynchus mykiss*

% (v/v) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.0	9.9	10.0	9.9	10.2	10.0	10.2	10.1	10.0	10.0	10.1	10.1	9.9
pH	6.8	7.2	7.2	7.2	7.3	7.2	7.2	7.1	7.1	6.9	7.1	7.0	7.2	7.0
Cond. (µS/cm)	28	28		28		28		28		29		28		31
Initials	A	SSD		SSD		A		A		SSD		GL		YML

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.2	9.8	10.1	10.0	10.2	10.1	10.1	10.1	10.0	10.1	10.0	10.1	10.0
pH	6.9	7.1	7.3	7.5	7.4	7.3	7.4	7.3	7.6	7.3	7.5	7.2	7.4	7.3
Cond. (µS/cm)	39	41		36		42		45		40		39		40
Initials	A	SSD		SSD		A		A		SSD		GL		YML

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.2	10.2	9.9	10.1	10.1	10.2	10.0	10.2	10.1	10.1	10.1	10.0	10.1	10.0
pH	7.0	7.1	7.4	7.5	7.4	7.5	7.6	7.5	7.7	7.7	7.5	7.5	7.4	7.6
Cond. (µS/cm)	70	74		66		66		71		70		71		71
Initials	A	SSD		SSD		A		A		SSD		GL		YML

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.2	10.2	9.6	10.1	10.1	10.2	10.0	10.2	10.0	10.1	10.1	9.8	10.1	10.0
pH	7.6	7.5	7.9	7.9	7.7	7.9	8.0	7.5	8.1	7.9	7.9	7.7	8.1	7.8
Cond. (µS/cm)	184	189		185		186		188		185		186		187
Initials	A	SSD		SSD		A		A		SSD		GL		YML

DO meter: DO - 1/3 **pH meter:** pH 1/3 **Conductivity meter:** C - 1/3

	Control	100%		
Hardness*	10	98		
Alkalinity*	6	92		

* mg/L as CaCO3

Analysts: AW, SSD, EC, YML

Reviewed by: [signature]

Date reviewed: June 2/15

Sample Description: clear

Comments:

Embryo-~~Alevin-Fry~~ Toxicity Test
Daily Mortality

Client: Teck (Line Creek) **Start Date & Time:** April 29/15 @ 1545 h
Sample ID: LC_DC DS-WS-2015-04-28-N **Stop Date:** May 6/15 @ 1100 h
Work Order #: 15365 **Test Species:** O. mykiss

Treatments (%) (v/v)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs/ Embryos/ ~~Alevins~~	Total Undeveloped/ Unhatched Embryos	Total No. ~~Alevins~~ Embryos	Total Exposed
Control	1	1	0	0	0	0	0	0	1	3	26	30
	2	0							0	0	27	27
	3	0							0	0	30	30
	4	0							0	1	29	30
6.25	1	4	~~4~~					2	4	1	25	30
	2	0							2	1	25	28
	3	2	~~2~~					0	2	1	27	30
	4	0				2		1	2	0	~~26~~	~~30~~ 30
12.5	1					1	1		2	1	27	30
	2					0	0		0	1	29	30
	3					0	0		0	0	30	30
	4				1	0	1	1	3	0 ~~27~~	~~27~~ ~~30~~	~~30~~ 30
25	1				0	0	0	0	0	2	28	30
	2				0	0		0	0	2	28	30
	3				0	0		0	0	1	29	30
	4				2	2		2	6	0	24	30
50	1				0	0	0	0	0	2	28	30
	2							0	0	1	29	30
	3							0	0	2	28	30
	4						2	0	2	2	26	30
100	1						0	0	0	0	30	30
	2							0	0	1	29	30
	3							1	1	0	29	30
	4							0	0	1	29	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	EC	[illegible]	[illegible]	EC	EC	MW	MW	MW	MW	MW

Comments: _____

Reviewed by: EC **Date reviewed:** June 2/15

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	21-3354-7440	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	09-5553-0349	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	06 May-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	06-4609-2256	**Code:**	268295E0	**Client:**	Teck Coal
Sample Date:	28 Apr-15 09:16	**Material:**	Water Sample	**Project:**	
Receive Date:	29 Apr-15 07:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	30h (8 °C)	**Station:**	LC_DCDS_WS_2015-04-28_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	588563	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9583	0.8667	1	0.03155	0.0631	6.58%	0.0%	112	117
6.25		4	0.8899	0.8333	0.9333	0.02081	0.04162	4.68%	7.14%	105	118
12.5		4	0.9417	0.9	1	0.025	0.05	5.31%	1.74%	113	120
25		4	0.9083	0.8	0.9667	0.03696	0.07391	8.14%	5.22%	109	120
50		4	0.925	0.8667	0.9667	0.02097	0.04194	4.53%	3.48%	111	120
100		4	0.975	0.9667	1	0.008333	0.01667	1.71%	-1.74%	117	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.8667	1	1	0.9667
6.25		0.8333	0.8929	0.9	0.9333
12.5		0.9	0.9667	1	0.9
25		0.9333	0.9333	0.9667	0.8
50		0.9333	0.9667	0.9333	0.8667
100		1	0.9667	0.9667	0.9667

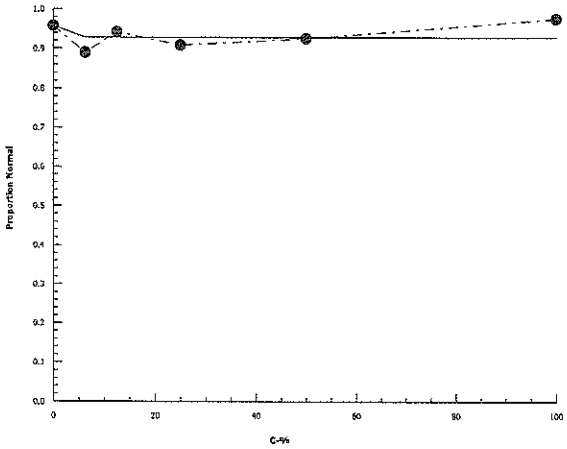
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	26/30	27/27	30/30	29/30
6.25		25/30	25/28	27/30	28/30
12.5		27/30	29/30	30/30	27/30
25		28/30	28/30	29/30	24/30
50		28/30	29/30	28/30	26/30
100		30/30	29/30	29/30	29/30

June 2/15

Analysis ID:	21-3354-7440	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Rainbow Trout Embryo Summary Sheet

Client: Teck Coal (Line Creek) Start Date/Time: April 29, 2015 @ 1545h

Work Order No.: 15365 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_LCS_2015-04-28_N
Sample Date: April 28, 2015
Date Received: April 29, 2015
Sample Volume: 3 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 6

Test Organism Information:

Batch No.: 042915
Source: Vancouver Island Trout Hatchery, Duncan, B.C.
Loading Density: 1.44 g/L

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE74
Stock Solution ID: 14504
Date Initiated: April 29 2015
7-d EC50 (95% CL): 6.7 (6.5 - 7.0) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.2 - 7.~~1~~6) mg/L SDS
Reference Toxicant CV (%): ~~37~~ 36

Test Results:

	Sample ID		
	LC_LCS_2015-04-28_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: [signature] Date reviewed: June 2/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck (Line Creek)
Sample ID: LC-LC5-2015-04-28-N
Work Order #: 15365

Start Date & Time: April 29/15 @ 1545 h
Stop Date & Time: May 6/15 @ 1100 h
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.0	9.7	10.0	9.8	10.2	10.0	10.2	10.0	10.0	9.9	10.1	10.1	10.0
pH	6.8	7.2	7.2	7.2	7.3	7.2	7.1	7.2	7.1	6.9	7.1	7.0	7.2	7.1
Cond. (µS/cm)	28	28		28		28		28		29		28		31
Initials	AS	SSD		SSD		AS		AS		SSD		GL		MML

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.2	9.9	10.1	9.9	10.2	10.1	10.1	10.1	10.1	10.0	10.1	10.1	10.0
pH	7.8	7.7	7.5	7.0	7.3	7.4	7.5	7.4	7.6	7.3	7.4	7.2	7.4	7.3
Cond. (µS/cm)	59	61		57		60		63		65		63		70
Initials	AS	SSD		SSD		AS		AS		SSD		GL		MML

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.2	9.8	10.1	10.0	10.2	10.0	10.1	10.1	10.1	10.1	10.1	10.1	10.0
pH	7.7	7.8	7.5	7.2	7.5	7.5	7.6	7.7	7.9	7.7	7.5	7.8	7.6	7.7
Cond. (µS/cm)	205	~~11~~ 200		186		190		195		202		199		204
Initials	AS	SSD		SSD		AS		AS		SSD		GL		MML

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.2	10.2	9.8	10.0	10.0	10.1	10.0	10.2	10.1	10.2	10.1	10.0	10.1	10.1
pH	8.1	8.3	8.2	8.3	7.9	8.1	8.1	8.2	8.3	8.2	8.1	8.2	8.1	8.2
Cond. (µS/cm)	631	625		632		630		631		632		634		639
Initials	AS	SSD		SSD		AS		AS		SSD		GL		MML

DO meter: DO-1/3 **pH meter:** pH 1/3 **Conductivity meter:** C-1/3

	Control	100%		
Hardness*	10	316		
Alkalinity*	6	182		

* mg/L as CaCO3

Analysts: AWS, SSD, EC, YYL

Reviewed by: [signature]
Date reviewed: June 2/15

Sample Description: clear

Comments:

Embryo-~~Alevin Fry~~ Toxicity Test
Daily Mortality

Client: Teck (Line Creek) **Start Date & Time:** April 29/15 @ 1545 h
Sample ID: LC-LC5-2015-04-28-N **Stop Date:** May 6/15 @ 1100 h
Work Order #: 15365 **Test Species:** O. mykiss

Treatments (%)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0	0	0	0	0	0	3	3	2	25	30
	2	↓	↓	↓	↓	↓	2	1	3	0	26	29
	3	↓	↓	↓	↓	↓	0	3	3	0	27	30
	4	↓	↓	↓	↓	↓	1	0	1	3	26	30
6.25	1	↓	↓	↓	↓	↓	0	0	0	4	25	29
	2	↓	↓	↓	↓	↓	↓	1	1	1	27	29
	3	↓	↓	↓	↓	↓	↓	1	1	1	28	30
	4	↓	↓	↓	↓	↓	↓	0	0	2	28	30
12.5	1	↓	↓	↓	↓	0	1	2	3	1	26	30
	2	↓	↓	↓	↓	1	1	2	4	4	22	30
	3	↓	↓	↓	↓	0	0	0	0	2	28	30
	4	↓	↓	↓	↓	0	0	2	2	0	28	30
25	1	↓	↓	↓	↓	0	0	0	0	4	26	30
	2	↓	↓	↓	↓	↓	↓	1	1	3	26	30
	3	↓	↓	↓	↓	↓	↓	1	1	3	26	30
	4	↓	↓	↓	↓	↓	↓	0	0	0	30	30
50	1	↓	↓	↓	↓	0	0	2	2	0	28	30
	2	↓	↓	↓	↓	0	0	1	1	1	27	29
	3	↓	↓	↓	↓	0	1	2	3	2	25	30
	4	↓	↓	↓	↓	2	1	1	4	2	24	30
100	1	↓	↓	↓	↓	0	0	0	0	3	27	30
	2	↓	↓	↓	↓	↓	↓	0	0	1	29	30
	3	↓	↓	↓	↓	↓	↓	1	1	2	27	30
	4	↓	↓	↓	↓	↓	↓	1	1	2	27	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	FC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Comments: _____

Reviewed by: [signature] **Date reviewed:** June 2/15

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	13-8157-2654	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:57	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-7379-7946	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	06 May-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	14-8027-4760	**Code:**	583B3348	**Client:**	Teck Coal
Sample Date:	28 Apr-15 10:24	**Material:**	Water Sample	**Project:**	
Receive Date:	29 Apr-15 07:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	29h (8 °C)	**Station:**	LC_LC5_2015-04-28_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	193600	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.8741	0.8333	0.9	0.01552	0.03105	3.55%	0.0%	104	119
6.25		4	0.9149	0.8621	0.9333	0.01763	0.03527	3.85%	-4.67%	108	118
12.5		4	0.8667	0.7333	0.9333	0.04714	0.09428	10.88%	0.85%	104	120
25		4	0.9	0.8667	1	0.03333	0.06667	7.41%	-2.96%	108	120
50		4	0.8744	0.8	0.9333	0.03404	0.06807	7.79%	-0.03%	104	119
100		4	0.9167	0.9	0.9667	0.01667	0.03333	3.64%	-4.87%	110	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.8333	0.8966	0.9	0.8667
6.25		0.8621	0.931	0.9333	0.9333
12.5		0.8667	0.7333	0.9333	0.9333
25		0.8667	0.8667	0.8667	1
50		0.9333	0.931	0.8333	0.8
100		0.9	0.9667	0.9	0.9

Proportion Normal Binomials

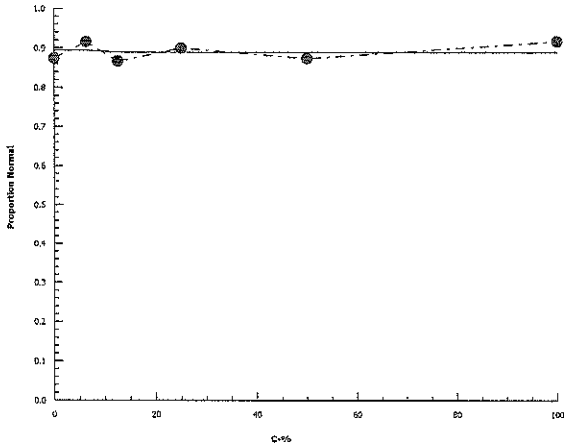
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	25/30	26/29	27/30	26/30
6.25		25/29	27/29	28/30	28/30
12.5		26/30	22/30	28/30	28/30
25		26/30	26/30	26/30	30/30
50		28/30	27/29	25/30	24/30
100		27/30	29/30	27/30	27/30

June 2/15

Salmonid Embryo Survival and Development Test | **Nautilus Environmental**

Analysis ID:	13-8157-2654	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:57	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 2/15

Client: Teck Coal (LCO)

W.O.#: 15364 KL S

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/L CaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L CaCO_3$)	Technician
LC_DC1_WS_2015-04-28_N	Apr 29/15	50	6.4	6.5	126		50	6.2	124	KL
LC_DCDS_WS_2015-04-28_N	↓	50	4.8	5.0	92		50	4.9	98	KL
LC_FRDSDC_WS_2015-04-28_N	↓	50	8.9	9.1	174		50	148.5	290	KL
LC_LC3_WS_2015-04-28_N	↓	50	9.4	9.6	184		10 ①	4.6	92 KL 460	KL
LC_LC5_WS_2015-04-28_N	↓	50	9.2	9.3	182		50	15.8	316	KL
Dechlor	↓	50	0.4	0.5	6		50	0.5	10	EC
LC_LCDSSLCC_WS_2015-28_N	↓	50	9.0	9.2	176		50	16.1	322	KL

Notes: ① Diluted w/ DI water up to 100mL

Reviewed by: [signature]

Date Reviewed: June 2/15

APPENDIX C – ***Lemna minor*** **Toxicity Test Data**

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 15378

Start Date: May 8, 2015
Set up by: JW

Sample Information:

Sample ID: LC_LCDSSLCC_WS_2015-05-06_N
Sample Date: May 5, 2015
Date Received: May 6, 2015
Sample Volume: 4 x 20L

Test Organism Information:

Culture Date: 050115
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (35 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 118
Date Initiated: May 20, 2015

7-d No. of Fronds IC50 (95% CL): 4.1 (3.8 - 4.3) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.1 (3.1 - 5.4) g/L KCl CV (%): 15

Test Results:	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	>97	>97
IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: [signature]

Date reviewed: June 8/15

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck
Setup by: JW
Sample ID: LC_LCDSSLCC_WS_2015-05-06_N
Test Date: May 8 , 2015
Work Order No.: 15378
Test Species: *Lemna minor*
Culture Source: CPCC # 490
Test Culture Age: 7 days
> 8X Growth? (Y/N): Y (35 fronds)
Light Intensity Range: 4000 - 4600 lux
Date Measured: JW ~~April~~ 7, 2015 May

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Initials	JW	A	MLT	MLT	MLT	LP	MLT	MLT

Sample Characteristics: Initial Water Quality

	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	23.0	Aeration?: 20 min	23.0
DO (mg/L)	9.3	Nutrients added?: Y →	8.4
pH	8.0		7.9
Conductivity (µS)	541		1319

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	24.0	8.2	9.6	882
1.5	23.0	24.0	8.0	9.9	891
3.0	23.0	24.0	8.0	9.3	900
6.1	23.0	24.0	8.0	9.4	914
12.1	23.0	24.0	8.0	9.5	942
24.2	23.0	24.0	8.0	9.4	996
48.5	23.0	24.0	8.0	9.5	1105
97	23.0	24.0	8.0	8.9	1309
Initials	JW	KL	JW	KL	JW

Instruments: Thermometer: CER #6 **Cond. Meter:** 3 **pH meter:** 3
Sample Description: Clear with black precipitate.
Comments:
Reviewed: KL **Date Reviewed:** June 9/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-LCDSSLCC.WS.2015-05-06.N
Work Order #: 15378

Start Date: May 8, 2015
Termination Date: May 15, 2015
Test set up by: JW

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	88										MLT/JW
	B	6	100										
	C	6	96										
	D	6	68										
1.5	A	6	75										
	B	6	88			X							
	C	6	73										
	D	6	89										
3.0	A	6	86										
	B	6	88										
	C	6	95										
	D	6	107										
6.1	A	6	98										
	B	6	85										
	C	6	74										
	D	6	79										
12.1	A	6	106										
	B	6	107										
	C	6	83										
	D	6	96										
24.2	A	6	116										
	B	6	97										
	C	6	102										
	D	6	105										

Comments: algae growth prominent in all concentrations except 97%o (v/v)

Reviewed by: [signature]

Date Reviewed: June 4/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC- LCDSSLCC-INS-2015-05-06-N
Work Order #: 15378

Start Date: May 8 , 2015
Termination Date: May 15 , 2015
Test set up by: JW

Concentration % (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	104										MLT/JW
	B	6	83										
	C	6	109										
	D	6	76										
97	A	6	72			X							
	B	6	74			X							
	C	6	73			X							
	D	6	81			X							
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: [signature]

Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Start Date: May 8, 2015
Sample ID: LC-LCDSSLCC-WS-2015-05-06-N
Termination Date: May 15, 2015
Work Order #: 15378

Concentration % (v/v)	Rep	Lemna Pan No. Red	Pan weight (mg)	Pan + plant (mg)	Initials
control	A	1	969.41	975.09	KL / JW
	B	2	956.46	962.90	KL
	C	3	961.99	968.30	KL
	D	4	967.24	971.28	KL
1.5	A	5	977.39	982.31	KL
	B	6	956.65	962.68	KL
	C	7	933.14	937.84	KL
	D	8	981.80	987.67	KL
3.0	A	9	948.55	954.19	KL
	B	10	951.76	957.39	KL
	C	11	958.32	964.41	KL
	D	12	961.94	969.35	KL
6.1	A	13	974.56	980.984 JW	KL
	B	14	961.26	966.85	KL
	C	15	962.70	967.93	KL
	D	16	947.26	952.70	KL
12.1	A	17	962.81	969.73	KL
	B	18	968.60	975.81	KL
	C	19	969.83	975.35	KL
	D	20	967.72	974.29	KL
24.2	A	21	957.91	965.70	KL
	B	22	976.62	983.23	KL
	C	23	974.82	981.93	KL
	D	24	1004.61	1011.94	KL
48.5	A	25	975.62	982.99	KL
	B	26	978.85	984.22	KL
	C	27	~~988~~ KL 989.03	996.46	KL
	D	28	938.07	943.57	KL

Comments: 10% reweigh: #3: 968.25 #22: 983.14
#15: 967.79 #30: 981.82

Reviewed by: [signature] Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck Start Date: May 8, 2015

Sample ID: LC- LCDSSLCC-WS-2015-05-06.N Termination Date: May 15, 2015

Work Order #: 15378

Concentration % (v/v)	Rep	Lemna Pan No. Red	Pan weight (mg)	Pan + plant (mg)	Initials
97	A	29	980.12	985.99	KL / JW
	B	30	978.04	983.94	KL
	C	31	972.56	978.26	KL
	D	32	976.18	983.04	KL
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: KL Date Reviewed: June 4/15

Lemna Growth Inhibition Test

Nautilus Environmental

Analysis ID:	18-9211-8472	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	00-5380-8605	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	15 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	08-2003-7136	**Code:**	30E0C610	**Client:**	Teck Coal
Sample Date:	05 May-15 14:34	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	57h (7 °C)	**Station:**	LC_LCDSSLCC_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	646700	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	57.89	N/A	65.72	1.728	1.522	NA
IC10	69.05	17.53	88.75	1.448	1.127	5.705
IC15	82.34	24.22	N/A	1.215	NA	4.129
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	82	62	94	7.118	14.24	17.36%	0.0%
1.5		4	75.25	67	83	4.211	8.421	11.19%	8.23%
3		4	88	80	101	4.743	9.487	10.78%	-7.32%
6.1		4	78	68	92	5.18	10.36	13.28%	4.88%
12.1		4	92	77	101	5.583	11.17	12.14%	-12.2%
24.2		4	99	91	110	4.021	8.042	8.12%	-20.73%
48.5		4	87	70	103	7.99	15.98	18.37%	-6.1%
97		4	69	66	75	2.041	4.082	5.92%	15.85%

Frond Count Detail

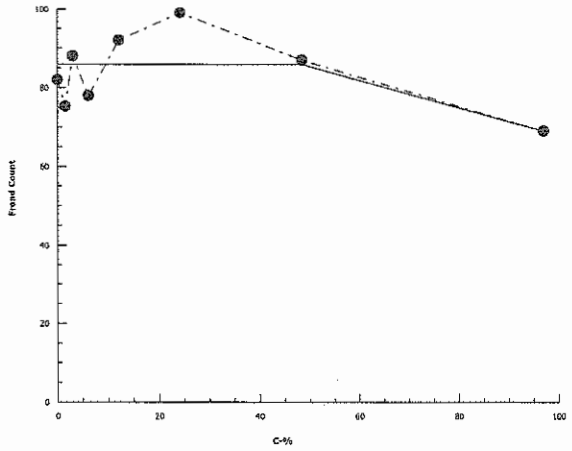
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	82	94	90	62
1.5		69	82	67	83
3		80	82	89	101
6.1		92	79	68	73
12.1		100	101	77	90
24.2		110	91	96	99
48.5		98	77	103	70
97		66	68	67	75

June 4/15

Lemna Growth Inhibition Test | Nautilus Environmental

Analysis ID:	18-9211-8472	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 4/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	18-3721-1928	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:59	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	00-5380-8605	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	15 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	08-2003-7136	**Code:**	30E0C610	**Client:**	Teck Coal
Sample Date:	05 May-15 14:34	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	57h (7 °C)	**Station:**	LC_LCDSSLCC_WS_2015-05-06_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	23.1%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-0.8843	2.482	18.95	6	0.9861	CDF	Non-Significant Effect
		3	0.786	2.482	18.95	6	0.5808	CDF	Non-Significant Effect
		6.1	-0.524	2.482	18.95	6	0.9624	CDF	Non-Significant Effect
		12.1	1.31	2.482	18.95	6	0.3426	CDF	Non-Significant Effect
		24.2	2.227	2.482	18.95	6	0.0819	CDF	Non-Significant Effect
		48.5	0.655	2.482	18.95	6	0.6406	CDF	Non-Significant Effect
		97	-1.703	2.482	18.95	6	0.9990	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2620.719	374.3884	7	3.213	0.0151	Significant Effect
Error	2796.75	116.5313	24			
Total	5417.469		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	5.242	18.48	0.6305	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9686	0.9081	0.4611	Normal Distribution

Frond Count Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	82	59.35	104.7	86	62	94	7.118	17.36%	0.0%
1.5		4	75.25	61.85	88.65	75.5	67	83	4.211	11.19%	8.23%
3		4	88	72.9	103.1	85.5	80	101	4.743	10.78%	-7.32%
6.1		4	78	61.51	94.49	76	68	92	5.18	13.28%	4.88%
12.1		4	92	74.23	109.8	95	77	101	5.583	12.14%	-12.2%
24.2		4	99	86.2	111.8	97.5	91	110	4.021	8.12%	-20.73%
48.5		4	87	61.57	112.4	87.5	70	103	7.99	18.37%	-6.1%
97		4	69	62.5	75.5	67.5	66	75	2.041	5.92%	15.85%

Frond Count Detail

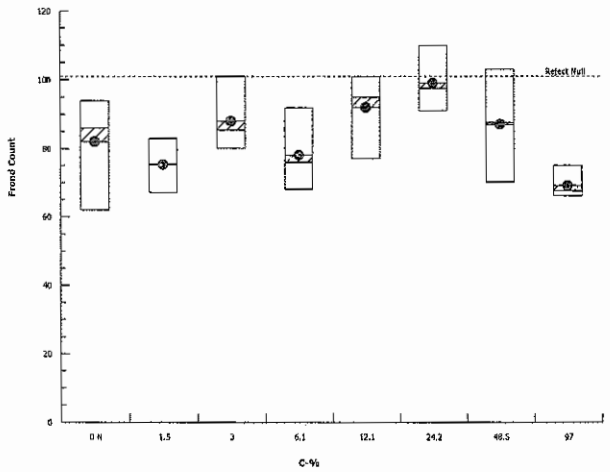
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	82	94	90	62
1.5		69	82	67	83
3		80	82	89	101
6.1		92	79	68	73
12.1		100	101	77	90
24.2		110	91	96	99
48.5		98	77	103	70
97		66	68	67	75

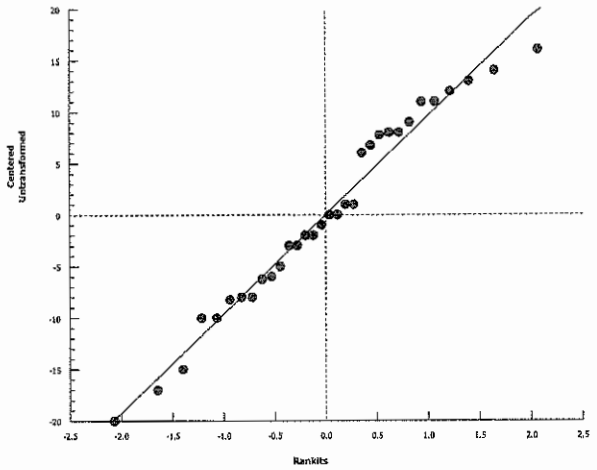
June 4/15

Lemna Growth Inhibition Test | **Nautilus Environmental**

Analysis ID: 18-3721-1928 **Endpoint:** Frond Count **CETIS Version:** CETISv1.8.7
Analyzed: 21 May-15 10:59 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Graphics





June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	03-4677-9763	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jun-15 9:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	00-5380-8605	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	15 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	08-2003-7136	**Code:**	30E0C610	**Client:**	Teck Coal
Sample Date:	05 May-15 14:34	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	57h (7 °C)	**Station:**	LC_LCDSSLCC_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	171126	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>97	N/A	N/A	<1.031	NA	NA
IC10	>97	N/A	N/A	<1.031	NA	NA
IC15	>97	N/A	N/A	<1.031	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	5.618	4.04	6.44	0.5514	1.103	19.63%	0.0%
1.5		4	5.38	4.7	6.03	0.3337	0.6675	12.41%	4.23%
3		4	6.192	5.63	7.41	0.4198	0.8395	13.56%	-10.24%
6.1		4	5.66	5.23	6.38	0.2511	0.5022	8.87%	-0.76%
12.1		4	6.555	5.52	7.21	0.369	0.738	11.26%	-16.69%
24.2		4	7.21	6.61	7.79	0.2451	0.4902	6.8%	-28.35%
48.5		4	6.617	5.5	7.43	0.4722	0.9444	14.27%	-17.8%
97		4	6.083	5.7	6.86	0.2629	0.5257	8.64%	-8.28%

Total Dry Weight-mg Detail

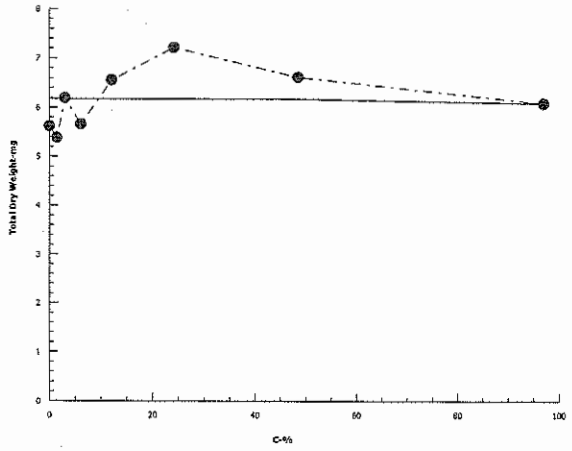
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	5.68	6.44	6.31	4.04
1.5		4.92	6.03	4.7	5.87
3		5.64	5.63	6.09	7.41
6.1		6.38	5.59	5.23	5.44
12.1		6.92	7.21	5.52	6.57
24.2		7.79	6.61	7.11	7.33
48.5		7.37	6.17	7.43	5.5
97		5.87	5.9	5.7	6.86

June 8/15

Lemna Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	03-4677-9763	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jun-15 9:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	14-3806-0118	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jun-15 10:01	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	00-5380-8605	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	15 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	08-2003-7136	**Code:**	30E0C610	**Client:**	Teck Coal
Sample Date:	05 May-15 14:34	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	57h (7 °C)	**Station:**	LC_LCDSSLCC_WS_2015-05-06_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	23.6%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-0.4444	2.482	1.327	6	0.9540	CDF	Non-Significant Effect
		3	1.076	2.482	1.327	6	0.4459	CDF	Non-Significant Effect
		6.1	0.07944	2.482	1.327	6	0.8541	CDF	Non-Significant Effect
		12.1	1.754	2.482	1.327	6	0.1848	CDF	Non-Significant Effect
		24.2*	2.979	2.482	1.327	6	0.0174	CDF	Significant Effect
		48.5	1.871	2.482	1.327	6	0.1533	CDF	Non-Significant Effect
		97	0.8699	2.482	1.327	6	0.5418	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	10.5098	1.5014	7	2.627	0.0364	Significant Effect
Error	13.71531	0.5714714	24			
Total	24.22511		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.461	18.48	0.8394	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9636	0.9081	0.3437	Normal Distribution

Total Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	5.618	3.863	7.372	5.995	4.04	6.44	0.5514	19.63%	0.0%
1.5		4	5.38	4.318	6.442	5.395	4.7	6.03	0.3337	12.41%	4.23%
3		4	6.192	4.857	7.528	5.865	5.63	7.41	0.4198	13.56%	-10.24%
6.1		4	5.66	4.861	6.459	5.515	5.23	6.38	0.2511	8.87%	-0.76%
12.1		4	6.555	5.381	7.729	6.745	5.52	7.21	0.369	11.26%	-16.69%
24.2		4	7.21	6.43	7.99	7.22	6.61	7.79	0.2451	6.8%	-28.35%
48.5		4	6.617	5.115	8.12	6.77	5.5	7.43	0.4722	14.27%	-17.8%
97		4	6.083	5.246	6.919	5.885	5.7	6.86	0.2629	8.64%	-8.28%

Total Dry Weight-mg Detail

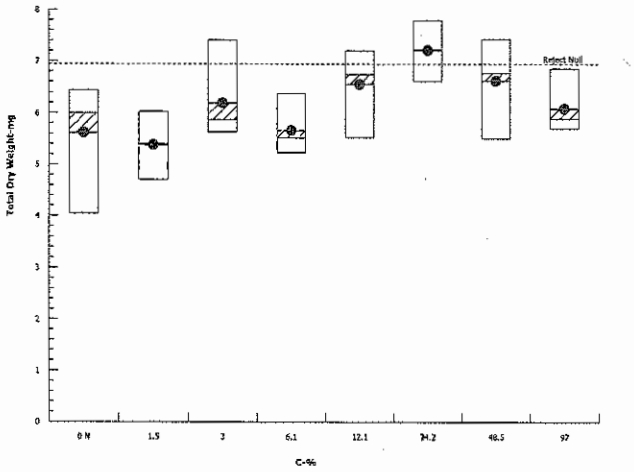
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	5.68	6.44	6.31	4.04
1.5		4.92	6.03	4.7	5.87
3		5.64	5.63	6.09	7.41
6.1		6.38	5.59	5.23	5.44
12.1		6.92	7.21	5.52	6.57
24.2		7.79	6.61	7.11	7.33
48.5		7.37	6.17	7.43	5.5
97		5.87	5.9	5.7	6.86

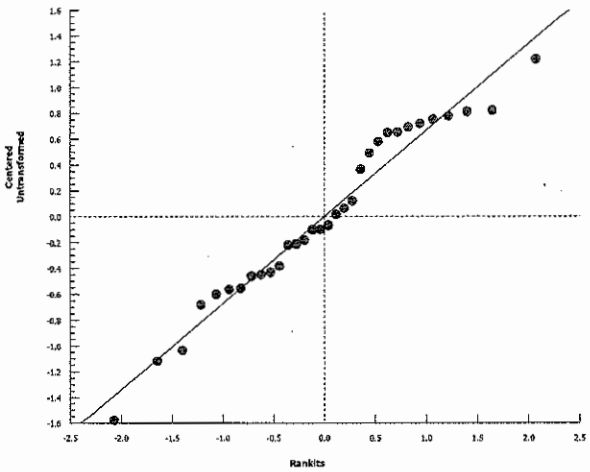
June 8/15

Lemna Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	14-3806-0118	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jun-15 10:01	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





6/8/15

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 15378

Start Date: May 8, 2015
Set up by: JW

Sample Information:

Sample ID: LC-LC3-WS-2015-05-06-N
Sample Date: May 5, 2015
Date Received: May 6, 2015
Sample Volume: 1 x 20L

Test Organism Information:

Culture Date: 050115
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (35 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 118
Date Initiated: May 20, 2015

7-d No. of Fronds IC50 (95% CL): 4.1 (3.8 - 4.3) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.1 (3.1 - 5.4) g/L KCl CV (%): 15

		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v) (95% CL)	75.9 (57.9 - 96.9)	> 97
	IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: [signature]

Date reviewed: June 8/15

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck
Setup by: JW
Sample ID: LC_LC3_INS_2015-05-06_N
Test Date: May 8, 2015
Work Order No.: 15378
Test Species: *Lemna minor*
Culture Source: CPCC # 490
Test Culture Age: 7 days
> 8X Growth? (Y/N): Y (35 fronds)
Light Intensity Range: 4200-4900 lux
Date Measured: ~~April~~ May 7, 2015 (JW)

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.0	24.0	24.5	24.0	24.0	24.0	24.0	24.0
Initials	JW	A	MLT	MLT	MLT	KeP	MLT	MLT

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	23.0	Aeration?: 20 min	23.0
DO (mg/L)	9.4	Nutrients added?: Y →	8.6
pH	7.8		7.8
Conductivity (µS)	779		1536

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	24.0	8.2	9.3	882
1.5	23.0	24.0	8.2	9.5	896
3.0	23.0	24.0	8.2	9.5	909
6.1	23.0	24.0	8.2	9.4	927
12.1	23.0	24.0	8.2	9.1	971
24.2	23.0	24.0	8.2[1]	9.2	1055
48.5	23.0	24.0	8.0	9.0	1217
97	23.0	24.0	7.9	8.7	1526
Initials	JW	KE	JW	KE	JW

Instruments: Thermometer: CER # 6 Cond. Meter: 3 pH meter: 3
Sample Description: Clear
Comments:
Reviewed: [signature] **Date Reviewed:** June 4/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC- LC3 - WS - 2015 - 05 - 06 - N
Work Order #: 15378

Start Date: May 8 , 2015
Termination Date: May 15 , 2015
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	87										MLT/JW
	B	6	62										
	C	6	89										
	D	6	57										
1.5	A	6	85										
	B	6	93										
	C	6	104										
	D	6	83 83 ML										
3.0	A	6	90										
	B	6	74										
	C	6	87										
	D	6	94										
6.1	A	6	97			X							
	B	6	69										
	C	6	76										
	D	6	82										
12.1	A	6	79										
	B	6	95			X							
	C	6	96										
	D	6	84		X								
24.2	A	6	77										
	B	6	91										
	C	6	85			X							
	D	6	75										

Comments: algae growth prominent in all concentrations except 97% (v/v)

Reviewed by: [signature]

Date Reviewed: June 4/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-LC3-WS-2015-05-06-N
Work Order #: 15378

Start Date: May 8, 2015
Termination Date: May 15, 2015
Test set up by: JN

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	69										MLT/JN
	B	6	84										
	C	6	83										
	D	6	76										
97	A	6	57			X							
	B	6	~~56~~51			X							
	C	6	56			X							
	D	6	51			X							
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: KW

Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC- LC3-WS-2015-05-06-N
Work Order #: 15378

Start Date: May 8, 2015
Termination Date: May 15, 2015

Concentration % (v/v)	Rep	Pan No. Key	Pan weight (mg)	Pan + plant (mg)	Initials
control	A	1	977.00	983.40	KL
	B	2	946.31	950.63	KL
	C	3	964.28	970.72	KL
	D	4	965.34	969.02	KL
1.5	A	5	955.45	961.66	KL
	B	6	973.31	980.08	KL
	C	7	979.54	986.88	KL
	D	8	969.89 92	975.44	KL
3.0	A	9	970.15	976.59	KL
	B	10	970.59	976.47	KL
	C	11	953.69	959.82	KL
	D	12	958.58	965.69	KL
6.1	A	13	985.16	992.34	KL
	B	14	972.41	977.35	KL
	C	15	955.70	961.71	KL
	D	16	973.43	979.69	KL
12.1	A	17	984.46	990.14	KL
	B	18	984.30	991.54	KL
	C	19	1006.93	1014.26	KL
	D	20	1015.10	1021.86	KL
24.2	A	21	995.90	1001.62	KL
	B	22	970.59	976.80	KL
	C	23	1010.46	1017.00	KL
	D	24	1003.54	1009.30	KL
48.5	A	25	999.79	1004.53	KL
	B	26	994.07	1000.43	KL
	C	27	998.70	1004.81	KL
	D	28	999.03	1004.36	KL

Comments: 10% reweigh : #3: 970.45 #20: 1021.61
#11: 959.57 #31: 1008.64

Reviewed by: [signature] Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - LC3 - WS - 2015 - 05 - 06 - N
Work Order #: 15378

Start Date: May 8 , 2015
Termination Date: May 15 , 2015

Concentration % (V/V)	Rep	Kit Pan No. Rep	Pan weight (mg)	Pan + plant (mg)	Initials
97	A	29	994.67	1000.85	KL
	B	30	984.85	990.25	KL
	C	31	1002.86	1008.80	KL
	D	32	1012.86	1017.91	KL
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: [signature]

Date Reviewed: June 4/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-0272-6236	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jun-15 9:48	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	00-5380-8605	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	15 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	01-8455-4594	**Code:**	B001462	**Client:**	Teck Coal
Sample Date:	05 May-15 14:49	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	57h (6.8 °C)	**Station:**	LC_LC3_WS_2015-05-06_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
4P Log-Logistic+Hormesis EV [Y=A(1+EX)/(1+(2ED+1)(X/D)^C)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
21	-88.79	187.1	191.4	0.4582	Yes	1.895	2.776	0.1440	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	43.83	N/A	62.61	2.281	1.597	NA
IC10	51.82	N/A	71.59	1.93	1.397	NA
IC15	59.63	40.08	79.81	1.677	1.253	2.495
IC20	67.58	49.29	87.88	1.48	1.138	2.029
IC25	75.92	57.88	96.92	1.317	1.032	1.728
IC40	105.5	75.29	150.3	0.9483	0.6654	1.328
IC50	132	80.45	250.1	0.7575	0.3998	1.243

JW
≥ 97 % (v/v)
JW

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	75.9	3.608	68.83	82.97	21.04	<0.0001	Significant Parameter
C	1.809	0.5944	0.6443	2.974	3.044	0.0050	Significant Parameter
D	132	38.22	57.11	206.9	3.454	0.0018	Significant Parameter
E	0.008164	0.01371	-0.01871	0.03503	0.5955	0.5563	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	3158.366	3158.366	1	29.22	<0.0001	Significant
Lack of Fit	726.5094	181.6273	4	1.895	0.1440	Non-Significant
Pure Error	2300	95.83334	24			
Residual	3026.509	108.0896	28			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	7.047	14.07	0.4240	Equal Variances
	Mod Levene Equality of Variance	2.414	2.423	0.0507	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9742	0.9338	0.6217	Normal Distribution
	Anderson-Darling A2 Normality	0.3586	2.492	0.4561	Normal Distribution

June 8/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 11-0272-6236 **Endpoint:** Frond Count **CETIS Version:** CETISv1.8.7
Analyzed: 08 Jun-15 9:48 **Analysis:** Nonlinear Regression **Official Results:** Yes

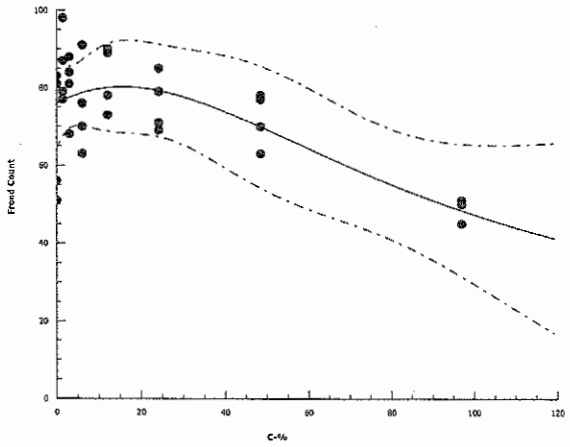
Frond Count Summary

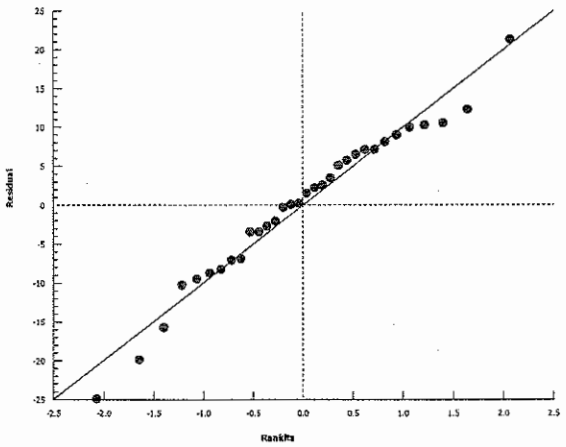
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	67.75	51	83	8.3	16.6	24.5%	0.0%
1.5		4	85.25	77	98	4.768	9.535	11.18%	-25.83%
3		4	80.25	68	88	4.328	8.655	10.79%	-18.45%
6.1		4	75	63	91	5.958	11.92	15.89%	-10.7%
12.1		4	82.5	73	90	4.173	8.347	10.12%	-21.77%
24.2		4	76	69	85	3.697	7.394	9.73%	-12.18%
48.5		4	72	63	78	3.488	6.976	9.69%	-6.27%
97		4	47.75	45	51	1.601	3.202	6.71%	29.52%

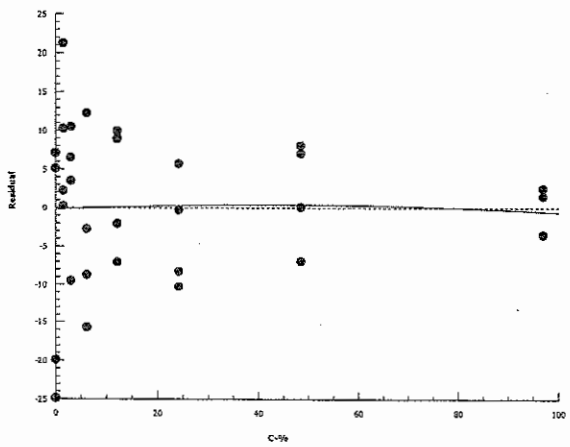
Frond Count Detail

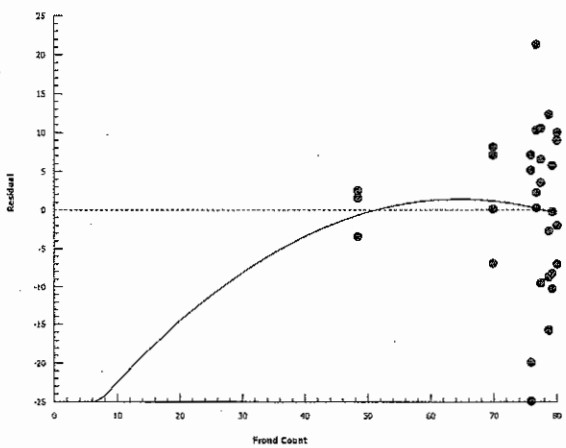
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	81	56	83	51
1.5		79	87	98	77
3		84	68	81	88
6.1		91	63	70	76
12.1		73	89	90	78
24.2		71	85	79	69
48.5		63	78	77	70
97		51	45	50	45

Graphics 4P Log-Logistic+Hormesis EV [Y=A(1+EX)/(1+(2ED+1)(X/D)^C)]









June 8/14

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	03-2429-0906	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 11:13	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	00-5380-8605	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	15 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	01-8455-4594	**Code:**	B001462	**Client:**	Teck Coal
Sample Date:	05 May-15 14:49	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	57h (6.8 °C)	**Station:**	LC_LC3_WS_2015-05-06_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
2P Exponential EV [Y=A*exp(log(0.5)*X/D)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
4	-10.1	24.62	27.14	0.0127	Yes	1.573	2.508	0.1980	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	53.11	N/A	129.1	1.883	0.7749	NA
IC10	109.1	N/A	278.4	0.9166	0.3592	NA
IC15	168.3	N/A	458.8	0.5943	0.218	NA
IC20	231	N/A	671	0.4328	0.149	NA
IC25	297.9	N/A	926.3	0.3357	0.108	NA
IC40	528.9	N/A	2381	0.1891	0.042	NA
IC50	717.7	N/A	N/A	0.1393	NA	NA

JW

> 97 % (v/v)

JW

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	6.17	0.1931	5.791	6.548	31.95	<0.0001	Significant Parameter
D	717.7	622.1	-501.6	1937	1.154	0.2577	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	1.033074	1.033074	1	1.4	0.2460	Non-Significant
Lack of Fit	6.248579	1.04143	6	1.573	0.1980	Non-Significant
Pure Error	15.88541	0.661892	24			
Residual	22.13399	0.7378	30			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	6.124	14.07	0.5254	Equal Variances
	Mod Levene Equality of Variance	2.266	2.423	0.0639	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9343	0.9338	0.0518	Normal Distribution
	Anderson-Darling A2 Normality	0.6112	2.492	0.1129	Normal Distribution

Total Dry Weight-mg Summary — Calculated Variate

C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	5.21	3.68	6.44	0.7107	1.421	27.28%	0.0%
1.5		4	6.46	5.52	7.34	0.3891	0.7782	12.05%	-23.99%
3		4	6.39	5.88	7.11	0.2659	0.5319	8.32%	-22.65%
6.1		4	6.098	4.94	7.18	0.4606	0.9212	15.11%	-17.04%
12.1		4	6.753	5.68	7.33	0.3788	0.7575	11.22%	-29.61%
24.2		4	6.057	5.72	6.54	0.1955	0.3909	6.45%	-16.27%
48.5		4	5.635	4.74	6.36	0.3703	0.7405	13.14%	-8.16%
97		4	5.643	5.05	6.18	0.2561	0.5123	9.08%	-8.3%

June 4/15

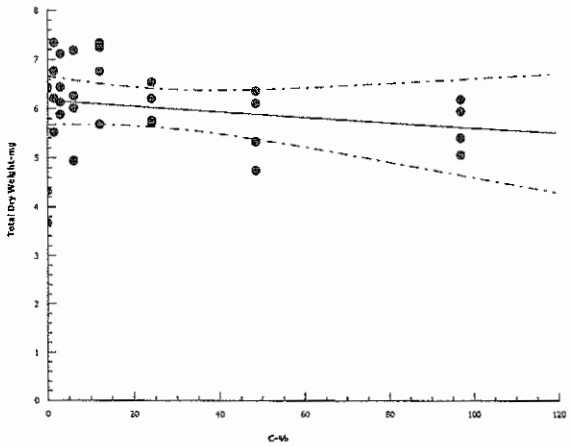
Lemna Growth Inhibition Test — **Nautilus Environmental**

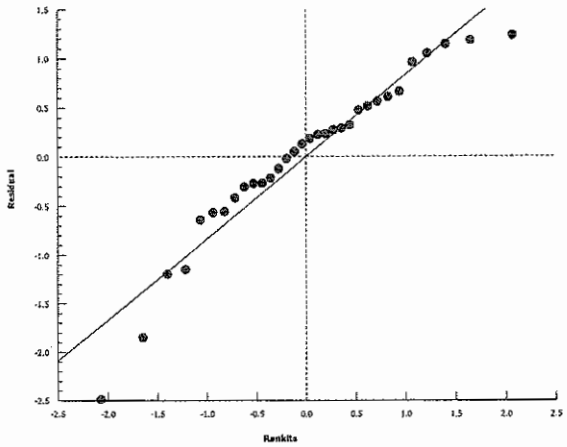
Analysis ID:	03-2429-0906	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 11:13	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes

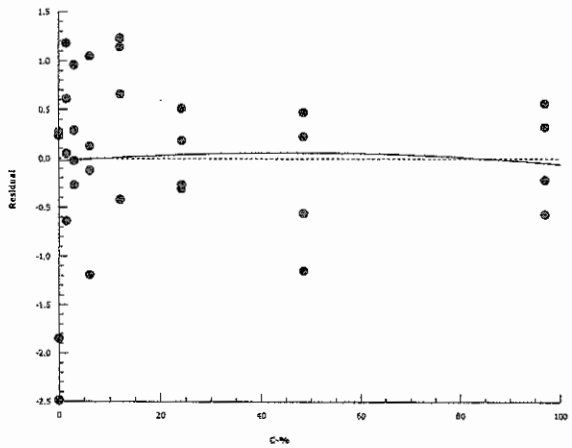
Total Dry Weight-mg Detail

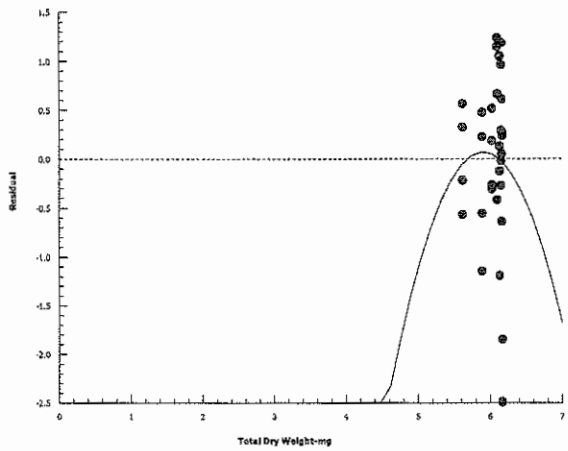
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.4	4.32	6.44	3.68
1.5		6.21	6.77	7.34	5.52
3		6.44	5.88	6.13	7.11
6.1		7.18	4.94	6.01	6.26
12.1		5.68	7.24	7.33	6.76
24.2		5.72	6.21	6.54	5.76
48.5		4.74	6.36	6.11	5.33
97		6.18	5.4	5.94	5.05

Graphics — 2P Exponential EV [Y=A*exp(log(0.5)*X/D)]









June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	12-5988-9254	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 11:14	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	00-5380-8605	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	15 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	01-8455-4594	**Code:**	B001462	**Client:**	Teck Coal
Sample Date:	05 May-15 14:49	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	57h (6.8 °C)	**Station:**	LC_LC3_WS_2015-05-06_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	27.4%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	2.173	2.482	1.428	6	0.0906	CDF	Non-Significant Effect
		3	2.051	2.482	1.428	6	0.1128	CDF	Non-Significant Effect
		6.1	1.543	2.482	1.428	6	0.2525	CDF	Non-Significant Effect
		12.1*	2.681	2.482	1.428	6	0.0332	CDF	Significant Effect
		24.2	1.473	2.482	1.428	6	0.2779	CDF	Non-Significant Effect
		48.5	0.7388	2.482	1.428	6	0.6026	CDF	Non-Significant Effect
		97	0.7518	2.482	1.428	6	0.5966	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	7.281652	1.040236	7	1.572	0.1918	Non-Significant Effect
Error	15.88541	0.6618923	24			
Total	23.16707		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.124	18.48	0.5254	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9779	0.9081	0.7374	Normal Distribution

Total Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	5.21	2.948	7.472	5.36	3.68	6.44	0.7107	27.28%	0.0%
1.5		4	6.46	5.222	7.698	6.49	5.52	7.34	0.3891	12.05%	-23.99%
3		4	6.39	5.544	7.236	6.285	5.88	7.11	0.2659	8.32%	-22.65%
6.1		4	6.098	4.632	7.563	6.135	4.94	7.18	0.4606	15.11%	-17.04%
12.1		4	6.753	5.547	7.958	7	5.68	7.33	0.3788	11.22%	-29.61%
24.2		4	6.057	5.435	6.68	5.985	5.72	6.54	0.1955	6.45%	-16.27%
48.5		4	5.635	4.457	6.813	5.72	4.74	6.36	0.3703	13.14%	-8.16%
97		4	5.643	4.827	6.458	5.67	5.05	6.18	0.2561	9.08%	-8.3%

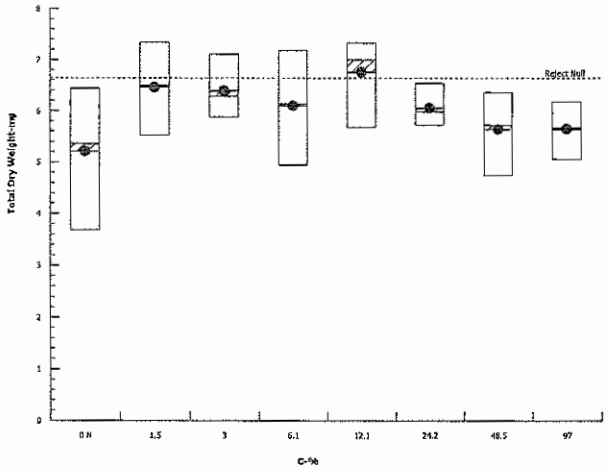
Total Dry Weight-mg Detail

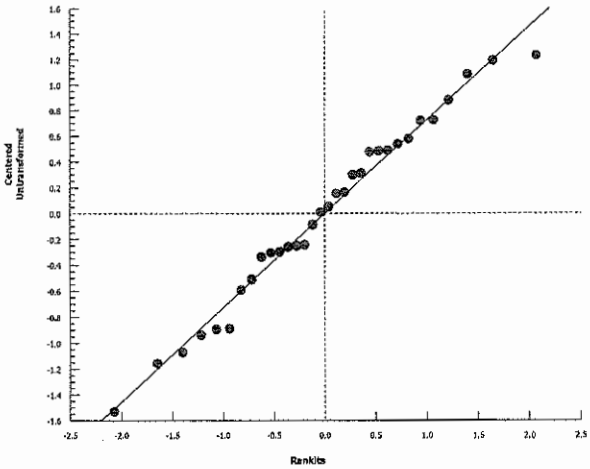
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.4	4.32	6.44	3.68
1.5		6.21	6.77	7.34	5.52
3		6.44	5.88	6.13	7.11
6.1		7.18	4.94	6.01	6.26
12.1		5.68	7.24	7.33	6.76
24.2		5.72	6.21	6.54	5.76
48.5		4.74	6.36	6.11	5.33
97		6.18	5.4	5.94	5.05

June 4/15

Analysis ID:	12-5988-9254	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 11:14	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





June 4/15

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 15378

Start Date: May 7, 2015
Set up by: JW

Sample Information:

Sample ID: LC-DCL_WS-2015-05-05-N
Sample Date: May 5, 2015
Date Received: May 6, 2015
Sample Volume: 1 x 20L

Test Organism Information:

Culture Date: 043015
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (35 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 118
Date Initiated: May 20, 2015

7-d No. of Fronds IC50 (95% CL): 4.1 (3.8 - 4.3) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.1 (3.1 - 5.4) g/L KCl CV (%): 15

Test Results:		Number of Fronds	Dry Weight
	IC25 %(v/v) (95% CL)	>97	>97
	IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: [signature]

Date reviewed: June 4/15

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck

Setup by: JW

Sample ID: LC_DC1_WS-2015-05-05-N

Test Date: May 7, 2015

Work Order No.: 15378

Test Species: *Lemna minor*

Culture Source: CPCC # 490

Test Culture Age: 7 days

> 8X Growth? (Y/N): Y (35 fronds)

Light Intensity Range: 4300 - 5300

Date Measured: ~~April~~ May 7, 2015

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Initials	JW	MLT	[illegible]	MLT	MLT	MLT	KLP	MLT

Sample Characteristics: Initial Water Quality

				Adjusted Water Quality
Temperature (°C)	24.0	Aeration?:	20 min	23.0
DO (mg/L)	9.5	Nutrients added?:	Y →	7.8
pH	7.8			8.0
Conductivity (µS)	235			1034

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	24.0	8.3	8.3	868
1.5	23.80 KL	24.0	8.2	9.1	871
3.0	23.0	24.0	8.2	8.8	876
6.1	23.0	24.0	8.2	9.3	881
12.1	23.0	24.0	8.2	9.4	890
24.2	23.0	24.0	8.1	9.3	910
48.5	23.0	24.0	8.1	9.4	951
97	23.0	24.0	8.0	9.3	1034
Initials	JW	KL	JW	KL	JW

Instruments: Thermometer: CER # 6 Cond. Meter: 3 pH meter: 3

Sample Description: Clear w/ black precipitate

Comments:

Reviewed: [signature] **Date Reviewed:** June 4/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC- DC L. WS. 2015 - 05 - 05 . N
Work Order #: 15378

Start Date: May 7 , 2015
Termination Date: May 14 , 2015
Test set up by: JW

Concentration % (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	91										JW
	B	6	89										
	C	6	96										
	D	6	84										
1.5	A	6	65										
	B	6	64										
	C	6	99										
	D	6	93										
3.0	A	6	98										
	B	6	91										
	C	6	99										
	D	6	71										
6.1	A	6	96		X	X						Emerging fronds are necrotic ↓	
	B	6	90		X	X							
	C	6	110			X							
	D	6	83										
12.1	A	6	90			X							
	B	6	123										
	C	6	97			X							
	D	6	102										
24.2	A	6	97										
	B	6	109										
	C	6	87										
	D	6	112			X							↓

Comments: Algal growth is prominent across all concentrations

Reviewed by: [signature]

Date Reviewed: June 4/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC_DCL_WS_2015-05-05_N
Work Order #: 153798

Start Date: May 7, 2015
Termination Date: May 14, 2015
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	103			X							JW
	B	6	86										
	C	6	108			X							
	D	6	102										
97	A	6	116			X							
	B	6	82										
	C	6	85										
	D	6	106		X	X							
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: [signature]

Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC-DCL-WS-2015-05-05_N
Work Order #: 15378

Start Date: May 7 , 2015
Termination Date: May 14 , 2015

Concentration % (v/v)	Rep	Kit Pan No. BLACK	Pan weight (mg)	Pan + plant (mg)	Initials
CONTROL	A	33	980.79	~~1011.65~~ 987.05	KL / JW
	B	34	990.24	~~1003.84~~ 996.39	KL
	C	35	1008.13	1015.43	KL
	D	36	1008.38	1014.38	KL
1.5	A	37	1003.12	1008.57	KL
	B	38	969.90	974.81	KL
	C	39	989.28	996.48	KL
	D	40	987.68	994.25	KL
3.0	A	41	976.85	984.14	KL
	B	42	966.96	973.65	KL
	C	43	979.07	986.11	KL
	D	44	990.87	997.53	KL
6.1	A	45	988.02	993.11	KL
	B	46	~~969~~ KL 968.99	975.75	KL
	C	47	984.81	992.80	KL
	D	48	980.28	986.42	KL
12.1	A	49	985.57	991.75	KL
	B	50	990.08	999.40	KL
	C	51	977.34	984.63	KL
	D	52	984.62	992.07	KL
24.2	A	53	973.57	980.42	KL
	B	54	988.88	996.53	KL
	C	55	981.17	988.45	KL
	D	56	984.80	992.80	KL
48.5	A	57	980.48	986.88	KL
	B	58	999.80	1005.90	KL
	C	59	1012.~~59~~ KL 68	1019.79	KL
	D	60	1011.48	1018.35	KL

Comments: 10% reweigh: #35: 1015.42 #55: 988.33
#43: 986.01 #63: 999.21

Reviewed by: [signature] Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - DCL - WS - 2015 - 05 - 05 - N
Work Order #: 15378

Start Date: May 7 , 2015
Termination Date: May 14 , 2015

Concentration % (v/v)	Rep	KH Pan No. Block	Pan weight (mg)	Pan + plant (mg)	Initials
97	A	61	991.34	999.63	KL / JW
	B	62	974.82	981.06	KL
	C	63	992.82	999.33	KL
	D	64	987.07	996.62	KL
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: KL

Date Reviewed: June 9/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	13-2738-4464	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:36	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	10-1375-8269	**Code:**	3C6CB93D	**Client:**	Teck Coal
Sample Date:	05 May-15 11:41	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	36h (6.3 °C)	**Station:**	LC_DC1_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	185349	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>97	N/A	N/A	<1.031	NA	NA
IC10	>97	N/A	N/A	<1.031	NA	NA
IC15	>97	N/A	N/A	<1.031	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	84	78	90	2.483	4.967	5.91%	0.0%
1.5		4	74.25	58	93	9.178	18.36	24.72%	11.61%
3		4	83.75	65	93	6.498	13	15.52%	0.3%
6.1		4	88.75	77	104	5.735	11.47	12.93%	-5.66%
12.1		4	97	84	117	7.106	14.21	14.65%	-15.48%
24.2		4	95.25	81	106	5.75	11.5	12.07%	-13.39%
48.5		4	93.75	80	102	4.768	9.535	10.17%	-11.61%
97		4	91.25	76	110	8.22	16.44	18.02%	-8.63%

Frond Count Detail

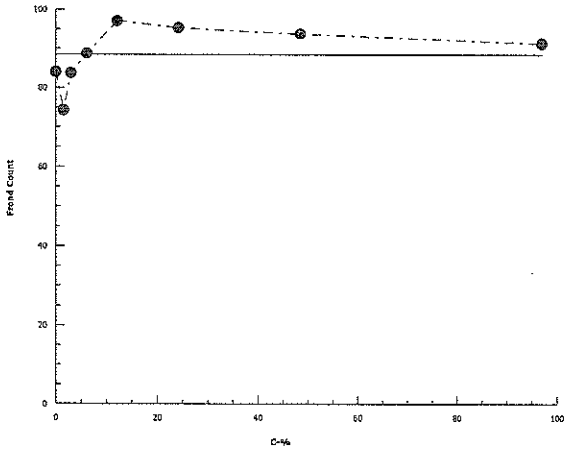
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	85	83	90	78
1.5		59	58	93	87
3		92	85	93	65
6.1		90	84	104	77
12.1		84	117	91	96
24.2		91	103	81	106
48.5		97	80	102	96
97		110	76	79	100

June 4/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	13-2738-4464	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:36	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	14-5762-8429	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:37	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	10-1375-8269	**Code:**	3C6CB93D	**Client:**	Teck Coal
Sample Date:	05 May-15 11:41	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	36h (6.3 °C)	**Station:**	LC_DC1_WS_2015-05-05_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	27.2%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-1.059	2.482	22.86	6	0.9918	CDF	Non-Significant Effect
		3	-0.02714	2.482	22.86	6	0.8816	CDF	Non-Significant Effect
		6.1	0.5157	2.482	22.86	6	0.7009	CDF	Non-Significant Effect
		12.1	1.411	2.482	22.86	6	0.3016	CDF	Non-Significant Effect
		24.2	1.221	2.482	22.86	6	0.3805	CDF	Non-Significant Effect
		48.5	1.059	2.482	22.86	6	0.4538	CDF	Non-Significant Effect
		97	0.7871	2.482	22.86	6	0.5803	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1595.5	227.9286	7	1.343	0.2738	Non-Significant Effect
Error	4072.5	169.6875	24			
Total	5668		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	4.627	18.48	0.7054	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9512	0.9081	0.1561	Normal Distribution

Frond Count Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	84	76.1	91.9	84	78	90	2.483	5.91%	0.0%
1.5		4	74.25	45.04	103.5	73	58	93	9.178	24.72%	11.61%
3		4	83.75	63.07	104.4	88.5	65	93	6.498	15.52%	0.3%
6.1		4	88.75	70.5	107	87	77	104	5.735	12.93%	-5.66%
12.1		4	97	74.38	119.6	93.5	84	117	7.106	14.65%	-15.48%
24.2		4	95.25	76.95	113.5	97	81	106	5.75	12.07%	-13.39%
48.5		4	93.75	78.58	108.9	96.5	80	102	4.768	10.17%	-11.61%
97		4	91.25	65.09	117.4	89.5	76	110	8.22	18.02%	-8.63%

Frond Count Detail

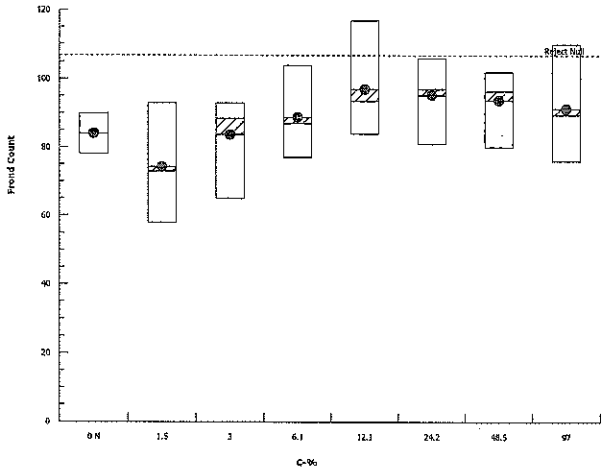
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	85	83	90	78
1.5		59	58	93	87
3		92	85	93	65
6.1		90	84	104	77
12.1		84	117	91	96
24.2		91	103	81	106
48.5		97	80	102	96
97		110	76	79	100

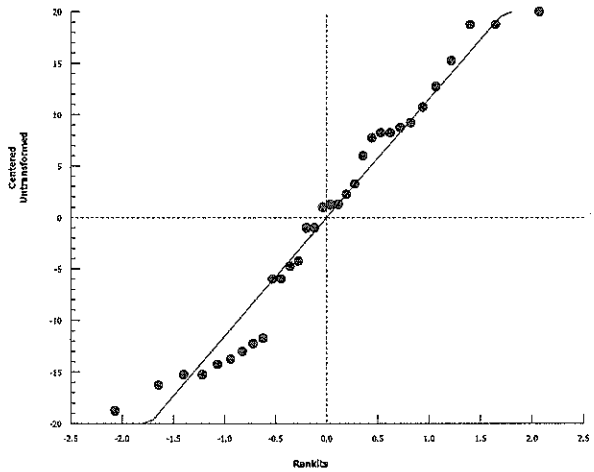
June 9/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	14-5762-8429	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:37	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-1120-5263	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:37	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	10-1375-8269	**Code:**	3C6CB93D	**Client:**	Teck Coal
Sample Date:	05 May-15 11:41	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	36h (6.3 °C)	**Station:**	LC_DC1_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	678283	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>97	N/A	N/A	<1.031	NA	NA
IC10	>97	N/A	N/A	<1.031	NA	NA
IC15	>97	N/A	N/A	<1.031	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.428	6	7.3	0.2957	0.5913	9.2%	0.0%
1.5		4	6.032	4.91	7.2	0.5205	1.041	17.26%	6.15%
3		4	6.92	6.66	7.29	0.1505	0.301	4.35%	-7.66%
6.1		4	6.495	5.09	7.99	0.6059	1.212	18.66%	-1.05%
12.1		4	7.56	6.18	9.32	0.6511	1.302	17.22%	-17.62%
24.2		4	7.445	6.85	8	0.2469	0.4937	6.63%	-15.83%
48.5		4	6.62	6.1	7.11	0.2275	0.4551	6.88%	-3.0%
97		4	7.447	6.24	8.75	0.6287	1.257	16.88%	-15.87%

Total Dry Weight-mg Detail

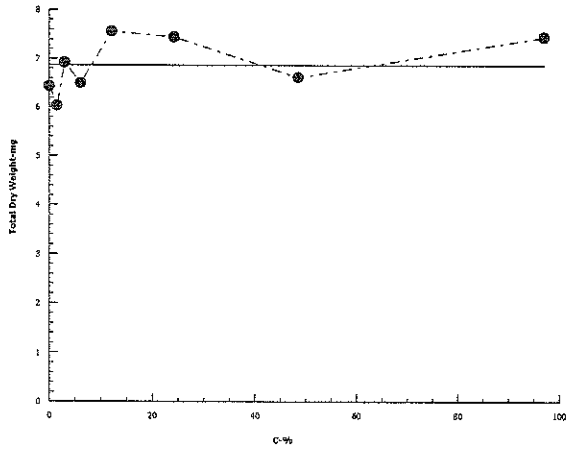
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.26	6.15	7.3	6
1.5		5.45	4.91	7.2	6.57
3		7.29	6.69	7.04	6.66
6.1		5.09	6.76	7.99	6.14
12.1		6.18	9.32	7.29	7.45
24.2		6.85	7.65	7.28	8
48.5		6.4	6.1	7.11	6.87
97		8.29	6.24	6.51	8.75

June 4/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-1120-5263	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:37	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	17-1889-0351	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:37	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	10-1375-8269	**Code:**	3C6CB93D	**Client:**	Teck Coal
Sample Date:	05 May-15 11:41	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	36h (6.3 °C)	**Station:**	LC_DC1_WS_2015-05-05_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	25.0%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-0.6095	2.482	1.608	6	0.9700	CDF	Non-Significant Effect
		3	0.7599	2.482	1.608	6	0.5929	CDF	Non-Significant Effect
		6.1	0.1041	2.482	1.608	6	0.8472	CDF	Non-Significant Effect
		12.1	1.747	2.482	1.608	6	0.1866	CDF	Non-Significant Effect
		24.2	1.57	2.482	1.608	6	0.2430	CDF	Non-Significant Effect
		48.5	0.297	2.482	1.608	6	0.7855	CDF	Non-Significant Effect
		97	1.574	2.482	1.608	6	0.2417	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.972311	1.281759	7	1.526	0.2061	Non-Significant Effect
Error	20.16042	0.8400177	24			
Total	29.13273		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	9.58	18.48	0.2136	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9738	0.9081	0.6093	Normal Distribution

Total Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	6.428	5.487	7.368	6.205	6	7.3	0.2957	9.2%	0.0%
1.5		4	6.032	4.376	7.689	6.01	4.91	7.2	0.5205	17.26%	6.15%
3		4	6.92	6.441	7.399	6.865	6.66	7.29	0.1505	4.35%	-7.66%
6.1		4	6.495	4.567	8.423	6.45	5.09	7.99	0.6059	18.66%	-1.05%
12.1		4	7.56	5.488	9.632	7.37	6.18	9.32	0.6511	17.22%	-17.62%
24.2		4	7.445	6.659	8.231	7.465	6.85	8	0.2469	6.63%	-15.83%
48.5		4	6.62	5.896	7.344	6.635	6.1	7.11	0.2275	6.88%	-3.0%
97		4	7.447	5.447	9.448	7.4	6.24	8.75	0.6287	16.88%	-15.87%

Total Dry Weight-mg Detail

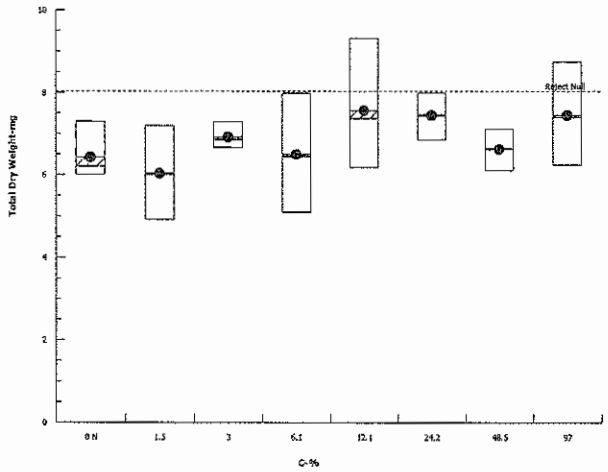
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.26	6.15	7.3	6
1.5		5.45	4.91	7.2	6.57
3		7.29	6.69	7.04	6.66
6.1		5.09	6.76	7.99	6.14
12.1		6.18	9.32	7.29	7.45
24.2		6.85	7.65	7.28	8
48.5		6.4	6.1	7.11	6.87
97		8.29	6.24	6.51	8.75

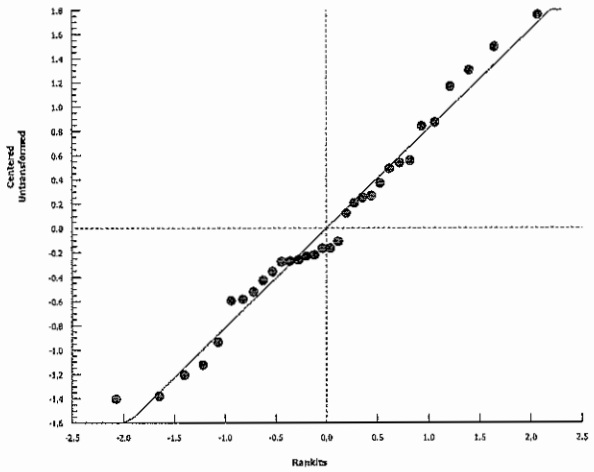
June 4/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	17-1889-0351	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:37	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: JW QA: June 4/15

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 15378

Start Date: May 7, 2015
Set up by: JW

Sample Information:

Sample ID: LC-FRDSOC-WS-2015-05-05-N
Sample Date: May 5, 2015
Date Received: May 6, 2015
Sample Volume: 1 x 20L

Test Organism Information:

Culture Date: 043015
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (35 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 118
Date Initiated: May 20, 2015

7-d No. of Fronds IC50 (95% CL): 4.1 (3.8 - 4.3) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.1 (3.1 - 5.4) g/L KCl CV (%): 15

Test Results:

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	>97	>97
IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: [signature]

Date reviewed: June 4/15

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck **Setup by:** JN

Sample ID: LC_ FRDSDC_WS-2015-05-05_N **Test Date:** May 7, 2015

Work Order No.: 15378 **Test Species:** *Lemna minor*

Culture Source: CPCC # 490

Test Culture Age: 7 days **> 8X Growth? (Y/N):** Y (35 fronds)

Light Intensity Range: 4000-4900 **Date Measured:** MLT ~~April~~ May 7, 2015

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Initials	JN	MLT	A	MLT	MLT	MLT	KLP	MLT

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	24.0	Aeration?: 20 min	23.0
DO (mg/L)	9.5	Nutrients added?:	7.8
pH	7.9	Y →	MLT ~~7.9~~ 8.1
Conductivity (µS)	571		1325

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	24.0	8.3	MLT ~~9~~ 8.3	868
1.5	23.0	24.0	8.2	9.2	876
3.0	23.0	24.0	8.2	8.5	884
6.1	23.0	24.0	8.2	9.2	898
12.1	23.0	24.0	8.2	9.4	929
24.2	23.0	24.0	8.2	9.1	988
48.5	23.0	24.0	8.2	8.8	1103
97	23.0	24.0	8.1	9.0	1325
Initials	JN	KL	JN	KL	JN

Instruments: Thermometer: CER #6 Cond. Meter: 3 pH meter: 3

Sample Description: Clear w/ brown precipitate.

Comments:

Reviewed: [signature] **Date Reviewed:** June 4/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC- FRDSDC - WS - 2015 - 05 - 05 - N
Work Order #: 15378

Start Date: May 7 , 2015
Termination Date: May 14 , 2015
Test set up by: JW

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	106										ML7 /JW
	B	6	109										
	C	6	97										
	D	6	87										
1.5	A	6	93		X								
	B	6	109		X								
	C	6	103		X	X							
	D	6	93		X	X							
3.0	A	6	120			X							
	B	6	81			X							
	C	6	84		X	X							
	D	6	87		X	X							
6.1	A	6	95		X	X							
	B	6	109		X	X							
	C	6	91		X								
	D	6	103										
12.1	A	6	72		X								
	B	6	97										
	C	6	84		X								
	D	6	103		X	X							
24.2	A	6	101										
	B	6	94		X								
	C	6	113										
	D	6	118		X								↓

Comments: algae growth is prominent in all concentrations

Reviewed by: [signature]

Date Reviewed: June 9/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC- FRDSDC-WS-2015-05-05-N
Work Order #: 15378

Start Date: May 7, 2015
Termination Date: May 14, 2015
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	93										MJ/JW
	B	6	99										
	C	6	101										
	D	6	119										
97	A	6	92			X							
	B	6	98										
	C	6	96										
	D	6	95			X							
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: KW

Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Start Date: May 7, 2015
Sample ID: LC- ERDSDC-WS-2015-05-05-N
Termination Date: May 14, 2015
Work Order #: 15378

Concentration % (v/v)	Rep	RTC 12 Pan No. ORANGE	Pan weight (mg)	Pan + plant (mg)	Initials
control	A	1	972.05	980.24	KL
	B	2	967.60	975.94	KL
	C	3	981.66	989.36	KL
	D	4	973.87	980.14	KL
1.5	A	5	995.60	1002.79	KL
	B	6	983.27	991.49	KL
	C	7	1004.33	1012.72	KL
	D	8	995.10	1001.98	KL
3.0	A	9	1000.44	1009.23	KL
	B	10	1000.18	1006.49	KL
	C	11	1001.08	1007.07	KL
	D	12	996.80	1003.66	KL
6.1	A	13	986.47	993.57	KL
	B	14	1010.80	1018.79	KL
	C	15	1013.21	1020.19	KL
	D	16	984.91	992.55	KL
12.1	A	17	990.94	996.24	KL
	B	18	1000.8 KL 77	1007.81	KL
	C	19	988.38	994.71	KL
	D	20	991.26	998.63	KL
24.2	A	21	1007.76	1014.82	KL
	B	22	986.39	993.23	KL
	C	23	988.90	997.00	KL
	D	24	1011.03	1019.53	KL
48.5	A	25	1036.66	1043.13	KL
	B	26	1022.14	1028.35	KL
	C	27	1015.93	1023.50	KL
	D	28	1014.15	1023.35	KL

Comments: 10% reweigh: #4: 980.00 #25: 1043.05
#14: 1018.65 #32: 1024.84

Reviewed by: [signature] Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: TECK JIN Start Date: May 7, 2015

Sample ID: LC- FRDSDC-2WS-2015-05-05-N Termination Date: May 14, 2015

Work Order #: ~~15378~~ mg 15378

Concentration % (V/V)	Rep	RTOL 12 Pan No. Grams	Pan weight (mg)	Pan + plant (mg)	Initials
97	A	29	1018.94	1025.95	KL
	B	30	975.64	983.77	KL
	C	31	1010.47	1017.71	KL
	D	32	1017.83	1024.97	KL
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments: _____

Reviewed by: _____ Date Reviewed: June 9/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-6668-2257	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:45	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	20-4735-3291	**Code:**	7A0821CB	**Client:**	Teck Coal
Sample Date:	05 May-15 13:32	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	34h (6 °C)	**Station:**	LC_FRDSDC_WS_2015-05-05_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
3P Log-Logistic EV [Y=A/(1+(X/D)^C)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
27	-95.56	198	201.5		Yes	2.6	2.621	0.0514	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.2555	N/A	3268000	391.4	0.0000306	NA JW
IC10	2160	N/A	9.12E+11	0.0463	0.0000000	NA
IC15	583100	N/A	3.55E+28	0.0001715	2.82E-27	NA
IC20	39470000	N/A	N/A	0.0000025	NA	NA
IC25	12830000	N/A	N/A	0.0000000	NA	NA
IC40	56360000	N/A	N/A	0.0000000	NA	NA
IC50	76190000	N/A	N/A	1.312E-13	NA	NA

> 97 % (V/V) JW

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	93.26	6.31	80.89	105.6	14.78	<0.0001	Significant Parameter
C	0.08264	0.3036	-0.5124	0.6777	0.2722	0.7874	Non-Significant Parameter
D	7.62E+14	8.64E+16	-1.7E+17	1.70E+17	0.008818	0.9930	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	0	0	1	0	1.0000	Non-Significant
Lack of Fit	1623.357	324.6714	5	2.6	0.0514	Non-Significant
Pure Error	2996.5	124.8542	24			
Residual	4619.857	159.3054	29			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	8.576	14.07	0.2846	Equal Variances
	Mod Levene Equality of Variance	0.6436	2.423	0.7158	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9747	0.9338	0.6371	Normal Distribution
	Anderson-Darling A2 Normality	0.3391	2.492	0.5039	Normal Distribution

June 4/15

Analysis ID: 06-6668-2257 **Endpoint:** Frond Count **CETIS Version:** CETISv1.8.7
Analyzed: 21 May-15 10:45 **Analysis:** Nonlinear Regression **Official Results:** Yes

Frond Count Summary

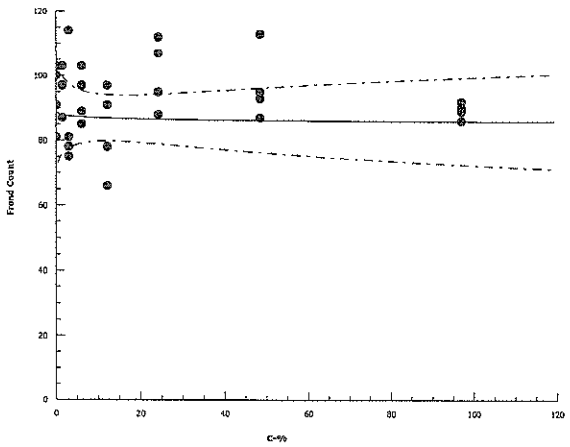
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	93.75	81	103	4.956	9.912	10.57%	0.0%
1.5		4	93.5	87	103	3.948	7.895	8.44%	0.27%
3		4	87	75	114	9.083	18.17	20.88%	7.2%
6.1		4	93.5	85	103	4.031	8.062	8.62%	0.27%
12.1		4	83	66	97	6.916	13.83	16.67%	11.47%
24.2		4	100.5	88	112	5.485	10.97	10.92%	-7.2%
48.5		4	97	87	113	5.598	11.2	11.54%	-3.47%
97		4	89.25	86	92	1.25	2.5	2.8%	4.8%

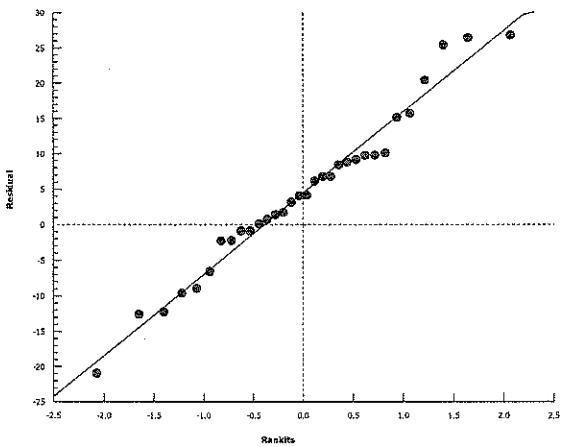
Frond Count Detail

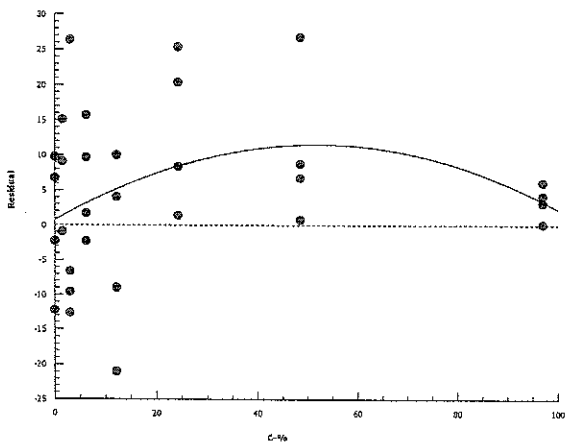
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	100	103	91	81
1.5		87	103	97	87
3		114	75	78	81
6.1		89	103	85	97
12.1		66	91	78	97
24.2		95	88	107	112
48.5		87	93	95	113
97		86	92	90	89

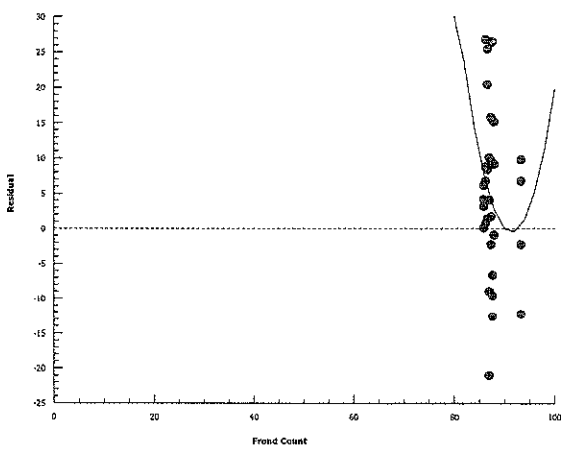
Graphics

3P Log-Logistic EV [Y=A/(1+(X/D)^C)]









June 4|15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-8056-9085	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:45	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	20-4735-3291	**Code:**	7A0821CB	**Client:**	Teck Coal
Sample Date:	05 May-15 13:32	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	34h (6 °C)	**Station:**	LC_FRDSDC_WS_2015-05-05_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	20.9%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-0.03164	2.482	19.61	6	0.8827	CDF	Non-Significant Effect
		3	-0.8543	2.482	19.61	6	0.9848	CDF	Non-Significant Effect
		6.1	-0.03164	2.482	19.61	6	0.8827	CDF	Non-Significant Effect
		12.1	-1.361	2.482	19.61	6	0.9969	CDF	Non-Significant Effect
		24.2	0.8543	2.482	19.61	6	0.5490	CDF	Non-Significant Effect
		48.5	0.4113	2.482	19.61	6	0.7430	CDF	Non-Significant Effect
		97	-0.5695	2.482	19.61	6	0.9666	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	872.375	124.625	7	0.9982	0.4565	Non-Significant Effect
Error	2996.5	124.8542	24			
Total	3868.875		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	8.576	18.48	0.2846	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9665	0.9081	0.4087	Normal Distribution

Frond Count Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	93.75	77.98	109.5	95.5	81	103	4.956	10.57%	0.0%
1.5		4	93.5	80.94	106.1	92	87	103	3.948	8.44%	0.27%
3		4	87	58.09	115.9	79.5	75	114	9.083	20.88%	7.2%
6.1		4	93.5	80.67	106.3	93	85	103	4.031	8.62%	0.27%
12.1		4	83	60.99	105	84.5	66	97	6.916	16.67%	11.47%
24.2		4	100.5	83.04	118	101	88	112	5.485	10.92%	-7.2%
48.5		4	97	79.19	114.8	94	87	113	5.598	11.54%	-3.47%
97		4	89.25	85.27	93.23	89.5	86	92	1.25	2.8%	4.8%

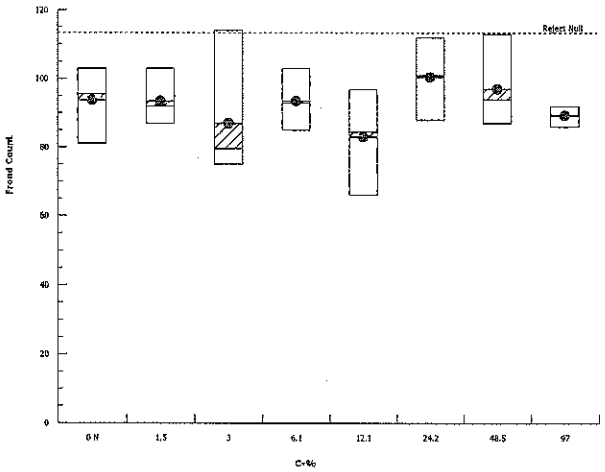
Frond Count Detail

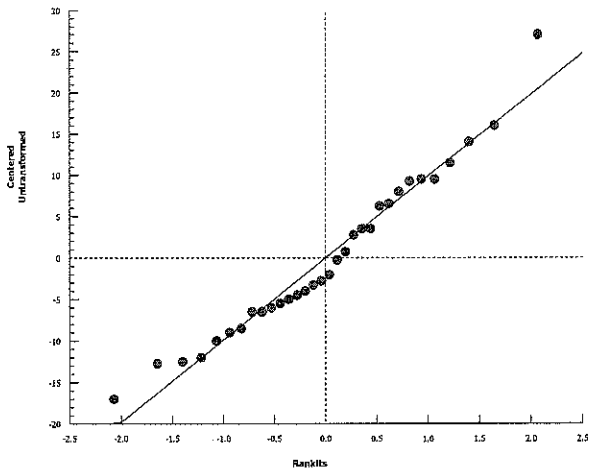
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	100	103	91	81
1.5		87	103	97	87
3		114	75	78	81
6.1		89	103	85	97
12.1		66	91	78	97
24.2		95	88	107	112
48.5		87	93	95	113
97		86	92	90	89

June 4/15

Analysis ID:	11-8056-9085	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:45	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	07-4548-6710	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:46	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	20-4735-3291	**Code:**	7A0821CB	**Client:**	Teck Coal
Sample Date:	05 May-15 13:32	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	34h (6 °C)	**Station:**	LC_FRDSDC_WS_2015-05-05_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
3P Log-Gompertz EV [Y=A*exp(log(0.5)(X/D)^C)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
21	-15.03	36.91	40.46		Yes	2.251	2.621	0.0818	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.005502	N/A	43150	18170	0.002318	~~NA~~ JW
IC10	12.45	0.005245	1326	8.031	~~0.07544~~	19070
IC15	1303	N/A	1.99E+08	~~0.07672~~	0.0000005	NA
IC20	39130	N/A	~~8.32E+12~~	0.002555	0.0000000	NA
IC25	597700	N/A	N/A	0.0001673	NA	NA
IC40	28340000	~~N/A~~	N/A	0.0000003	NA	NA
IC50	~~74950000~~	N/A	N/A	0.0000000	NA	NA

> 97 %. (v/v) JW

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	7.608	0.5095	6.609	8.606	14.93	<0.0001	Significant Parameter
C	0.09319	0.2024	-0.3036	0.4899	0.4604	0.6487	Non-Significant Parameter
D	7.5E+09	3.14E+11	-6.1E+11	6.23E+11	0.02385	0.9811	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	0	0	1	0	1.0000	Non-Significant
Lack of Fit	9.615332	1.923066	5	2.251	0.0818	Non-Significant
Pure Error	20.50029	0.854179	24			
Residual	30.11562	1.03847	29			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	4.908	14.07	0.6712	Equal Variances
	Mod Levene Equality of Variance	0.6803	2.423	0.6872	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9893	0.9338	0.9840	Normal Distribution
	Anderson-Darling A2 Normality	0.2043	2.492	0.9159	Normal Distribution

June 4/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	07-4548-6710	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:46	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes

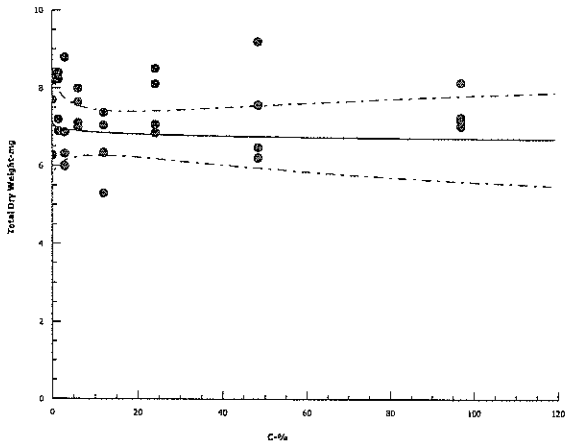
Total Dry Weight-mg Summary

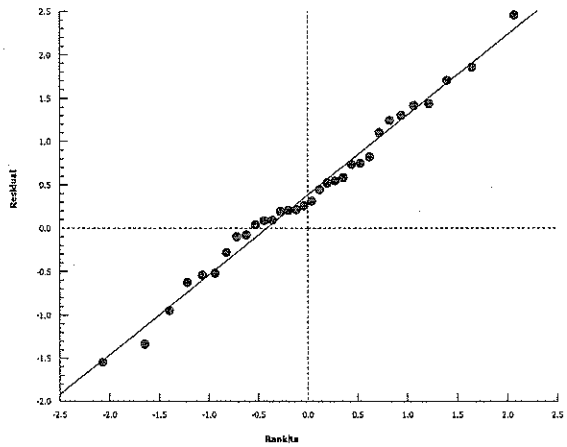
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	7.625	6.27	8.34	0.4719	0.9438	12.38%	0.0%
1.5		4	7.67	6.88	8.39	0.3736	0.7473	9.74%	-0.59%
3		4	6.987	5.99	8.79	0.6271	1.254	17.95%	8.36%
6.1		4	7.428	6.98	7.99	0.2361	0.4723	6.36%	2.59%
12.1		4	6.51	5.3	7.37	0.458	0.916	14.07%	14.62%
24.2		4	7.625	6.84	8.5	0.4007	0.8014	10.51%	0.0%
48.5		4	7.362	6.21	9.2	0.6797	1.359	18.46%	3.44%
97		4	7.38	7.01	8.13	0.2544	0.5088	6.89%	3.21%

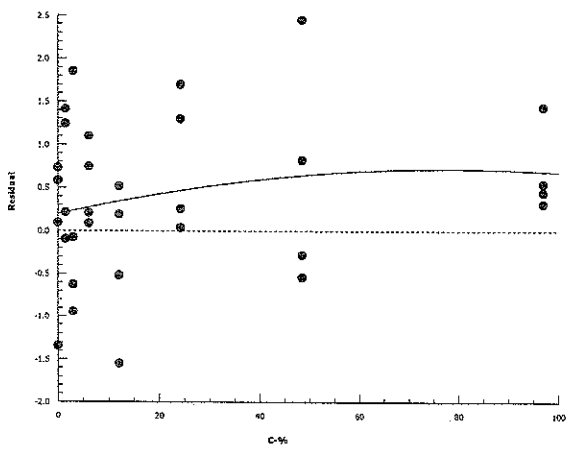
Total Dry Weight-mg Detail

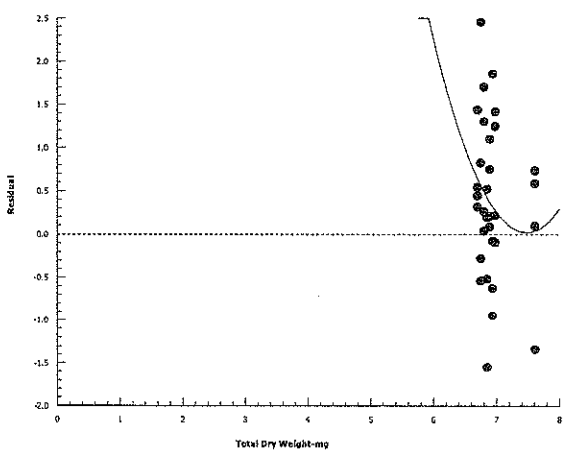
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	8.19	8.34	7.7	6.27
1.5		7.19	8.22	8.39	6.88
3		8.79	6.31	5.99	6.86
6.1		7.1	7.99	6.98	7.64
12.1		5.3	7.04	6.33	7.37
24.2		7.06	6.84	8.1	8.5
48.5		6.47	6.21	7.57	9.2
97		7.01	8.13	7.24	7.14

Graphics — 3P Log-Gompertz EV [Y=A*exp(log(0.5)(X/D)^C)]









June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	02-0529-6258	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:46	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	20-4735-3291	**Code:**	7A0821CB	**Client:**	Teck Coal
Sample Date:	05 May-15 13:32	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	34h (6 °C)	**Station:**	LC_FRDSDC_WS_2015-05-05_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	21.3%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.06881	2.482	1.622	6	0.8570	CDF	Non-Significant Effect
		3	-0.9755	2.482	1.622	6	0.9894	CDF	Non-Significant Effect
		6.1	-0.3022	2.482	1.622	6	0.9351	CDF	Non-Significant Effect
		12.1	-1.706	2.482	1.622	6	0.9990	CDF	Non-Significant Effect
		24.2	-4.7E-05	2.482	1.622	6	0.8750	CDF	Non-Significant Effect
		48.5	-0.4017	2.482	1.622	6	0.9489	CDF	Non-Significant Effect
		97	-0.3749	2.482	1.622	6	0.9454	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.368309	0.6240442	7	0.7306	0.6481	Non-Significant Effect
Error	20.50029	0.8541786	24			
Total	24.8686		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	4.908	18.48	0.6712	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.963	0.9081	0.3321	Normal Distribution

Total Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	7.625	6.123	9.127	7.945	6.27	8.34	0.4719	12.38%	0.0%
1.5		4	7.67	6.481	8.859	7.705	6.88	8.39	0.3736	9.74%	-0.59%
3		4	6.987	4.992	8.983	6.585	5.99	8.79	0.6271	17.95%	8.36%
6.1		4	7.428	6.676	8.179	7.37	6.98	7.99	0.2361	6.36%	2.59%
12.1		4	6.51	5.052	7.968	6.685	5.3	7.37	0.458	14.07%	14.62%
24.2		4	7.625	6.35	8.9	7.58	6.84	8.5	0.4007	10.51%	0.0%
48.5		4	7.362	5.199	9.526	7.02	6.21	9.2	0.6797	18.46%	3.44%
97		4	7.38	6.57	8.19	7.19	7.01	8.13	0.2544	6.89%	3.21%

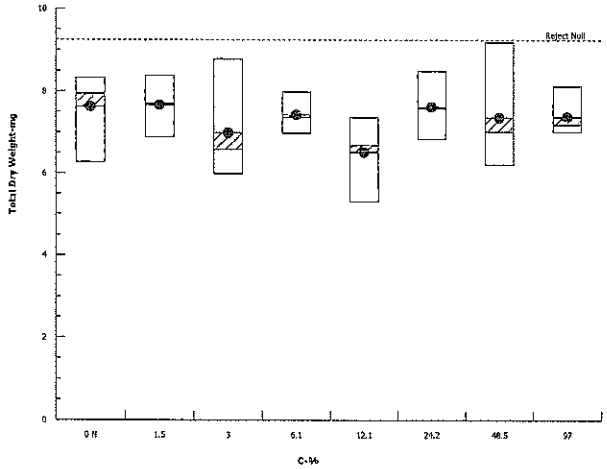
Total Dry Weight-mg Detail

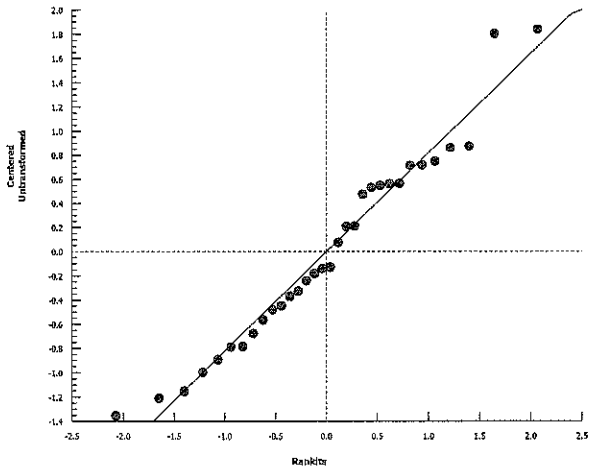
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	8.19	8.34	7.7	6.27
1.5		7.19	8.22	8.39	6.88
3		8.79	6.31	5.99	6.86
6.1		7.1	7.99	6.98	7.64
12.1		5.3	7.04	6.33	7.37
24.2		7.06	6.84	8.1	8.5
48.5		6.47	6.21	7.57	9.2
97		7.01	8.13	7.24	7.14

JW 4/15

Analysis ID:	02-0529-6258	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:46	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





June 4/15

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 15378

Start Date: May 7, 2015
Set up by: JW

Sample Information:

Sample ID: LC-DCDS_INS-2015-05-05 N
Sample Date: May 5, 2015
Date Received: May 6, 2015
Sample Volume: 1 x 20L

Test Organism Information:

Culture Date: 043015
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (35 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 118
Date Initiated: May 20, 2015

7-d No. of Fronds IC50 (95% CL): 4.1 (3.8 - 4.3) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.1 (3.1 - 5.4) g/L KCl CV (%): 15

Test Results:

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	> 97	> 97
IC50 %(v/v) (95% CL)	> 97	> 97

Reviewed by: [signature]

Date reviewed: June 4/15

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck
Setup by: JW
Sample ID: LC_DCDS_WS_2015-05-05_N
Test Date: May 7, 2015
Work Order No.: 15378
Test Species: *Lemna minor*
Culture Source: CPCC # 490
Test Culture Age: 7 days
> 8X Growth? (Y/N): Y (35 fronds)
Light Intensity Range: 4000 - 4600
Date Measured: MLT ~~April~~ May 7, 2015

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Initials	JW	MLT	A	~~MLT~~	MLT	MLT	KLP	MLT

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	24.0	Aeration?: 20 min	23.0
DO (mg/L)	9.3	Nutrients added?:	8.1
pH	7.8	Y →	~~8.0~~ MLT 8.0
Conductivity (µS)	192		1003

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	24.0	8.3	8.6	868
1.5	23.0	24.0	8.2	8.2	868
3.0	23.0	24.0	8.2	9.0	870
6.1	23.0	24.0	8.2	8.7	875
12.1	23.0	24.0	8.2	8.4	883
24.2	23.0	24.0	8.2	8.6	900
48.5	23.0	24.0	8.1	9.3	934
97	23.0	24.0	8.0	9.4	1003
Initials	JW	MLT	JW	MLT	JW

Instruments: Thermometer: CER # 6 Cond. Meter: 3 pH meter: 3
Sample Description: slightly turbid w/ black precipitate
Comments:
Reviewed: [signature] **Date Reviewed:** June 9/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC- PCDS - WS - 2015 - 05 - 05 - N
Work Order #: 15378

Start Date: May 7 , 2015
Termination Date: May 14 , 2015
Test set up by: JW

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	102										MG/JW
	B	6	66										
	C	6	87 MG										
	D	6	96										
1.5	A	6	100										
	B	6	110										
	C	6	104										
	D	6	84			X							
3.0	A	6	101										
	B	6	99										
	C	6	109		X								
	D	6	89										
6.1	A	6	95										
	B	6	94										
	C	6	118		X								
	D	6	77										
12.1	A	6	113										
	B	6	78										
	C	6	88										
	D	6	99										
24.2	A	6	106										
	B	6	98										
	C	6	87										
	D	6	93										

Comments: algae growth prominent in all concentrations

Reviewed by: [signature]

Date Reviewed: June 4/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC- DCDS - WS - 2015 - 05 - 05 - N
Work Order #: 15378

Start Date: May 7 , 2015
Termination Date: May 14 , 2015
Test set up by: JN

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	105										MLT/JW
	B	6	104										
	C	6	92										
	D	6	77										
97	A	6	106										
	B	6	109										
	C	6	106										
	D	6	115										
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: [illegible]

Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC- DCDS - WS - 2015 - 05 - 05 N
Work Order #: 15378

Start Date: May 7 , 2015
Termination Date: May 14 , 2015

Concentration % (v/v)	Rep	ME Pan No. Red	Pan weight (mg)	Pan + plant (mg)	Initials
control	A	1	1006.34	1013.12	KL
	B	2	1005.65	1010.00	KL
	C	3	990.38	996.23	KL
	D	4	987.89	993.54	KL
1.5	A	5	1004.60	1011.45	KL
	B	6	1008.95	1016.94	KL
	C	7	1006.62	1013.68	KL
	D	8	1008.02	1013.29	KL
3.0	A	9	984.94	991.58 #3	KL
	B	10	989.91	996.46	KL
	C	11	1003.75	1010.96	KL
	D	12	1015.04	1020.96	KL
6.1	A	13	1004.09	1010.37	KL
	B	14	1002.34	1008.66	KL
	C	15	996.64	1004.70	KL
	D	16	1001.90	1007.15	KL
12.1	A	17	985.73	993.09	KL
	B	18	994.43	999.89	KL
	C	19	992.23	998.27	KL
	D	20	984.96	991.24	KL
24.2	A	21	984.82	992.32	KL
	B	22	977.32	984.37	KL
	C	23	1002.09	1008.23	KL
	D	24	998.72	1004.84	KL
48.5	A	25	993.95	1001.05	KL
	B	26	988.29	995.29	KL
	C	27	977.80	984.03	KL
	D	28	969.15	974.22	KL

Comments: 10% reweigh: #1: 1013.00 #21: 992.12
#12: 1020.77 #31: 1046.28

Reviewed by: [signature] Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC- DCDS-WS-2015-05-05-N
Work Order #: 15378

Start Date: May 7, 2015
Termination Date: May 14, 2015

Concentration % (V/V)	Rep	ME Pan No. Rep	Pan weight (mg)	Pan + plant (mg)	Initials
97	A	29	980.384	987.31	KL
	B	30	990.25	997.59	KL
	C	31	1039.32	1046.44	KL
	D	32	994.38	1002.36	KL
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: [signature]

Date Reviewed: June 4/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-3916-6138	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	12-7328-6829	**Code:**	4BE4D0AD	**Client:**	Teck Coal
Sample Date:	05 May-15 11:14	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (7.8 °C)	**Station:**	LC_DCDS_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	715546	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>97	N/A	N/A	<1.031	NA	NA
IC10	>97	N/A	N/A	<1.031	NA	NA
IC15	>97	N/A	N/A	<1.031	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	81.75	60	96	7.878	15.76	19.27%	0.0%
1.5		4	93.5	78	104	5.56	11.12	11.89%	-14.37%
3		4	93.5	83	103	4.113	8.226	8.8%	-14.37%
6.1		4	90	71	112	8.416	16.83	18.7%	-10.09%
12.1		4	88.5	72	107	7.511	15.02	16.97%	-8.26%
24.2		4	90	81	100	4.021	8.042	8.94%	-10.09%
48.5		4	88.5	71	99	6.538	13.08	14.78%	-8.26%
97		4	103	100	109	2.121	4.243	4.12%	-25.99%

Frond Count Detail

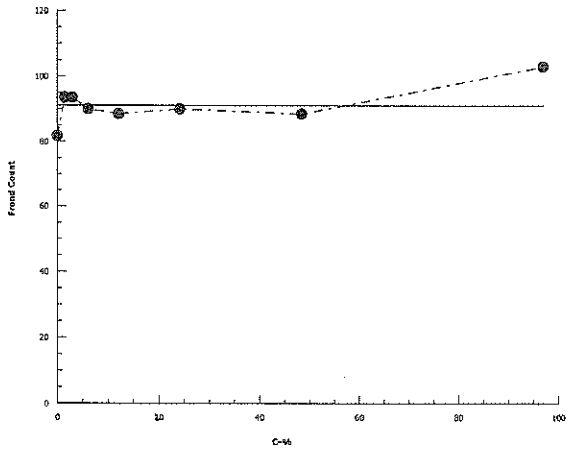
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	96	60	81	90
1.5		94	104	98	78
3		95	93	103	83
6.1		89	88	112	71
12.1		107	72	82	93
24.2		100	92	81	87
48.5		99	98	86	71
97		100	103	100	109

June 4/15

Lemna Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	11-3916-6138	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 4/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	10-4468-0489	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:52	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	12-7328-6829	**Code:**	4BE4D0AD	**Client:**	Teck Coal
Sample Date:	05 May-15 11:14	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (7.8 °C)	**Station:**	LC_DCDS_WS_2015-05-05_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	26.3%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	1.356	2.482	21.51	6	0.3239	CDF	Non-Significant Effect
		3	1.356	2.482	21.51	6	0.3239	CDF	Non-Significant Effect
		6.1	0.9517	2.482	21.51	6	0.5034	CDF	Non-Significant Effect
		12.1	0.7787	2.482	21.51	6	0.5842	CDF	Non-Significant Effect
		24.2	0.9517	2.482	21.51	6	0.5034	CDF	Non-Significant Effect
		48.5	0.7787	2.482	21.51	6	0.5842	CDF	Non-Significant Effect
		97	2.451	2.482	21.51	6	0.0531	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1025.969	146.567	7	0.9753	0.4713	Non-Significant Effect
Error	3606.75	150.2813	24			
Total	4632.719		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.097	18.48	0.5284	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9733	0.9081	0.5943	Normal Distribution

Frond Count Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	81.75	56.68	106.8	85.5	60	96	7.878	19.27%	0.0%
1.5		4	93.5	75.8	111.2	96	78	104	5.56	11.89%	-14.37%
3		4	93.5	80.41	106.6	94	83	103	4.113	8.8%	-14.37%
6.1		4	90	63.22	116.8	88.5	71	112	8.416	18.7%	-10.09%
12.1		4	88.5	64.6	112.4	87.5	72	107	7.511	16.97%	-8.26%
24.2		4	90	77.2	102.8	89.5	81	100	4.021	8.94%	-10.09%
48.5		4	88.5	67.69	109.3	92	71	99	6.538	14.78%	-8.26%
97		4	103	96.25	109.8	101.5	100	109	2.121	4.12%	-25.99%

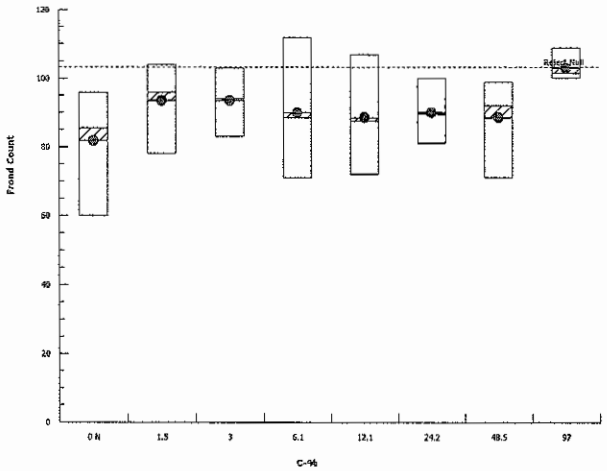
Frond Count Detail

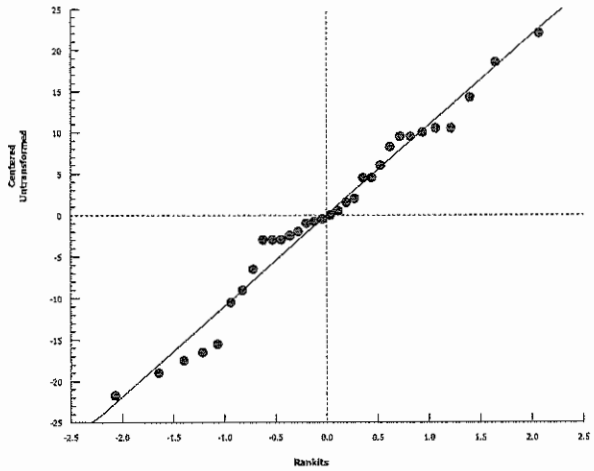
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	96	60	81	90
1.5		94	104	98	78
3		95	93	103	83
6.1		89	88	112	71
12.1		107	72	82	93
24.2		100	92	81	87
48.5		99	98	86	71
97		100	103	100	109

June 4/15

Analysis ID:	10-4468-0489	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:52	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-5132-5540	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	12-7328-6829	**Code:**	4BE4D0AD	**Client:**	Teck Coal
Sample Date:	05 May-15 11:14	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (7.8 °C)	**Station:**	LC_DCDS_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	820281	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>97	N/A	N/A	<1.031	NA	NA
IC10	>97	N/A	N/A	<1.031	NA	NA
IC15	>97	N/A	N/A	<1.031	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	5.657	4.35	6.78	0.5006	1.001	17.7%	0.0%
1.5		4	6.792	5.27	7.99	0.5647	1.129	16.63%	-20.06%
3		4	6.568	5.92	7.21	0.2634	0.5269	8.02%	-16.09%
6.1		4	6.477	5.25	8.06	0.5827	1.165	17.99%	-14.49%
12.1		4	6.285	5.46	7.36	0.3975	0.7951	12.65%	-11.09%
24.2		4	6.702	6.12	7.5	0.3431	0.6862	10.24%	-18.47%
48.5		4	6.35	5.07	7.1	0.4689	0.9377	14.77%	-12.24%
97		4	7.352	6.97	7.98	0.2225	0.4451	6.05%	-29.96%

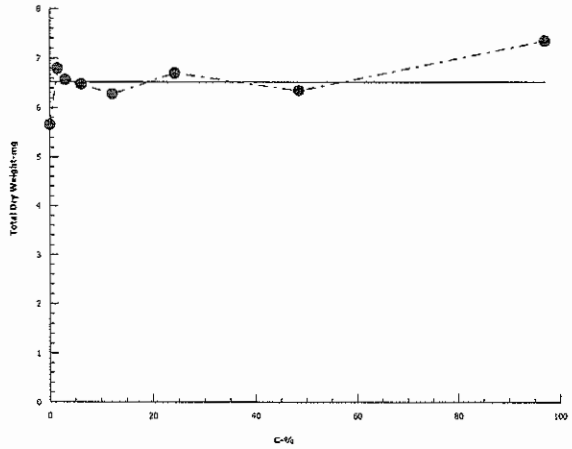
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.78	4.35	5.85	5.65
1.5		6.85	7.99	7.06	5.27
3		6.59	6.55	7.21	5.92
6.1		6.28	6.32	8.06	5.25
12.1		7.36	5.46	6.04	6.28
24.2		7.5	7.05	6.14	6.12
48.5		7.1	7	6.23	5.07
97		6.97	7.34	7.12	7.98

June 4/15

Analysis ID:	06-5132-5540	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 9 15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	12-7968-0224	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:52	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	12-7328-6829	**Code:**	4BE4D0AD	**Client:**	Teck Coal
Sample Date:	05 May-15 11:14	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (7.8 °C)	**Station:**	LC_DCDS_WS_2015-05-05_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	27.1%	48.5	97	68.59	2.062

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	1.839	2.482	1.532	6	0.1614	CDF	Non-Significant Effect
		3	1.475	2.482	1.532	6	0.2774	CDF	Non-Significant Effect
		6.1	1.329	2.482	1.532	6	0.3349	CDF	Non-Significant Effect
		12.1	1.017	2.482	1.532	6	0.4731	CDF	Non-Significant Effect
		24.2	1.693	2.482	1.532	6	0.2028	CDF	Non-Significant Effect
		48.5	1.122	2.482	1.532	6	0.4247	CDF	Non-Significant Effect
		97*	2.747	2.482	1.532	6	0.0289	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.530683	0.9329547	7	1.225	0.3280	Non-Significant Effect
Error	18.28234	0.7617644	24			
Total	24.81303		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	4.033	18.48	0.7760	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9777	0.9081	0.7297	Normal Distribution

Total Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	5.657	4.064	7.25	5.75	4.35	6.78	0.5006	17.7%	0.0%
1.5		4	6.792	4.995	8.59	6.955	5.27	7.99	0.5647	16.63%	-20.06%
3		4	6.568	5.729	7.406	6.57	5.92	7.21	0.2634	8.02%	-16.09%
6.1		4	6.477	4.623	8.332	6.3	5.25	8.06	0.5827	17.99%	-14.49%
12.1		4	6.285	5.02	7.55	6.16	5.46	7.36	0.3975	12.65%	-11.09%
24.2		4	6.702	5.611	7.794	6.595	6.12	7.5	0.3431	10.24%	-18.47%
48.5		4	6.35	4.858	7.842	6.615	5.07	7.1	0.4689	14.77%	-12.24%
97		4	7.352	6.644	8.061	7.23	6.97	7.98	0.2225	6.05%	-29.96%

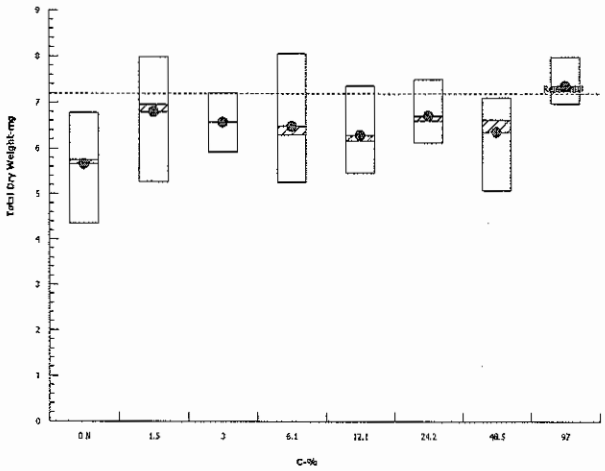
Total Dry Weight-mg Detail

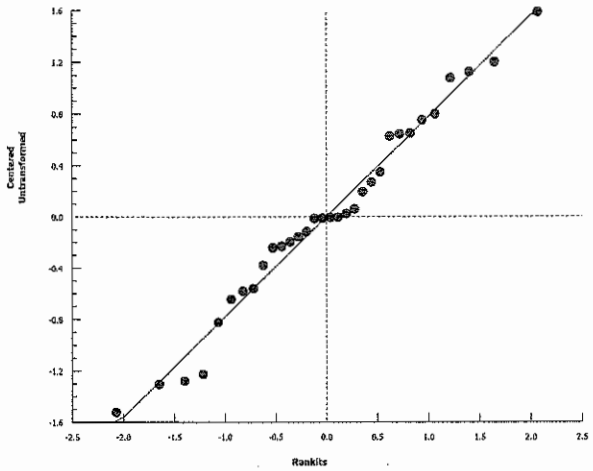
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.78	4.35	5.85	5.65
1.5		6.85	7.99	7.06	5.27
3		6.59	6.55	7.21	5.92
6.1		6.28	6.32	8.06	5.25
12.1		7.36	5.46	6.04	6.28
24.2		7.5	7.05	6.14	6.12
48.5		7.1	7	6.23	5.07
97		6.97	7.34	7.12	7.98

June 4/15

Analysis ID:	12-7968-0224	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:52	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





June 4/15

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 15378

Start Date: May 8, 2015
Set up by: JW

Sample Information:

Sample ID: LC_LC5_INS_2015-05-06_N
Sample Date: May 5, 2015
Date Received: May 6, 2015
Sample Volume: 1 x 20L

Test Organism Information:

Culture Date: 050115
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (35 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 118
Date Initiated: May 20, 2015

7-d No. of Fronds IC50 (95% CL): 4.1 (3.8 - 4.3) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.1 (3.1 - 5.4) g/L KCl CV (%): 15

		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v) (95% CL)	>97	>97
	IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: [signature]

Date reviewed: June 4/15

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck
Setup by: JW
Sample ID: LC_ LC5_INS_2015-05-06_N
Test Date: May 8 , 2015
Work Order No.: 15378
Test Species: *Lemna minor*
Culture Source: CPCC # 490
Test Culture Age: 7 days
> 8X Growth? (Y/N): Y (35 fronds)
Light Intensity Range: 4100 - 5200 lux
Date Measured: ~~April~~ JW May 7, 2015

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.0	24.0	24.5	24.0	24.0	24.0	24.0	24.0
Initials	JW	A	MLT	MLT	MLT	KLP	MLT	MLT

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	23.0	Aeration?: 20 min	23.0
DO (mg/L)	9.2	Nutrients added?:	8.2
pH	8.0	Y →	8.0
Conductivity (µS)	580		1356

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	24.0	8.2	9.1	882
1.5	23.0	24.0	8.2	9.2	888
3.0	23.0	24.0	8.2	9.6	900
6.1	23.0	24.0	8.2	9.2	919
12.1	23.0	24.0	8.2	9.1	945
24.2	23.0	24.0	8.2	9.2	1013
48.5	23.0	24.0	8.1	9.1	1128
97	23.0	24.0	8.1	8.9	1350
Initials	JW	MLT	JW	MLT	JW

Instruments: Thermometer: CER # 6 Cond. Meter: 3 pH meter: 3
Sample Description: Clear with brown precipitate.
Comments:
Reviewed: Date Reviewed: June 4/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-LC5.WS-2015-05-06.N
Work Order #: 15378

Start Date: May 8, 2015
Termination Date: May 15, 2015
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	106										MLT/JW
	B	6	89										
	C	6	67										
	D	6	101										
1.5	A	6	99										
	B	6	86										
	C	6	98										
	D	6	89										
3.0	A	6	74										
	B	6	106										
	C	6	70										
	D	6	100										
6.1	A	6	69										
	B	6	87										
	C	6	99										
	D	6	110										
12.1	A	6	94										
	B	6	69										
	C	6	100										
	D	6	103										
24.2	A	6	102										
	B	6	97										
	C	6	91										
	D	6	92										

Comments: algae growth prominent in all concentrations except 97%(v/v)

Reviewed by: [signature]

Date Reviewed: June 4/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-LC5-NS-2015-05-06-N
Work Order #: 15378

Start Date: May 8, 2015
Termination Date: May 15, 2015
Test set up by: JN

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	81										MLT/JW
	B	6	72										
	C	6	80										
	D	6	76										
97	A	6	87										
	B	6	59										
	C	6	80										
	D	6	94										↓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: [signature]

Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC- LC5 - WS - 2015 - 05 - 06 - N
Work Order #: 15378

Start Date: May 8 , 2015
Termination Date: May 15 , 2015

Concentration % (v/v)	Rep	KT1 Pan No. BLACK	Pan weight (mg)	Pan + plant (mg)	Initials
control	A	1	1004.51	1011.65	KL
	B	2	997.64	1003.64	KL
	C	3	989.15	993.84	KL
	D	4	988.52	995.70	KL
1.5	A	5	991.05	997.75	KL
	B	6	994.86	1001.02	KL
	C	7	989.82	996.62	KL
	D	8	984.17	990.99	KL
3.0	A	9	984.30	989.52	KL
	B	10	993.29	1001.14	KL
	C	11	993.72	998.91	KL
	D	12	1000.60	1007.89	KL
6.1	A	13	984.63	989.76	KL
	B	14	973.87	980.06	KL
	C	16	988.87	995.96	KL
	D	16	994.66	1002.70	KL
12.1	A	17	997.23	1003.90	KL
	B	18	989.82	994.67	KL
	C	19	1004.96	1012.21	KL
	D	20	988.75	996.16	KL
24.2	A	21	964.69	971.51	KL
	B	22	991.06	998.16	KL
	C	23	980.23	986.89	KL
	D	24	977.60	984.61	KL
48.5	A	25	981.95	987.89	KL
	B	26	988.02	993.08	KL
	C	27	992.76	998.39	KL
	D	28	989.02	994.62	KL

Comments: 10% Reweigh : #5 : 997.61 #23 : 986.86
#16 : 1002.63 #32 : 987.82

Reviewed by: KL Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC-LE5-WS-2015-05-06-N
Work Order #: 15378

Start Date: May 8, 2015
Termination Date: May 15, 2015

Concentration % (v/v)	Rep	Pan No. (KRT Block)	Pan weight (mg)	Pan + plant (mg)	Initials
97	A	29	986.60	993.64	KL
	B	30	984.20	988.45	KL
	C	31	978.24	984.50	KL
	D	32	980.63	987.77	KL
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: [signature]

Date Reviewed: June 4/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	14-8591-8137	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 11:24	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	00-5380-8605	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	15 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	11-8749-7839	**Code:**	46C7C76F	**Client:**	Teck Coal
Sample Date:	05 May-15 14:02	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	58h (6.8 °C)	**Station:**	LC_LC5_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	895300	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	29.88	N/A	42.75	3.347	2.339	NA
IC10	37.72	N/A	N/A	2.651	NA	NA
IC15	47.55	N/A	N/A	2.103	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	84.75	61	100	8.683	17.37	20.49%	0.0%
1.5		4	87	80	93	3.24	6.481	7.45%	-2.66%
3		4	81.5	64	100	9.069	18.14	22.26%	3.84%
6.1		4	85.25	63	104	8.779	17.56	20.59%	-0.59%
12.1		4	85.5	63	97	7.73	15.46	18.08%	-0.89%
24.2		4	89.5	85	96	2.533	5.066	5.66%	-5.61%
48.5		4	71.25	66	75	2.056	4.113	5.77%	15.93%
97		4	74	53	88	7.561	15.12	20.43%	12.68%

Frond Count Detail

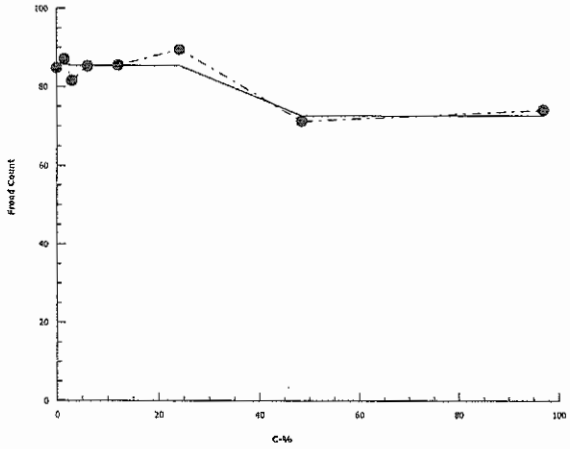
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	100	83	61	95
1.5		93	80	92	83
3		68	100	64	94
6.1		63	81	93	104
12.1		88	63	94	97
24.2		96	91	85	86
48.5		75	66	74	70
97		81	53	74	88

June 4/15

Lemna Growth Inhibition Test — Nautilus Environmental

Analysis ID:	14-8591-8137	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 11:24	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	16-6915-5539	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 11:25	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	00-5380-8605	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	15 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	11-8749-7839	**Code:**	46C7C76F	**Client:**	Teck Coal
Sample Date:	05 May-15 14:02	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	58h (6.8 °C)	**Station:**	LC_LC5_WS_2015-05-06_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	28.3%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.2331	2.482	23.96	6	0.8074	CDF	Non-Significant Effect
		3	-0.3367	2.482	23.96	6	0.9401	CDF	Non-Significant Effect
		6.1	0.05179	2.482	23.96	6	0.8616	CDF	Non-Significant Effect
		12.1	0.07769	2.482	23.96	6	0.8546	CDF	Non-Significant Effect
		24.2	0.492	2.482	23.96	6	0.7107	CDF	Non-Significant Effect
		48.5	-1.398	2.482	23.96	6	0.9972	CDF	Non-Significant Effect
		97	-1.114	2.482	23.96	6	0.9931	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1161.969	165.9955	7	0.8906	0.5291	Non-Significant Effect
Error	4473.25	186.3854	24			
Total	5635.219		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	10.31	18.48	0.1716	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.943	0.9081	0.0913	Normal Distribution

Frond Count Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	84.75	57.12	112.4	89	61	100	8.683	20.49%	0.0%
1.5		4	87	76.69	97.31	87.5	80	93	3.24	7.45%	-2.66%
3		4	81.5	52.64	110.4	81	64	100	9.069	22.26%	3.84%
6.1		4	85.25	57.31	113.2	87	63	104	8.779	20.59%	-0.59%
12.1		4	85.5	60.9	110.1	91	63	97	7.73	18.08%	-0.89%
24.2		4	89.5	81.44	97.56	88.5	85	96	2.533	5.66%	-5.61%
48.5		4	71.25	64.71	77.79	72	66	75	2.056	5.77%	15.93%
97		4	74	49.94	98.06	77.5	53	88	7.561	20.43%	12.68%

Frond Count Detail

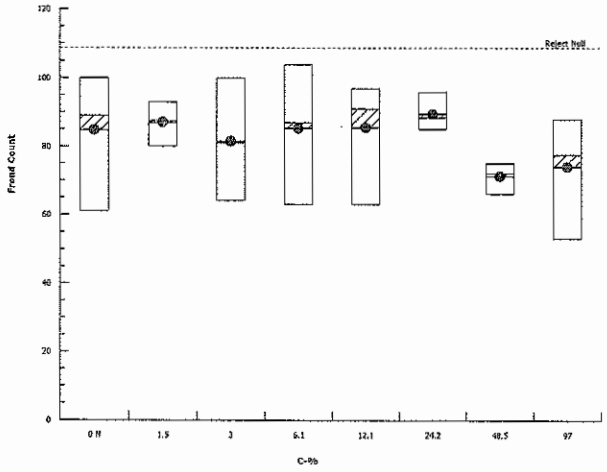
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	100	83	61	95
1.5		93	80	92	83
3		68	100	64	94
6.1		63	81	93	104
12.1		88	63	94	97
24.2		96	91	85	86
48.5		75	66	74	70
97		81	53	74	88

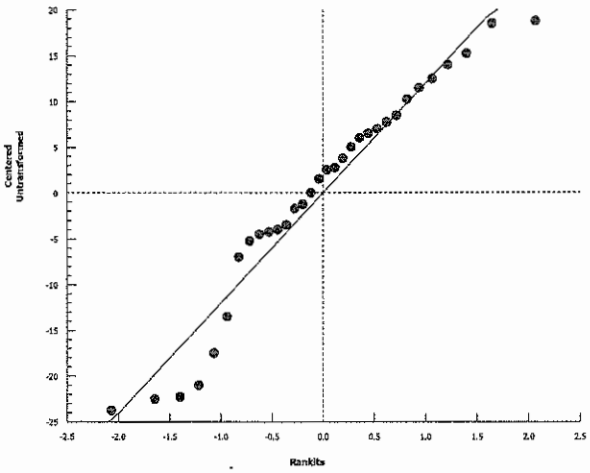
June 4/15

Lemna Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	16-6915-5539	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 11:25	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





June 4/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-2874-0677	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 11:26	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	00-5380-8605	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	15 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	11-8749-7839	**Code:**	46C7C76F	**Client:**	Teck Coal
Sample Date:	05 May-15 14:02	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	58h (6.8 °C)	**Station:**	LC_LC5_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	776202	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	33.76	N/A	N/A	2.962	NA	NA
IC10	46.96	N/A	N/A	2.13	NA	NA
IC15	>97	N/A	N/A	<1.031	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.253	4.69	7.18	0.5883	1.177	18.82%	0.0%
1.5		4	6.62	6.16	6.82	0.1556	0.3111	4.7%	-5.88%
3		4	6.388	5.19	7.85	0.6923	1.385	21.68%	-2.16%
6.1		4	6.613	5.13	8.04	0.622	1.244	18.81%	-5.76%
12.1		4	6.545	4.85	7.41	0.5869	1.174	17.94%	-4.68%
24.2		4	6.898	6.66	7.1	0.09834	0.1967	2.85%	-10.32%
48.5		4	5.557	5.06	5.94	0.1828	0.3655	6.58%	11.12%
97		4	6.173	4.25	7.14	0.6703	1.341	21.72%	1.28%

Total Dry Weight-mg Detail

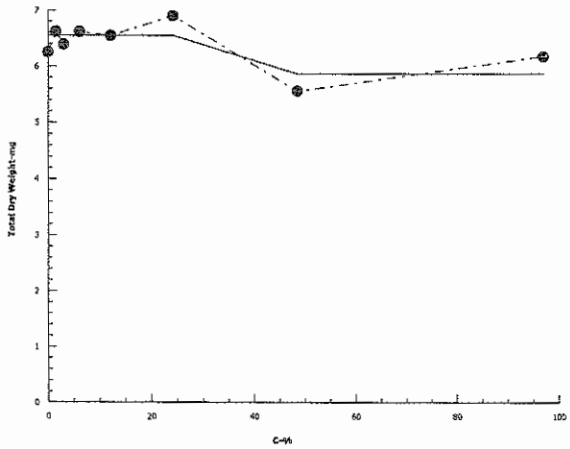
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	7.14	6	4.69	7.18
1.5		6.7	6.16	6.8	6.82
3		5.22	7.85	5.19	7.29
6.1		5.13	6.19	7.09	8.04
12.1		6.67	4.85	7.25	7.41
24.2		6.82	7.1	6.66	7.01
48.5		5.94	5.06	5.63	5.6
97		7.04	4.25	6.26	7.14

June 4/15

Lemna Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	11-2874-0677	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 11:26	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 4/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	16-3932-0494	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 11:27	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	00-5380-8605	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	15 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	11-8749-7839	**Code:**	46C7C76F	**Client:**	Teck Coal
Sample Date:	05 May-15 14:02	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	58h (6.8 °C)	**Station:**	LC_LC5_WS_2015-05-06_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	28.6%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.5105	2.482	1.787	6	0.7031	CDF	Non-Significant Effect
		3	0.1875	2.482	1.787	6	0.8221	CDF	Non-Significant Effect
		6.1	0.5001	2.482	1.787	6	0.7074	CDF	Non-Significant Effect
		12.1	0.4063	2.482	1.787	6	0.7450	CDF	Non-Significant Effect
		24.2	0.8959	2.482	1.787	6	0.5296	CDF	Non-Significant Effect
		48.5	-0.9654	2.482	1.787	6	0.9891	CDF	Non-Significant Effect
		97	-0.1111	2.482	1.787	6	0.9005	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.570322	0.6529031	7	0.6298	0.7266	Non-Significant Effect
Error	24.87947	1.036644	24			
Total	29.44979		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	14.85	18.48	0.0380	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9417	0.9081	0.0834	Normal Distribution

Total Dry Weight-mg Summary

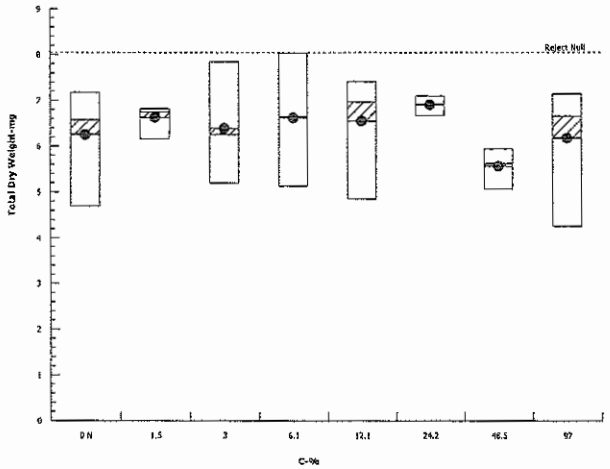
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	6.253	4.38	8.125	6.57	4.69	7.18	0.5883	18.82%	0.0%
1.5		4	6.62	6.125	7.115	6.75	6.16	6.82	0.1556	4.7%	-5.88%
3		4	6.388	4.184	8.591	6.255	5.19	7.85	0.6923	21.68%	-2.16%
6.1		4	6.613	4.633	8.592	6.64	5.13	8.04	0.622	18.81%	-5.76%
12.1		4	6.545	4.677	8.413	6.96	4.85	7.41	0.5869	17.94%	-4.68%
24.2		4	6.898	6.585	7.21	6.915	6.66	7.1	0.09834	2.85%	-10.32%
48.5		4	5.557	4.976	6.139	5.615	5.06	5.94	0.1828	6.58%	11.12%
97		4	6.173	4.039	8.306	6.65	4.25	7.14	0.6703	21.72%	1.28%

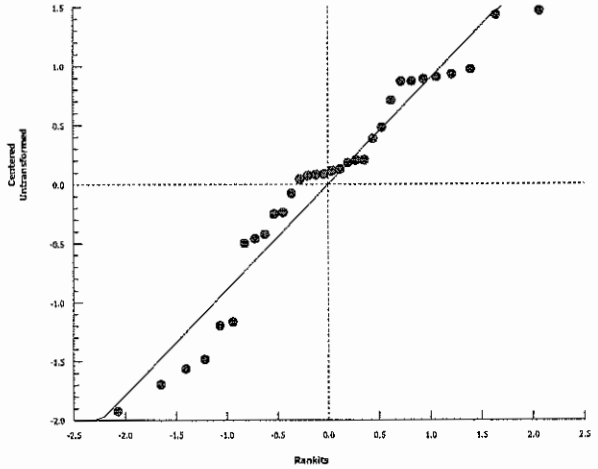
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	7.14	6	4.69	7.18
1.5		6.7	6.16	6.8	6.82
3		5.22	7.85	5.19	7.29
6.1		5.13	6.19	7.09	8.04
12.1		6.67	4.85	7.25	7.41
24.2		6.82	7.1	6.66	7.01
48.5		5.94	5.06	5.63	5.6
97		7.04	4.25	6.26	7.14

June 4/15

Graphics





June 4/15

APPENDIX D – *Pseudokirchneriella subcapitata* Toxicity Test Data

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15377

Start Date: May 8/15
Set up by: MLT

Sample Information:

Sample ID: LC-LCDSSLCC_WS_2015-05-06_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 4x20L

Test Organism Information:

Culture Date: May 1/15
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC129
Stock Solution ID: 15Zn01
Date Initiated: May 5/15

72-h IC50 (95% CL): 38.6 (35.0 - 42.4) µg/L Zn

72-h IC50 Reference Toxicant Mean and Range: 26.4 (13.6 - 51.1) µg/L Zn CV (%): 39

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]

Date reviewed: June 9/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal **Setup by:** MLT

Sample ID: LC_LCDSSLCC_WS_2015-05-06_N **Test Date/Time:** May 8/15 @ 1150h

Work Order No.: 15377 **Test Species:** *Pseudokirchneriella subcapitata*

Culture Date: May 1/15 **Age of Culture:** 7d **Culture Health:** Good

Culture Count: 1 625 2 650 **Average:** 637.5 **Culture Cell Density (c1):** 637.5 x10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 637.5 x10⁴ cells/ml = 3.4 mL

Time Zero Counts: 1 21 2 21 **Average:** 21

No. of Cells/mL: 21 x10⁴ **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	6.9	24.0	25.0	24.5	25.0	25.0	✓	✓	✓	✓
1.5	6.9	24.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.1	24.0	↓	↓	↓	↓	✓	✓	✓	✓
6.0	7.3	24.0	↓	↓	↓	↓	✓	✓	✓	✓
11.9	7.5	24.0	↓	↓	↓	↓	✓	✓	✓	✓
23.8	7.7	24.0	↓	↓	↓	↓	✓	✓	✓	✓
47.6	8.0	24.0	↓	↓	↓	↓	✓	✓	✓	✓
95.2	8.2	24.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.9 Well 2: 6.9

Final control pH: Well 1: 6.9 Well 2: 6.9

Light intensity (lux): 4200 **Date measured:** May 8/15

Instruments: Thermometer 4 pH meter 2 Light meter 1

Sample Description: clear, some ppt present

Comments:

Reviewed: [signature] **Date reviewed:** June 3/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal — Start Date/Time: May 8/15 @ 1150h

Work Order #: 15377 — Termination Date: May 11/15 @ 1150h

Sample ID: LC_LCDSSLCC-WS_2015-05-06_N — Test set up by: MLT

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	35					MLT
	B	37					
	C	41					
	D	34					
	E	32					
	F	34					
	G	38					
	H	35					
1.5	A	50					
	B	42					
	C	44					
	D	46					
3.0	A	69					
	B	66					
	C	60					
	D	63					
6.0	A	83					
	B	93					
	C	64	90	97			
	D	92					
11.9	A	114					
	B	108					
	C	117					
	D	104					
23.8	A	118					
	B	129					
	C	114					
	D	100					
47.6	A	121					
	B	130					
	C	109					
	D	119					
95.2	A	77					
	B	73					
	C	65					
	D	66					

Comments:

Reviewed by: [signature] — Date Reviewed: June 3/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	08-May-15 @ 1150h		
WO#:	15377	Termination Date:	11-May-15 @ 1150h		
Sample ID:	LC_LCDSSLCC_WS_2015-05-06_N				
		Initial Cell Density:	9545 cell/mL		210000
					0.22
					0.01

Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9545.455
Control	A	35				35	34.0	mean	34.8
	B	37				37	36.0	SD	2.815772
	C	41				41	40.0	CV	8.092356
	D	34				34	33.0		
	E	32				32	31.0		
	F	34				34	33.0		
	G	38				38	37.0		
	H	35				35	34.0		
1.5	A	50				50	49.0		
	B	42				42	41.0		
	C	44				44	43.0		
	D	46				46	45.0		
3	A	69				69	68.0		
	B	66				66	65.0		
	C	60				60	59.0		
	D	63				63	62.0		
6	A	83				83	82.0		
	B	93				93	92.0		
	C	64	90	97		83.666667	82.7		
	D	92				92	91.0		
11.9	A	114				114	113.0		
	B	108				108	107.0		
	C	117				117	116.0		
	D	104				104	103.0		
23.8	A	118				118	117.0		
	B	129				129	128.0		
	C	114				114	113.0		
	D	100				100	99.0		
47.6	A	121				121	120.0		
	B	130				130	129.0		
	C	109				109	108.0		
	D	119				119	118.0		
95.2	A	77				77	76.0		
	B	73				73	72.0		
	C	65				65	64.0		
	D	66				66	65.0		

June 3/15

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	08-5083-7188	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 14:40	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	10-9311-0363	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 May-15 11:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	11 May-15 11:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	08-2003-7136	**Code:**	30E0C610	**Client:**	Teck Coal
Sample Date:	05 May-15 14:34	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	69h (7 °C)	**Station:**	LC_LCDSSLCC_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2109744	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7232	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	59.73	53.88	71.35	1.674	1.402	~~1.856~~ mg
IC10	74.88	60.71	~~105.7~~	~~1.336~~	0.9464	1.647 795.2%(v/v) mg
IC15	~~83.81~~	68.05	N/A	1.066	NA	1.469
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	34.75	31	40	0.9955	2.816	8.1%	0.0%
1.5		4	44.5	41	49	1.708	3.416	7.68%	-28.06%
3		4	63.5	59	68	1.936	3.873	6.1%	-82.73%
6		4	87	82	92	2.614	5.228	6.01%	-150.4%
11.9		4	109.8	103	116	2.926	5.852	5.33%	-215.8%
23.8		4	114.3	99	128	5.991	11.98	10.49%	-228.8%
47.6		4	118.8	108	129	4.308	8.617	7.26%	-241.7%
95.2		4	69.25	64	76	2.869	5.737	8.29%	-99.28%

Cell Yield Detail

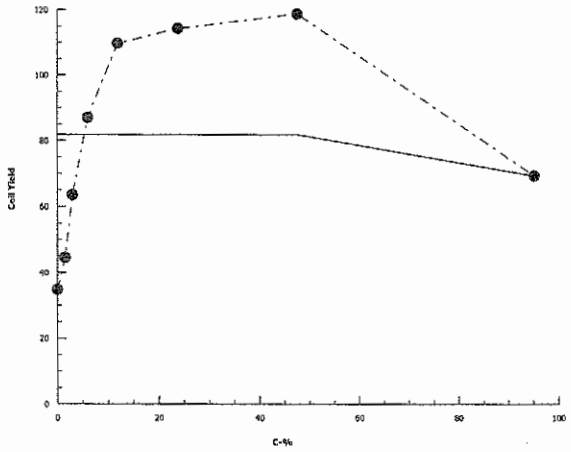
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	34	36	40	33	31	33	37	34
1.5		49	41	43	45				
3		68	65	59	62				
6		82	92	83	91				
11.9		113	107	116	103				
23.8		117	128	113	99				
47.6		120	129	108	118				
95.2		76	72	64	65				

June 3/15

EC Alga Growth Inhibition Test — Nautilus Environmental

Analysis ID:	08-5083-7188	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 14:40	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 3/15

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	13-6951-7192	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 14:40	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	10-9311-0363	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 May-15 11:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	11 May-15 11:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	08-2003-7136	**Code:**	30E0C610	**Client:**	Teck Coal
Sample Date:	05 May-15 14:34	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	69h (7 °C)	**Station:**	LC_LCDSSLCC_WS_2015-05-06_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	27.6%	<1.5	1.5	NA	>66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5*	2.573	2.526	9.574	10	0.0453	CDF	Significant Effect
		3*	7.586	2.526	9.574	10	<0.0001	CDF	Significant Effect
		6*	13.79	2.526	9.574	10	<0.0001	CDF	Significant Effect
		11.9*	19.79	2.526	9.574	10	<0.0001	CDF	Significant Effect
		23.8*	20.98	2.526	9.574	10	<0.0001	CDF	Significant Effect
		47.6*	22.16	2.526	9.574	10	<0.0001	CDF	Significant Effect
		95.2*	9.103	2.526	9.574	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7232	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	36566.5	5223.786	7	136.4	<0.0001	Significant Effect
Error	1072.5	38.30357	28			
Total	37639		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	11.88	18.48	0.1047	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9782	0.9166	0.6829	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	34.75	32.4	37.1	34	31	40	0.9955	8.1%	0.0%
1.5		4	44.5	39.06	49.94	44	41	49	1.708	7.68%	-28.06%
3		4	63.5	57.34	69.66	63.5	59	68	1.936	6.1%	-82.73%
6		4	87	78.68	95.32	87	82	92	2.614	6.01%	-150.4%
11.9		4	109.8	100.4	119.1	110	103	116	2.926	5.33%	-215.8%
23.8		4	114.3	95.18	133.3	115	99	128	5.991	10.49%	-228.8%
47.6		4	118.8	105	132.5	119	108	129	4.308	7.26%	-241.7%
95.2		4	69.25	60.12	78.38	68.5	64	76	2.869	8.29%	-99.28%

June 3/15

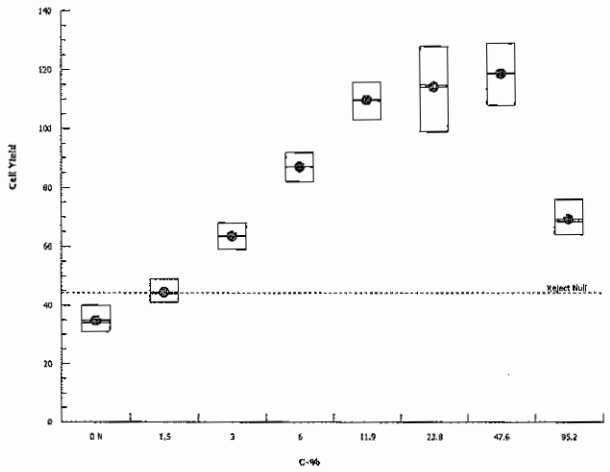
EC Alga Growth Inhibition Test — Nautilus Environmental

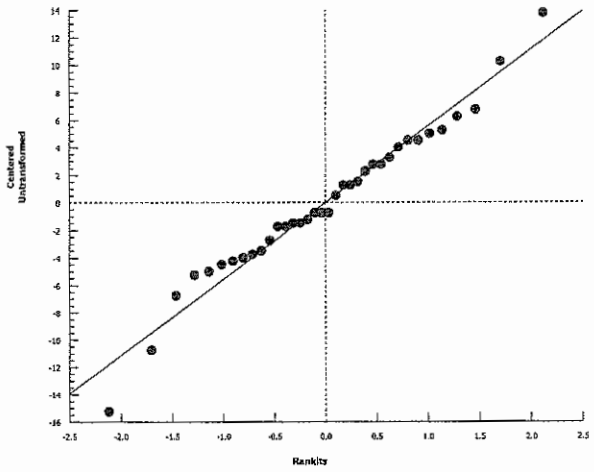
Analysis ID:	13-6951-7192	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 14:40	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	34	36	40	33	31	33	37	34
1.5		49	41	43	45				
3		68	65	59	62				
6		82	92	83	91				
11.9		113	107	116	103				
23.8		117	128	113	99				
47.6		120	129	108	118				
95.2		76	72	64	65				

Graphics





June 3/15

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15377

Start Date: May 8/15
Set up by: MLT

Sample Information:

Sample ID: LC_LC3_WS_2015-05-06_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 1x20L

Test Organism Information:

Culture Date: May 1/15
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC129
Stock Solution ID: 15Zn01
Date Initiated: May 5/15

72-h IC50 (95% CL): 38.6 (35.0 - 42.4) mg/L Zn

72-h IC50 Reference Toxicant Mean and Range: 26.4 (13.6 - 51.1) mg/L Zn CV (%): 39

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]

Date reviewed: June 4/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal **Setup by:** MLT

Sample ID: LC_LC3_WS_2015-05-06_N **Test Date/Time:** May 8/15 @ 1130h

Work Order No.: 15377 **Test Species:** *Pseudokirchneriella subcapitata*

Culture Date: May 1/15 **Age of Culture:** 7d **Culture Health:** Good

Culture Count: 1 625 2 650 **Average:** 637.5 **Culture Cell Density (c1):** 637.5 x104 cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 637.5 x104 cells/ml x 10 mL = 3.4 mL

Time Zero Counts: 1 21 2 21 **Average:** 21

No. of Cells/mL: 21 x104 **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	6.9	24.0	25.0	24.5	25.0	25.0	✓	✓	✓	✓
1.5	6.9	24.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.3	24.0					–	✓	✓	✓
6.0	7.4	24.0					✓	✓	✓	–
11.9	7.5	24.0					✓	✓	✓	✓
23.8	7.8	24.0					✓	✓	✓	✓
47.6	7.9	24.0					✓	✓	✓	✓
95.2	8.2	24.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.9 Well 2: 6.9

Final control pH: Well 1: 6.9 Well 2: 6.9

Light intensity (lux): 4060 **Date measured:** May 8/15

Instruments: Thermometer 4 pH meter 2 Light meter 1

Sample Description: clear

Comments:

Reviewed: [signature] **Date reviewed:** June 3/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal — Start Date/Time: May 8/15 @ 1130h
Work Order #: 15377 — Termination Date: May 11/15 @ 1130h
Sample ID: LC-LC3-WS-2015-05-06-N — Test set up by: ML
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	35					ML
	B	33					
	C	39					
	D	32					
	E	37					
	F	32					
	G	35					
	H	32					
1.5	A	40					
	B	38					
	C	34					
	D	36					
3.0	A	55					
	B	58					
	C	59					
	D	52					
6.0	A	93					
	B	81					
	C	88					
	D	89					
11.9	A	98					
	B	117					
	C	103					
	D	115					
23.8	A	98					
	B	118					
	C	97					
	D	103					
47.6	A	104					
	B	108					
	C	102					
	D	92					
95.2	A	67					
	B	74					
	C	59					
	D	64					↓

Comments:

Reviewed by: [signature] — Date Reviewed: June 3/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	08-May-15 @ 1130h
WO#:	15377	Termination Date:	11-May-15 @ 1130h
Sample ID:	LC_LC3_WS_2015-05-06_N		
		Initial Cell Density:	9545 cell/mL

									210000
									0.22
									0.01
Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9545.455
Control	A	35				35	34.0	mean	33.4
	B	33				33	32.0	SD	2.615203
	C	39				39	38.0	CV	7.825156
	D	32				32	31.0		
	E	37				37	36.0		
	F	32				32	31.0		
	G	35				35	34.0		
	H	32				32	31.0		
1.5	A	40				40	39.0		
	B	38				38	37.0		
	C	34				34	33.0		
	D	36				36	35.0		
3	A	55				55	54.0		
	B	58				58	57.0		
	C	59				59	58.0		
	D	52				52	51.0		
6	A	93				93	92.0		
	B	81				81	80.0		
	C	88				88	87.0		
	D	89				89	88.0		
11.9	A	98				98	97.0		
	B	117				117	116.0		
	C	103				103	102.0		
	D	115				115	114.0		
23.8	A	98				98	97.0		
	B	118				118	117.0		
	C	97				97	96.0		
	D	103				103	102.0		
47.6	A	104				104	103.0		
	B	108				108	107.0		
	C	102				102	101.0		
	D	92				92	91.0		
95.2	A	67				67	66.0		
	B	74				74	73.0		
	C	59				59	58.0		
	D	64				64	63.0		

June 3/15

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	04-3153-2802	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 14:47	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-0261-7271	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 May-15 11:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	11 May-15 11:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	01-8455-4594	**Code:**	B001462	**Client:**	Teck Coal
Sample Date:	05 May-15 14:49	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	69h (6.8 °C)	**Station:**	LC_LC3_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	108557	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.2166	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	62.44	53.4	92.82	1.602	~~1.077~~	~~1.873~~ MLT
IC10	~~81.8~~	~~59.25~~	N/A	1.222	NA	1.688
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

>95.2% (v/v) MLT

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	33.38	31	38	0.9246	2.615	7.84%	0.0%
1.5		4	36	33	39	1.291	2.582	7.17%	-7.87%
3		4	55	51	58	1.581	3.162	5.75%	-64.79%
6		4	86.75	80	92	2.496	4.992	5.75%	-159.9%
11.9		4	107.3	97	116	4.608	9.215	8.59%	-221.3%
23.8		4	103	96	117	4.848	9.695	9.41%	-208.6%
47.6		4	100.5	91	107	3.403	6.807	6.77%	-201.1%
95.2		4	65	58	73	3.136	6.272	9.65%	-94.76%

Cell Yield Detail

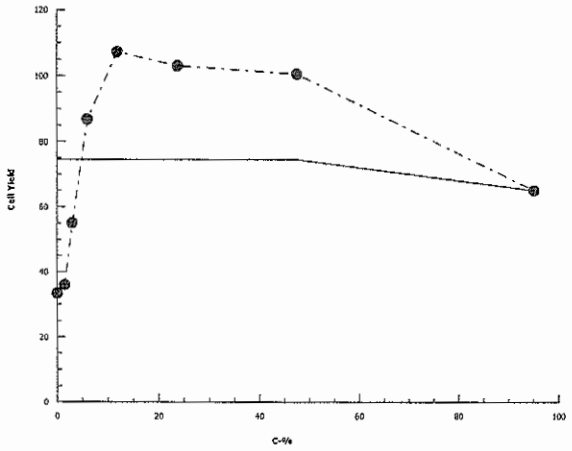
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	34	32	38	31	36	31	34	31
1.5		39	37	33	35				
3		54	57	58	51				
6		92	80	87	88				
11.9		97	116	102	114				
23.8		97	117	96	102				
47.6		103	107	101	91				
95.2		66	73	58	63				

June 3/15

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	04-3153-2802	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 14:47	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 3/15

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-6042-9291	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 14:47	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	03-0261-7271	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 May-15 11:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	11 May-15 11:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	01-8455-4594	**Code:**	B001462	**Client:**	Teck Coal
Sample Date:	05 May-15 14:49	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	69h (6.8 °C)	**Station:**	LC_LC3_WS_2015-05-06_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	27.2%	1.5	3	2.121	66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.7297	2.526	9.088	10	0.6842	CDF	Non-Significant Effect
		3*	6.011	2.526	9.088	10	<0.0001	CDF	Significant Effect
		6*	14.84	2.526	9.088	10	<0.0001	CDF	Significant Effect
		11.9*	20.53	2.526	9.088	10	<0.0001	CDF	Significant Effect
		23.8*	19.35	2.526	9.088	10	<0.0001	CDF	Significant Effect
		47.6*	18.66	2.526	9.088	10	<0.0001	CDF	Significant Effect
		95.2*	8.791	2.526	9.088	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.2166	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	31062.38	4437.482	7	128.6	<0.0001	Significant Effect
Error	966.375	34.51339	28			
Total	32028.75		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	12.52	18.48	0.0847	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9836	0.9166	0.8600	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	33.38	31.19	35.56	33	31	38	0.9246	7.84%	0.0%
1.5		4	36	31.89	40.11	36	33	39	1.291	7.17%	-7.87%
3		4	55	49.97	60.03	55.5	51	58	1.581	5.75%	-64.79%
6		4	86.75	78.81	94.69	87.5	80	92	2.496	5.75%	-159.9%
11.9		4	107.3	92.59	121.9	108	97	116	4.608	8.59%	-221.3%
23.8		4	103	87.57	118.4	99.5	96	117	4.848	9.41%	-208.6%
47.6		4	100.5	89.67	111.3	102	91	107	3.403	6.77%	-201.1%
95.2		4	65	55.02	74.98	64.5	58	73	3.136	9.65%	-94.76%

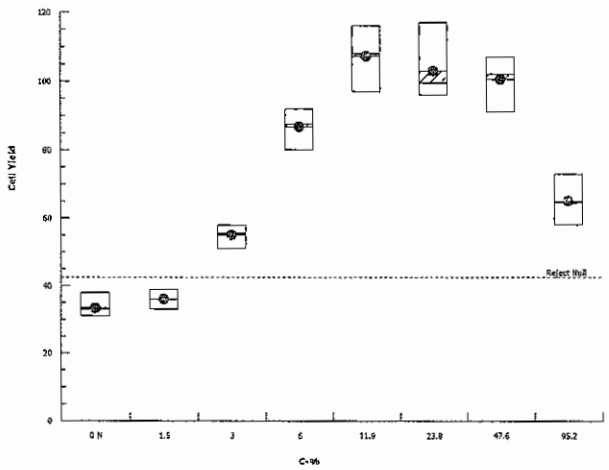
June 3/15

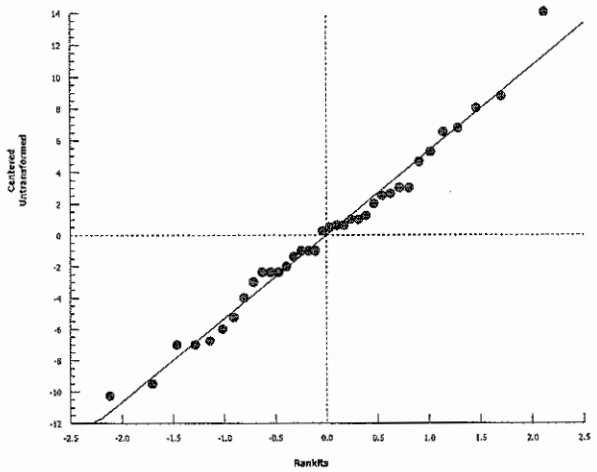
Analysis ID: 06-6042-9291 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 20 May-15 14:47 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	34	32	38	31	36	31	34	31
1.5		39	37	33	35				
3		54	57	58	51				
6		92	80	87	88				
11.9		97	116	102	114				
23.8		97	117	96	102				
47.6		103	107	101	91				
95.2		66	73	58	63				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15377
Start Date: May 7/15
Set up by: MLT

Sample Information:

Sample ID: LC_DCI_WS_2015-05-05_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 1 x 20L

Test Organism Information:

Culture Date: May 1/15
Age of culture (Day 0): 6d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC129
Stock Solution ID: 15Zn01
Date Initiated: May 5/15

72-h IC50 (95% CL): 38.6 (35.0-42.4) mg/L Zn

72-h IC50 Reference Toxicant Mean and Range: 26.4 (13.6-51.1) mg/L Zn CV (%): 39

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]
Date reviewed: June 4/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck Coal **Setup by:** MLT

Sample ID: LC-DCI_WS_2015-05-05_N **Test Date/Time:** May 7/15 @ 1300h

Work Order No.: 15377 **Test Species:** *Pseudokirchneriella subcapitata*

Culture Date: May 1/15 **Age of Culture:** 6d **Culture Health:** Good

Culture Count: 1 435 2 450 **Average:** 442.5 **Culture Cell Density (c1):** 442.5 x 10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 442.5x104 cells/ml = 5 mL

Time Zero Counts: 1 20 2 22 **Average:** 21

No. of Cells/mL: 21 x10⁴ **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	6.8	24.0	25.0	25.0	24.5	25.0	✓	✓	✓	✓
1.5	6.8	24.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	6.9	24.0					✓	✓	✓	✓
6.0	7.1	24.0					✓	✓	✓	✓
11.9	7.2	24.0					✓	✓	✓	✓
23.8	7.5	24.0					✓	✓	✓	✓
47.6	7.8	24.0					✓	✓	✓	✓
95.2	8.1	24.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.8 Well 2: 6.8

Final control pH: Well 1: 6.6 Well 2: 6.6

Light intensity (lux): 3900 **Date measured:** May 7/15

Instruments: Thermometer 4 pH meter 2 Light meter 1

Sample Description: clear

Comments:

Reviewed: [signature] **Date reviewed:** June 2/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: May 7/15 @ 1300h
Work Order #: 15377 Termination Date: May 10/15 @ 1300h
Sample ID: LC-DCI-WS-2015-05-05-N Test set up by: MLT
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	38					MLT
	B	33					
	C	34					
	D	39					
	E	33					
	F	31					
	G	36					
	H	35					
1.5	A	38					
	B	34					
	C	39					
	D	40					
3.0	A	50					
	B	47					
	C	46					
	D	48					
6.0	A	75					
	B	~~7577~~ TNTC					
	C	77					
	D	64					
11.9	A	90					
	B	79					
	C	81					
	D	88					
23.8	A	113					
	B	114					
	C	95					
	D	107					
47.6	A	117					
	B	123					
	C	109					
	D	110					
95.2	A	134					
	B	118					
	C	117					
	D	122					

Comments:

Reviewed by: Date Reviewed: June 2/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	07-May-15 @ 1300h		
WO#:	15377	Termination Date:	10-May-15 @ 1300h		
Sample ID:	LC_DC1_WS_2015-05-05_N				
		Initial Cell Density:	9545 cell/mL		210000
					0.22
					0.01

Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		
									9545.455
Control	A	38				38	37.0	mean	33.9
	B	33				33	32.0	SD	2.695896
	C	34				34	33.0	CV	7.947701
	D	39				39	38.0		
	E	33				33	32.0		
	F	31				31	30.0		
	G	36				36	35.0		
	H	35				35	34.0		
1.5	A	38				38	37.0		
	B	34				34	33.0		
	C	39				39	38.0		
	D	40				40	39.0		
3	A	50				50	49.0		
	B	47				47	46.0		
	C	46				46	45.0		
	D	48				48	47.0		
6	A	75				75	74.0		
	B	75				75	74.0		
	C	77				77	76.0		
	D	64				64	63.0		
11.9	A	90				90	89.0		
	B	79				79	78.0		
	C	81				81	80.0		
	D	88				88	87.0		
23.8	A	113				113	112.0		
	B	114				114	113.0		
	C	95				95	94.0		
	D	107				107	106.0		
47.6	A	117				117	116.0		
	B	123				123	122.0		
	C	109				109	108.0		
	D	110				110	109.0		
95.2	A	134				134	133.0		
	B	118				118	117.0		
	C	117				117	116.0		
	D	122				122	121.0		

June 2/15

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	12-3819-7494	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 12:24	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-6079-6586	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	07 May-15 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	10 May-15 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	6d
Sample ID:	10-1375-8269	**Code:**	3C6CB93D	**Client:**	Teck Coal
Sample Date:	05 May-15 11:41	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	49h (6.3 °C)	**Station:**	LC_DC1_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1256765	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7195	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	33.88	30	38	0.9531	2.696	7.96%	0.0%
1.5		4	36.75	33	39	1.315	2.63	7.16%	-8.49%
3		4	46.75	45	49	0.8539	1.708	3.65%	-38.01%
6		4	71.75	63	76	2.955	5.909	8.24%	-111.8%
11.9		4	83.5	78	89	2.661	5.323	6.38%	-146.5%
23.8		4	106.3	94	113	4.366	8.732	8.22%	-213.7%
47.6		4	113.8	108	122	3.276	6.551	5.76%	-235.8%
95.2		4	121.8	116	133	3.902	7.805	6.41%	-259.4%

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	37	32	33	38	32	30	35	34
1.5		37	33	38	39				
3		49	46	45	47				
6		74	74	76	63				
11.9		89	78	80	87				
23.8		112	113	94	106				
47.6		116	122	108	109				
95.2		133	117	116	121				

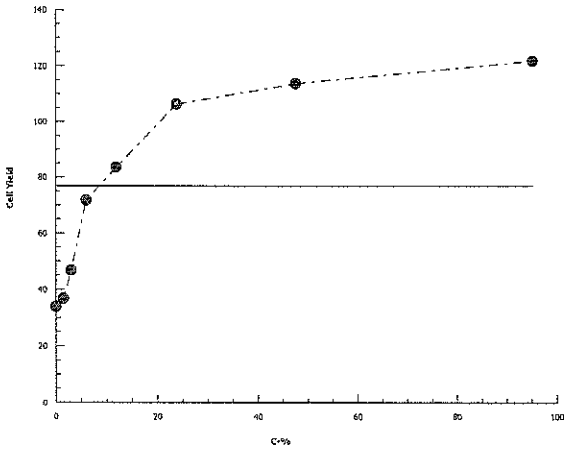
June 2/15

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	12-3819-7494	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 12:24	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 2/15

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	12-7024-4433	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 12:24	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	03-6079-6586	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	07 May-15 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	10 May-15 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	6d
Sample ID:	10-1375-8269	**Code:**	3C6CB93D	**Client:**	Teck Coal
Sample Date:	05 May-15 11:41	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	49h (6.3 °C)	**Station:**	LC_DC1_WS_2015-05-05_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	24.6%	1.5	3	2.121	66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.8727	2.526	8.322	10	0.6152	CDF	Non-Significant Effect
		3*	3.908	2.526	8.322	10	0.0018	CDF	Significant Effect
		6*	11.5	2.526	8.322	10	<0.0001	CDF	Significant Effect
		11.9*	15.06	2.526	8.322	10	<0.0001	CDF	Significant Effect
		23.8*	21.97	2.526	8.322	10	<0.0001	CDF	Significant Effect
		47.6*	24.25	2.526	8.322	10	<0.0001	CDF	Significant Effect
		95.2*	26.67	2.526	8.322	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7195	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	41242.6	5891.8	7	203.6	<0.0001	Significant Effect
Error	810.375	28.94197	28			
Total	42052.97		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	12.57	18.48	0.0833	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9909	0.9166	0.9897	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	33.88	31.62	36.13	33.5	30	38	0.9531	7.96%	0.0%
1.5		4	36.75	32.57	40.93	37.5	33	39	1.315	7.16%	-8.49%
3		4	46.75	44.03	49.47	46.5	45	49	0.8539	3.65%	-38.01%
6		4	71.75	62.35	81.15	74	63	76	2.955	8.24%	-111.8%
11.9		4	83.5	75.03	91.97	83.5	78	89	2.661	6.38%	-146.5%
23.8		4	106.3	92.36	120.1	109	94	113	4.366	8.22%	-213.7%
47.6		4	113.8	103.3	124.2	112.5	108	122	3.276	5.76%	-235.8%
95.2		4	121.8	109.3	134.2	119	116	133	3.902	6.41%	-259.4%

June 2/15

EC Alga Growth Inhibition Test

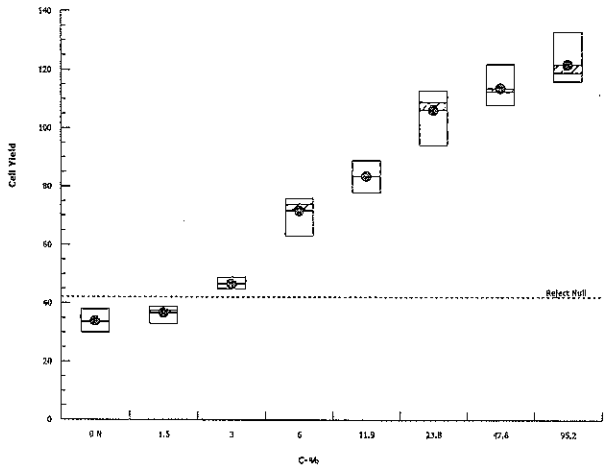
Nautilus Environmental

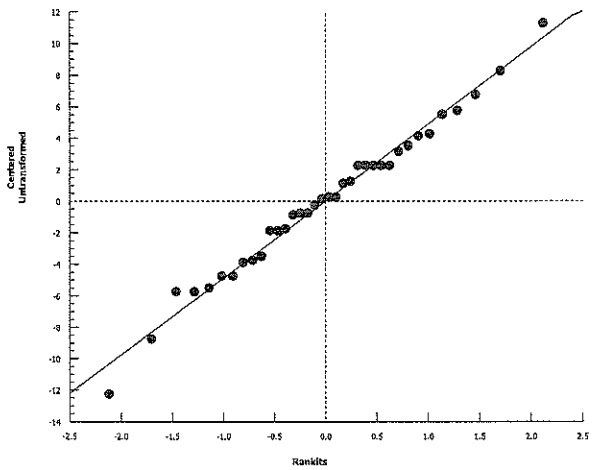
Analysis ID: 12-7024-4433 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 20 May-15 12:24 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	37	32	33	38	32	30	35	34
1.5		37	33	38	39				
3		49	46	45	47				
6		74	74	76	63				
11.9		89	78	80	87				
23.8		112	113	94	106				
47.6		116	122	108	109				
95.2		133	117	116	121				

Graphics





June 2/15

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15377

Start Date: May 8/15
Set up by: MLT

Sample Information:

Sample ID: LC_FRDSDC_WS_2015-05-05_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 1 x 20L

Test Organism Information:

Culture Date: May 1/15
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC129
Stock Solution ID: 15Zn01
Date Initiated: May 5/15

72-h IC50 (95% CL): 38.6 (35.0 - 42.4) mg/L Zn

72-h IC50 Reference Toxicant Mean and Range: 26.4 (13.6 - 51.1) mg/L Zn CV (%): 39

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]

Date reviewed: June 4/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal **Setup by:** MLT

Sample ID: LC-FRDSDC_WS_2015-05-05_N **Test Date/Time:** May 8/15 @ 1140h

Work Order No.: 15377 **Test Species:** *Pseudokirchneriella subcapitata*

Culture Date: May 1/15 **Age of Culture:** 7d **Culture Health:** Good

Culture Count: 1 625 2 650 **Average:** 637.5 **Culture Cell Density (c1):** 637.5 x 10^4 cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 637.5 x10^4 cells/ml = 3.4 mL

Time Zero Counts: 1 21 2 21 **Average:** 21

No. of Cells/mL: 21 x 10^4 **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	6.9	24.0	25.0	24.5	25.0	25.0	✓	✓	✓	✓
1.5	6.9	24.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.0	24.0					✓	✓	✓	✓
6.0	7.2	24.0					✓	✓	✓	✓
11.9	7.5	24.0					✓	✓	✓	✓
23.8	7.7	24.0					✓	✓	✓	✓
47.6	8.0	24.0					✓	✓	✓	✓
95.2	8.2	24.0					✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.9 Well 2: 6.9

Final control pH: Well 1: 6.9 Well 2: 6.9

Light intensity (lux): 3900 **Date measured:** May 8/15

Instruments: Thermometer 4 pH meter 2 Light meter 1

Sample Description: clear

Comments:

Reviewed: [signature] **Date reviewed:** June 3/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: May 8/15 @ 1140h

Work Order #: 15377 Termination Date: May 11/15 @ 1140h

Sample ID: LC-FRDSDC_WS_2015-05-05_N Test set up by: MLT

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	33					MLT
	B	34					
	C	31					
	D	31					
	E	37					
	F	35					
	G	31					
	H	32					
1.5	A	33					
	B	36					
	C	41					
	D	38					
3.0	A	51					
	B	54					
	C	46					
	D	45					
6.0	A	75					
	B	63					
	C	58					
	D	65					
11.9	A	97					
	B	86					
	C	80					
	D	82					
23.8	A	108					
	B	116					
	C	92					
	D	90					
47.6	A	83					
	B	97					
	C	82					
	D	76					
95.2	A	73					
	B	77					
	C	75					
	D	70					↓

Comments:

Reviewed by: Date Reviewed: June 3/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	08-May-15 @ 1140h
WO#:	15377	Termination Date:	11-May-15 @ 1140h
Sample ID:	LC_FRDSDC_WS_2015-05-05_N		
		Initial Cell Density:	9545 cell/mL

									210000
									0.22
									0.01
Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9545.455
Control	A	33				33	32.0	mean	32.0
	B	34				34	33.0	SD	2.203893
	C	31				31	30.0	CV	6.877396
	D	31				31	30.0		
	E	37				37	36.0		
	F	35				35	34.0		
	G	31				31	30.0		
	H	32				32	31.0		
1.5	A	33				33	32.0		
	B	36				36	35.0		
	C	41				41	40.0		
	D	38				38	37.0		
3	A	51				51	50.0		
	B	54				54	53.0		
	C	46				46	45.0		
	D	45				45	44.0		
6	A	75				75	74.0		
	B	63				63	62.0		
	C	58				58	57.0		
	D	65				65	64.0		
11.9	A	97				97	96.0		
	B	86				86	85.0		
	C	80				80	79.0		
	D	82				82	81.0		
23.8	A	108				108	107.0		
	B	116				116	115.0		
	C	92				92	91.0		
	D	90				90	89.0		
47.6	A	83				83	82.0		
	B	97				97	96.0		
	C	82				82	81.0		
	D	76				76	75.0		
95.2	A	73				73	72.0		
	B	77				77	76.0		
	C	75				75	74.0		
	D	70				70	69.0		

June 3/15

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	10-3885-9475	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 13:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	12-8273-8012	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 May-15 11:40	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	11 May-15 11:40	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	20-4735-3291	**Code:**	7A0821CB	**Client:**	Teck Coal
Sample Date:	05 May-15 13:32	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	70h (6 °C)	**Station:**	LC_FRDSDC_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	122847	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7295	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	32	30	36	0.7792	2.204	6.89%	0.0%
1.5		4	36	32	40	1.683	3.367	9.35%	-12.5%
3		4	48	44	53	2.121	4.243	8.84%	-50.0%
6		4	64.25	57	74	3.568	7.136	11.11%	-100.8%
11.9		4	85.25	79	96	3.794	7.588	8.9%	-166.4%
23.8		4	100.5	89	115	6.292	12.58	12.52%	-214.1%
47.6		4	83.5	75	96	4.444	8.888	10.64%	-160.9%
95.2		4	72.75	69	76	1.493	2.986	4.11%	-127.3%

Cell Yield Detail

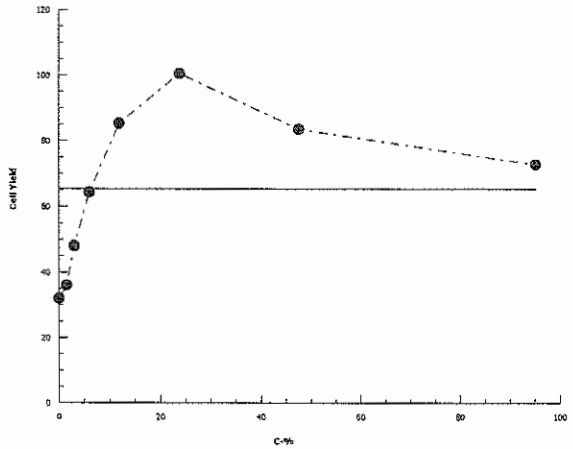
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	32	33	30	30	36	34	30	31
1.5		32	35	40	37				
3		50	53	45	44				
6		74	62	57	64				
11.9		96	85	79	81				
23.8		107	115	91	89				
47.6		82	96	81	75				
95.2		72	76	74	69				

June 3/15

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	10-3885-9475	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 13:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 3/15

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	17-2147-6863	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 14:00	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	12-8273-8012	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 May-15 11:40	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	11 May-15 11:40	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	20-4735-3291	**Code:**	7A0821CB	**Client:**	Teck Coal
Sample Date:	05 May-15 13:32	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	70h (6 °C)	**Station:**	LC_FRDSDC_WS_2015-05-05_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	31.5%	1.5	3	2.121	66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	1.004	2.526	10.07	10	0.5495	CDF	Non-Significant Effect
		3*	4.014	2.526	10.07	10	0.0013	CDF	Significant Effect
		6*	8.091	2.526	10.07	10	<0.0001	CDF	Significant Effect
		11.9*	13.36	2.526	10.07	10	<0.0001	CDF	Significant Effect
		23.8*	17.19	2.526	10.07	10	<0.0001	CDF	Significant Effect
		47.6*	12.92	2.526	10.07	10	<0.0001	CDF	Significant Effect
		95.2*	10.22	2.526	10.07	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7295	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	21104.5	3014.928	7	71.16	<0.0001	Significant Effect
Error	1186.25	42.36607	28			
Total	22290.75		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	17.08	18.48	0.0169	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9609	0.9166	0.2287	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	32	30.16	33.84	31.5	30	36	0.7792	6.89%	0.0%
1.5		4	36	30.64	41.36	36	32	40	1.683	9.35%	-12.5%
3		4	48	41.25	54.75	47.5	44	53	2.121	8.84%	-50.0%
6		4	64.25	52.9	75.6	63	57	74	3.568	11.11%	-100.8%
11.9		4	85.25	73.18	97.32	83	79	96	3.794	8.9%	-166.4%
23.8		4	100.5	80.48	120.5	99	89	115	6.292	12.52%	-214.1%
47.6		4	83.5	69.36	97.64	81.5	75	96	4.444	10.64%	-160.9%
95.2		4	72.75	68	77.5	73	69	76	1.493	4.11%	-127.3%

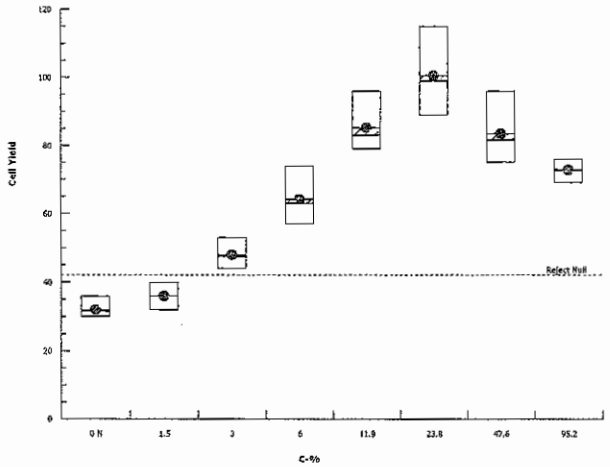
June 3/15

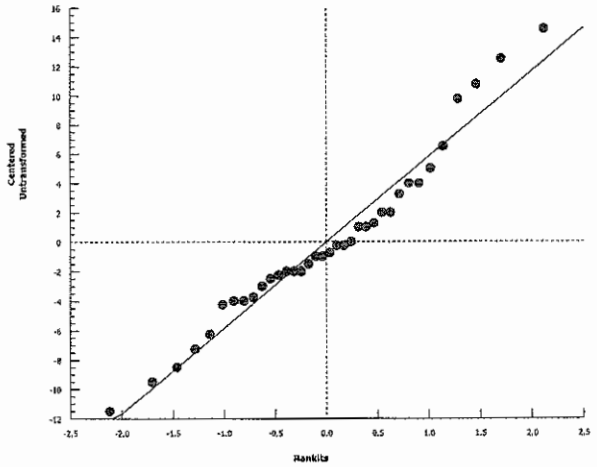
Analysis ID:	17-2147-6863	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 14:00	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	32	33	30	30	36	34	30	31
1.5		32	35	40	37				
3		50	53	45	44				
6		74	62	57	64				
11.9		96	85	79	81				
23.8		107	115	91	89				
47.6		82	96	81	75				
95.2		72	76	74	69				

Graphics





June 3/15

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15377

Start Date: May 7/15
Set up by: MLT

Sample Information:

Sample ID: LC_DCDS_WS_2015-05-05_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 1x20L

Test Organism Information:

Culture Date: May 1/15
Age of culture (Day 0): 6d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC129
Stock Solution ID: 15Zn01
Date Initiated: May 5/15

72-h IC50 (95% CL): 38.6 (35.0 - 42.4) µg/L Zn

72-h IC50 Reference Toxicant Mean and Range: 26.4 (13.6 - 51.1) µg/L Zn CV (%): 39

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]

Date reviewed: June 4/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal **Setup by:** MLT

Sample ID: LC-DCDS_WS_2015-05-05_N **Test Date/Time:** May 7/15 @ 1300h

Work Order No.: 15377 **Test Species:** *Pseudokirchneriella subcapitata*

Culture Date: May 1/15 **Age of Culture:** 6d **Culture Health:** Good

Culture Count: 1 435 2 450 **Average:** 442.5 **Culture Cell Density (c1):** 442.5 x10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 442.5 x10⁴ cells/ml = 5mL

Time Zero Counts: 1 20 2 22 **Average:** 21

No. of Cells/mL: 21 x10⁴ **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	6.8	24.0	25.0	25.0	24.5	25.0	✓	~	✓	✓
1.5	6.9	24.0	↓	↓	↓	↓	✓	~	✓	✓
3.0	7.0	24.0					✓	~	~	✓
6.0	7.1	24.0					✓	~	~	✓
11.9	7.2	24.0					✓	~	~	✓
23.8	7.4	24.0					✓	~	✓	✓
47.6	7.7	24.0					✓	~	✓	~
95.2	8.0	24.0	↓	↓	↓	↓ MLT	✓	~	✓	~
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.8 Well 2: 6.8

Final control pH: Well 1: 6.6 Well 2: 6.6

Light intensity (lux): 4100 **Date measured:** May 7/15

Instruments: Thermometer 4 pH meter 2 Light meter 1

Sample Description: clear, some ppt present

Comments:

Reviewed: [signature] **Date reviewed:** June 2/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: May 7/15 @ 1300h

Work Order #: 15377 Termination Date: May 10/15 @ 1300h

Sample ID: LC_PCDS_WS_2015-05-05_N Test set up by: ML

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	40					ML
	B	38					
	C	32					
	D	33					
	E	ML 38					
	F	39					
	G	37					
	H	36					
1.5	A	42					
	B	38					
	C	45					
	D	35					
3.0	A	ML 63					
	B	58					
	C	61					
	D	53					
6.0	A	ML 75					
	B	69					
	C	62					
	D	74					
11.9	A	81					
	B	86					
	C	95					
	D	83					
23.8	A	167					
	B	142					
	C	132					
	D	129					
47.6	A	156					
	B	138					
	C	131					
	D	136					
95.2	A	135					
	B	139					
	C	134					
	D	126					✓

Comments:

Reviewed by: Date Reviewed: May 29/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	07-May-15 @ 1300h
WO#:	15377	Termination Date:	10-May-15 @ 1300h
Sample ID:	LC_DCDS_WS_2015-05-05_N		

Initial Cell Density: 9545 cell/mL

									210000
									0.22
									0.01
Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9545.455
Control	A	40				40	39.0	mean	35.2
	B	38				38	37.0	SD	3.090885
	C	32				32	31.0	CV	8.7883
	D	33				33	32.0		
	E	38				38	37.0		
	F	39				39	38.0		
	G	33				33	32.0		
	H	36				36	35.0		
1.5	A	42				42	41.0		
	B	38				38	37.0		
	C	45				45	44.0		
	D	35				35	34.0		
3	A	63				63	62.0		
	B	58				58	57.0		
	C	61				61	60.0		
	D	53				53	52.0		
6	A	75				75	74.0		
	B	69				69	68.0		
	C	62				62	61.0		
	D	74				74	73.0		
11.9	A	81				81	80.0		
	B	86				86	85.0		
	C	95				95	94.0		
	D	83				83	82.0		
23.8	A	107				107	106.0		
	B	112				112	111.0		
	C	132				132	131.0		
	D	129				129	128.0		
47.6	A	156				156	155.0		
	B	138				138	137.0		
	C	131				131	130.0		
	D	136				136	135.0		
95.2	A	135				135	134.0		
	B	139				139	138.0		
	C	134				134	133.0		
	D	126				126	125.0		

June 2/15

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	02-4292-0299	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 13:54	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	12-5093-4433	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	07 May-15 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	10 May-15 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	6d
Sample ID:	12-7328-6829	**Code:**	4BE4D0AD	**Client:**	Teck Coal
Sample Date:	05 May-15 11:14	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	50h (7.8 °C)	**Station:**	LC_DCDS_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	516634	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.5540	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	35.13	31	39	1.093	3.091	8.8%	0.0%
1.5		4	39	34	44	2.198	4.397	11.27%	-11.03%
3		4	57.75	52	62	2.175	4.349	7.53%	-64.41%
6		4	69	61	74	2.972	5.944	8.62%	-96.44%
11.9		4	85.25	80	94	3.092	6.185	7.26%	-142.7%
23.8		4	119	106	131	6.178	12.36	10.38%	-238.8%
47.6		4	139.3	130	155	5.452	10.9	7.83%	-296.4%
95.2		4	132.5	125	138	2.723	5.447	4.11%	-277.2%

Cell Yield Detail

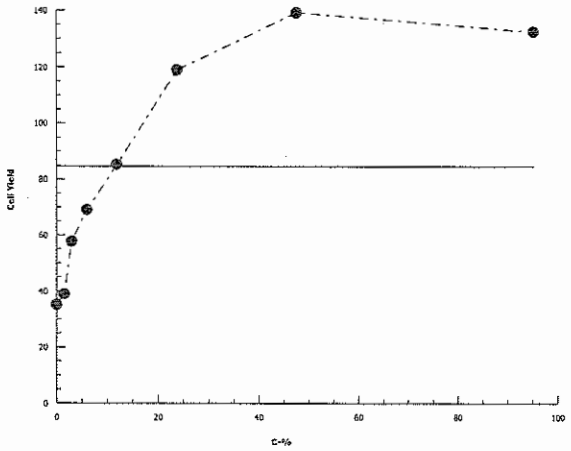
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	39	37	31	32	37	38	32	35
1.5		41	37	44	34				
3		62	57	60	52				
6		74	68	61	73				
11.9		80	85	94	82				
23.8		106	111	131	128				
47.6		155	137	130	135				
95.2		134	138	133	125				

June 2/15

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	02-4292-0299	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 13:54	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 2/15

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	15-5623-5728	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 13:54	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	12-5093-4433	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	07 May-15 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	10 May-15 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	6d
Sample ID:	12-7328-6829	**Code:**	4BE4D0AD	**Client:**	Teck Coal
Sample Date:	05 May-15 11:14	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	50h (7.8 °C)	**Station:**	LC_DCDS_WS_2015-05-05_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	30.1%	1.5	3	2.121	66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.9265	2.526	10.57	10	0.5884	CDF	Non-Significant Effect
		3*	5.41	2.526	10.57	10	<0.0001	CDF	Significant Effect
		6*	8.099	2.526	10.57	10	<0.0001	CDF	Significant Effect
		11.9*	11.98	2.526	10.57	10	<0.0001	CDF	Significant Effect
		23.8*	20.05	2.526	10.57	10	<0.0001	CDF	Significant Effect
		47.6*	24.9	2.526	10.57	10	<0.0001	CDF	Significant Effect
		95.2*	23.28	2.526	10.57	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.5540	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	56531.43	8075.918	7	173.1	<0.0001	Significant Effect
Error	1306.125	46.64732	28			
Total	57837.55		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	11.53	18.48	0.1170	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9875	0.9166	0.9495	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	35.13	32.54	37.71	36	31	39	1.093	8.8%	0.0%
1.5		4	39	32	46	39	34	44	2.198	11.27%	-11.03%
3		4	57.75	50.83	64.67	58.5	52	62	2.175	7.53%	-64.41%
6		4	69	59.54	78.46	70.5	61	74	2.972	8.62%	-96.44%
11.9		4	85.25	75.41	95.09	83.5	80	94	3.092	7.26%	-142.7%
23.8		4	119	99.34	138.7	119.5	106	131	6.178	10.38%	-238.8%
47.6		4	139.3	121.9	156.6	136	130	155	5.452	7.83%	-296.4%
95.2		4	132.5	123.8	141.2	133.5	125	138	2.723	4.11%	-277.2%

June 2/15

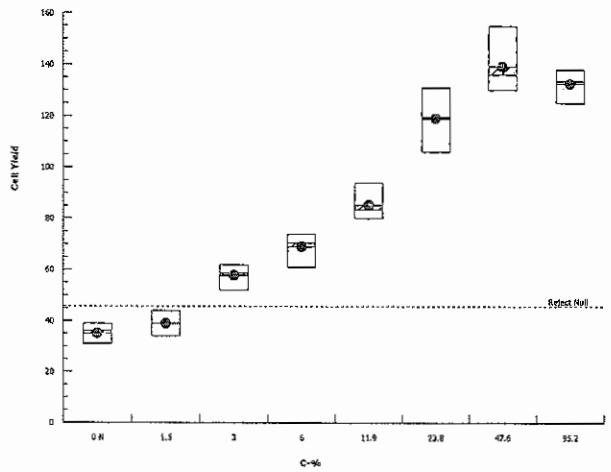
EC Alga Growth Inhibition Test — Nautilus Environmental

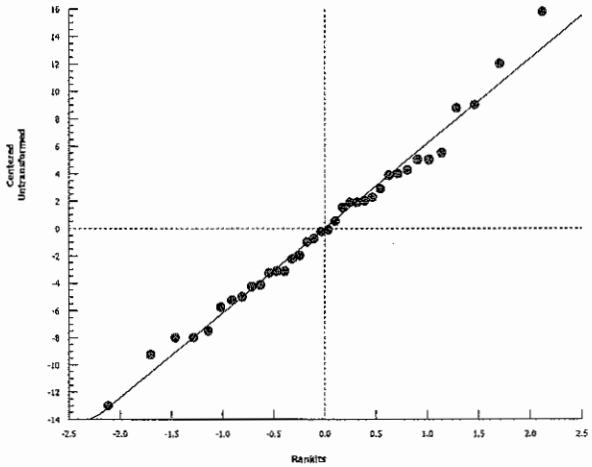
Analysis ID:	15-5623-5728	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 13:54	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	39	37	31	32	37	38	32	35
1.5		41	37	44	34				
3		62	57	60	52				
6		74	68	61	73				
11.9		80	85	94	82				
23.8		106	111	131	128				
47.6		155	137	130	135				
95.2		134	138	133	125				

Graphics





June 2/15

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15377

Start Date: May 8/15
Set up by: MLT

Sample Information:

Sample ID: LC_LC5_WS_2015-05-06_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 1x 20L

Test Organism Information:

Culture Date: May 1/15
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC129
Stock Solution ID: 15Zn01
Date Initiated: May 5/15

72-h IC50 (95% CL): 38.6 (35.0 - 42.4) µg/L Zn

72-h IC50 Reference Toxicant Mean and Range: 26.4 (13.6 - 51.1) µg/L Zn CV (%): 39

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]

Date reviewed: June 4/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: MLT

Sample ID: LC_LC5_WS_2015-05-06_N | Test Date/Time: May 8/15 @ 1200h

Work Order No.: 15377 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: May 1/15 | Age of Culture: 7d | Culture Health: Good

Culture Count: 1 ~~125~~ MLT 625 | 2 ~~130~~ MLT 650 | Average: 637.5 | Culture Cell Density (c1): 637.5x10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 637.5 x10⁴ cells/ml = 3.4 mL

Time Zero Counts: 1 21 2 21 | Average: 21

No. of Cells/mL: 21 x10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	6.9	24.0	25.0	24.5	25.0	25.0	✓	✓	✓	✓
1.5	6.9	24.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.0	24.0	↓	↓	↓	↓	✓	✓	✓	✓
6.0	7.3	24.0	↓	↓	↓	↓	✓	✓	✓	✓
11.9	7.5	24.0	↓	↓	↓	↓	✓	✓	✓	✓
23.8	7.7	24.0	↓	↓	↓	↓	✓	✓	✓	✓
47.6	7.9	24.0	↓	↓	↓	↓	✓	✓	✓	✓
95.2	8.2	24.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.9 Well 2: 6.9

Final control pH: Well 1: 6.9 Well 2: 6.9

Light intensity (lux): 3850 | Date measured: May 8/15

Instruments: Thermometer 4 | pH meter 2 | Light meter 1

Sample Description: clear

Comments:

Reviewed: [signature] | Date reviewed: June 2/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal — Start Date/Time: May 8/15 @ 1200h
Work Order #: 15377 — Termination Date: May 11/15 @ 1200h
Sample ID: LC_LC5_WS_2015-05-06_N — Test set up by: MLT
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	33					MLT
	B	32					
	C	41					
	D	33					
	E	36					
	F	32					
	G	33					
	H	34					
1.5	A	61					
	B	63					
	C	70					
	D	60					
3.0	A	84					
	B	81					
	C	81					
	D	76					
6.0	A	120					
	B	109					
	C	93					
	D	108					
11.9	A	121					
	B	130					
	C	110					
	D	108					
23.8	A	117					
	B	124					
	C	111					
	D	114					
47.6	A	85					
	B	97					
	C	88					
	D	95					
95.2	A	83					
	B	71					
	C	75					
	D	66					↓

Comments:

Reviewed by: [signature] — Date Reviewed: June 2/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	08-May-15 @ 1200h		
WO#:	15377	Termination Date:	11-May-15 @ 1200h		
Sample ID:	LC_LC5_WS_2015-05-06_N				
		Initial Cell Density:	9545 cell/mL		210000
					0.22
					0.01

Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9545.455
Control	A	33				33	32.0	mean	33.3
	B	32				32	31.0	SD	3.011881
	C	41				41	40.0	CV	9.045923
	D	33				33	32.0		
	E	36				36	35.0		
	F	32				32	31.0		
	G	33				33	32.0		
	H	34				34	33.0		
1.5	A	61				61	60.0		
	B	63				63	62.0		
	C	70				70	69.0		
	D	60				60	59.0		
3	A	84				84	83.0		
	B	81				81	80.0		
	C	81				81	80.0		
	D	76				76	75.0		
6	A	120				120	119.0		
	B	109				109	108.0		
	C	93				93	92.0		
	D	108				108	107.0		
11.9	A	121				121	120.0		
	B	130				130	129.0		
	C	110				110	109.0		
	D	108				108	107.0		
23.8	A	117				117	116.0		
	B	124				124	123.0		
	C	111				111	110.0		
	D	114				114	113.0		
47.6	A	85				85	84.0		
	B	97				97	96.0		
	C	88				88	87.0		
	D	95				95	94.0		
95.2	A	83				83	82.0		
	B	71				71	70.0		
	C	75				75	74.0		
	D	66				66	65.0		

June 2/15

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	04-4163-8071	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 12:33	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	08-1217-8386	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 May-15 12:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	11 May-15 12:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	11-8749-7839	**Code:**	46C7C76F	**Client:**	Teck Coal
Sample Date:	05 May-15 14:02	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	70h (6.8 °C)	**Station:**	LC_LC5_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	791042	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9122	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	59.45	53.3	89.68	1.682	1.115	~~1.876~~ mLT
IC10	74.18	59.96	N/A	~~1.348~~	NA	1.668 > 95.2 %(v/v) mLT
IC15	~~92.5~~	66.9	N/A	1.081	NA	1.495
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	33.25	31	40	1.065	3.012	9.06%	0.0%
1.5		4	62.5	59	69	2.255	4.509	7.22%	-87.97%
3		4	79.5	75	83	1.658	3.317	4.17%	-139.1%
6		4	106.5	92	119	5.545	11.09	10.41%	-220.3%
11.9		4	116.3	107	129	5.121	10.24	8.81%	-249.6%
23.8		4	115.5	110	123	2.784	5.568	4.82%	-247.4%
47.6		4	90.25	84	96	2.839	5.679	6.29%	-171.4%
95.2		4	72.75	65	82	3.591	7.182	9.87%	-118.8%

Cell Yield Detail

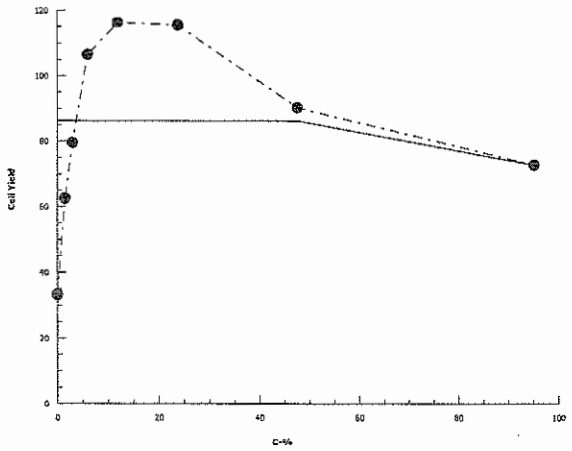
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	32	31	40	32	35	31	32	33
1.5		60	62	69	59				
3		83	80	80	75				
6		119	108	92	107				
11.9		120	129	109	107				
23.8		116	123	110	113				
47.6		84	96	87	94				
95.2		82	70	74	65				

June 2/15

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	04-4163-8071	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 12:33	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 2/15

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	13-5688-7537	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 12:33	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	08-1217-8386	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 May-15 12:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	11 May-15 12:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	11-8749-7839	**Code:**	46C7C76F	**Client:**	Teck Coal
Sample Date:	05 May-15 14:02	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	70h (6.8 °C)	**Station:**	LC_LC5_WS_2015-05-06_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	30.3%	<1.5	1.5	NA	>66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5*	7.34	2.526	10.07	10	<0.0001	CDF	Significant Effect
		3*	11.61	2.526	10.07	10	<0.0001	CDF	Significant Effect
		6*	18.38	2.526	10.07	10	<0.0001	CDF	Significant Effect
		11.9*	20.83	2.526	10.07	10	<0.0001	CDF	Significant Effect
		23.8*	20.64	2.526	10.07	10	<0.0001	CDF	Significant Effect
		47.6*	14.3	2.526	10.07	10	<0.0001	CDF	Significant Effect
		95.2*	9.912	2.526	10.07	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9122	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	32400.55	4628.651	7	109.3	<0.0001	Significant Effect
Error	1185.75	42.34821	28			
Total	33586.3		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	10.99	18.48	0.1389	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9801	0.9166	0.7486	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	33.25	30.73	35.77	32	31	40	1.065	9.06%	0.0%
1.5		4	62.5	55.32	69.68	61	59	69	2.255	7.22%	-87.97%
3		4	79.5	74.22	84.78	80	75	83	1.658	4.17%	-139.1%
6		4	106.5	88.85	124.1	107.5	92	119	5.545	10.41%	-220.3%
11.9		4	116.3	99.95	132.5	114.5	107	129	5.121	8.81%	-249.6%
23.8		4	115.5	106.6	124.4	114.5	110	123	2.784	4.82%	-247.4%
47.6		4	90.25	81.21	99.29	90.5	84	96	2.839	6.29%	-171.4%
95.2		4	72.75	61.32	84.18	72	65	82	3.591	9.87%	-118.8%

June 2/15

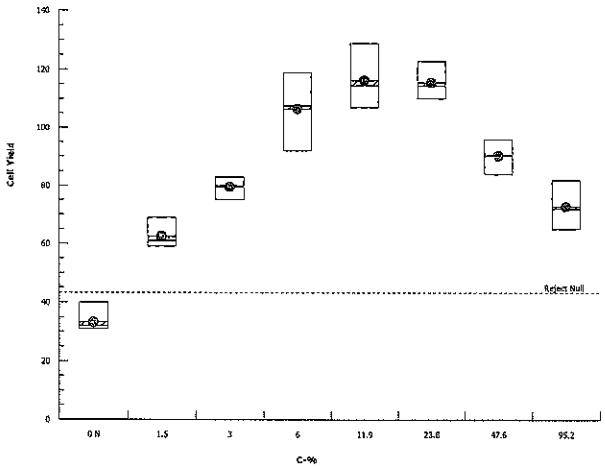
EC Alga Growth Inhibition Test — Nautilus Environmental

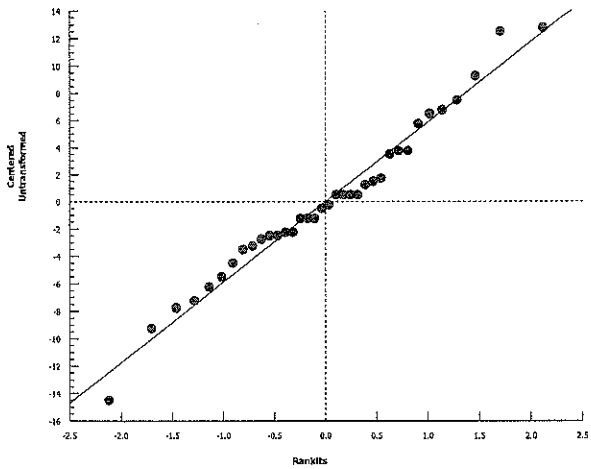
Analysis ID:	13-5688-7537	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 12:33	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	32	31	40	32	35	31	32	33
1.5		60	62	69	59				
3		83	80	80	75				
6		119	108	92	107				
11.9		120	129	109	107				
23.8		116	123	110	113				
47.6		84	96	87	94				
95.2		82	70	74	65				

Graphics





June 2/15

APPENDIX E – Analytical Chemistry

GH_ER2 (0200378)

statistic	sample_date	ALUMINUM (D)	ALUMINUM (T)	ANTIMONY (D)	ANTIMONY (T)	ARSENIC (D)	ARSENIC (T)	BARIUM (D)	BARIUM (T)
	4/14/2015	< 0.0030	0.0332	< 0.00010	< 0.00010	< 0.00010	0.00013	0.0483	0.0496
	4/14/2015	< 0.0030	0.0097	< 0.00010	< 0.00010	< 0.00010	0.00010	0.0509	0.0498
	4/21/2015	< 0.0030	0.0452	< 0.00010	< 0.00010	< 0.00010	0.00013	0.0486	0.0475
	4/28/2015	< 0.0030	0.0308	< 0.00010	< 0.00010	< 0.00010	0.00011	0.0467	0.0478
	5/5/2015	< 0.0030	0.0761	< 0.00010	< 0.00010	0.00011	0.00016	0.0462	0.0476
	5/12/2015	< 0.0030	0.0432	< 0.00010	< 0.00010	0.00010	0.00014	0.0446	0.0449
	5/19/2015	< 0.0030	0.0590	< 0.00010	< 0.00010	0.00011	0.00016	0.0448	0.0450
	5/26/2015	< 0.0030	0.203	< 0.00010	< 0.00010	0.00013	0.00023	0.0397	0.0432
	6/2/2015	0.0062	0.540	< 0.00010	< 0.00010	0.00012	0.00053	0.0350	0.0444
	6/9/2015	0.230	0.773	< 0.00010	< 0.00010	0.00032	0.00050	0.0415	0.0423
	6/16/2015	< 0.0030	0.0652	< 0.00010	< 0.00010	0.00010	0.00017	0.0383	0.0394
	6/23/2015	< 0.0030	0.0281	< 0.00010	< 0.00010	0.00010	0.00014	0.0387	0.0383
	6/30/2015	0.0043	0.351	< 0.00010	< 0.00010	0.00010	0.00027	0.0377	0.0408
Average Sample Result		0.020808	0.17365	0.00010000	0.00010000	0.00012231	0.00021308	0.043154	0.044662
Exceedance Count		1	0	0	0	0	0	0	0
Maximum Sample Result		0.23	0.773	0.0001	0.0001	0.00032	0.00053	0.0509	0.0498
Minimum Sample Result		0.003	0.0097	0.0001	0.0001	0.0001	0.0001	0.035	0.0383
Sample Count		13	13	13	13	13	13	13	13
Sample Range		0.22700	0.76330	0.0000	0.0000	0.00022000	0.00043000	0.015900	0.011500
Std Deviation		0.062861	0.23838	0.0000	0.0000	0.000060160	0.00014191	0.0049757	0.0037456
Std Error		0.017435	0.066114	0.0000	0.0000	0.000016685	0.000039360	0.0013800	0.0010388

GH_ER2 (0200378)

statistic	sample_date	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)	BISMUTH (T)	BORON (D)	BORON (T)	BROMIDE (D)	CADMIUM (D)
	4/14/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000051
	4/14/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000056
	4/21/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050
	4/28/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050
	5/5/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050
	5/12/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000060
	5/19/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000059
	5/26/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000052
	6/2/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000084
	6/9/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000872
	6/16/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000067
	6/23/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000067
	6/30/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000069
Average Sample Result		0.00010000	0.00010000	0.000050000	0.000050000	0.010000	0.010000	0.050000	0.000012208
Exceedance Count		0	0	0	0	0	0	0	0
Maximum Sample Result		0.0001	0.0001	5e-005	5e-005	0.01	0.01	0.05	8.72e-005
Minimum Sample Result		0.0001	0.0001	5e-005	5e-005	0.01	0.01	0.05	5e-006
Sample Count		13	13	13	13	13	13	13	13
Sample Range		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.000082200
Std Deviation		0.0000	0.0000	0.0000	0.0000	2.6885E-10	2.6885E-10	0.0000000010754	0.000022555
Std Error		0.0000	0.0000	0.0000	0.0000	7.4565E-11	7.4565E-11	2.9826E-10	0.0000062556

GH_ER2 (0200378)

statistic	sample_date	CADMIUM (T)	CALCIUM (T)	CARBON, DISSOLVED ORGANIC (D)	CHLORIDE (D)	CHROMIUM (D)	CHROMIUM (T)
	4/14/2015	0.0000102	55.5	1.01	< 1.0	0.00024	0.00034
	4/14/2015	< 0.0000050	50.9	0.92	< 1.0	0.00027	0.00034
	4/21/2015	0.0000108	51.6	1.10	1.1	0.00021	0.00034
	4/28/2015	0.0000085	50.9	0.94	< 1.0	0.00019	0.00031
	5/5/2015	0.0000155	48.2	0.84	1.0	0.00022	0.00037
	5/12/2015	0.0000113	49.6	1.24	1.1	0.00022	0.00034
	5/19/2015	0.0000171	49.9	1.30	1.5	0.00019	0.00214
	5/26/2015	0.0000309	46.9	1.26	1.2	0.00013	0.00061
	6/2/2015	0.0000950	49.7	1.46	< 1.0	0.00022	0.00149
	6/9/2015	0.0000964	45.8		< 0.50	0.00064	0.00185
	6/16/2015	0.0000140	45.7	0.88	1.2	0.00021	0.00062
	6/23/2015	0.0000086	43.1	0.69	1.2	0.00025	0.00026
	6/30/2015	0.0000270	42.7	0.72	1.1	0.00021	0.00073
Average Sample Result		0.000026946	48.500	1.0300	1.0692	0.00024615	0.00074923
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		9.64e-005	55.5	1.46	1.5	0.00064	0.00214
Minimum Sample Result		5e-006	42.7	0.69	0.5	0.00013	0.00026
Sample Count		13	13	12	13	13	13
Sample Range		0.000091400	12.800	0.77000	1.0000	0.00051000	0.0018800
Std Deviation		0.000031372	3.5977	0.24320	0.22130	0.00012299	0.00064402
Std Error		0.0000087012	0.99782	0.070205	0.061378	0.000034110	0.00017862

GH_ER2 (0200378)

statistic	sample_date	COBALT (D)	COBALT (T)	CONDUCTIVITY, FIELD (N)	CONDUCTIVITY, LAB (N)	COPPER (D)	COPPER (T)
	4/14/2015	< 0.00010	< 0.00010	238.9	330	< 0.00050	< 0.00050
	4/14/2015	< 0.00010	< 0.00010		322	< 0.00050	< 0.00050
	4/21/2015	< 0.00010	< 0.00010	248.2	321	< 0.00050	< 0.00050
	4/28/2015	< 0.00010	< 0.00010	244.4	321	< 0.00050	< 0.00050
	5/5/2015	< 0.00010	< 0.00010	254.5	303	< 0.00050	< 0.00050
	5/12/2015	< 0.00010	< 0.00010	309	300	< 0.00050	< 0.00050
	5/19/2015	< 0.00010	< 0.00010	307	289	< 0.00050	< 0.00050
	5/26/2015	< 0.00010	0.00010	276	270	< 0.00050	< 0.00050
	6/2/2015	< 0.00010	0.00036	217.3	253	< 0.00050	0.00117
	6/9/2015	0.00023	0.00033	206.6	256	0.00065	0.00104
	6/16/2015	< 0.00010	< 0.00010	224.7	254	< 0.00050	< 0.00050
	6/23/2015	< 0.00010	< 0.00010	225.2	286	< 0.00050	< 0.00050
	6/30/2015	< 0.00010	0.00017	215.8	270	< 0.00050	0.00053
Average Sample Result		0.00011000	0.00014308	247.30	290.38	0.00051154	0.00059538
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.00023	0.00036	309	330	0.00065	0.00117
Minimum Sample Result		0.0001	0.0001	206.6	253	0.0005	0.0005
Sample Count		13	13	12	13	13	13
Sample Range		0.00013000	0.00026000	102.40	77.000	0.00015000	0.00067000
Std Deviation		0.000036056	0.000091868	34.211	28.064	0.000041603	0.00022787
Std Error		0.000010000	0.000025480	9.8758	7.7836	0.000011538	0.000063201

GH_ER2 (0200378)

statistic	sample_date	DISSOLVED OXYGEN, FIELD (N)	FLUORIDE (D)	Hardness, Total or Dissolved CaCO3 (N)	IRON (D)	IRON (T)	LEAD (D)
	4/14/2015	11.41	0.156	184	< 0.010	0.032	< 0.000050
	4/14/2015		0.158	174	< 0.010	0.015	< 0.000050
	4/21/2015	11.48	0.161	177	< 0.010	0.051	< 0.000050
	4/28/2015	11.39	0.152	171	< 0.010	0.032	< 0.000050
	5/5/2015	11.53	0.153	160	< 0.010	0.066	< 0.000050
	5/12/2015	10.19	0.159	167	< 0.010	0.046	< 0.000050
	5/19/2015	10.28	0.159	164	< 0.010	0.101	< 0.000050
	5/26/2015	9.34	0.148	150	< 0.010	0.220	< 0.000050
	6/2/2015	10.24	0.153	141	< 0.010	0.842	< 0.000050
	6/9/2015	9.64	0.149	163	0.315	0.884	0.000440
	6/16/2015	8.74	0.151	151	< 0.010	0.077	< 0.000050
	6/23/2015	9.39	0.152	149	< 0.010	0.037	< 0.000050
	6/30/2015	9.53	0.157	143	< 0.010	0.302	< 0.000050
Average Sample Result		10.263	0.15446	161.08	0.033462	0.20808	0.000080000
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		11.53	0.161	184	0.315	0.884	0.00044
Minimum Sample Result		8.74	0.148	141	0.01	0.015	5e-005
Sample Count		12	13	13	13	13	13
Sample Range		2.7900	0.013000	43.000	0.30500	0.86900	0.00039000
Std Deviation		0.97874	0.0041355	13.518	0.084592	0.30222	0.00010817
Std Error		0.28254	0.0011470	3.7493	0.023462	0.083820	0.000030000

GH_ER2 (0200378)

statistic	sample_date	LEAD (T)	LITHIUM (D)	LITHIUM (T)	MAGNESIUM (T)	MANGANESE (D)	MANGANESE (T)	MERCURY (D)
	4/14/2015	< 0.000050	0.0015	0.0015	12.7	0.00262	0.00459	< 0.0000050
	4/14/2015	< 0.000050	0.0016	0.0016	11.4	0.00275	0.00340	< 0.0000050
	4/21/2015	< 0.000050	0.0017	0.0018	11.5	0.00283	0.00484	< 0.0000050
	4/28/2015	< 0.000050	0.0017	0.0016	11.4	0.00328	0.00509	< 0.0000050
	5/5/2015	< 0.000050	0.0017	0.0016	10.8	0.00327	0.00594	< 0.0000050
	5/12/2015	< 0.000050	0.0016	0.0015	11.6	0.00311	0.00548	< 0.0000050
	5/19/2015	0.000053	0.0018	0.0020	10.8	0.00273	0.00694	0.0000073
	5/26/2015	0.000155	0.0013	0.0019	9.98	0.00235	0.0133	< 0.0000050
	6/2/2015	0.000598	0.0013	0.0022	9.92	0.00093	0.0475	< 0.0000050
	6/9/2015	0.000542	0.0014	0.0022	9.24	0.0509	0.0486	< 0.0000050
	6/16/2015	0.000064	0.0016	0.0014	9.70	0.00311	0.00786	< 0.0000050
	6/23/2015	< 0.000050	0.0013	0.0014	9.17	0.00308	0.00515	< 0.0000050
	6/30/2015	0.000216	0.0013	0.0020	8.78	0.00218	0.0136	< 0.0000050
Average Sample Result		0.00015215	0.0015231	0.0017462	10.538	0.0063954	0.013253	0.0000051769
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.000598	0.0018	0.0022	12.7	0.0509	0.0486	7.3e-006
Minimum Sample Result		5e-005	0.0013	0.0014	8.78	0.00093	0.0034	5e-006
Sample Count		13	13	13	13	13	13	13
Sample Range		0.00054800	0.00050000	0.00080000	3.9200	0.049970	0.045200	0.0000023000
Std Deviation		0.00019268	0.00018328	0.00028756	1.1688	0.013387	0.015760	0.00000063791
Std Error		0.000053439	0.000050831	0.000079756	0.32417	0.0037128	0.0043710	0.00000017692

GH_ER2 (0200378)

statistic	sample_date	MERCURY (T)	MOLYBDENUM (D)	MOLYBDENUM (T)	NICKEL (D)	NICKEL (T)	NITRATE NITROGEN (NO3), AS N (N)
	4/14/2015	< 0.0000050	0.000900	0.000946	< 0.00050	< 0.00050	0.0972
	4/14/2015	< 0.0000050	0.000908	0.000919	< 0.00050	< 0.00050	0.0869
	4/21/2015	< 0.0000050	0.000912	0.000906	< 0.00050	< 0.00050	0.0869
	4/28/2015	< 0.0000050	0.000920	0.000946	< 0.00050	< 0.00050	0.0897
	5/5/2015	< 0.0000050	0.000918	0.000936	< 0.00050	< 0.00050	0.0856
	5/12/2015	< 0.0000050	0.00101	0.00101	< 0.00050	< 0.00050	0.0742
	5/19/2015	< 0.0000050	0.000982	0.00102	< 0.00050	< 0.00050	0.0673
	5/26/2015	< 0.0000050	0.000914	0.000891	< 0.00050	0.00055	0.0945
	6/2/2015	< 0.0000050	0.000863	0.000967	< 0.00050	0.00168	0.0817
	6/9/2015	< 0.0000050	0.000451	0.000888	0.00113	0.00168	0.0691
	6/16/2015	< 0.0000050	0.000929	0.00104	< 0.00050	< 0.00050	0.0563
	6/23/2015	< 0.0000050	0.000943	0.000885	< 0.00050	< 0.00050	0.0464
	6/30/2015	< 0.0000050	0.000857	0.000831	< 0.00050	0.00069	0.0478
Average Sample Result		0.0000050000	0.00088515	0.00093731	0.00054846	0.00070000	0.075662
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		5e-006	0.00101	0.00104	0.00113	0.00168	0.0972
Minimum Sample Result		5e-006	0.000451	0.000831	0.0005	0.0005	0.0464
Sample Count		13	13	13	13	13	13
Sample Range		0.0000	0.00055900	0.00020900	0.00063000	0.0011800	0.050800
Std Deviation		9.2825E-14	0.00013681	0.000060298	0.00017473	0.00043812	0.017142
Std Error		2.5745E-14	0.000037944	0.000016724	0.000048462	0.00012151	0.0047543

GH_ER2 (0200378)

statistic	sample_date	NITRITE NITROGEN (NO2), AS N (N)	NITROGEN, AMMONIA (AS N) (N)	ORTHO-PHOSPHATE (N)	pH, Field (N)	pH, LAB (N)
	4/14/2015	< 0.0010	< 0.0050	< 0.0010	8.21	8.38
	4/14/2015	< 0.0010	< 0.0050	< 0.0010		8.30
	4/21/2015	< 0.0010	< 0.0050	< 0.0010	8.13	8.48
	4/28/2015	< 0.0010	< 0.0050	< 0.0010	8.51	8.43
	5/5/2015	< 0.0010	< 0.0050	< 0.0010	7.98	8.30
	5/12/2015	< 0.0010	< 0.0050	< 0.0010	8.15	8.30
	5/19/2015	< 0.0010	< 0.0050	< 0.0010	8.39	8.37
	5/26/2015	< 0.0010	0.0140	0.0014	8.21	8.29
	6/2/2015	< 0.0010	< 0.0050	0.0015	7.99	8.36
	6/9/2015	< 0.0010		0.0013	8.19	8.30
	6/16/2015	< 0.0010	< 0.0050	0.0015	8.27	8.27
	6/23/2015	< 0.0010	< 0.0050	< 0.0010	8.21	8.32
	6/30/2015	< 0.0010	< 0.0050	< 0.0010	8.15	8.29
Average Sample Result		0.0010000	0.0057500	0.0011308	8.1992	8.3377
Exceedance Count		0	0	0	0	0
Maximum Sample Result		0.001	0.014	0.0015	8.51	8.48
Minimum Sample Result		0.001	0.005	0.001	7.98	8.27
Sample Count		13	12	13	12	13
Sample Range		0.0000	0.0090000	0.00050000	0.53000	0.21000
Std Deviation		0.0000	0.0025981	0.00020970	0.14768	0.062737
Std Error		0.0000	0.00075000	0.000058160	0.042631	0.017400

GH_ER2 (0200378)

statistic	sample_date	PHOSPHORUS (N)	POTASSIUM (T)	SELENIUM (D)	SELENIUM (T)	SILVER (D)	SILVER (T)	SODIUM (T)
	4/14/2015	0.0034	0.339	0.855	0.912	< 0.000010	< 0.000010	0.703
	4/14/2015	< 0.0020	0.338	0.907	0.924	< 0.000010	< 0.000010	0.671
	4/21/2015	0.0022	0.403	0.945	0.914	< 0.000010	< 0.000010	0.796
	4/28/2015	0.0042	0.347	0.808	0.868	< 0.000010	< 0.000010	0.716
	5/5/2015	0.0080	0.367	0.787	0.87	< 0.000010	< 0.000010	0.726
	5/12/2015	0.0051	0.358	0.769	0.791	< 0.000010	< 0.000010	0.722
	5/19/2015	0.0069	0.354	0.765	0.777	< 0.000010	< 0.000010	0.799
	5/26/2015	0.0206	0.431	0.601	0.659	< 0.000010	< 0.000010	0.718
	6/2/2015	0.0810	0.576	0.609	0.637	< 0.000010	0.000019	0.567
	6/9/2015		0.654	0.578	0.579	< 0.000010	0.000016	0.466
	6/16/2015	< 0.0020	0.367	0.656	0.695	< 0.000010	< 0.000010	0.566
	6/23/2015	< 0.0020	0.335	0.616	0.628	< 0.000010	< 0.000010	0.511
	6/30/2015	0.0022	0.483	0.54	0.611	< 0.000010	< 0.000010	0.481
Average Sample Result		0.011633	0.41169	0.72585	0.75885	0.000010000	0.000011154	0.64938
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.081	0.654	0.945	0.924	1e-005	1.9e-005	0.799
Minimum Sample Result		0.002	0.335	0.54	0.579	1e-005	1e-005	0.466
Sample Count		12	13	13	13	13	13	13
Sample Range		0.079000	0.31900	0.40500	0.34500	0.0000	0.0000090000	0.33300
Std Deviation		0.022462	0.10093	0.13354	0.12931	1.8565E-13	0.0000028823	0.11633
Std Error		0.0064842	0.027992	0.037037	0.035864	5.1490E-14	0.00000079941	0.032263

GH_ER2 (0200378)

statistic	sample_date	STRONTIUM (D)	STRONTIUM (T)	SULFATE (AS SO4) (D)	TEMPERATURE, FIELD (N)	THALLIUM (D)	THALLIUM (T)
	4/14/2015	0.214	0.223	20.9	4.3	< 0.000010	< 0.000010
	4/14/2015	0.208	0.214	20.5		< 0.000010	< 0.000010
	4/21/2015	0.216	0.213	20.1	6.1	< 0.000010	< 0.000010
	4/28/2015	0.205	0.206	19.1	5.4	< 0.000010	< 0.000010
	5/5/2015	0.200	0.210	17.7	3.8	< 0.000010	< 0.000010
	5/12/2015	0.211	0.215	17.6	4.17	< 0.000010	< 0.000010
	5/19/2015	0.202	0.207	17.2	4.76	< 0.000010	< 0.000010
	5/26/2015	0.198	0.223	13.4	5.68	< 0.000010	0.000012
	6/2/2015	0.188	0.196	13.2	6.5	< 0.000010	0.000032
	6/9/2015	0.190	0.190	12.4	9.4	0.000013	0.000032
	6/16/2015	0.192	0.204	13.9	8.9	< 0.000010	< 0.000010
	6/23/2015	0.192	0.188	14.1	8.9	< 0.000010	< 0.000010
	6/30/2015	0.184	0.188	13.7	11	< 0.000010	0.000012
Average Sample Result		0.20000	0.20592	16.446	6.5758	0.000010231	0.000013692
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.216	0.223	20.9	11	1.3e-005	3.2e-005
Minimum Sample Result		0.184	0.188	12.4	3.8	1e-005	1e-005
Sample Count		13	13	13	12	13	13
Sample Range		0.032000	0.035000	8.5000	7.2000	0.0000030000	0.000022000
Std Deviation		0.010400	0.012237	3.1071	2.3882	0.00000083205	0.0000081587
Std Error		0.0028845	0.0033939	0.86177	0.68942	0.00000023077	0.0000022628

GH_ER2 (0200378)

statistic	sample_date	TIN (D)	TIN (T)	TITANIUM (D)	TITANIUM (T)	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)
	4/14/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	192
	4/14/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	180
	4/21/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	180
	4/28/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	184
	5/5/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	191
	5/12/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	184
	5/19/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	188
	5/26/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	161
	6/2/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	153
	6/9/2015	< 0.00010	< 0.00010	0.012	0.015	
	6/16/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	162
	6/23/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	154
	6/30/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	171
Average Sample Result		0.00010000	0.00010000	0.010154	0.010385	175.00
Exceedance Count		0	0	0	0	0
Maximum Sample Result		0.0001	0.0001	0.012	0.015	192
Minimum Sample Result		0.0001	0.0001	0.01	0.01	153
Sample Count		13	13	13	13	12
Sample Range		0.0000	0.0000	0.0020000	0.0050000	39.000
Std Deviation		0.0000	0.0000	0.00055470	0.0013868	14.245
Std Error		0.0000	0.0000	0.00015385	0.00038462	4.1121

GH_ER2 (0200378)

statistic	sample_date	TOTAL KJELDAHL NITROGEN (N)	TOTAL ORGANIC CARBON (T)	TOTAL SUSPENDED SOLIDS, LAB (N)
	4/14/2015	< 0.050	0.89	2.1
	4/14/2015	0.078	0.64	< 1.0
	4/21/2015	0.086	1.10	2.6
	4/28/2015	< 0.050	1.13	1.9
	5/5/2015	0.067	1.80	4.4
	5/12/2015	0.093	1.38	3.2
	5/19/2015	0.065	1.09	5.4
	5/26/2015	0.126	1.55	13.8
	6/2/2015	0.163	2.80	51.9
	6/9/2015			65.9
	6/16/2015	< 0.050	0.86	6.8
	6/23/2015	< 0.050	0.70	3.5
	6/30/2015	0.066	0.84	16.8
Average Sample Result		0.078667	1.2317	13.792
Exceedance Count		0	0	0
Maximum Sample Result		0.163	2.8	65.9
Minimum Sample Result		0.05	0.64	1
Sample Count		12	12	13
Sample Range		0.11300	2.1600	64.900
Std Deviation		0.034880	0.60263	20.755
Std Error		0.010069	0.17396	5.7564

GH_ER2 (0200378)

statistic	sample_date	TURBIDITY, LAB (N)	URANIUM (D)	URANIUM (T)	VANADIUM (D)	VANADIUM (T)	ZINC (D)	ZINC (T)
	4/14/2015	0.73	0.000757	0.000789	< 0.00050	< 0.00050	< 0.0030	< 0.0030
	4/14/2015	0.42	0.000792	0.000808	< 0.00050	< 0.00050	< 0.0030	< 0.0030
	4/21/2015	1.03	0.000807	0.000799	< 0.00050	< 0.00050	< 0.0030	< 0.0030
	4/28/2015	0.96	0.000788	0.000805	< 0.00050	< 0.00050	< 0.0030	< 0.0030
	5/5/2015	3.89	0.000785	0.000778	< 0.00050	0.00051	< 0.0030	< 0.0030
	5/12/2015	1.07	0.000793	0.000802	< 0.00050	< 0.00050	< 0.0030	< 0.0030
	5/19/2015	2.59	0.000814	0.000824	< 0.00050	< 0.00050	< 0.0030	< 0.0030
	5/26/2015	10.4	0.000681	0.000732	< 0.00050	0.00106	< 0.0030	0.0030
	6/2/2015	26.5	0.000655	0.000743	< 0.00050	0.00250	< 0.0030	0.0079
	6/9/2015	27.4	0.000663	0.000690	0.00129	0.00330	0.0043	0.0077
	6/16/2015	2.90	0.000661	0.000695	< 0.00050	< 0.00050	< 0.0030	< 0.0030
	6/23/2015	0.73	0.000625	0.000604	< 0.00050	< 0.00050	< 0.0030	< 0.0030
	6/30/2015	9.99	0.000577	0.000593	< 0.00050	0.00141	< 0.0030	< 0.0030
Average Sample Result		6.8162	0.00072292	0.00074323	0.00056077	0.00098308	0.0031000	0.0037385
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		27.4	0.000814	0.000824	0.00129	0.0033	0.0043	0.0079
Minimum Sample Result		0.42	0.000577	0.000593	0.0005	0.0005	0.003	0.003
Sample Count		13	13	13	13	13	13	13
Sample Range		26.980	0.00023700	0.00023100	0.00079000	0.0028000	0.0013000	0.0049000
Std Deviation		9.5377	0.000081125	0.000077267	0.00021911	0.00091050	0.00036056	0.0018030
Std Error		2.6453	0.000022500	0.000021430	0.000060769	0.00025253	0.00010000	0.00050007

LC_LC3 (200337)

statistic	sample_date	ALKALINITY, TOTAL (As CaCO3) (N)	ALUMINUM (D)	ALUMINUM (T)	ANTIMONY (D)	ANTIMONY (T)	ARSENIC (D)	ARSENIC (T)
	4/6/2015	214	< 0.0030	0.0085	0.34	0.35	0.15	0.16
	4/13/2015	214	< 0.0030	0.0089	0.34	0.34	0.13	0.15
	4/20/2015	< 1.0	< 0.0030	< 0.0030	< 0.10	< 0.10	< 0.10	< 0.10
	4/20/2015	199	< 0.0030	0.0102	0.33	0.33	0.14	0.22
	4/27/2015	163	< 0.0030	0.0091	0.32	0.31	0.15	0.17
	4/28/2015	143	< 0.0030	0.0144	0.31	0.30	0.11	0.19
	4/29/2015	186	< 0.0030	0.0123	0.30	0.34	0.11	0.13
	4/30/2015							
	5/5/2015	168	< 0.0030	0.0108	0.29	0.30	0.13	0.15
	5/11/2015	193	< 0.0030	0.0061	0.26	0.31	0.12	0.15
	5/19/2015	182	< 0.0030	0.0072	0.28	0.30	0.12	0.13
	5/26/2015	132	< 0.0030	0.0081	0.34	0.35	0.11	0.13
		145	< 0.0030	0.0096	0.33	0.35	0.10	0.12
	6/2/2015	143	< 0.0030	0.0087	0.32	0.31	0.12	0.14
	6/2/2015	149	< 0.0030	0.0113	0.32	0.31	0.11	0.15
	6/8/2015	155	< 0.0030	0.0072	0.29	0.32	0.13	0.13
	6/16/2015	177	< 0.0030	0.0052	0.29	0.29	0.13	0.15
		175	< 0.0030	0.0051	0.27	0.31	0.12	0.15
	6/16/2015							
	6/23/2015	< 1.0	< 0.0030	< 0.0030	< 0.10	< 0.10	< 0.10	< 0.10
		173	< 0.0030	0.0065	0.28	0.29	0.12	0.13
	6/30/2015	188	< 0.0030	0.0063	0.33	0.33	0.12	0.15
Average Sample Result		155.05	0.0030000	0.0080750	0.28700	0.29700	0.12100	0.14500
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		214	0.003	0.0144	0.34	0.35	0.15	0.22
Minimum Sample Result		1	0.003	0.003	0.1	0.1	0.1	0.1
Sample Count		20	20	20	20	20	20	20
Sample Range		213.00	0.0000	0.011400	0.24000	0.25000	0.050000	0.12000
Std Deviation		57.559	0.0000	0.0029426	0.068449	0.070120	0.014832	0.027625
Std Error		12.871	0.0000	0.00065798	0.015306	0.015679	0.0033166	0.0061772

LC_LC3 (200337)

statistic	sample_date	BARIUM (D)	BARIUM (T)	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)	BISMUTH (T)	BORON (D)
	4/6/2015	0.0607	0.0618	< 0.10	< 0.10	< 0.000050	< 0.000050	0.014
	4/13/2015	0.0686	0.0691	< 0.10	< 0.10	< 0.000050	< 0.000050	0.017
	4/20/2015	< 0.000050	< 0.000050	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/20/2015	0.0666	0.0661	< 0.10	< 0.10	< 0.000050	< 0.000050	0.014
	4/27/2015	0.0393	0.0389	< 0.10	< 0.10	< 0.000050	< 0.000050	0.012
	4/28/2015	0.0412	0.0410	< 0.10	< 0.10	< 0.000050	< 0.000050	0.013
	4/29/2015	0.0396	0.0406	< 0.10	< 0.10	< 0.000050	< 0.000050	0.012
	4/30/2015							
	5/5/2015	0.0354	0.0353	< 0.10	< 0.10	< 0.000050	< 0.000050	0.012
	5/11/2015	0.0363	0.0359	< 0.10	< 0.10	< 0.000050	< 0.000050	0.012
	5/19/2015	0.0408	0.0403	< 0.10	< 0.10	< 0.000050	< 0.000050	0.014
	5/26/2015	0.0296	0.0305	< 0.10	< 0.10	< 0.000050	< 0.000050	0.012
		0.0297	0.0305	< 0.10	< 0.10	< 0.000050	< 0.000050	0.012
	6/2/2015	0.0299	0.0305	< 0.10	< 0.10	< 0.000050	< 0.000050	0.011
	6/2/2015	0.0301	0.0309	< 0.10	< 0.10	< 0.000050	< 0.000050	0.011
	6/8/2015	0.0314	0.0323	< 0.10	< 0.10	< 0.000050	< 0.000050	0.013
	6/16/2015	0.0402	0.0403	< 0.10	< 0.10	< 0.000050	< 0.000050	0.014
		0.0406	0.0412	< 0.10	< 0.10	< 0.000050	< 0.000050	0.015
	6/16/2015							
	6/23/2015	< 0.000050	< 0.000050	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
		0.0437	0.0432	< 0.10	< 0.10	< 0.000050	< 0.000050	0.012
	6/30/2015	0.0506	0.0513	< 0.10	< 0.10	< 0.000050	< 0.000050	0.013
Average Sample Result		0.037720	0.037990	0.10000	0.10000	0.000050000	0.000050000	0.012650
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.0686	0.0691	0.1	0.1	5e-005	5e-005	0.017
Minimum Sample Result		5e-005	5e-005	0.1	0.1	5e-005	5e-005	0.01
Sample Count		20	20	20	20	20	20	20
Sample Range		0.068550	0.069050	0.0000	0.0000	0.0000	0.0000	0.0070000
Std Deviation		0.017312	0.017333	0.0000000012086	0.0000000012086	0.0000	0.0000	0.0016944
Std Error		0.0038710	0.0038758	2.7026E-10	2.7026E-10	0.0000	0.0000	0.00037888

LC_LC3 (200337)

statistic	sample_date	BORON (T)	BROMIDE (D)	CADMIUM (D)	CADMIUM (T)	CALCIUM (T)	CARBON, DISSOLVED ORGANIC (D)	CHLORIDE (D)
	4/6/2015	0.015	< 0.25	0.322	0.325	133	0.93	3.1
	4/13/2015	0.018	< 0.25	0.297	0.287	125	0.86	3.3
	4/20/2015	< 0.010	< 0.050	< 0.0050	< 0.0050	< 0.050	< 0.50	< 1.0
	4/20/2015	0.015	< 0.25	0.279	0.313	139	0.75	2.9
	4/27/2015	0.012	< 0.10	0.320	0.338	109	0.82	2.3
	4/28/2015	0.013	< 0.10	0.318	0.341	104	0.84	2.5
	4/29/2015	0.013	< 0.10	0.348	0.368	106	0.95	2.1
	4/30/2015							
	5/5/2015	0.012	< 0.10	0.353	0.382	93.2	0.74	1.9
	5/11/2015	0.013	< 0.10	0.391	0.389	104	0.77	2.0
	5/19/2015	0.012	< 0.10	0.389	0.394	97.9	0.76	2.1
	5/26/2015	0.014	< 0.050	0.423	0.430	81.2	0.67	1.2
		0.013	< 0.050	0.431	0.449	80.2	0.65	1.4
	6/2/2015	0.012	< 0.050	0.415	0.425	71.5	1.05	< 1.0
	6/2/2015	0.012	< 0.050	0.434	0.429	68.5	0.81	1.2
	6/8/2015	0.014	< 0.050	0.431	0.458	72.5	0.85	1.3
	6/16/2015	0.014	< 0.050	0.521	0.537	86.6	0.63	2.0
		0.014	< 0.050	0.519	0.535	87.5	0.61	2.1
	6/16/2015							
	6/23/2015	< 0.010	< 0.050	< 0.0050	< 0.0050	< 0.050	< 0.50	< 1.0
		0.011	< 0.10	0.515	0.512	89.3	0.80	2.0
	6/30/2015	0.015	< 0.10	0.566	0.588	97.1	0.63	2.0
Average Sample Result		0.013100	0.10000	0.36410	0.37550	87.280	0.75600	1.9200
Exceedance Count		0	0	2	0	0	0	0
Maximum Sample Result		0.018	0.25	0.566	0.588	139	1.05	3.3
Minimum Sample Result		0.01	0.05	0.005	0.005	0.05	0.5	1
Sample Count		20	20	20	20	20	20	20
Sample Range		0.0080000	0.20000	0.56100	0.58300	138.95	0.55000	2.3000
Std Deviation		0.0018890	0.068825	0.14677	0.15006	35.499	0.14387	0.69176
Std Error		0.00042240	0.015390	0.032818	0.033555	7.9379	0.032171	0.15468

LC_LC3 (200337)

statistic	sample_date	CHROMIUM (D)	CHROMIUM (T)	COBALT (D)	COBALT (T)	CONDUCTIVITY, FIELD (N)	CONDUCTIVITY, LAB (N)	COPPER (D)
	4/6/2015	0.14	0.18	< 0.10	< 0.10	947	974	< 0.50
	4/13/2015	0.15	0.19	< 0.10	< 0.10	955	1030	< 0.50
	4/20/2015	< 0.10	< 0.10	< 0.10	< 0.10		< 2.0	< 0.50
	4/20/2015	0.15	0.18	< 0.10	< 0.10	930	970	< 0.50
	4/27/2015	0.14	0.18	< 0.10	< 0.10	772.5	798	< 0.50
	4/28/2015	0.11	0.17	< 0.10	0.12	782.9	811	< 0.50
	4/29/2015	0.14	0.16	< 0.10	0.10		788	< 0.50
	4/30/2015					700.5		
	5/5/2015	0.17	0.19	0.10	0.11	703.4	760	< 0.50
	5/11/2015	0.12	0.16	< 0.10	< 0.10	724.0	774	< 0.50
	5/19/2015	0.19	0.20	< 0.10	< 0.10	720.9	798	< 0.50
	5/26/2015	0.14 < 0.10	0.13 0.13	0.13 0.12	0.14 0.14	574.6	619 615	< 0.50 0.75
	6/2/2015	0.18	0.17	0.12	0.13	547.7	534	< 0.50
	6/2/2015	0.19	0.19	0.11	0.13		537	< 0.50
	6/8/2015	0.15	0.18	0.12	0.13	339.9	543	0.57
	6/16/2015	0.18 0.22	0.19 0.18	0.10 < 0.10	< 0.10 < 0.10	666.0	631 636	< 0.50 < 0.50
	6/16/2015					669		
	6/23/2015	< 0.10 0.12	< 0.10 0.16	< 0.10 < 0.10	< 0.10 0.11	503.3	< 2.0 666	< 0.50 0.50
	6/30/2015	< 0.10	0.15	< 0.10	< 0.10	673.9	785	< 0.50
Average Sample Result		0.14450	0.16450	0.10500	0.11050	700.66	663.65	0.51600
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.22	0.2	0.13	0.14	955	1030	0.75
Minimum Sample Result		0.1	0.1	0.1	0.1	339.9	2	0.5
Sample Count		20	20	20	20	16	20	20
Sample Range		0.12000	0.10000	0.030000	0.040000	615.10	1028.0	0.25000
Std Deviation		0.035165	0.029105	0.0094591	0.015035	163.74	267.84	0.057253
Std Error		0.0078631	0.0065081	0.0021151	0.0033619	40.935	59.890	0.012802

LC_LC3 (200337)

statistic	sample_date	COPPER (T)	DISSOLVED OXYGEN, FIELD (N)	FLUORIDE (D)	Hardness, Total or Dissolved CaCO3 (N)	IRON (D)	IRON (T)	LEAD (D)
	4/6/2015	< 0.50	12.46	0.21	570	< 0.010	< 0.010	< 0.050
	4/13/2015	< 0.50	11.46	0.19	564	< 0.010	< 0.010	< 0.050
	4/20/2015	< 0.50		< 0.020	< 0.50	< 0.010	< 0.010	< 0.050
	4/20/2015	0.53	12.50	0.19	575	< 0.010	< 0.010	< 0.050
	4/27/2015	< 0.50	11.29	0.195	456	< 0.010	< 0.010	< 0.050
	4/28/2015	< 0.50	11.78	0.190	453	< 0.010	0.015	< 0.050
	4/29/2015	< 0.50		0.195	448	< 0.010	< 0.010	< 0.050
	4/30/2015		12.52					
	5/5/2015	< 0.50	10.11	0.210	401	< 0.010	< 0.010	< 0.050
	5/11/2015	< 0.50	12.12	0.205	444	< 0.010	< 0.010	< 0.050
	5/19/2015	< 0.50	11.12	0.197	421	< 0.010	< 0.010	< 0.050
	5/26/2015	0.54 0.56	12.07	0.230 0.229	337 331	< 0.010 < 0.010	< 0.010 < 0.010	< 0.050 < 0.050
	6/2/2015	0.56	11.18	0.235	291	< 0.010	< 0.010	< 0.050
	6/2/2015	0.58		0.236	279	< 0.010	< 0.010	< 0.050
	6/8/2015	0.71	11.64	0.233	285	< 0.010	< 0.010	< 0.050
	6/16/2015	0.56 0.61	11.40	0.219 0.218	352 353	< 0.010 < 0.010	< 0.010 < 0.010	< 0.050 < 0.050
	6/16/2015		11.34					
	6/23/2015	< 0.50 < 0.50	11.06	< 0.020 0.191	< 0.50 370	< 0.010 < 0.010	< 0.010 < 0.010	< 0.050 < 0.050
	6/30/2015	0.55	11.46	0.210	406	< 0.010	< 0.010	< 0.050
Average Sample Result		0.53500	11.594	0.19115	366.85	0.010000	0.010250	0.050000
Exceedance Count		2	0	0	0	0	0	0
Maximum Sample Result		0.71	12.52	0.236	575	0.01	0.015	0.05
Minimum Sample Result		0.5	10.11	0.02	0.5	0.01	0.01	0.05
Sample Count		20	16	20	20	20	20	20
Sample Range		0.21000	2.4100	0.21600	574.50	0.0000	0.0050000	0.0000
Std Deviation		0.053262	0.63677	0.060713	153.59	0.0000	0.0011180	6.0432E-10
Std Error		0.011910	0.15919	0.013576	34.343	0.0000	0.00025000	1.3513E-10

LC_LC3 (200337)

statistic	sample_date	LEAD (T)	LITHIUM (D)	LITHIUM (T)	MAGNESIUM (T)	MANGANESE (D)	MANGANESE (T)	MERCURY (D)
	4/6/2015	< 0.050	0.0432	0.0448	58.4	< 0.00010	0.00026	< 0.0050
	4/13/2015	< 0.050	0.0456	0.0475	64.4	< 0.00010	0.00022	< 0.0050
	4/20/2015	< 0.050	< 0.0010	< 0.0010	< 0.10	< 0.00010	< 0.00010	< 0.0050
	4/20/2015	< 0.050	0.0429	0.0430	55.2	0.00015	0.00029	< 0.0050
	4/27/2015	0.060	0.0335	0.0328	46.3	0.00012	0.00023	< 0.0050
	4/28/2015	< 0.050	0.0335	0.0337	44.8	0.00011	0.00056	< 0.0050
	4/29/2015	< 0.050	0.0332	0.0345	48.1	0.00011	0.00034	< 0.0050
	4/30/2015							
	5/5/2015	< 0.050	0.0297	0.0304	41.4	0.00010	0.00030	< 0.0050
	5/11/2015	< 0.050	0.0305	0.0321	47.0	0.00012	0.00021	< 0.0050
	5/19/2015	< 0.050	0.0307	0.0300	42.2	0.00011	0.00019	< 0.0050
	5/26/2015	< 0.050	0.0247	0.0254	34.0	0.00011	0.00027	< 0.0050
		< 0.050	0.0251	0.0255	34.3	0.00011	0.00034	< 0.0050
	6/2/2015	< 0.050	0.0229	0.0231	29.3	0.00022	0.00040	< 0.0050
	6/2/2015	< 0.050	0.0225	0.0234	27.7	0.00020	0.00042	< 0.0050
	6/8/2015	< 0.050	0.0194	0.0201	28.4	0.00017	0.00031	< 0.0050
	6/16/2015	< 0.050	0.0278	0.0281	34.3	0.00019	0.00027	< 0.0050
		< 0.050	0.0282	0.0293	35.2	0.00018	0.00027	< 0.0050
	6/16/2015							
	6/23/2015	< 0.050	< 0.0010	< 0.0010	< 0.10	< 0.00010	< 0.00010	< 0.0050
								< 0.00050
		< 0.050	0.0237	0.0231	35.6	0.00021	0.00041	< 0.0050
	6/30/2015	< 0.050	0.0314	0.0329	40.8	0.00021	0.00026	< 0.00050
Average Sample Result		0.050500	0.027525	0.028085	37.380	0.00014100	0.00028750	0.0043864
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.06	0.0456	0.0475	64.4	0.00022	0.00056	0.005
Minimum Sample Result		0.05	0.001	0.001	0.1	0.0001	0.0001	0.0005
Sample Count		20	20	20	20	20	20	22
Sample Range		0.010000	0.044600	0.046500	64.300	0.00012000	0.00046000	0.0045000
Std Deviation		0.0022361	0.011471	0.011788	16.125	0.000044827	0.00010804	0.0015806
Std Error		0.00050000	0.0025649	0.0026358	3.6056	0.000010024	0.000024158	0.00033699

LC_LC3 (200337)

statistic	sample_date	MERCURY (T)	MOLYBDENUM (D)	MOLYBDENUM (T)	NICKEL (D)	NICKEL (T)	NITRATE NITROGEN (NO3), AS N (N)	NITRITE NITROGEN (NO2), AS N (N)
	4/6/2015	< 0.0050	0.00203	0.00211	8.78	8.92	18.2	< 0.0050
	4/13/2015	< 0.0050	0.00215	0.00225	9.03	9.23	18.0	< 0.0050
	4/20/2015	< 0.0050	< 0.000050	< 0.000050	< 0.50	< 0.50	< 0.0050	< 0.0010
	4/20/2015	< 0.0050	0.00206	0.00205	9.34	9.17	17.3	< 0.0050
	4/27/2015	< 0.0050	0.00183	0.00180	7.98	8.05	12.8	0.0022
	4/28/2015	< 0.0050	0.00180	0.00184	7.79	8.08	13.1	0.0025
	4/29/2015	< 0.00050	0.00183	0.00188	8.29	8.63	13.1	0.0020
	4/30/2015							
	5/5/2015	< 0.0050	0.00167	0.00172	8.79	9.15	11.5	< 0.0020
	5/11/2015	< 0.0050	0.00165	0.00176	8.67	8.60	11.7	< 0.0020
	5/19/2015	< 0.0050	0.00165	0.00165	8.69	9.02	11.4	< 0.0020
	5/26/2015	< 0.0050 < 0.0050	0.00167 0.00167	0.00176 0.00177	8.51 8.52	8.76 8.92	7.69 7.69	< 0.0010 < 0.0010
	6/2/2015	< 0.0050	0.00149	0.00154	8.33	8.43	5.98	< 0.0010
	6/2/2015	< 0.0050	0.00150	0.00157	8.47	9.01	5.98	< 0.0010
	6/8/2015	< 0.0050	0.00143	0.00148	8.65	8.71	5.66	< 0.0010
	6/16/2015	< 0.0050 < 0.0050	0.00158 0.00156	0.00157 0.00159	9.78 9.93	10.2 10.3	8.43 8.44	< 0.0010 < 0.0010
	6/16/2015							
	6/23/2015	< 0.0050 < 0.00050 < 0.0050	< 0.000050 0.00150	< 0.000050 0.00143	< 0.50 9.96	< 0.50 9.92	< 0.0050 9.00	< 0.0010 < 0.0020
	6/30/2015	0.00059	0.00159	0.00162	10.9	11.1	9.94	0.0033
Average Sample Result		0.0041859	0.0015380	0.0015745	8.0705	8.2600	9.7960	0.0021000
Exceedance Count		0	0	0	0	0	18	0
Maximum Sample Result		0.005	0.00215	0.00225	10.9	11.1	18.2	0.005
Minimum Sample Result		0.0005	5e-005	5e-005	0.5	0.5	0.005	0.001
Sample Count		22	20	20	20	20	20	20
Sample Range		0.0045000	0.0021000	0.0022000	10.400	10.600	18.195	0.0040000
Std Deviation		0.0017677	0.00054559	0.00056192	2.6947	2.7584	5.0544	0.0014101
Std Error		0.00037687	0.00012200	0.00012565	0.60256	0.61679	1.1302	0.00031531

LC_LC3 (200337)

statistic	sample_date	NITROGEN, AMMONIA (AS N) (N)	ORTHO-PHOSPHATE (N)	pH, Field (N)	pH, LAB (N)	PHOSPHORUS (N)	POTASSIUM (T)	SELENIUM (D)
	4/6/2015	< 0.0050	0.0016	8.62	8.25	0.0031	1.58	72.3
	4/13/2015	< 0.0050	0.0013	8.65	8.28	0.0024	1.66	78.2
	4/20/2015	< 0.0050	< 0.0010		5.76	< 0.0020	< 0.050	< 0.050
	4/20/2015	< 0.0050	0.0017	8.11	8.24	0.0032	1.58	75.9
	4/27/2015	< 0.0050	0.0021	8.03	8.18	0.0042	1.27	50.8
	4/28/2015	< 0.0050	0.0015	8.02	8.22	0.0044	1.27	52
	4/29/2015	< 0.0050	0.0029		8.14	0.0036	1.41	55
	4/30/2015			7.64				
	5/5/2015	< 0.0050	0.0025	8.05	8.31	0.0034	1.34	50.2
	5/11/2015	< 0.0050	0.0017	7.96	8.22	0.0029	1.32	53.4
	5/19/2015	< 0.0050	0.0026	8.19	8.36	0.0037	1.31	51.1
	5/26/2015	< 0.0050	0.0022	7.98	8.14	0.0023	1.23	39.5
		< 0.0050	0.0019		8.23	0.0028	1.25	39.3
	6/2/2015	< 0.0050	0.0018	7.99	8.31	0.0028	1.20	31.1
	6/2/2015	< 0.0050	0.0023		8.28	0.0026	1.22	32
	6/8/2015	< 0.0050	0.0021	8.26	8.41	0.0035	1.25	26.1
	6/16/2015	< 0.0050	0.0019	8.06	8.11	0.0023	1.30	37
		< 0.0050	0.0077		8.15	0.0036	1.34	37.3
	6/16/2015			7.87				
	6/23/2015	< 0.0050	< 0.0010	7.89	5.89	< 0.0020	< 0.050	< 0.050
		< 0.0050	0.0022		8.05	0.0023	1.24	42.2
	6/30/2015	< 0.0050	0.0020	8.00	8.34	0.0022	1.36	49.5
Average Sample Result		0.0050000	0.0022000	8.0825	7.9935	0.0029650	1.2115	43.650
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.005	0.0077	8.65	8.41	0.0044	1.66	78.2
Minimum Sample Result		0.005	0.001	7.64	5.76	0.002	0.05	0.05
Sample Count		20	20	16	20	20	20	20
Sample Range		0.0000	0.0067000	1.0100	2.6500	0.0024000	1.6100	78.150
Std Deviation		0.0000	0.0013849	0.25585	0.74726	0.00071692	0.41712	20.594
Std Error		0.0000	0.00030967	0.063963	0.16709	0.00016031	0.093272	4.6049

LC_LC3 (200337)

statistic	sample_date	SELENIUM (T)	SILVER (D)	SILVER (T)	SODIUM (T)	STRONTIUM (D)	STRONTIUM (T)	SULFATE (AS SO4) (D)
	4/6/2015	72.9	< 0.010	< 0.010	6.76	0.210	0.217	305
	4/13/2015	77.7	< 0.010	< 0.010	7.29	0.218	0.229	292
	4/20/2015	< 0.050	< 0.010	< 0.010	< 0.050	< 0.00020	< 0.00020	< 0.30
	4/20/2015	72.7	< 0.010	< 0.010	6.79	0.220	0.215	300
	4/27/2015	50.4	< 0.010	< 0.010	5.14	0.183	0.178	212
	4/28/2015	51.9	< 0.010	< 0.010	5.19	0.180	0.180	217
	4/29/2015	55.7	< 0.010	< 0.010	5.66	0.176	0.181	219
	4/30/2015							
	5/5/2015	50.1	< 0.010	< 0.010	5.06	0.158	0.160	197
	5/11/2015	54.2	< 0.010	< 0.010	4.99	0.158	0.172	208
	5/19/2015	53.2	< 0.010	< 0.010	5.08	0.162	0.161	211
	5/26/2015	40.6	< 0.010	< 0.010	3.71	0.138	0.142	145
		41	< 0.010	< 0.010	3.76	0.142	0.147	145
	6/2/2015	30.9	< 0.010	< 0.010	3.46	0.123	0.124	115
	6/2/2015	31.5	< 0.010	< 0.010	3.50	0.121	0.126	115
	6/8/2015	26.4	< 0.010	< 0.010	3.19	0.116	0.122	107
	6/16/2015	39	< 0.010	< 0.010	4.16	0.152	0.154	154
		38.8	< 0.010	< 0.010	4.27	0.153	0.155	155
	6/16/2015							
	6/23/2015	< 0.050	< 0.010	< 0.010	< 0.050	< 0.00020	< 0.00020	< 0.30
		40.8	< 0.010	< 0.010	4.24	0.149	0.148	166
	6/30/2015	48	< 0.010	< 0.010	4.69	0.166	0.166	187
Average Sample Result		43.795	0.010000	0.010000	4.3520	0.14627	0.14887	172.53
Exceedance Count		18	0	0	0	0	0	0
Maximum Sample Result		77.7	0.01	0.01	7.29	0.22	0.229	305
Minimum Sample Result		0.05	0.01	0.01	0.05	0.0002	0.0002	0.3
Sample Count		20	20	20	20	20	20	20
Sample Range		77.650	0.0000	0.0000	7.2400	0.21980	0.22880	304.70
Std Deviation		20.339	0.0000	0.0000	1.8591	0.057978	0.058745	82.641
Std Error		4.5479	0.0000	0.0000	0.41570	0.012964	0.013136	18.479

LC_LC3 (200337)

statistic	sample_date	TEMPERATURE, FIELD (N)	THALLIUM (D)	THALLIUM (T)	TIN (D)	TIN (T)	TITANIUM (D)	TITANIUM (T)
	4/6/2015	3.8	0.013	0.014	< 0.00010	< 0.00010	< 10	< 10
	4/13/2015	4.6	0.013	0.013	< 0.00010	< 0.00010	< 10	< 10
	4/20/2015		< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/20/2015	4.8	0.013	0.014	< 0.00010	< 0.00010	10	11
	4/27/2015	4.6	0.012	0.015	< 0.00010	< 0.00010	< 10	< 10
	4/28/2015	4.9	0.013	0.012	< 0.00010	< 0.00010	< 10	< 10
	4/29/2015		0.014	0.014	< 0.00010	< 0.00010	< 10	< 10
	4/30/2015	4.4						
	5/5/2015	4.7	0.013	0.014	< 0.00010	< 0.00010	< 10	< 10
	5/11/2015	4.1	0.013	0.014	< 0.00010	< 0.00010	< 10	< 10
	5/19/2015	5.0	0.013	0.013	< 0.00010	< 0.00010	< 10	< 10
	5/26/2015	4.4	0.011 0.014	0.014 0.020	< 0.00010 < 0.00010	< 0.00010 < 0.00010	< 10 < 10	< 10 < 10
	6/2/2015	4.3	0.018	0.013	< 0.00010	< 0.00010	< 10	< 10
	6/2/2015		0.013	0.014	< 0.00010	< 0.00010	< 10	< 10
	6/8/2015	4.7	0.013	0.014	< 0.00010	< 0.00010	< 10	
	6/16/2015	5.7	0.013 0.013	0.015 0.015	< 0.00010 < 0.00010	< 0.00010 < 0.00010	< 10 < 10	< 10 < 10
	6/16/2015							
	6/23/2015	5.4	< 0.010 0.014	< 0.010 0.013	< 0.00010 < 0.00010	< 0.00010 < 0.00010	< 10 < 10	< 10 < 10
	6/30/2015	6.2	0.015	0.015	< 0.00010	< 0.00010	< 10	< 10
Average Sample Result		4.7733	0.013050	0.013800	0.00010000	0.00010000	10.000	10.053
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		6.2	0.018	0.02	0.0001	0.0001	10	11
Minimum Sample Result		3.8	0.01	0.01	0.0001	0.0001	10	10
Sample Count		15	20	20	20	20	20	19
Sample Range		2.4000	0.0080000	0.010000	0.0000	0.0000	0.0000	1.0000
Std Deviation		0.61698	0.0017006	0.0020417	0.0000	0.0000	0.0000	0.22942
Std Error		0.15930	0.00038027	0.00045653	0.0000	0.0000	0.0000	0.052632

LC_LC3 (200337)

statistic	sample_date	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)	TOTAL KJELDAHL NITROGEN (N)	TOTAL ORGANIC CARBON (T)	TOTAL SUSPENDED SOLIDS, LAB (N)	TURBIDITY, LAB (N)	URANIUM (D)	URANIUM (T)
	4/6/2015	707	< 0.050	0.65	< 1.0	0.62	4.45	4.47
	4/13/2015	741	< 0.050	0.52	< 1.0	0.39	4.73	4.83
	4/20/2015	< 3.0	< 0.050	< 0.50	< 1.0	< 0.10	< 0.010	< 0.010
	4/20/2015	708	< 0.050	0.69	< 1.0	0.67	4.54	4.40
	4/27/2015	556	< 0.050	0.69	< 1.0	0.45	3.32	3.30
	4/28/2015	590	< 0.050	0.82	3.4	0.65	3.40	3.41
	4/29/2015	575	< 0.050	1.02	< 1.0	0.50	3.54	3.67
	4/30/2015							
	5/5/2015	519	< 0.050	0.77	1.1	0.42	3.30	3.36
	5/11/2015	510	< 0.050	0.86	< 1.0	0.23	3.24	3.58
	5/19/2015	528	< 0.050	0.57	< 1.0	0.27	3.23	3.19
	5/26/2015	426	< 0.050	0.56	< 1.0	0.60	2.60	2.65
		422	< 0.050	0.54	< 1.0	0.78	2.61	2.60
	6/2/2015	356	0.091	1.08	< 1.0	0.42	2.08	2.08
	6/2/2015	352	0.106	0.73	< 1.0	0.45	2.11	2.12
	6/8/2015	328	0.123	0.74	< 1.0	0.45	2.05	2.14
	6/16/2015	448	0.095	0.76	< 1.0	0.33	2.82	2.81
		444	0.089	0.55	< 1.0	0.27	2.80	2.87
	6/16/2015							
	6/23/2015	< 3.0	< 0.050	< 0.50	< 1.0	< 0.10	< 0.010	< 0.010
		473	< 0.050	0.61	1.2	0.35	2.69	2.68
	6/30/2015	528	0.082	0.73	< 1.0	0.29	3.16	3.05
Average Sample Result		460.85	0.064300	0.69450	1.1350	0.41700	2.8345	2.8615
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		741	0.123	1.08	3.4	0.78	4.73	4.83
Minimum Sample Result		3	0.05	0.5	1	0.1	0.01	0.01
Sample Count		20	20	20	20	20	20	20
Sample Range		738.00	0.073000	0.58000	2.4000	0.68000	4.7200	4.8200
Std Deviation		194.23	0.023649	0.16317	0.53536	0.18397	1.2269	1.2349
Std Error		43.432	0.0052881	0.036487	0.11971	0.041136	0.27435	0.27614

LC_LC3 (200337)

statistic	sample_date	VANADIUM (D)	VANADIUM (T)	ZINC (D)	ZINC (T)
	4/6/2015	< 0.50	< 0.50	11.5	12.4
	4/13/2015	< 0.50	< 0.50	11.1	26.6
	4/20/2015	< 0.50	< 0.50	< 3.0	< 3.0
	4/20/2015	< 0.50	0.59	11.3	11.7
	4/27/2015	< 0.50	< 0.50	13.1	14.2
	4/28/2015	< 0.50	< 0.50	12.8	14.2
	4/29/2015	< 0.50	< 0.50	13.7	13.9
	4/30/2015				
	5/5/2015	< 0.50	< 0.50	16.9	17.4
	5/11/2015	< 0.50	< 0.50	16.5	16.7
	5/19/2015	< 0.50	< 0.50	16.2	16.5
	5/26/2015	< 0.50 < 0.50	< 0.50 < 0.50	18.2 18.5	19.6 19.4
	6/2/2015	< 0.50	< 0.50	19.6	19.8
	6/2/2015	< 0.50	< 0.50	19.6	20.4
	6/8/2015	< 0.50	< 0.50	19.4	20.2
	6/16/2015	< 0.50 < 0.50	< 0.50 < 0.50	23.2 24.2	23.6 24.1
	6/16/2015				
	6/23/2015	< 0.50 < 0.50	< 0.50 < 0.50	< 3.0 23.0	< 3.0 22.5
	6/30/2015	< 0.50	< 0.50	23.1	23.3
Average Sample Result		0.50000	0.50450	15.895	17.125
Exceedance Count		0	0	0	0
Maximum Sample Result		0.5	0.59	24.2	26.6
Minimum Sample Result		0.5	0.5	3	3
Sample Count		20	20	20	20
Sample Range		0.0000	0.090000	21.200	23.600
Std Deviation		0.0000	0.020125	6.0534	6.3451
Std Error		0.0000	0.0045000	1.3536	1.4188

LC_LCDSSLCC (E297110)

statistic	sample_date	ALKALINITY, TOTAL (As CaCO3) (N)	ALUMINUM (D)	ALUMINUM (T)	ANTIMONY (D)	ANTIMONY (T)	ARSENIC (D)
	4/6/2015	186	< 0.0030	0.0093	0.20	0.22	0.12
	4/13/2015	197	< 0.0030	0.0055	0.20	0.21	0.10
	4/20/2015	185	< 0.0030	0.0083	0.19	0.19	0.13
	4/27/2015	181	< 0.0030	0.0106	0.18	0.19	0.12
	4/28/2015	150	< 0.0030	0.0096	0.17	0.19	0.13
	5/5/2015	150	< 0.0030	0.0163	0.15	0.17	0.11
	5/12/2015	158	< 0.0030	0.0099	0.17	0.16	0.13
	5/19/2015	157	< 0.0030	0.0110	0.15	0.16	0.12
	5/26/2015	131	< 0.0030	0.320	0.11	0.15	0.11
	6/2/2015	119	0.0126	1.95	0.11	0.20	0.13
	6/8/2015	120	< 0.0030	0.0137	0.17	0.17	0.12
	6/16/2015	159	< 0.0030	0.0073	0.17	0.17	0.11
	6/16/2015						
	6/23/2015	159	< 0.0030	0.0065	0.16	0.18	0.11
	6/24/2015	159	< 0.0030	0.0076	0.20	0.22	0.11
	6/30/2015						
	6/30/2015	168	< 0.0030	0.0068	0.19	0.21	< 0.10
Average Sample Result		158.60	0.0036400	0.15949	0.16800	0.18600	0.11667
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		197	0.0126	1.95	0.2	0.22	0.13
Minimum Sample Result		119	0.003	0.0055	0.11	0.15	0.1
Sample Count		15	15	15	15	15	15
Sample Range		78.000	0.0096000	1.9445	0.090000	0.070000	0.030000
Std Deviation		23.120	0.0024787	0.50175	0.028835	0.022615	0.010465
Std Error		5.9696	0.00064000	0.12955	0.0074450	0.0058391	0.0027021

LC_LCDSSLCC (E297110)

statistic	sample_date	ARSENIC (T)	BARIUM (D)	BARIUM (T)	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)	BISMUTH (T)	BORON (D)
	4/6/2015	0.13	0.0698	0.0703	< 0.10	< 0.10	< 0.000050	< 0.000050	0.013
	4/13/2015	0.12	0.0734	0.0699	< 0.10	< 0.10	< 0.000050	< 0.000050	0.013
	4/20/2015	0.22	0.0663	0.0679	< 0.10	< 0.10	< 0.000050	< 0.000050	0.011
	4/27/2015	0.15	0.0522	0.0509	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/28/2015	0.17	0.0515	0.0515	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/5/2015	0.14	0.0414	0.0421	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/12/2015	0.11	0.0463	0.0448	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/19/2015	0.11	0.0425	0.0426	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/26/2015	0.33	0.0308	0.0363	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/2/2015	1.20	0.0301	0.0540	< 0.10	0.12	< 0.000050	0.000186	< 0.010
	6/8/2015	0.14	0.0346	0.0344	< 0.10	< 0.10	< 0.000050	< 0.000050	0.011
	6/16/2015	0.13	0.0451	0.0458	< 0.10	< 0.10	< 0.000050	< 0.000050	0.011
	6/16/2015								
	6/23/2015	0.11	0.0479	0.0492	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/24/2015	0.13	0.0497	0.0512	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/30/2015								
	6/30/2015	0.16	0.0527	0.0523	< 0.10	< 0.10	< 0.000050	< 0.000050	0.010
Average Sample Result		0.22333	0.048953	0.050880	0.10000	0.10133	0.000050000	0.000059067	0.010600
Exceedance Count		0	0	0	0	0	0	0	0
Maximum Sample Result		1.2	0.0734	0.0703	0.1	0.12	5e-005	0.000186	0.013
Minimum Sample Result		0.11	0.0301	0.0344	0.1	0.1	5e-005	5e-005	0.01
Sample Count		15	15	15	15	15	15	15	15
Sample Range		1.0900	0.043300	0.035900	0.0000	0.020000	0.0000	0.00013600	0.0030000
Std Deviation		0.27603	0.013031	0.011136	0.0000000014080	0.0051640	0.0000	0.000035115	0.0010556
Std Error		0.071272	0.0033647	0.0028754	3.6355E-10	0.0013333	0.0000	0.0000090667	0.00027255

LC_LCDSSLCC (E297110)

statistic	sample_date	BORON (T)	BROMIDE (D)	CADMIUM (D)	CADMIUM (T)	CALCIUM (T)	CARBON, DISSOLVED ORGANIC (D)	CHLORIDE (D)
	4/6/2015	0.015	< 0.10	0.116	0.134	102	1.18	2.5
	4/13/2015	0.014	< 0.10	0.119	0.122	105	0.77	2.4
	4/20/2015	0.011	< 0.10	0.101	0.105	103	0.96	2.4
	4/27/2015	< 0.010	< 0.10	0.132	0.150	85.9	1.02	2.0
	4/28/2015	< 0.010	< 0.10	0.136	0.147	81.2	1.10	2.0
	5/5/2015	< 0.010	< 0.050	0.135	0.139	68.2	1.24	1.4
	5/12/2015	< 0.010	< 0.050	0.167	0.164	75.6	1.33	1.8
	5/19/2015	0.011	< 0.050	0.144	0.158	72.1	1.68	1.4
	5/26/2015	< 0.010	< 0.050	0.0738	0.262	60.1	2.10	1.2
	6/2/2015	< 0.010	< 0.050	0.0356	0.493	78.5	3.19	1.2
	6/8/2015	0.012	< 0.050	0.166	0.181	56.2	1.22	1.2
	6/16/2015	0.012	< 0.050	0.218	0.211	70.6	0.78	1.8
	6/16/2015							
	6/23/2015	< 0.010	< 0.050	0.191	0.223	75.4	0.98	1.7
	6/24/2015	< 0.010	< 0.050	0.234	0.224	75.1	0.81	2.0
	6/30/2015							
	6/30/2015	< 0.010	< 0.050	0.221	0.227	76.8	0.84	1.9
Average Sample Result		0.011000	0.066667	0.14596	0.19600	79.047	1.2800	1.7933
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.015	0.1	0.234	0.493	105	3.19	2.5
Minimum Sample Result		0.01	0.05	0.0356	0.105	56.2	0.77	1.2
Sample Count		15	15	15	15	15	15	15
Sample Range		0.0050000	0.050000	0.19840	0.38800	48.800	2.4200	1.3000
Std Deviation		0.0016036	0.024398	0.055353	0.093856	14.614	0.63893	0.44315
Std Error		0.00041404	0.0062994	0.014292	0.024233	3.7734	0.16497	0.11442

LC_LCDSSLCC (E297110)

statistic	sample_date	CHROMIUM (D)	CHROMIUM (T)	COBALT (D)	COBALT (T)	CONDUCTIVITY, FIELD (N)	CONDUCTIVITY, LAB (N)
	4/6/2015	0.15	0.17	< 0.10	< 0.10	744.6	672
	4/13/2015	0.15	0.17	< 0.10	< 0.10	740.8	801
	4/20/2015	0.16	0.19	< 0.10	< 0.10	679.7	719
	4/27/2015	0.14	0.16	< 0.10	< 0.10	610.5	632
	4/28/2015	0.14	0.17	< 0.10	< 0.10	586.9	612
	5/5/2015	0.14	0.19	< 0.10	< 0.10	481.6	535
	5/12/2015	0.16	0.18	< 0.10	< 0.10	531.8	585
	5/19/2015	< 0.10	0.47	< 0.10	< 0.10	503.1	552
	5/26/2015	0.11	0.79	< 0.10	0.30	348.8	370
	6/2/2015	0.19	4.33	< 0.10	1.10	314.2	306
	6/8/2015	0.20	0.26	< 0.10	< 0.10	412.7	421
	6/16/2015	0.19	0.19	< 0.10	< 0.10	519.9	497
	6/16/2015						
	6/23/2015	0.11	0.18	< 0.10	< 0.10	414.1	569
	6/24/2015	0.14	0.19	< 0.10	< 0.10	508.3	531
	6/30/2015						
	6/30/2015	0.16	0.16	< 0.10	< 0.10	530.4	605
Average Sample Result		0.14933	0.52000	0.10000	0.18000	528.49	560.47
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.2	4.33	0.1	1.1	744.6	801
Minimum Sample Result		0.1	0.16	0.1	0.1	314.2	306
Sample Count		15	15	15	15	15	15
Sample Range		0.10000	4.1700	0.0000	1.0000	430.40	495.00
Std Deviation		0.029391	1.0675	0.0000000014080	0.25967	128.96	128.72
Std Error		0.0075886	0.27562	3.6355E-10	0.067047	33.297	33.235

LC_LCDSSLCC (E297110)

statistic	sample_date	COPPER (D)	COPPER (T)	DISSOLVED OXYGEN, FIELD (N)	FLUORIDE (D)	Hardness, Total or Dissolved CaCO3 (N)
	4/6/2015	< 0.50	< 0.50	12.85	0.205	439
	4/13/2015	< 0.50	1.50	11.54	0.221	454
	4/20/2015	< 0.50	< 0.50	12.37	0.220	416
	4/27/2015	< 0.50	< 0.50	10.97	0.201	360
	4/28/2015	< 0.50	< 0.50	10.64	0.198	337
	5/5/2015	< 0.50	< 0.50	10.17	0.215	269
	5/12/2015	< 0.50	< 0.50	12.52	0.225	325
	5/19/2015	< 0.50	< 0.50	12.40	0.220	289
	5/26/2015	< 0.50	1.08	12.69	0.191	202
	6/2/2015	< 0.50	2.83	11.58	0.185	167
	6/8/2015	< 0.50	< 0.50	10.78	0.218	217
	6/16/2015	< 0.50	< 0.50	11.10	0.221	278
	6/16/2015					
	6/23/2015	< 0.50	< 0.50	10.90	0.223	287
	6/24/2015	< 0.50	< 0.50	10.84	0.234	290
	6/30/2015					
	6/30/2015	< 0.50	< 0.50	10.99	0.231	311
Average Sample Result		0.50000	0.76067	11.489	0.21387	309.40
Exceedance Count		0	0	0	0	0
Maximum Sample Result		0.5	2.83	12.85	0.234	454
Minimum Sample Result		0.5	0.5	10.17	0.185	167
Sample Count		15	15	15	15	15
Sample Range		0.0000	2.3300	2.6800	0.049000	287.00
Std Deviation		0.0000	0.64065	0.86088	0.014525	83.195
Std Error		0.0000	0.16542	0.22228	0.0037504	21.481

LC_LCDSSLCC (E297110)

statistic	sample_date	INSTANTANEOUS FLOW (N)	IRON (D)	IRON (T)	LEAD (D)	LEAD (T)	LITHIUM (D)	LITHIUM (T)	MAGNESIUM (T)
	4/6/2015	0.935	< 0.010	< 0.010	< 0.050	< 0.050	0.0286	0.0298	45.4
	4/13/2015		< 0.010	< 0.010	< 0.050	< 0.050	0.0293	0.0288	43.9
	4/20/2015	1.275	< 0.010	< 0.010	< 0.050	< 0.050	0.0248	0.0249	38.3
	4/27/2015		< 0.010	0.011	< 0.050	< 0.050	0.0219	0.0215	33.8
	4/28/2015		< 0.010	< 0.010	< 0.050	< 0.050	0.0203	0.0201	31.7
	5/5/2015		< 0.010	0.018	< 0.050	< 0.050	0.0163	0.0160	25.2
	5/12/2015	2.684	< 0.010	0.012	< 0.050	< 0.050	0.0198	0.0200	32.8
	5/19/2015		< 0.010	< 0.010	< 0.050	< 0.050	0.0173	0.0176	26.2
	5/26/2015		< 0.010	0.376	< 0.050	0.356	0.0101	0.0105	18.4
	6/2/2015		< 0.010	2.41	< 0.050	1.70	0.0075	0.0106	20.2
	6/8/2015		< 0.010	0.015	< 0.050	< 0.050	0.0116	0.0117	18.6
	6/16/2015		< 0.010	< 0.010	< 0.050	< 0.050	0.0174	0.0186	25.5
	6/16/2015								
	6/23/2015		< 0.010	< 0.010	< 0.050	< 0.050	0.0148	0.0146	26.1
	6/24/2015		< 0.010	< 0.010	< 0.050	< 0.050	0.0190	0.0195	26.9
	6/30/2015	0.665							
	6/30/2015		< 0.010	< 0.010	< 0.050	< 0.050	0.0196	0.0199	28.9
Average Sample Result		1.3898	0.010000	0.19547	0.050000	0.18040	0.018553	0.018940	29.460
Exceedance Count		0	0	1	0	0	0	0	0
Maximum Sample Result		2.684	0.01	2.41	0.05	1.7	0.0293	0.0298	45.4
Minimum Sample Result		0.665	0.01	0.01	0.05	0.05	0.0075	0.0105	18.4
Sample Count		4	15	15	15	15	15	15	15
Sample Range		2.0190	0.0000	2.4000	0.0000	1.6500	0.021800	0.019300	27.000
Std Deviation		0.89820	1.7600E-10	0.61980	7.0401E-10	0.42771	0.0061910	0.0058769	8.2996
Std Error		0.44910	4.5444E-11	0.16003	1.8178E-10	0.11043	0.0015985	0.0015174	2.1430

LC_LCDSSLCC (E297110)

statistic	sample_date	MANGANESE (D)	MANGANESE (T)	MERCURY (D)	MERCURY (T)	MOLYBDENUM (D)	MOLYBDENUM (T)	NICKEL (D)
	4/6/2015	< 0.00010	0.00033	< 0.0050	< 0.0050	0.00157	0.00164	3.82
	4/13/2015	0.00010	0.00020	< 0.0050	< 0.0050	0.00170	0.00163	3.61
	4/20/2015	< 0.00010	0.00035	< 0.0050	< 0.0050	0.00152	0.00145	3.39
	4/27/2015	0.00011	0.00044	< 0.0050	< 0.0050	0.00139	0.00138	3.74
	4/28/2015	0.00015	0.00038	< 0.0050	< 0.0050	0.00132	0.00133	3.62
	5/5/2015	0.00016	0.00051	< 0.0050	< 0.0050	0.00114	0.00115	3.56
	5/12/2015	0.00011	0.00055	< 0.0050	< 0.0050	0.00124	0.00120	4.02
	5/19/2015	< 0.00010	0.00031	< 0.0050	< 0.0050	0.00120	0.00121	3.59
	5/26/2015	0.00035	0.0194	< 0.0050	< 0.0050	0.000859	0.000883	2.21
	6/2/2015	0.00066	0.0889	< 0.0050	< 0.025	0.000727	0.00108	1.70
	6/8/2015	0.00021	0.00077	< 0.0050	< 0.0050	0.00103	0.00103	3.87
	6/16/2015	0.00013	0.00040	< 0.0050	< 0.0050	0.00123	0.00126	4.50
	6/16/2015							
	6/23/2015	0.00011	0.00032	< 0.0050	< 0.0050	0.00118	0.00117	4.63
	6/24/2015	0.00012	0.00032	< 0.0050	< 0.0050	0.00133	0.00132	4.71
	6/30/2015							
	6/30/2015	0.00016	0.00038	< 0.0050	< 0.0050	0.00131	0.00124	4.70
Average Sample Result		0.00017800	0.0075707	0.0050000	0.0063333	0.0012497	0.0012649	3.7113
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.00066	0.0889	0.005	0.025	0.0017	0.00164	4.71
Minimum Sample Result		0.0001	0.0002	0.005	0.005	0.000727	0.000883	1.7
Sample Count		15	15	15	15	15	15	15
Sample Range		0.00056000	0.088700	0.0000	0.020000	0.00097300	0.00075700	3.0100
Std Deviation		0.00014838	0.023025	8.8002E-11	0.0051640	0.00025455	0.00020599	0.84654
Std Error		0.000038312	0.0059451	2.2722E-11	0.0013333	0.000065723	0.000053188	0.21858

LC_LCDSSLCC (E297110)

statistic	sample_date	NICKEL (T)	NITRATE NITROGEN (NO3), AS N (N)	NITRITE NITROGEN (NO2), AS N (N)	NITROGEN, AMMONIA (AS N) (N)
	4/6/2015	3.77	11.6	0.0023	< 0.0050
	4/13/2015	3.65	11.6	0.0036	< 0.0050
	4/20/2015	3.50	10.1	0.0044	< 0.0050
	4/27/2015	3.72	8.13	0.0034	< 0.0050
	4/28/2015	3.55	7.46	0.0029	< 0.0050
	5/5/2015	3.61	5.83	0.0014	< 0.0050
	5/12/2015	4.09	6.62	0.0012	< 0.0050
	5/19/2015	3.73	5.77	< 0.0010	< 0.0050
	5/26/2015	4.98	2.82	< 0.0010	< 0.0050
	6/2/2015	7.63	1.85	< 0.0010	< 0.0050
	6/8/2015	4.18	3.24	< 0.0010	< 0.0050
	6/16/2015	4.62	5.02	< 0.0010	< 0.0050
	6/16/2015		5.02	< 0.0010	< 0.0050
	6/23/2015	4.91	5.44	< 0.0010	< 0.0050
	6/24/2015	5.04	5.59	0.0018	< 0.0050
	6/30/2015				
	6/30/2015	4.78	5.92	0.0013	< 0.0050
Average Sample Result		4.3840	6.3756	0.0018313	0.0050000
Exceedance Count		0	16	0	0
Maximum Sample Result		7.63	11.6	0.0044	0.005
Minimum Sample Result		3.5	1.85	0.001	0.005
Sample Count		15	16	16	16
Sample Range		4.1300	9.7500	0.0034000	0.0000
Std Deviation		1.0623	2.8492	0.0011330	8.5018E-11
Std Error		0.27429	0.71230	0.00028324	2.1254E-11

LC_LCDSSLCC (E297110)

statistic	sample_date	ORTHO-PHOSPHATE (N)	pH, Field (N)	pH, LAB (N)	PHOSPHORUS (N)	POTASSIUM (T)	SELENIUM (D)	SELENIUM (T)
	4/6/2015	< 0.0010	8.85	8.33	< 0.0020	1.13	48.8	48.9
	4/13/2015	< 0.0010	8.87	8.38	< 0.0020	1.14	49.8	48.8
	4/20/2015	< 0.0010	8.28	8.37	0.0020	1.06	43.1	42.5
	4/27/2015	0.0010	8.36	8.15	0.0030	0.922	34.1	33.9
	4/28/2015	< 0.0010	8.33	8.36	0.0040	0.898	33	31.5
	5/5/2015	0.0027	8.46	8.42	0.0056	0.821	24.8	25.1
	5/12/2015	< 0.0010	8.18	8.43	0.0030	0.900	33.4	31.4
	5/19/2015	< 0.0010	8.03	8.42	0.0025	0.782	29.3	28.2
	5/26/2015	0.0019	8.22	8.33	0.0445	0.749	14.8	14.4
	6/2/2015	0.0024	8.21	8.31	0.244	1.34	9.68	9.56
	6/8/2015	0.0024	8.59	8.43	0.0047	0.809	15.1	14.9
	6/16/2015	0.0014	8.25	8.29	< 0.0020	0.938	23.2	24.3
	6/16/2015	0.0019			0.0026			
	6/23/2015	0.0015	8.16	8.30	0.0025	0.937	27.7	27.8
	6/24/2015	0.0017	8.43	8.30	0.0021	1.01	28.9	29.7
	6/30/2015							
	6/30/2015	0.0010	8.30	8.45	0.0039	0.941	31	30.5
Average Sample Result		0.0014938	8.3680	8.3513	0.020650	0.95847	29.779	29.431
Exceedance Count		0	0	0	0	0	0	15
Maximum Sample Result		0.0027	8.87	8.45	0.244	1.34	49.8	48.9
Minimum Sample Result		0.001	8.03	8.15	0.002	0.749	9.68	9.56
Sample Count		16	15	15	16	15	15	15
Sample Range		0.0017000	0.84000	0.30000	0.24200	0.59100	40.120	39.340
Std Deviation		0.00060163	0.24105	0.077907	0.060463	0.15738	11.653	11.450
Std Error		0.00015041	0.062238	0.020116	0.015116	0.040635	3.0087	2.9565

LC_LCDSSLCC (E297110)

statistic	sample_date	SILVER (D)	SILVER (T)	SODIUM (T)	STRONTIUM (D)	STRONTIUM (T)	SULFATE (AS SO4) (D)
	4/6/2015	< 0.010	< 0.010	4.92	0.193	0.202	211
	4/13/2015	< 0.010	< 0.010	4.99	0.202	0.197	207
	4/20/2015	< 0.010	< 0.010	4.47	0.190	0.187	186
	4/27/2015	< 0.010	< 0.010	3.56	0.163	0.165	147
	4/28/2015	< 0.010	< 0.010	3.44	0.158	0.157	136
	5/5/2015	< 0.010	< 0.010	2.90	0.128	0.131	107
	5/12/2015	< 0.010	< 0.010	3.35	0.140	0.138	125
	5/19/2015	< 0.010	< 0.010	3.10	0.134	0.136	113
	5/26/2015	< 0.010	< 0.010	1.64	0.0965	0.101	58.6
	6/2/2015	< 0.010	0.048	1.38	0.0776	0.104	40.6
	6/8/2015	< 0.010	< 0.010	2.07	0.0975	0.0983	67.4
	6/16/2015	< 0.010	< 0.010	2.85	0.130	0.133	104
	6/16/2015						
	6/23/2015	< 0.010	< 0.010	3.04	0.127	0.128	112
	6/24/2015	< 0.010	< 0.010	3.21	0.142	0.148	116
	6/30/2015						
	6/30/2015	< 0.010	< 0.010	3.26	0.146	0.144	125
Average Sample Result		0.010000	0.012533	3.2120	0.14164	0.14462	123.71
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.01	0.048	4.99	0.202	0.202	211
Minimum Sample Result		0.01	0.01	1.38	0.0776	0.0983	40.6
Sample Count		15	15	15	15	15	15
Sample Range		0.0000	0.038000	3.6100	0.12440	0.10370	170.40
Std Deviation		1.7600E-10	0.0098116	1.0439	0.035904	0.032542	49.591
Std Error		4.5444E-11	0.0025333	0.26955	0.0092703	0.0084023	12.804

LC_LCDSSLCC (E297110)

statistic	sample_date	TEMPERATURE, FIELD (N)	THALLIUM (D)	THALLIUM (T)	TIN (D)	TIN (T)	TITANIUM (D)	TITANIUM (T)
	4/6/2015	3.0	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/13/2015	4.3	< 0.010	< 0.010	< 0.00010	< 0.00010	12	12
	4/20/2015	4.5	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/27/2015	5.6	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/28/2015	6.4	0.011	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/5/2015	5.6	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/12/2015	3.9	0.013	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/19/2015	3.3	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/26/2015	4.2	< 0.010	0.025	< 0.00010	< 0.00010	< 10	10
	6/2/2015	4.3	< 0.010	0.092	< 0.00010	< 0.00010	< 10	28
	6/8/2015	5.6	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	
	6/16/2015	6.2	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/16/2015							
	6/23/2015	5.8	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/24/2015	7.9	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/30/2015							
	6/30/2015	6.8	< 0.010	0.011	< 0.00010	< 0.00010	< 10	< 10
Average Sample Result		5.1600	0.010267	0.016533	0.00010000	0.00010000	10.133	11.429
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		7.9	0.013	0.092	0.0001	0.0001	12	28
Minimum Sample Result		3	0.01	0.01	0.0001	0.0001	10	10
Sample Count		15	15	15	15	15	15	14
Sample Range		4.9000	0.0030000	0.082000	0.0000	0.0000	2.0000	18.000
Std Deviation		1.3721	0.00079881	0.021230	0.0000	0.0000	0.51640	4.7993
Std Error		0.35427	0.00020625	0.0054815	0.0000	0.0000	0.13333	1.2827

LC_LCDSSLCC (E297110)

statistic	sample_date	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)	TOTAL KJELDAHL NITROGEN (N)	TOTAL ORGANIC CARBON (T)
	4/6/2015	530	< 0.050	0.99
	4/13/2015	546	< 0.050	0.63
	4/20/2015	509	< 0.050	0.94
	4/27/2015	429	< 0.050	0.98
	4/28/2015	399	< 0.050	1.05
	5/5/2015	337	< 0.050	1.52
	5/12/2015	379	< 0.050	1.22
	5/19/2015	347	< 0.050	1.26
	5/26/2015	249	0.298	2.73
	6/2/2015	206	0.647	7.50
	6/8/2015	244	0.159	1.51
	6/16/2015	332	0.082	1.73
	6/16/2015		0.092	0.72
	6/23/2015	347	0.134	0.83
	6/24/2015	369	0.133	0.78
	6/30/2015			
	6/30/2015	393	0.129	0.73
Average Sample Result		374.40	0.12963	1.5700
Exceedance Count		0	0	0
Maximum Sample Result		546	0.647	7.5
Minimum Sample Result		206	0.05	0.63
Sample Count		15	16	16
Sample Range		340.00	0.59700	6.8700
Std Deviation		100.55	0.15304	1.6653
Std Error		25.962	0.038260	0.41631

LC_LCDSSLCC (E297110)

statistic	sample_date	TOTAL SUSPENDED SOLIDS, LAB (N)	TURBIDITY, LAB (N)	URANIUM (D)	URANIUM (T)	VANADIUM (D)	VANADIUM (T)
	4/6/2015	< 1.0	0.44	3.26	3.31	< 0.50	< 0.50
	4/13/2015	1.1	0.25	3.34	3.27	< 0.50	< 0.50
	4/20/2015	< 1.0	0.34	2.98	2.91	< 0.50	0.60
	4/27/2015	1.1	0.34	2.40	2.35	< 0.50	< 0.50
	4/28/2015	< 1.0	0.49	2.27	2.33	< 0.50	< 0.50
	5/5/2015	1.6	0.48	1.98	2.00	< 0.50	< 0.50
	5/12/2015	1.6	0.32	2.30	2.28	< 0.50	< 0.50
	5/19/2015	< 1.0	0.35	2.11	2.19	< 0.50	< 0.50
	5/26/2015	42.1	14.1	1.24	1.29	< 0.50	1.11
	6/2/2015	251	97.4	0.925	1.17	< 0.50	5.54
	6/8/2015	1.6	0.63	1.41	1.42	< 0.50	< 0.50
	6/16/2015	< 1.0	0.24	1.94	1.99	< 0.50	< 0.50
	6/16/2015						
	6/23/2015	1.1	0.24	1.90	1.89	< 0.50	< 0.50
	6/24/2015	< 1.0	0.38	2.07	2.13	< 0.50	< 0.50
	6/30/2015						
	6/30/2015	1.0	0.32	2.21	2.08	< 0.50	< 0.50
Average Sample Result		20.547	7.7547	2.1557	2.1740	0.50000	0.88333
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		251	97.4	3.34	3.31	0.5	5.54
Minimum Sample Result		1	0.24	0.925	1.17	0.5	0.5
Sample Count		15	15	15	15	15	15
Sample Range		250.00	97.160	2.4150	2.1400	0.0000	5.0400
Std Deviation		64.619	25.051	0.67926	0.63323	0.0000	1.2978
Std Error		16.685	6.4680	0.17538	0.16350	0.0000	0.33509

LC_LCDSSLCC (E297110)

statistic	sample_date	ZINC (D)	ZINC (T)
	4/6/2015	5.0	5.4
	4/13/2015	4.3	4.2
	4/20/2015	4.1	4.5
	4/27/2015	5.8	6.2
	4/28/2015	5.4	5.9
	5/5/2015	6.1	6.6
	5/12/2015	6.5	6.8
	5/19/2015	6.1	7.8
	5/26/2015	4.0	16.8
	6/2/2015	< 3.0	42.3
	6/8/2015	8.7	9.7
	6/16/2015	10.3	11.0
	6/16/2015		
	6/23/2015	10.4	10.8
	6/24/2015	10.3	11.1
	6/30/2015		
	6/30/2015	8.6	9.2
Average Sample Result		6.5733	10.553
Exceedance Count		0	0
Maximum Sample Result		10.4	42.3
Minimum Sample Result		3	4.2
Sample Count		15	15
Sample Range		7.4000	38.100
Std Deviation		2.4875	9.3788
Std Error		0.64228	2.4216

LC_LC5 (0200028)

statistic	sample_date	ALKALINITY, TOTAL (As CaCO3) (N)	ALUMINUM (D)	ALUMINUM (T)	ANTIMONY (D)	ANTIMONY (T)	ARSENIC (D)
	4/6/2015	165	< 0.0030	0.0149	0.11	0.14	< 0.10
	4/13/2015	201	< 0.0030	0.0093	0.10	0.11	< 0.10
	4/20/2015	182	< 0.0030	0.0298	0.11	0.12	< 0.10
	4/27/2015	159	< 0.0030	0.0429	0.12	0.14	< 0.10
	4/28/2015	173	< 0.0030	0.0283	0.12	0.13	< 0.10
	5/4/2015	131	< 0.0030	0.0303	0.13	0.12	< 0.10
	5/5/2015	167	0.0041	0.0222	0.12	0.14	0.11
	5/11/2015	170	< 0.0030	0.116	0.12	0.13	< 0.10
	5/19/2015	166	< 0.0030	0.0253	0.11	0.13	< 0.10
	5/26/2015	129	< 0.0030	0.185	0.11	0.14	< 0.10
	6/2/2015	134	< 0.0030	0.209	0.12	0.14	< 0.10
	6/8/2015	147	< 0.0030	0.0722	0.12	0.14	0.11
	6/15/2015	163	< 0.0030	0.0196	0.13	0.13	0.11
	6/15/2015						
	6/23/2015	166	< 0.0030	0.0184	0.11	0.13	< 0.10
	6/30/2015	170	< 0.0030	0.0212	0.12	0.16	< 0.10
Average Sample Result		161.53	0.0030733	0.056293	0.11667	0.13333	0.10200
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		201	0.0041	0.209	0.13	0.16	0.11
Minimum Sample Result		129	0.003	0.0093	0.1	0.11	0.1
Sample Count		15	15	15	15	15	15
Sample Range		72.000	0.0011000	0.19970	0.030000	0.050000	0.010000
Std Deviation		19.460	0.00028402	0.063303	0.0081650	0.011751	0.0041404
Std Error		5.0246	0.000073333	0.016345	0.0021082	0.0030342	0.0010690

LC_LC5 (0200028)

statistic	sample_date	ARSENIC (T)	BARIUM (D)	BARIUM (T)	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)	BISMUTH (T)	BORON (D)
	4/6/2015	0.12	0.101	0.102	< 0.10	< 0.10	< 0.000050	< 0.000050	0.013
	4/13/2015	0.11	0.0966	0.0928	< 0.10	< 0.10	< 0.000050	< 0.000050	0.011
	4/20/2015	0.21	0.0930	0.0939	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/27/2015	0.16	0.0868	0.0856	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/28/2015	0.15	0.0858	0.0851	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/4/2015	0.14	0.0760	0.0761	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/5/2015	0.13	0.0765	0.0786	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/11/2015	0.18	0.0757	0.0791	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/19/2015	0.13	0.0732	0.0745	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/26/2015	0.24	0.0615	0.0681	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/2/2015	0.24	0.0575	0.0627	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/8/2015	0.16	0.0618	0.0621	< 0.10	< 0.10	< 0.000050	< 0.000050	0.011
	6/15/2015	0.14	0.0711	0.0729	< 0.10	< 0.10	< 0.000050	< 0.000050	0.010
	6/15/2015								
	6/23/2015	0.11	0.0771	0.0759	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/30/2015	0.15	0.0824	0.0807	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
Average Sample Result		0.15800	0.078400	0.079340	0.10000	0.10000	0.000050000	0.000050000	0.010333
Exceedance Count		0	0	0	0	0	0	0	0
Maximum Sample Result		0.24	0.101	0.102	0.1	0.1	5e-005	5e-005	0.013
Minimum Sample Result		0.11	0.0575	0.0621	0.1	0.1	5e-005	5e-005	0.01
Sample Count		15	15	15	15	15	15	15	15
Sample Range		0.13000	0.043500	0.039900	0.0000	0.0000	0.0000	0.0000	0.0030000
Std Deviation		0.042292	0.012798	0.011241	0.0000000014080	0.0000000014080	0.0000	0.0000	0.00081650
Std Error		0.010920	0.0033045	0.0029025	3.6355E-10	3.6355E-10	0.0000	0.0000	0.00021082

LC_LC5 (0200028)

statistic	sample_date	BORON (T)	BROMIDE (D)	CADMIUM (D)	CADMIUM (T)	CALCIUM (T)	CARBON, DISSOLVED ORGANIC (D)	CHLORIDE (D)
	4/6/2015	0.014	< 0.10	0.0134	0.0303	99.8	0.94	2.8
	4/13/2015	0.011	< 0.10	0.0155	0.0289	88.2	1.09	2.7
	4/20/2015	< 0.010	< 0.10	0.0126	0.0295	99.8	1.05	2.4
	4/27/2015	< 0.010	< 0.10	0.0207	0.0415	86.3	1.05	2.0
	4/28/2015	< 0.010	< 0.10	0.0276	0.0400	84.1	1.24	2.2
	5/4/2015	< 0.010	< 0.050	0.0254	0.0462	74.8	1.36	1.5
	5/5/2015	< 0.010	< 0.050	0.0350	0.0336	74.8	1.17	1.5
	5/11/2015	< 0.010	< 0.050	0.0269	0.0522	80.9	1.58	1.6
	5/19/2015	< 0.010	< 0.050	0.0192	0.0401	76.8	1.41	1.4
	5/26/2015	< 0.010	< 0.050	0.0142	0.0940	68.4	1.31	1.3
	6/2/2015	< 0.010	< 0.050	0.0191	0.0996	62.1	1.47	1.0
	6/8/2015	0.012	< 0.050	0.0240	0.0562	63.4	1.29	1.2
	6/15/2015	< 0.010	< 0.050	0.0345	0.0444	69.9	1.83	1.4
	6/15/2015							
	6/23/2015	< 0.010	< 0.050	0.0165	0.0463	77.1	1.06	1.5
	6/30/2015	< 0.010	< 0.050	0.0194	0.0455	77.1	0.82	1.8
Average Sample Result		0.010467	0.066667	0.021600	0.048553	78.900	1.2447	1.7533
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.014	0.1	0.035	0.0996	99.8	1.83	2.8
Minimum Sample Result		0.01	0.05	0.0126	0.0289	62.1	0.82	1
Sample Count		15	15	15	15	15	15	15
Sample Range		0.0040000	0.050000	0.022400	0.070700	37.700	1.0100	1.8000
Std Deviation		0.0011255	0.024398	0.0071421	0.021180	11.352	0.26259	0.54885
Std Error		0.00029059	0.0062994	0.0018441	0.0054688	2.9311	0.067801	0.14171

LC_LC5 (0200028)

statistic	sample_date	CHROMIUM (D)	CHROMIUM (T)	COBALT (D)	COBALT (T)	CONDUCTIVITY, FIELD (N)	CONDUCTIVITY, LAB (N)
	4/6/2015	0.14	0.24	< 0.10	< 0.10	695.0	733
	4/13/2015	0.13	0.15	< 0.10	< 0.10	679.9	734
	4/20/2015	0.15	0.19	< 0.10	< 0.10	654	694
	4/27/2015	< 0.10	0.20	< 0.10	< 0.10	604.5	641
	4/28/2015	< 0.10	0.17	< 0.10	< 0.10	599.8	647
	5/4/2015	0.11	0.20	< 0.10	< 0.10	549.7	585
	5/5/2015	0.16	0.21	< 0.10	< 0.10	516.4	576
	5/11/2015	0.11	0.34	< 0.10	0.11	532.3	577
	5/19/2015	0.22	0.41	< 0.10	< 0.10	523.4	579
	5/26/2015	0.11	0.40	< 0.10	0.19	435	469
	6/2/2015	0.14	0.60	< 0.10	0.17	431.5	424
	6/8/2015	0.15	0.32	< 0.10	< 0.10	459.7	467
	6/15/2015	0.14	0.18	< 0.10	< 0.10		487
	6/15/2015					520.8	
	6/23/2015	0.14	0.19	< 0.10	< 0.10	415.8	571
	6/30/2015	< 0.10	0.18	< 0.10	< 0.10	530.1	609
Average Sample Result		0.13333	0.26533	0.10000	0.11133	543.19	586.20
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.22	0.6	0.1	0.19	695	734
Minimum Sample Result		0.1	0.15	0.1	0.1	415.8	424
Sample Count		15	15	15	15	15	15
Sample Range		0.12000	0.45000	0.0000	0.090000	279.20	310.00
Std Deviation		0.031547	0.12541	0.0000000014080	0.028251	88.761	95.170
Std Error		0.0081455	0.032380	3.6355E-10	0.0072943	22.918	24.573

LC_LC5 (0200028)

statistic	sample_date	COPPER (D)	COPPER (T)	DISSOLVED OXYGEN, FIELD (N)	FLUORIDE (D)	Hardness, Total or Dissolved CaCO3 (N)
	4/6/2015	< 0.50	< 0.50	13.83	0.176	408
	4/13/2015	< 0.50	< 0.50	12.25	0.191	396
	4/20/2015	< 0.50	< 0.50	12.88	0.178	404
	4/27/2015	< 0.50	< 0.50	11.63	0.172	358
	4/28/2015	< 0.50	6.49	10.97	0.172	348
	5/4/2015	< 0.50	< 0.50	10.17	0.198	306
	5/5/2015	< 0.50	< 0.50	9.8	0.193	300
	5/11/2015	< 0.50	< 0.50	12.2	0.203	328
	5/19/2015	< 0.50	< 0.50	13.07	0.201	307
	5/26/2015	< 0.50	0.57	16.52	0.193	250
	6/2/2015	< 0.50	0.57	11.16	0.196	231
	6/8/2015	< 0.50	< 0.50	10.06	0.205	246
	6/15/2015	< 0.50	< 0.50		0.203	272
	6/15/2015			10.38		
	6/23/2015	< 0.50	< 0.50	10.13	0.207	302
	6/30/2015	< 0.50	< 0.50	9.64	0.214	312
Average Sample Result		0.50000	0.90867	11.646	0.19347	317.87
Exceedance Count		0	0	0	0	0
Maximum Sample Result		0.5	6.49	16.52	0.214	408
Minimum Sample Result		0.5	0.5	9.64	0.172	231
Sample Count		15	15	15	15	15
Sample Range		0.0000	5.9900	6.8800	0.042000	177.00
Std Deviation		0.0000	1.5442	1.8797	0.013298	56.413
Std Error		0.0000	0.39872	0.48535	0.0034335	14.566

LC_LC5 (0200028)

statistic	sample_date	INSTANTANEOUS FLOW (N)	IRON (D)	IRON (T)	LEAD (D)	LEAD (T)	LITHIUM (D)	LITHIUM (T)	MAGNESIUM (T)
	4/6/2015		< 0.010	0.022	< 0.050	< 0.050	0.0160	0.0162	39.2
	4/13/2015		< 0.010	0.014	< 0.050	< 0.050	0.0168	0.0164	41.1
	4/20/2015		< 0.010	0.039	< 0.050	< 0.050	0.0157	0.0158	35.9
	4/27/2015		< 0.010	0.058	< 0.050	0.051	0.0155	0.0152	33.1
	4/28/2015		< 0.010	0.033	< 0.050	0.125	0.0152	0.0152	32.8
	5/4/2015		< 0.010	0.049	< 0.050	< 0.050	0.0141	0.0140	29.3
	5/5/2015		0.013	0.031	< 0.050	< 0.050	0.0138	0.0142	29.7
	5/11/2015		< 0.010	0.169	< 0.050	0.130	0.0148	0.0147	32.2
	5/19/2015		< 0.010	0.031	< 0.050	< 0.050	0.0135	0.0145	29.4
	5/26/2015		< 0.010	0.259	< 0.050	0.201	0.0117	0.0124	24.3
	6/2/2015		< 0.010	0.264	< 0.050	0.185	0.0112	0.0117	21.3
	6/8/2015		< 0.010	0.110	< 0.050	0.082	0.0115	0.0117	21.6
	6/15/2015		< 0.010	0.030	< 0.050	< 0.050	0.0151	0.0155	26.4
	6/15/2015								
	6/23/2015		< 0.010	0.035	< 0.050	< 0.050	0.0120	0.0119	26.0
	6/30/2015		< 0.010	0.030	< 0.050	< 0.050	0.0152	0.0168	29.3
Average Sample Result		0	0.010200	0.078267	0.050000	0.081600	0.014140	0.014413	30.107
Exceedance Count		0	0	0	0	0	0	0	0
Maximum Sample Result		0	0.013	0.264	0.05	0.201	0.0168	0.0168	41.1
Minimum Sample Result		0	0.01	0.014	0.05	0.05	0.0112	0.0117	21.3
Sample Count		0	15	15	15	15	15	15	15
Sample Range		0	0.0030000	0.25000	0.0000	0.15100	0.0056000	0.0051000	19.800
Std Deviation		0	0.00077460	0.084327	7.0401E-10	0.052846	0.0017948	0.0017439	5.8181
Std Error		0	0.00020000	0.021773	1.8178E-10	0.013645	0.00046340	0.00045028	1.5022

LC_LC5 (0200028)

statistic	sample_date	MANGANESE (D)	MANGANESE (T)	MERCURY (D)	MERCURY (T)	MOLYBDENUM (D)	MOLYBDENUM (T)	NICKEL (D)
	4/6/2015	0.00040	0.00182	< 0.0050	< 0.0050	0.00107	0.00110	1.09
	4/13/2015	0.00039	0.00109	< 0.0050	< 0.0050	0.00109	0.00105	1.38
	4/20/2015	0.00046	0.00246	< 0.0050	< 0.0050	0.00104	0.00105	1.23
	4/27/2015	0.00072	0.00474	< 0.0050	< 0.0050	0.00106	0.00108	1.18
	4/28/2015	0.00063	0.00267	< 0.0050	< 0.0050	0.00109	0.00107	1.15
	5/4/2015	0.00072	0.00374	< 0.0050	< 0.0050	0.00106	0.00102	1.19
	5/5/2015	0.00248	0.00257	< 0.0050	< 0.0050	0.00105	0.00105	1.25
	5/11/2015	0.00042	0.0110	< 0.0050	< 0.0050	0.00103	0.000970	1.17
	5/19/2015	0.00034	0.00236	< 0.0050	< 0.0050	0.00102	0.00103	1.15
	5/26/2015	0.00049	0.0149	< 0.0050	< 0.0050	0.000964	0.00100	1.12
	6/2/2015	0.00026	0.0158	< 0.0050	< 0.0050	0.000887	0.000890	1.19
	6/8/2015	0.00038	0.00702	< 0.0050	< 0.0050	0.000937	0.000943	1.22
	6/15/2015	0.00054	0.00187	< 0.0050	< 0.0050	0.00103	0.00108	1.21
	6/15/2015							
	6/23/2015	0.00035	0.00242	< 0.0050	< 0.0050	0.00100	0.000990	1.35
	6/30/2015	0.00025	0.00216	< 0.0050	< 0.0050	0.00107	0.00106	1.20
Average Sample Result		0.00058867	0.0051080	0.0050000	0.0050000	0.0010265	0.0010255	1.2053
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.00248	0.0158	0.005	0.005	0.00109	0.0011	1.38
Minimum Sample Result		0.00025	0.00109	0.005	0.005	0.000887	0.00089	1.09
Sample Count		15	15	15	15	15	15	15
Sample Range		0.0022300	0.014710	0.0000	0.0000	0.00020300	0.00021000	0.29000
Std Deviation		0.00054318	0.0048615	8.8002E-11	8.8002E-11	0.000057925	0.000057737	0.077170
Std Error		0.00014025	0.0012552	2.2722E-11	2.2722E-11	0.000014956	0.000014908	0.019925

LC_LC5 (0200028)

statistic	sample_date	NICKEL (T)	NITRATE NITROGEN (NO3), AS N (N)	NITRITE NITROGEN (NO2), AS N (N)	NITROGEN, AMMONIA (AS N) (N)
	4/6/2015	1.14	10.2	0.0025	< 0.0050
	4/13/2015	0.96	9.79	0.0041	< 0.0050
	4/20/2015	1.11	9.24	0.0036	< 0.0050
	4/27/2015	1.47	7.69	0.0042	< 0.0050
	4/28/2015	1.42	7.58	0.0057	< 0.0050
	5/4/2015	1.38	6.82	0.0045	< 0.0050
	5/5/2015	1.74	6.69	0.0037	< 0.0050
	5/11/2015	1.53	7.16	0.0027	< 0.0050
	5/19/2015	1.26	7.22	0.0026	< 0.0050
	5/26/2015	1.83	5.26	0.0018	< 0.0050
	6/2/2015	1.96	4.59	0.0016	< 0.0050
	6/8/2015	1.45	5.10	0.0022	< 0.0050
	6/15/2015	1.33	6.25	0.0032	< 0.0050
	6/15/2015				
	6/23/2015	1.45	6.63	0.0026	< 0.0050
	6/30/2015	1.33	7.24	0.0030	< 0.0050
Average Sample Result		1.4240	7.1640	0.0032000	0.0050000
Exceedance Count		0	15	0	0
Maximum Sample Result		1.96	10.2	0.0057	0.005
Minimum Sample Result		0.96	4.59	0.0016	0.005
Sample Count		15	15	15	15
Sample Range		1.0000	5.6100	0.0041000	0.0000
Std Deviation		0.26830	1.6225	0.0011078	8.8002E-11
Std Error		0.069274	0.41893	0.00028602	2.2722E-11

LC_LC5 (0200028)

statistic	sample_date	ORTHO-PHOSPHATE (N)	pH, Field (N)	pH, LAB (N)	PHOSPHORUS (N)	POTASSIUM (T)	SELENIUM (D)	SELENIUM (T)
	4/6/2015	< 0.0010	8.82	8.37	0.0031	1.06	38.6	39
	4/13/2015	< 0.0010	8.91	8.42	< 0.0020	1.03	41.3	39.6
	4/20/2015	< 0.0010	8.26	8.40	0.0039	1.09	38.9	38.2
	4/27/2015	< 0.0010	8.47	8.46	0.0068	0.974	33.8	32.2
	4/28/2015	< 0.0010	8.49	8.48	0.0061	0.962	35.1	32.8
	5/4/2015	< 0.0010	8.54	8.48	0.0064	0.954	27.7	27.7
	5/5/2015	0.0012	8.35	8.48	0.0076	0.997	26.4	27.3
	5/11/2015	< 0.0010	8.28	8.44	0.0081	1.06	27.8	28.1
	5/19/2015	< 0.0010	8.31	8.46	0.0039	0.945	27	28.3
	5/26/2015	< 0.0010	8.34	8.36	0.0244	0.926	19.6	21.2
	6/2/2015	< 0.0010	8.54	8.39	0.0251	0.926	17.4	17.5
	6/8/2015	0.0016	8.76	8.47	0.0142	0.904	17.8	17.6
	6/15/2015	0.0011		8.36	0.0052	0.992	22.4	23
	6/15/2015		8.46					
	6/23/2015	0.0016	8.15	8.35	0.0044	1.01	25.5	25.6
	6/30/2015	0.0014	8.33	8.47	0.0049	1.04	26.7	27.9
Average Sample Result		0.0011267	8.4673	8.4260	0.0084067	0.99133	28.400	28.400
Exceedance Count		0	0	0	0	0	0	15
Maximum Sample Result		0.0016	8.91	8.48	0.0251	1.09	41.3	39.6
Minimum Sample Result		0.001	8.15	8.35	0.002	0.904	17.4	17.5
Sample Count		15	15	15	15	15	15	15
Sample Range		0.00060000	0.76000	0.13000	0.023100	0.18600	23.900	22.100
Std Deviation		0.00022190	0.21868	0.049828	0.0072168	0.056236	7.6516	7.0406
Std Error		0.000057293	0.056463	0.012866	0.0018634	0.014520	1.9756	1.8179

LC_LC5 (0200028)

statistic	sample_date	SILVER (D)	SILVER (T)	SODIUM (T)	STRONTIUM (D)	STRONTIUM (T)	SULFATE (AS SO4) (D)
	4/6/2015	< 0.010	< 0.010	2.83	0.170	0.178	187
	4/13/2015	< 0.010	< 0.010	2.77	0.164	0.161	178
	4/20/2015	< 0.010	< 0.010	2.64	0.154	0.154	172
	4/27/2015	< 0.010	< 0.010	2.18	0.142	0.140	145
	4/28/2015	< 0.010	< 0.010	2.20	0.142	0.142	143
	5/4/2015	< 0.010	< 0.010	2.00	0.122	0.124	125
	5/5/2015	< 0.010	< 0.010	2.06	0.124	0.128	120
	5/11/2015	< 0.010	< 0.010	2.03	0.127	0.127	123
	5/19/2015	< 0.010	< 0.010	2.16	0.123	0.127	118
	5/26/2015	< 0.010	< 0.010	1.56	0.111	0.118	86.6
	6/2/2015	< 0.010	< 0.010	1.50	0.0979	0.102	73.5
	6/8/2015	< 0.010	< 0.010	1.50	0.0999	0.0991	78.1
	6/15/2015	< 0.010	< 0.010	1.86	0.113	0.117	97.0
	6/15/2015						
	6/23/2015	< 0.010	< 0.010	1.89	0.117	0.119	107
	6/30/2015	< 0.010	< 0.010	2.08	0.132	0.132	117
Average Sample Result		0.010000	0.010000	2.0840	0.12925	0.13121	124.68
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.01	0.01	2.83	0.17	0.178	187
Minimum Sample Result		0.01	0.01	1.5	0.0979	0.0991	73.5
Sample Count		15	15	15	15	15	15
Sample Range		0.0000	0.0000	1.3300	0.072100	0.078900	113.50
Std Deviation		1.7600E-10	1.7600E-10	0.41574	0.021595	0.021210	35.011
Std Error		4.5444E-11	4.5444E-11	0.10734	0.0055759	0.0054763	9.0398

LC_LC5 (0200028)

statistic	sample_date	TEMPERATURE, FIELD (N)	THALLIUM (D)	THALLIUM (T)	TIN (D)	TIN (T)	TITANIUM (D)	TITANIUM (T)
	4/6/2015	1.7	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/13/2015	3.1	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/20/2015	3.6	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/27/2015	4.8	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/28/2015	7.4	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/4/2015	6.60	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/5/2015	6.9	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/11/2015	5.4	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/19/2015	4.4	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/26/2015	6	< 0.010	0.010	< 0.00010	< 0.00010	< 10	< 10
	6/2/2015	6.7	< 0.010	0.010	< 0.00010	< 0.00010	< 10	< 10
	6/8/2015	8.2	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	
	6/15/2015		< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/15/2015	8.6						
	6/23/2015	7.7	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/30/2015	9.8	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
Average Sample Result		6.0600	0.010000	0.010000	0.00010000	0.00010000	10.000	10.000
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		9.8	0.01	0.01	0.0001	0.0001	10	10
Minimum Sample Result		1.7	0.01	0.01	0.0001	0.0001	10	10
Sample Count		15	15	15	15	15	15	14
Sample Range		8.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Std Deviation		2.2283	1.7600E-10	1.7600E-10	0.0000	0.0000	0.0000	0.0000
Std Error		0.57535	4.5444E-11	4.5444E-11	0.0000	0.0000	0.0000	0.0000

LC_LC5 (0200028)

statistic	sample_date	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)	TOTAL KJELDAHL NITROGEN (N)	TOTAL ORGANIC CARBON (T)
	4/6/2015	478	< 0.050	0.92
	4/13/2015	495	< 0.050	0.91
	4/20/2015	479	0.068	1.03
	4/27/2015	426	< 0.050	1.13
	4/28/2015	430	< 0.050	1.13
	5/4/2015	378	0.151	1.48
	5/5/2015	368	< 0.050	1.44
	5/11/2015	372	< 0.050	1.19
	5/19/2015	369	< 0.050	1.18
	5/26/2015	310	0.192	2.24
	6/2/2015	278	0.217	1.99
	6/8/2015	280	0.170	1.47
	6/15/2015	375	0.176	1.80
	6/15/2015			
	6/23/2015	364	0.144	1.01
	6/30/2015	389	0.152	1.32
Average Sample Result		386.07	0.10800	1.3493
Exceedance Count		0	0	0
Maximum Sample Result		495	0.217	2.24
Minimum Sample Result		278	0.05	0.91
Sample Count		15	15	15
Sample Range		217.00	0.16700	1.3300
Std Deviation		66.918	0.064162	0.39572
Std Error		17.278	0.016566	0.10217

LC_LC5 (0200028)

statistic	sample_date	TOTAL SUSPENDED SOLIDS, LAB (N)	TURBIDITY, LAB (N)	URANIUM (D)	URANIUM (T)	VANADIUM (D)	VANADIUM (T)
	4/6/2015	1.9	0.81	2.13	2.14	< 0.50	< 0.50
	4/13/2015	1.0	0.49	2.09	2.06	< 0.50	< 0.50
	4/20/2015	3.0	0.60	1.97	1.93	< 0.50	0.63
	4/27/2015	3.6	0.60	1.73	1.71	< 0.50	< 0.50
	4/28/2015	2.4	1.12	1.65	1.65	< 0.50	< 0.50
	5/4/2015	2.6	0.82	1.53	1.52	< 0.50	< 0.50
	5/5/2015	5.1	1.12	1.56	1.62	< 0.50	< 0.50
	5/11/2015	5.7	0.65	1.62	1.62	< 0.50	0.52
	5/19/2015	2.4	0.65	1.63	1.68	< 0.50	< 0.50
	5/26/2015	19.6	4.05	1.28	1.38	< 0.50	0.81
	6/2/2015	18.6	4.93	1.15	1.19	< 0.50	0.92
	6/8/2015	7.9	1.11	1.27	1.25	< 0.50	< 0.50
	6/15/2015	3.5	1.04	1.42	1.46	< 0.50	< 0.50
	6/15/2015						
	6/23/2015	3.3	0.63	1.48	1.46	< 0.50	< 0.50
	6/30/2015	1.6	0.76	1.61	1.62	< 0.50	< 0.50
Average Sample Result		5.4800	1.2920	1.6080	1.6193	0.50000	0.55867
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		19.6	4.93	2.13	2.14	0.5	0.92
Minimum Sample Result		1	0.49	1.15	1.19	0.5	0.5
Sample Count		15	15	15	15	15	15
Sample Range		18.600	4.4400	0.98000	0.95000	0.0000	0.42000
Std Deviation		5.8010	1.3255	0.28596	0.26903	0.0000	0.13043
Std Error		1.4978	0.34225	0.073835	0.069464	0.0000	0.033677

LC_LC5 (0200028)

statistic	sample_date	ZINC (D)	ZINC (T)
	4/6/2015	< 3.0	< 3.0
	4/13/2015	< 3.0	< 3.0
	4/20/2015	< 3.0	< 3.0
	4/27/2015	< 3.0	< 3.0
	4/28/2015	< 3.0	5.5
	5/4/2015	< 3.0	< 3.0
	5/5/2015	3.2	< 3.0
	5/11/2015	< 3.0	3.2
	5/19/2015	< 3.0	< 3.0
	5/26/2015	< 3.0	5.7
	6/2/2015	< 3.0	5.4
	6/8/2015	< 3.0	3.3
	6/15/2015	< 3.0	< 3.0
	6/15/2015		
	6/23/2015	< 3.0	< 3.0
	6/30/2015	< 3.0	< 3.0
Average Sample Result		3.0133	3.5400
Exceedance Count		0	0
Maximum Sample Result		3.2	5.7
Minimum Sample Result		3	3
Sample Count		15	15
Sample Range		0.20000	2.7000
Std Deviation		0.051640	1.0370
Std Error		0.013333	0.26776

LC_FRDSDC (E288272)

statistic	sample_date	ALKALINITY, TOTAL (As CaCO3) (N)	ALUMINUM (D)	ALUMINUM (T)	ANTIMONY (D)	ANTIMONY (T)	ARSENIC (D)
	4/7/2015	179	< 0.0030	0.0106	< 0.10	< 0.10	< 0.10
	4/13/2015	167	< 0.0030	0.0103	< 0.10	< 0.10	< 0.10
	4/20/2015	178	< 0.0030	0.0196	0.11	0.13	0.12
	4/27/2015	165	< 0.0030	0.0246	0.13	0.13	< 0.10
	4/28/2015	182	< 0.0030	0.0264	0.13	0.15	0.11
	5/4/2015	134	< 0.0030	0.0462	0.13	0.12	0.10
	5/5/2015	163	< 0.0030	0.0192	0.12	0.14	< 0.10
	5/11/2015	131	< 0.0030	0.0254	0.12	0.13	0.10
	5/19/2015	163	< 0.0030	0.0316	0.12	0.13	0.11
	5/25/2015	153	< 0.0030	0.0923	0.11	0.13	0.11
	6/1/2015	143	< 0.0030	0.108	< 0.10	0.13	0.10
	6/8/2015	129	< 0.0030	0.0578	0.12	0.12	0.10
	6/15/2015	166	< 0.0030	0.0279	0.12	0.15	0.10
	6/22/2015	165	< 0.0030	0.0199	0.11	0.12	< 0.10
	6/29/2015	174	< 0.0030	0.0144	0.12	0.13	0.10
Average Sample Result		159.47	0.0030000	0.035613	0.11600	0.12733	0.10333
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		182	0.003	0.108	0.13	0.15	0.12
Minimum Sample Result		129	0.003	0.0103	0.1	0.1	0.1
Sample Count		15	15	15	15	15	15
Sample Range		53.000	0.0000	0.097700	0.030000	0.050000	0.020000
Std Deviation		17.586	0.0000	0.029195	0.010556	0.014376	0.0061721
Std Error		4.5407	0.0000	0.0075381	0.0027255	0.0037118	0.0015936

LC_FRDSDC (E288272)

statistic	sample_date	ARSENIC (T)	BARIUM (D)	BARIUM (T)	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)	BISMUTH (T)	BORON (D)
	4/7/2015	< 0.10	0.122	0.124	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/13/2015	0.10	0.117	0.117	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/20/2015	0.19	0.110	0.108	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/27/2015	0.15	0.103	0.100	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/28/2015	0.14	0.105	0.103	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/4/2015	0.15	0.0914	0.0908	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/5/2015	0.15	0.0900	0.0897	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/11/2015	0.14	0.0890	0.0901	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/19/2015	0.14	0.0874	0.0856	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/25/2015	0.18	0.0741	0.0785	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/1/2015	0.20	0.0715	0.0740	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/8/2015	0.16	0.0702	0.0701	< 0.10	< 0.10	< 0.000050	< 0.000050	0.010
	6/15/2015	0.14	0.0809	0.0822	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/22/2015	0.11	0.0853	0.0861	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/29/2015	0.11	0.0890	0.0918	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
Average Sample Result		0.14400	0.092387	0.092727	0.10000	0.10000	0.000050000	0.000050000	0.010000
Exceedance Count		0	0	0	0	0	0	0	0
Maximum Sample Result		0.2	0.122	0.124	0.1	0.1	5e-005	5e-005	0.01
Minimum Sample Result		0.1	0.0702	0.0701	0.1	0.1	5e-005	5e-005	0.01
Sample Count		15	15	15	15	15	15	15	15
Sample Range		0.10000	0.051800	0.053900	0.0000	0.0000	0.0000	0.0000	0.0000
Std Deviation		0.030659	0.015956	0.015237	0.0000000014080	0.0000000014080	0.0000	0.0000	1.7600E-10
Std Error		0.0079162	0.0041198	0.0039341	3.6355E-10	3.6355E-10	0.0000	0.0000	4.5444E-11

LC_FRDSDC (E288272)

statistic	sample_date	BORON (T)	BROMIDE (D)	CADMIUM (D)	CADMIUM (T)	CALCIUM (T)	CARBON, DISSOLVED ORGANIC (D)	CHLORIDE (D)
	4/7/2015	< 0.010	< 0.10	0.0224	0.0243	109	0.90	2.3
	4/13/2015	0.011	< 0.25	0.0164	0.0259	97.2	0.83	2.2
	4/20/2015	< 0.010	< 0.10	0.0166	0.0286	100	1.10	1.9
	4/27/2015	< 0.010	< 0.10	0.0270	0.0302	83.0	1.14	1.7
	4/28/2015	< 0.010	< 0.10	0.0176	0.0288	81.8	1.38	1.8
	5/4/2015	< 0.010	< 0.050	0.0154	0.0319	70.9	1.56	1.2
	5/5/2015	< 0.010	< 0.050	0.0215	0.0255	72.1	1.18	1.1
	5/11/2015	< 0.010	< 0.050	0.0200	0.0247	78.0	1.11	1.7
	5/19/2015	< 0.010	< 0.050	0.0204	0.0278	73.6	1.51	1.4
	5/25/2015	< 0.010	< 0.050	0.0117	0.0366	68.2	1.14	1.2
	6/1/2015	< 0.010	< 0.050	0.0148	0.0409	63.9	1.18	1.0
	6/8/2015	0.011	< 0.050	0.0147	0.0340	64.0	1.13	1.3
	6/15/2015	< 0.010	< 0.050	0.0207	0.0255	72.4	1.14	1.1
	6/22/2015	0.012	< 0.050	0.0160	0.0168	73.2	0.88	1.3
	6/29/2015	< 0.010	< 0.050	0.0131	0.0237	78.4	0.88	1.3
Average Sample Result		0.010267	0.076667	0.017887	0.028347	79.047	1.1373	1.5000
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.012	0.25	0.027	0.0409	109	1.56	2.3
Minimum Sample Result		0.01	0.05	0.0117	0.0168	63.9	0.83	1
Sample Count		15	15	15	15	15	15	15
Sample Range		0.0020000	0.20000	0.015300	0.024100	45.100	0.73000	1.3000
Std Deviation		0.00059362	0.053005	0.0040509	0.0058620	13.327	0.21803	0.40883
Std Error		0.00015327	0.013686	0.0010459	0.0015136	3.4411	0.056294	0.10556

LC_FRDSDC (E288272)

statistic	sample_date	CHROMIUM (D)	CHROMIUM (T)	COBALT (D)	COBALT (T)	CONDUCTIVITY, FIELD (N)	CONDUCTIVITY, LAB (N)
	4/7/2015	0.11	0.15	< 0.10	< 0.10	738.8	786
	4/13/2015	0.12	0.14	< 0.10	< 0.10	719.3	764
	4/20/2015	0.10	0.19	< 0.10	< 0.10	665.6	694
	4/27/2015	< 0.10	0.15	< 0.10	< 0.10	597.4	630
	4/28/2015	< 0.10	0.18	< 0.10	< 0.10	603.2	632
	5/4/2015	0.11	0.27	< 0.10	< 0.10	542.4	562
	5/5/2015	< 0.10	0.17	< 0.10	< 0.10	338.1	559
	5/11/2015	< 0.10	0.15	< 0.10	< 0.10	530.1	575
	5/19/2015	< 0.10	0.22	< 0.10	< 0.10	533.9	571
	5/25/2015	< 0.10	0.24	< 0.10	< 0.10	443.0	471
	6/1/2015	< 0.10	0.28	< 0.10	0.10	453.8	436
	6/8/2015	0.12	0.30	< 0.10	< 0.10	453.8	484
	6/15/2015	0.12	0.17	< 0.10	< 0.10	543.9	501
	6/22/2015	0.10	0.18	< 0.10	< 0.10	292.2	586
	6/29/2015	0.13	0.16	< 0.10	< 0.10	373.4	629
Average Sample Result		0.10733	0.19667	0.10000	0.10000	521.93	592.00
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.13	0.3	0.1	0.1	738.8	786
Minimum Sample Result		0.1	0.14	0.1	0.1	292.2	436
Sample Count		15	15	15	15	15	15
Sample Range		0.030000	0.16000	0.0000	0.0000	446.60	350.00
Std Deviation		0.010328	0.052463	0.0000000014080	0.0000000014080	132.07	101.32
Std Error		0.0026667	0.013546	3.6355E-10	3.6355E-10	34.100	26.160

LC_FRDSDC (E288272)

statistic	sample_date	COPPER (D)	COPPER (T)	DISSOLVED OXYGEN, FIELD (N)	FLUORIDE (D)	Hardness, Total or Dissolved CaCO3 (N)
	4/7/2015	< 0.50	< 0.50	13.01	0.143	448
	4/13/2015	< 0.50	< 0.50	12.21	0.16	424
	4/20/2015	< 0.50	4.71	11.63	0.135	406
	4/27/2015	< 0.50	< 0.50	11.56	0.136	345
	4/28/2015	< 0.50	< 0.50	11.05	0.141	345
	5/4/2015	< 0.50	< 0.50	10.08	0.166	288
	5/5/2015	< 0.50	< 0.50	9.78	0.168	295
	5/11/2015	< 0.50	< 0.50	12.18	0.175	329
	5/19/2015	< 0.50	< 0.50	11.45	0.182	299
	5/25/2015	< 0.50	0.82	13.01	0.179	259
	6/1/2015	< 0.50	< 0.50	10.75	0.185	248
	6/8/2015	< 0.50	< 0.50	10.75	0.188	255
	6/15/2015	< 0.50	< 0.50	9.52	0.179	288
	6/22/2015	< 0.50	< 0.50	9.88	0.185	305
	6/29/2015	< 0.50	< 0.50	9.73	0.186	327
Average Sample Result		0.50000	0.80200	11.106	0.16720	324.07
Exceedance Count		0	0	0	0	0
Maximum Sample Result		0.5	4.71	13.01	0.188	448
Minimum Sample Result		0.5	0.5	9.52	0.135	248
Sample Count		15	15	15	15	15
Sample Range		0.0000	4.2100	3.4900	0.053000	200.00
Std Deviation		0.0000	1.0843	1.1711	0.019483	61.060
Std Error		0.0000	0.27995	0.30238	0.0050306	15.766

LC_FRDSDC (E288272)

statistic	sample_date	INSTANTANEOUS FLOW (N)	IRON (D)	IRON (T)	LEAD (D)	LEAD (T)	LITHIUM (D)	LITHIUM (T)	MAGNESIUM (T)
	4/7/2015		< 0.010	0.025	< 0.050	< 0.050	0.0164	0.0172	44.6
	4/13/2015		< 0.010	0.023	< 0.050	< 0.050	0.0170	0.0177	45.4
	4/20/2015		< 0.010	0.033	< 0.050	< 0.050	0.0173	0.0174	36.4
	4/27/2015		< 0.010	0.038	< 0.050	< 0.050	0.0156	0.0150	33.1
	4/28/2015		< 0.010	0.037	< 0.050	< 0.050	0.0154	0.0151	32.2
	5/4/2015		< 0.010	0.059	< 0.050	< 0.050	0.0142	0.0137	26.7
	5/5/2015		< 0.010	0.022	< 0.050	< 0.050	0.0133	0.0130	28.2
	5/11/2015		< 0.010	0.038	< 0.050	< 0.050	0.0149	0.0151	31.9
	5/19/2015		< 0.010	0.044	< 0.050	0.081	0.0138	0.0135	28.1
	5/25/2015		< 0.010	0.125	< 0.050	0.109	0.0116	0.0123	24.6
	6/1/2015		< 0.010	0.150	< 0.050	0.135	0.0109	0.0109	22.0
	6/8/2015		< 0.010	0.094	< 0.050	0.080	0.0122	0.0121	22.0
	6/15/2015		< 0.010	0.038	< 0.050	< 0.050	0.0153	0.0152	29.8
	6/22/2015		< 0.010	0.029	< 0.050	< 0.050	0.0151	0.0162	30.6
	6/29/2015		< 0.010	0.018	< 0.050	< 0.050	0.0152	0.0150	32.7
Average Sample Result		0	0.010000	0.051533	0.050000	0.063667	0.014547	0.014627	31.220
Exceedance Count		0	0	0	0	0	0	0	0
Maximum Sample Result		0	0.01	0.15	0.05	0.135	0.0173	0.0177	45.4
Minimum Sample Result		0	0.01	0.018	0.05	0.05	0.0109	0.0109	22
Sample Count		0	15	15	15	15	15	15	15
Sample Range		0	0.0000	0.13200	0.0000	0.085000	0.0064000	0.0068000	23.400
Std Deviation		0	1.7600E-10	0.039763	7.0401E-10	0.026411	0.0018901	0.0020310	6.9158
Std Error		0	4.5444E-11	0.010267	1.8178E-10	0.0068192	0.00048803	0.00052440	1.7857

LC_FRDSDC (E288272)

statistic	sample_date	MANGANESE (D)	MANGANESE (T)	MERCURY (D)	MERCURY (T)	MOLYBDENUM (D)	MOLYBDENUM (T)	NICKEL (D)
	4/7/2015	0.00117	0.00228	< 0.0050	< 0.0050	0.000728	0.000760	0.57
	4/13/2015	0.00139	0.00220	< 0.0050	< 0.0050	0.000726	0.000770	< 0.50
	4/20/2015	0.00119	0.00279	< 0.0050	< 0.0050	0.000825	0.000828	0.58
	4/27/2015	0.00125	0.00309	< 0.0050	< 0.0050	0.000967	0.000947	0.78
	4/28/2015	0.00123	0.00282	< 0.0050	< 0.0050	0.000985	0.000932	0.90
	5/4/2015	0.00099	0.00352	< 0.0050	< 0.0050	0.000978	0.000963	0.77
	5/5/2015	0.00147	0.00207	< 0.0050	< 0.0050	0.000868	0.000915	0.91
	5/11/2015	0.00114	0.00285	< 0.0050	< 0.0050	0.000901	0.000937	0.83
	5/19/2015	0.00105	0.00293	< 0.0050	< 0.0050	0.000910	0.000881	0.77
	5/25/2015	0.00118	0.00682	< 0.0050	< 0.0050	0.000890	0.000932	0.58
	6/1/2015	0.00091	0.00784	< 0.0050	< 0.0050	0.000854	0.000850	0.61
	6/8/2015	0.00085	0.00515	< 0.0050	< 0.0050	0.000866	0.000862	0.67
	6/15/2015	0.00137	0.00382	< 0.0050	< 0.0050	0.000915	0.000944	0.68
	6/22/2015	0.00190	0.00335	< 0.0050	< 0.0050	0.000817	0.000875	0.72
	6/29/2015	0.00118	0.00275	< 0.0050	< 0.0050	0.000898	0.000901	0.67
Average Sample Result		0.0012180	0.0036187	0.0050000	0.0050000	0.00087520	0.00088647	0.70267
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.0019	0.00784	0.005	0.005	0.000985	0.000963	0.91
Minimum Sample Result		0.00085	0.00207	0.005	0.005	0.000726	0.00076	0.5
Sample Count		15	15	15	15	15	15	15
Sample Range		0.0010500	0.0057700	0.0000	0.0000	0.00025900	0.00020300	0.41000
Std Deviation		0.00025426	0.0016937	8.8002E-11	8.8002E-11	0.000078227	0.000063033	0.12349
Std Error		0.000065648	0.00043732	2.2722E-11	2.2722E-11	0.000020198	0.000016275	0.031885

LC_FRDSDC (E288272)

statistic	sample_date	NICKEL (T)	NITRATE NITROGEN (NO3), AS N (N)	NITRITE NITROGEN (NO2), AS N (N)	NITROGEN, AMMONIA (AS N) (N)
	4/7/2015	0.52	12.2	0.0037	< 0.0050
	4/13/2015	0.51	12.0	< 0.0050	< 0.0050
	4/20/2015	0.56	10.5	0.0039	< 0.0050
	4/27/2015	0.87	8.03	0.0038	< 0.0050
	4/28/2015	0.88	8.11	0.0036	< 0.0050
	5/4/2015	1.01	6.91	0.0035	< 0.0050
	5/5/2015	0.81	7.05	0.0029	< 0.0050
	5/11/2015	1.06	7.85	0.0027	< 0.0050
	5/19/2015	0.79	7.86	0.0020	< 0.0050
	5/25/2015	0.85	6.01	0.0024	< 0.0050
	6/1/2015	1.00	5.62	0.0027	< 0.0050
	6/8/2015	0.91	6.10	0.0026	< 0.0050
	6/15/2015	0.75	7.53	0.0022	< 0.0050
	6/22/2015	0.73	7.91	0.0044	< 0.0050
	6/29/2015	0.63	8.96	0.0037	0.0053
Average Sample Result		0.79200	8.1760	0.0032733	0.0050200
Exceedance Count		0	15	0	0
Maximum Sample Result		1.06	12.2	0.005	0.0053
Minimum Sample Result		0.51	5.62	0.002	0.005
Sample Count		15	15	15	15
Sample Range		0.55000	6.5800	0.0030000	0.00030000
Std Deviation		0.17591	1.9992	0.00085479	0.000077460
Std Error		0.045421	0.51620	0.00022071	0.000020000

LC_FRDSDC (E288272)

statistic	sample_date	ORTHO-PHOSPHATE (N)	pH, Field (N)	pH, LAB (N)	PHOSPHORUS (N)	POTASSIUM (T)	SELENIUM (D)	SELENIUM (T)
	4/7/2015	< 0.0010	8.85	8.41	< 0.0020	1.13	44.5	46.7
	4/13/2015	< 0.0010	8.67	8.35	< 0.0020	1.16	47.7	48.2
	4/20/2015	0.0019	8.01	8.33	0.0060	1.15	41.9	41.8
	4/27/2015	0.0025	8.27	8.41	0.0075	1.01	34.4	33.9
	4/28/2015	0.0023	8.28	8.43	0.0053	1.02	35.1	33.5
	5/4/2015	0.0025	8.35	8.44	0.0070	0.986	28.1	27.4
	5/5/2015	0.0036	8.15	8.39	0.0118	0.997	27.3	27.7
	5/11/2015	0.0023	8.01	8.35	0.0058	1.07	29.6	29.5
	5/19/2015	0.0013	8.37	8.41	0.0070	0.954	27.9	30.3
	5/25/2015	0.0021	8.30	8.33	0.0128	0.907	20.6	21.3
	6/1/2015	0.0022	8.40	8.30	0.0157	0.757	19	18.8
	6/8/2015	0.0020	8.4	8.45	0.0136	0.902	19.6	19.5
	6/15/2015	0.0019	7.95	8.26	0.0062	1.02	24.5	24.5
	6/22/2015	0.0017	8.18	8.34	0.0038	1.08	27.4	28.3
	6/29/2015	< 0.0010	8.24	8.43	0.0159	1.08	29.8	29.5
Average Sample Result		0.0019533	8.2953	8.3753	0.0081600	1.0149	30.493	30.727
Exceedance Count		0	0	0	0	0	0	15
Maximum Sample Result		0.0036	8.85	8.45	0.0159	1.16	47.7	48.2
Minimum Sample Result		0.001	7.95	8.26	0.002	0.757	19	18.8
Sample Count		15	15	15	15	15	15	15
Sample Range		0.0026000	0.90000	0.19000	0.013900	0.40300	28.700	29.400
Std Deviation		0.00069986	0.23889	0.056804	0.0046400	0.10687	8.7705	8.9685
Std Error		0.00018070	0.061682	0.014667	0.0011980	0.027595	2.2645	2.3156

LC_FRDSDC (E288272)

statistic	sample_date	SILVER (D)	SILVER (T)	SODIUM (T)	STRONTIUM (D)	STRONTIUM (T)	SULFATE (AS SO4) (D)
	4/7/2015	< 0.010	< 0.010	2.05	0.141	0.145	198
	4/13/2015	< 0.010	< 0.010	2.15	0.141	0.145	194
	4/20/2015	< 0.010	< 0.010	1.92	0.130	0.129	174
	4/27/2015	< 0.010	< 0.010	1.57	0.115	0.114	139
	4/28/2015	< 0.010	< 0.010	1.60	0.117	0.115	140
	5/4/2015	< 0.010	< 0.010	1.45	0.105	0.110	116
	5/5/2015	< 0.010	< 0.010	1.50	0.102	0.104	117
	5/11/2015	< 0.010	< 0.010	1.51	0.105	0.109	119
	5/19/2015	< 0.010	< 0.010	1.40	0.109	0.105	113
	5/25/2015	< 0.010	< 0.010	1.20	0.102	0.109	86.1
	6/1/2015	< 0.010	< 0.010	1.15	0.0933	0.0924	76.4
	6/8/2015	< 0.010	< 0.010	1.16	0.0901	0.0908	79.4
	6/15/2015	< 0.010	< 0.010	1.38	0.0981	0.101	97.8
	6/22/2015	< 0.010	< 0.010	1.43	0.0993	0.107	107
	6/29/2015	< 0.010	< 0.010	1.51	0.113	0.116	120
Average Sample Result		0.010000	0.010000	1.5320	0.11072	0.11281	125.11
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.01	0.01	2.15	0.141	0.145	198
Minimum Sample Result		0.01	0.01	1.15	0.0901	0.0908	76.4
Sample Count		15	15	15	15	15	15
Sample Range		0.0000	0.0000	1.0000	0.050900	0.054200	121.60
Std Deviation		1.7600E-10	1.7600E-10	0.30012	0.015828	0.016037	38.060
Std Error		4.5444E-11	4.5444E-11	0.077492	0.0040867	0.0041408	9.8271

LC_FRDSDC (E288272)

statistic	sample_date	TEMPERATURE, FIELD (N)	THALLIUM (D)	THALLIUM (T)	TIN (D)	TIN (T)	TITANIUM (D)	TITANIUM (T)
	4/7/2015	1.7	< 0.010	< 0.010	< 0.00010	< 0.00010	11	11
	4/13/2015	2.1	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/20/2015	2.6	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/27/2015	3.0	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/28/2015	3.5	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/4/2015	4.0	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/5/2015	4.4	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/11/2015	4.0	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/19/2015	4.5	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/25/2015	5.3	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/1/2015	6.7	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/8/2015	6.7	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	
	6/15/2015	5.8	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/22/2015	8.2	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/29/2015	8.7	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
Average Sample Result		4.7467	0.010000	0.010000	0.00010000	0.00010000	10.067	10.071
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		8.7	0.01	0.01	0.0001	0.0001	11	11
Minimum Sample Result		1.7	0.01	0.01	0.0001	0.0001	10	10
Sample Count		15	15	15	15	15	15	14
Sample Range		7.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000
Std Deviation		2.1280	1.7600E-10	1.7600E-10	0.0000	0.0000	0.25820	0.26726
Std Error		0.54945	4.5444E-11	4.5444E-11	0.0000	0.0000	0.066667	0.071429

LC_FRDSDC (E288272)

statistic	sample_date	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)	TOTAL KJELDAHL NITROGEN (N)	TOTAL ORGANIC CARBON (T)
	4/7/2015	542	< 0.050	0.68
	4/13/2015	531	< 0.050	0.74
	4/20/2015	463	< 0.050	1.05
	4/27/2015	420	< 0.050	1.20
	4/28/2015	420	< 0.050	1.28
	5/4/2015	361	< 0.050	1.63
	5/5/2015	359	< 0.050	1.50
	5/11/2015	380	< 0.050	1.20
	5/19/2015	365	< 0.050	1.37
	5/25/2015	311	< 0.10	1.37
	6/1/2015	284	0.209	1.53
	6/8/2015	282	0.193	1.04
	6/15/2015	365	0.186	1.78
	6/22/2015	348	0.156	0.79
	6/29/2015	410	0.206	1.03
Average Sample Result		389.40	0.10000	1.2127
Exceedance Count		0	0	0
Maximum Sample Result		542	0.209	1.78
Minimum Sample Result		282	0.05	0.68
Sample Count		15	15	15
Sample Range		260.00	0.15900	1.1000
Std Deviation		77.720	0.068033	0.32832
Std Error		20.067	0.017566	0.084771

LC_FRDSDC (E288272)

statistic	sample_date	TOTAL SUSPENDED SOLIDS, LAB (N)	TURBIDITY, LAB (N)	URANIUM (D)	URANIUM (T)	VANADIUM (D)	VANADIUM (T)
	4/7/2015	1.6	0.63	1.77	1.88	< 0.50	< 0.50
	4/13/2015	< 1.0	0.33	1.82	1.90	< 0.50	< 0.50
	4/20/2015	1.6	1.13	1.76	1.72	< 0.50	0.68
	4/27/2015	2.9	0.88	1.44	1.41	< 0.50	< 0.50
	4/28/2015	2.4	0.84	1.48	1.42	< 0.50	< 0.50
	5/4/2015	2.0	1.58	1.36	1.33	< 0.50	0.51
	5/5/2015	5.2	1.45	1.33	1.34	< 0.50	< 0.50
	5/11/2015	1.5	0.59	1.37	1.46	< 0.50	< 0.50
	5/19/2015	2.0	1.0	1.45	1.42	< 0.50	< 0.50
	5/25/2015	9.0	2.07	1.21	1.26	< 0.50	0.63
	6/1/2015	12.2	3.25	1.13	1.12	< 0.50	0.77
	6/8/2015	9.2	1.84	1.16	1.17	< 0.50	< 0.50
	6/15/2015	3.0	1.11	1.33	1.37	< 0.50	< 0.50
	6/22/2015	1.2	0.84	1.32	1.40	< 0.50	< 0.50
	6/29/2015	1.4	0.52	1.54	1.59	< 0.50	< 0.50
Average Sample Result		3.7467	1.2040	1.4313	1.4527	0.50000	0.53933
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		12.2	3.25	1.82	1.9	0.5	0.77
Minimum Sample Result		1	0.33	1.13	1.12	0.5	0.5
Sample Count		15	15	15	15	15	15
Sample Range		11.200	2.9200	0.69000	0.78000	0.0000	0.27000
Std Deviation		3.5244	0.75150	0.21441	0.23023	0.0000	0.084131
Std Error		0.90999	0.19404	0.055359	0.059446	0.0000	0.021723

LC_FRDSDC (E288272)

statistic	sample_date	ZINC (D)	ZINC (T)
	4/7/2015	< 3.0	< 3.0
	4/13/2015	< 3.0	< 3.0
	4/20/2015	< 3.0	< 3.0
	4/27/2015	< 3.0	< 3.0
	4/28/2015	< 3.0	< 3.0
	5/4/2015	< 3.0	< 3.0
	5/5/2015	< 3.0	< 3.0
	5/11/2015	< 3.0	< 3.0
	5/19/2015	< 3.0	< 3.0
	5/25/2015	< 3.0	< 3.0
	6/1/2015	< 3.0	< 3.0
	6/8/2015	< 3.0	< 3.0
	6/15/2015	< 3.0	< 3.0
	6/22/2015	< 3.0	< 3.0
	6/29/2015	< 3.0	< 3.0
Average Sample Result		3.0000	3.0000
Exceedance Count		0	0
Maximum Sample Result		3	3
Minimum Sample Result		3	3
Sample Count		15	15
Sample Range		0.0000	0.0000
Std Deviation		0.0000	0.0000
Std Error		0.0000	0.0000

LC_DC1 (E288270)

statistic	sample_date	ALKALINITY, TOTAL (As CaCO3) (N)	ALUMINUM (D)	ALUMINUM (T)	ANTIMONY (D)	ANTIMONY (T)	ARSENIC (D)
	4/7/2015	164	< 0.0030	0.0413	0.14	0.14	0.15
	4/13/2015	152	< 0.0030	0.0130	0.14	0.16	0.15
	4/20/2015	122	0.0090	0.0723	0.16	0.19	0.24
	4/27/2015	132	0.0051	0.0379	0.16	0.16	0.21
	4/28/2015	130	< 0.0030	0.0260	0.13	0.16	0.20
	5/4/2015	120	0.0066	0.0687	0.14	0.16	0.20
	5/5/2015	119	0.0060	0.0782	0.15	0.16	0.20
	5/11/2015	128	0.0034	0.0318	0.14	0.13	0.20
	5/19/2015	127	0.0039	0.0472	0.14	0.17	0.22
	5/25/2015	134	0.0077	0.112	0.14	0.17	0.20
	6/1/2015						
	6/1/2015	116	0.0303	0.258	0.14	0.23	0.21
	6/8/2015	95.4	0.0150	0.150	0.14	0.17	0.20
	6/15/2015	132	0.0061	0.0465	0.15	0.15	0.18
	6/22/2015	143	0.0034	0.0318	0.14	0.16	0.18
	6/29/2015	150	< 0.0030	0.0191	0.16	0.17	0.17
Average Sample Result		130.96	0.0072333	0.068920	0.14467	0.16533	0.19400
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		164	0.0303	0.258	0.16	0.23	0.24
Minimum Sample Result		95.4	0.003	0.013	0.13	0.13	0.15
Sample Count		15	15	15	15	15	15
Sample Range		68.600	0.027300	0.24500	0.030000	0.10000	0.090000
Std Deviation		16.713	0.0071498	0.063911	0.0091548	0.022636	0.024437
Std Error		4.3152	0.0018461	0.016502	0.0023637	0.0058445	0.0063095

LC_DC1 (E288270)

statistic	sample_date	ARSENIC (T)	BARIUM (D)	BARIUM (T)	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)	BISMUTH (T)	BORON (D)
	4/7/2015	0.18	0.158	0.157	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/13/2015	0.17	0.149	0.146	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/20/2015	0.27	0.142	0.127	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/27/2015	0.26	0.144	0.133	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/28/2015	0.20	0.130	0.129	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/4/2015	0.25	0.126	0.126	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/5/2015	0.24	0.131	0.131	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/11/2015	0.21	0.132	0.131	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/19/2015	0.25	0.136	0.142	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/25/2015	0.27	0.136	0.140	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/1/2015								
	6/1/2015	0.37	0.144	0.152	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/8/2015	0.30	0.145	0.147	< 0.10	< 0.10	< 0.000050	< 0.000050	0.012
	6/15/2015	0.24	0.155	0.148	< 0.10	< 0.10	< 0.000050	< 0.000050	0.010
	6/22/2015	0.20	0.153	0.154	< 0.10	< 0.10	< 0.000050	< 0.000050	0.011
	6/29/2015	0.23	0.165	0.165	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
Average Sample Result		0.24267	0.14307	0.14187	0.10000	0.10000	0.000050000	0.000050000	0.010200
Exceedance Count		0	0	0	0	0	0	0	0
Maximum Sample Result		0.37	0.165	0.165	0.1	0.1	5e-005	5e-005	0.012
Minimum Sample Result		0.17	0.126	0.126	0.1	0.1	5e-005	5e-005	0.01
Sample Count		15	15	15	15	15	15	15	15
Sample Range		0.20000	0.039000	0.039000	0.0000	0.0000	0.0000	0.0000	0.0020000
Std Deviation		0.050351	0.011392	0.012106	0.0000000014080	0.0000000014080	0.0000	0.0000	0.00056061
Std Error		0.013001	0.0029414	0.0031257	3.6355E-10	3.6355E-10	0.0000	0.0000	0.00014475

LC_DC1 (E288270)

statistic	sample_date	BORON (T)	BROMIDE (D)	CADMIUM (D)	CADMIUM (T)	CALCIUM (T)	CARBON, DISSOLVED ORGANIC (D)	CHLORIDE (D)
	4/7/2015	0.010	< 0.050	0.0190	0.0374	42.8	1.71	1.1
	4/13/2015	0.010	< 0.050	0.0278	0.0330	36.1	1.87	< 1.0
	4/20/2015	< 0.010	< 0.050	0.0279	0.0553	34.9	1.92	1.2
	4/27/2015	< 0.010	< 0.050	0.0285	0.0389	33.7	2.03	1.3
	4/28/2015	< 0.010	< 0.050	0.0312	0.0417	32.3	2.12	1.0
	5/4/2015	< 0.010	< 0.050	0.0260	0.0461	30.3	2.06	1.1
	5/5/2015	< 0.010	< 0.050	0.0285	0.0462	29.9	1.89	< 1.0
	5/11/2015	< 0.010	< 0.050	0.0237	0.0393	32.2	1.83	< 1.0
	5/19/2015	< 0.010	< 0.050	0.0271	0.0457	33.2	2.06	< 1.0
	5/25/2015	0.010	< 0.050	0.0291	0.0669	32.0	2.14	< 1.0
	6/1/2015							
	6/1/2015	< 0.010	< 0.050	0.0282	0.123	32.3	2.31	1.2
	6/8/2015	0.012	< 0.050	0.0305	0.0769	32.6	1.95	< 1.0
	6/15/2015	< 0.010	< 0.050	0.0258	0.0432	33.9	1.75	< 1.0
	6/22/2015	0.012	< 0.050	0.0326	0.0466	36.0	1.67	< 1.0
	6/29/2015	< 0.010	< 0.050	0.0304	0.0441	37.8	1.50	< 1.0
Average Sample Result		0.010267	0.050000	0.027753	0.052287	34.000	1.9207	1.0600
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.012	0.05	0.0326	0.123	42.8	2.31	1.3
Minimum Sample Result		0.01	0.05	0.019	0.033	29.9	1.5	1
Sample Count		15	15	15	15	15	15	15
Sample Range		0.0020000	0.0000	0.013600	0.090000	12.900	0.81000	0.30000
Std Deviation		0.00070373	7.0401E-10	0.0033106	0.022651	3.2439	0.20978	0.098561
Std Error		0.00018170	1.8178E-10	0.00085478	0.0058485	0.83757	0.054164	0.025448

LC_DC1 (E288270)

statistic	sample_date	CHROMIUM (D)	CHROMIUM (T)	COBALT (D)	COBALT (T)	CONDUCTIVITY, FIELD (N)	CONDUCTIVITY, LAB (N)
	4/7/2015	0.11	0.16	< 0.10	< 0.10	281.9	296
	4/13/2015	< 0.10	0.13	< 0.10	< 0.10	256.5	253
	4/20/2015	< 0.10	0.21	< 0.10	< 0.10	223.1	233
	4/27/2015	< 0.10	0.13	< 0.10	< 0.10	227.2	241
	4/28/2015	< 0.10	0.12	< 0.10	< 0.10	228.6	244
	5/4/2015	< 0.10	0.23	< 0.10	< 0.10	217.7	232
	5/5/2015	< 0.10	0.23	< 0.10	< 0.10	207.61	232
	5/11/2015	< 0.10	0.15	< 0.10	< 0.10	216.5	231
	5/19/2015	< 0.10	0.18	< 0.10	< 0.10	214.8	199
	5/25/2015	< 0.10	0.24	< 0.10	< 0.10	207.0	223
	6/1/2015						
	6/1/2015	< 0.10	0.55	< 0.10	0.17	223.7	218
	6/8/2015	0.13	0.38	< 0.10	< 0.10	235.1	222
	6/15/2015	< 0.10	0.19	< 0.10	< 0.10	255.7	231
	6/22/2015	0.12	0.18	< 0.10	< 0.10	204.5	278
	6/29/2015	< 0.10	0.13	< 0.10	< 0.10	259.8	301
Average Sample Result		0.10400	0.21400	0.10000	0.10467	230.65	242.27
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.13	0.55	0.1	0.17	281.9	301
Minimum Sample Result		0.1	0.12	0.1	0.1	204.5	199
Sample Count		15	15	15	15	15	15
Sample Range		0.030000	0.43000	0.0000	0.070000	77.400	102.00
Std Deviation		0.0091026	0.11388	0.0000000014080	0.018074	22.845	28.694
Std Error		0.0023503	0.029404	3.6355E-10	0.0046667	5.8985	7.4088

LC_DC1 (E288270)

statistic	sample_date	COPPER (D)	COPPER (T)	DISSOLVED OXYGEN, FIELD (N)	FLUORIDE (D)	Hardness, Total or Dissolved CaCO3 (N)
	4/7/2015	< 0.50	< 0.50	12.93	0.120	168
	4/13/2015	< 0.50	< 0.50	12.16	0.123	149
	4/20/2015	< 0.50	0.87	12.75	0.108	134
	4/27/2015	< 0.50	< 0.50	11.75	0.104	129
	4/28/2015	< 0.50	< 0.50	11.71	0.104	130
	5/4/2015	< 0.50	< 0.50	10.51	0.105	119
	5/5/2015	< 0.50	< 0.50	10.33	0.102	119
	5/11/2015	< 0.50	< 0.50	12.24	0.109	131
	5/19/2015	< 0.50	< 0.50	12.83	0.109	127
	5/25/2015	< 0.50	0.55	10.96	0.103	123
	6/1/2015					
	6/1/2015	< 0.50	0.96	10.77	0.107	125
	6/8/2015	< 0.50	0.67	9.73	0.109	127
	6/15/2015	< 0.50	< 0.50	10.88	0.107	139
	6/22/2015	< 0.50	< 0.50	9.41	0.114	143
	6/29/2015	< 0.50	1.32	10.7	0.117	152
Average Sample Result		0.50000	0.62467	11.311	0.10940	134.33
Exceedance Count		0	0	0	0	0
Maximum Sample Result		0.5	1.32	12.93	0.123	168
Minimum Sample Result		0.5	0.5	9.41	0.102	119
Sample Count		15	15	15	15	15
Sample Range		0.0000	0.82000	3.5200	0.021000	49.000
Std Deviation		0.0000	0.24189	1.1221	0.0063449	13.652
Std Error		0.0000	0.062457	0.28972	0.0016382	3.5250

LC_DC1 (E288270)

statistic	sample_date	INSTANTANEOUS FLOW (N)	IRON (D)	IRON (T)	LEAD (D)	LEAD (T)	LITHIUM (D)	LITHIUM (T)	MAGNESIUM (T)
	4/7/2015		< 0.010	0.038	< 0.050	< 0.050	0.0094	0.0096	15.2
	4/13/2015		< 0.010	0.019	< 0.050	< 0.050	0.0090	0.0088	13.9
	4/20/2015		< 0.010	0.090	< 0.050	0.076	0.0084	0.0076	11.0
	4/27/2015		< 0.010	0.041	< 0.050	< 0.050	0.0084	0.0082	11.2
	4/28/2015		< 0.010	0.036	< 0.050	< 0.050	0.0078	0.0079	11.0
	5/4/2015		< 0.010	0.073	< 0.050	0.076	0.0081	0.0078	10.3
	5/5/2015		< 0.010	0.073	< 0.050	0.067	0.0081	0.0081	10.5
	5/11/2015		< 0.010	0.037	< 0.050	< 0.050	0.0091	0.0086	11.1
	5/19/2015		< 0.010	0.040	< 0.050	< 0.050	0.0085	0.0090	11.4
	5/25/2015		< 0.010	0.107	< 0.050	0.120	0.0089	0.0089	10.9
	6/1/2015								
	6/1/2015		< 0.010	0.266	< 0.050	0.313	0.0088	0.0093	10.8
	6/8/2015		< 0.010	0.160	0.148	0.177	0.0093	0.0094	10.8
	6/15/2015		< 0.010	0.058	< 0.050	0.059	0.0103	0.0096	11.9
	6/22/2015		< 0.010	0.048	< 0.050	< 0.050	0.0107	0.0103	13.3
	6/29/2015		< 0.010	0.027	< 0.050	< 0.050	0.0096	0.0094	13.6
Average Sample Result		0	0.010000	0.074200	0.056533	0.085867	0.0089600	0.0088333	11.793
Exceedance Count		0	0	0	0	0	0	0	0
Maximum Sample Result		0	0.01	0.266	0.148	0.313	0.0107	0.0103	15.2
Minimum Sample Result		0	0.01	0.019	0.05	0.05	0.0078	0.0076	10.3
Sample Count		0	15	15	15	15	15	15	15
Sample Range		0	0.0000	0.24700	0.098000	0.26300	0.0029000	0.0027000	4.9000
Std Deviation		0	1.7600E-10	0.064435	0.025303	0.072024	0.00081311	0.00078710	1.4762
Std Error		0	4.5444E-11	0.016637	0.0065333	0.018596	0.00020994	0.00020323	0.38116

LC_DC1 (E288270)

statistic	sample_date	MANGANESE (D)	MANGANESE (T)	MERCURY (D)	MERCURY (T)	MOLYBDENUM (D)	MOLYBDENUM (T)	NICKEL (D)
	4/7/2015	0.00065	0.00210	< 0.0050	< 0.0050	0.00108	0.00109	< 0.50
	4/13/2015	0.00057	0.00118	< 0.0050	< 0.0050	0.00111	0.00109	< 0.50
	4/20/2015	0.00056	0.00350	< 0.0050	< 0.0050	0.000963	0.000934	0.51
	4/27/2015	0.00050	0.00153	< 0.0050	< 0.0050	0.000944	0.000917	0.52
	4/28/2015	0.00019	0.00129	< 0.0050	< 0.0050	0.000907	0.000964	0.51
	5/4/2015	0.00030	0.00181	< 0.0050	< 0.0050	0.000945	0.000937	< 0.50
	5/5/2015	0.00040	0.00171	< 0.0050	< 0.0050	0.000934	0.000944	< 0.50
	5/11/2015	0.00041	0.00119	< 0.0050	< 0.0050	0.000963	0.000960	< 0.50
	5/19/2015	0.00029	0.00144	< 0.0050	< 0.0050	0.000974	0.00101	< 0.50
	5/25/2015	0.00050	0.00356	< 0.0050	< 0.0050	0.000966	0.000984	< 0.50
	6/1/2015							
	6/1/2015	0.00082	0.00633	< 0.0050	0.0056	0.000915	0.000946	0.51
	6/8/2015	0.00059	0.00383	< 0.0050	< 0.0050	0.000943	0.000959	< 0.50
	6/15/2015	0.00054	0.00193	< 0.0050	< 0.0050	0.00104	0.000970	< 0.50
	6/22/2015	0.00065	0.00187	< 0.0050	< 0.0050	0.000984	0.000994	< 0.50
	6/29/2015	0.00060	0.00167	< 0.0050	< 0.0050	0.00110	0.00108	< 0.50
Average Sample Result		0.00050467	0.0023293	0.0050000	0.0050400	0.00098453	0.00098527	0.50333
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.00082	0.00633	0.005	0.0056	0.00111	0.00109	0.52
Minimum Sample Result		0.00019	0.00118	0.005	0.005	0.000907	0.000917	0.5
Sample Count		15	15	15	15	15	15	15
Sample Range		0.00063000	0.0051500	0.0000	0.00060000	0.00020300	0.00017300	0.020000
Std Deviation		0.00016335	0.0014087	8.8002E-11	0.00015492	0.000065997	0.000057619	0.0061721
Std Error		0.000042177	0.00036373	2.2722E-11	0.000040000	0.000017040	0.000014877	0.0015936

LC_DC1 (E288270)

statistic	sample_date	NICKEL (T)	NITRATE NITROGEN (NO3), AS N (N)	NITRITE NITROGEN (NO2), AS N (N)	NITROGEN, AMMONIA (AS N) (N)
	4/7/2015	< 0.50	0.149	< 0.0010	< 0.0050
	4/13/2015	< 0.50	0.155	< 0.0010	< 0.0050
	4/20/2015	0.56	0.226	< 0.0010	< 0.0050
	4/27/2015	0.64	0.164	< 0.0010	< 0.0050
	4/28/2015	0.51	0.163	< 0.0010	< 0.0050
	5/4/2015	0.65	0.124	< 0.0010	< 0.0050
	5/5/2015	0.64	0.117	< 0.0010	< 0.0050
	5/11/2015	< 0.50	0.0768	< 0.0010	< 0.0050
	5/19/2015	0.56	0.0547	< 0.0010	< 0.0050
	5/25/2015	0.66	0.0811	< 0.0010	0.0076
	6/1/2015				
	6/1/2015	1.28	0.0983	< 0.0010	0.0057
	6/8/2015	0.93	0.108	< 0.0010	0.0052
	6/15/2015	0.56	0.0930	< 0.0010	0.0055
	6/22/2015	0.50	0.0598	< 0.0010	0.0057
	6/29/2015	0.52	0.0425	< 0.0010	0.0056
Average Sample Result		0.63400	0.11415	0.0010000	0.0053533
Exceedance Count		0	0	0	0
Maximum Sample Result		1.28	0.226	0.001	0.0076
Minimum Sample Result		0.5	0.0425	0.001	0.005
Sample Count		15	15	15	15
Sample Range		0.78000	0.18350	0.0000	0.0026000
Std Deviation		0.21088	0.050154	0.0000	0.00068229
Std Error		0.054448	0.012950	0.0000	0.00017617

LC_DC1 (E288270)

statistic	sample_date	ORTHO-PHOSPHATE (N)	pH, Field (N)	pH, LAB (N)	PHOSPHORUS (N)	POTASSIUM (T)	SELENIUM (D)	SELENIUM (T)
	4/7/2015	0.0107	8.81	8.44	0.0134	1.09	1.5	1.5
	4/13/2015	0.0106	8.76	8.38	0.0133	1.01	1.47	1.46
	4/20/2015	0.0189	7.97	8.33	0.0282	0.938	1.11	1.17
	4/27/2015	0.0185	8.41	8.38	0.0257	0.878	1.29	1.39
	4/28/2015	0.0173	8.31	8.36	0.0194	0.868	1.38	1.8
	5/4/2015	0.0183	8.49	8.37	0.0239	0.872	1.42	1.38
	5/5/2015	0.0182	8.27	8.37	0.0275	0.924	1.37	1.4
	5/11/2015	0.0149	8.22	8.39	0.0217	0.899	1.5	1.49
	5/19/2015	0.0126	8.52	8.27	0.0226	0.932	1.51	1.52
	5/25/2015	0.0162	8.36	8.31	0.0274	0.933	1.34	1.42
	6/1/2015							
	6/1/2015	0.0198	8.34	8.26	0.0448	0.905	1.44	1.54
	6/8/2015	0.0202	8.72	8.40	0.0588	0.990	1.36	1.49
	6/15/2015	0.0161	8.41	8.31	0.0232	0.955	1.38	1.4
	6/22/2015	0.0154	8.44	8.37	0.0163	1.07	1.47	1.46
	6/29/2015	0.0124	8.22	8.48	0.0180	1.11	1.46	1.45
Average Sample Result		0.016007	8.4167	8.3613	0.025613	0.95827	1.4000	1.4580
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.0202	8.81	8.48	0.0588	1.11	1.51	1.8
Minimum Sample Result		0.0106	7.97	8.26	0.0133	0.868	1.11	1.17
Sample Count		15	15	15	15	15	15	15
Sample Range		0.0096000	0.84000	0.22000	0.045500	0.24200	0.40000	0.63000
Std Deviation		0.0031842	0.22363	0.058781	0.011953	0.079215	0.10372	0.12907
Std Error		0.00082216	0.057741	0.015177	0.0030862	0.020453	0.026780	0.033327

LC_DC1 (E288270)

statistic	sample_date	SILVER (D)	SILVER (T)	SODIUM (T)	STRONTIUM (D)	STRONTIUM (T)	SULFATE (AS SO4) (D)
	4/7/2015	< 0.010	< 0.010	1.10	0.0474	0.0485	8.13
	4/13/2015	< 0.010	< 0.010	1.00	0.0462	0.0454	7.66
	4/20/2015	< 0.010	0.013	0.974	0.0396	0.0386	6.76
	4/27/2015	< 0.010	< 0.010	1.01	0.0385	0.0387	6.76
	4/28/2015	< 0.010	< 0.010	0.985	0.0368	0.0393	6.90
	5/4/2015	< 0.010	< 0.010	0.973	0.0383	0.0387	7.64
	5/5/2015	< 0.010	< 0.010	1.02	0.0389	0.0391	7.56
	5/11/2015	< 0.010	< 0.010	1.01	0.0401	0.0374	7.78
	5/19/2015	< 0.010	< 0.010	1.05	0.0401	0.0420	7.88
	5/25/2015	< 0.010	< 0.010	0.943	0.0402	0.0418	7.99
	6/1/2015						
	6/1/2015	< 0.010	0.019	0.991	0.0384	0.0404	7.14
	6/8/2015	< 0.010	< 0.010	1.04	0.0392	0.0402	7.01
	6/15/2015	< 0.010	< 0.010	1.04	0.0431	0.0417	7.08
	6/22/2015	< 0.010	< 0.010	1.08	0.0417	0.0426	7.35
	6/29/2015	< 0.010	< 0.010	1.23	0.0468	0.0472	7.26
Average Sample Result		0.010000	0.010800	1.0297	0.041020	0.041440	7.3933
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.01	0.019	1.23	0.0474	0.0485	8.13
Minimum Sample Result		0.01	0.01	0.943	0.0368	0.0374	6.76
Sample Count		15	15	15	15	15	15
Sample Range		0.0000	0.0090000	0.28700	0.010600	0.011100	1.3700
Std Deviation		1.7600E-10	0.0023964	0.069333	0.0033418	0.0033019	0.44875
Std Error		4.5444E-11	0.00061875	0.017902	0.00086284	0.00085255	0.11587

LC_DC1 (E288270)

statistic	sample_date	TEMPERATURE, FIELD (N)	THALLIUM (D)	THALLIUM (T)	TIN (D)	TIN (T)	TITANIUM (D)	TITANIUM (T)
	4/7/2015	3.0	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/13/2015	1.6	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/20/2015	1.8	< 0.010	0.014	< 0.00010	< 0.00010	< 10	< 10
	4/27/2015	2.6	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/28/2015	2.6	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/4/2015	4.3	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/5/2015	4.8	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/11/2015	3.7	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/19/2015	5.6	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/25/2015	6.6	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/1/2015							
	6/1/2015	6.7	< 0.010	0.018	< 0.00010	< 0.00010	< 10	< 10
	6/8/2015	8.6	< 0.010	0.010	< 0.00010	< 0.00010	< 10	
	6/15/2015	6.1	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/22/2015	10.00	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/29/2015	8.1	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
Average Sample Result		5.0733	0.010000	0.010800	0.00010000	0.00010000	10.000	10.000
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		10	0.01	0.018	0.0001	0.0001	10	10
Minimum Sample Result		1.6	0.01	0.01	0.0001	0.0001	10	10
Sample Count		15	15	15	15	15	15	14
Sample Range		8.4000	0.0000	0.0080000	0.0000	0.0000	0.0000	0.0000
Std Deviation		2.5919	1.7600E-10	0.0022424	0.0000	0.0000	0.0000	0.0000
Std Error		0.66922	4.5444E-11	0.00057900	0.0000	0.0000	0.0000	0.0000

LC_DC1 (E288270)

statistic	sample_date	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)	TOTAL KJELDAHL NITROGEN (N)	TOTAL ORGANIC CARBON (T)
	4/7/2015	165	0.094	1.46
	4/13/2015	165	0.066	1.41
	4/20/2015	128	0.157	2.10
	4/27/2015	143	0.081	1.98
	4/28/2015	145	0.092	2.40
	5/4/2015	139	0.137	2.49
	5/5/2015	135	0.146	2.18
	5/11/2015	128	0.137	1.90
	5/19/2015	134	0.126	2.22
	5/25/2015	130	0.167	2.30
	6/1/2015			
	6/1/2015	138	0.185	2.51
	6/8/2015	135	0.120	1.90
	6/15/2015	149	0.110	1.66
	6/22/2015	161	0.111	1.73
	6/29/2015	159	0.111	1.58
Average Sample Result		143.60	0.12267	1.9880
Exceedance Count		0	0	0
Maximum Sample Result		165	0.185	2.51
Minimum Sample Result		128	0.066	1.41
Sample Count		15	15	15
Sample Range		37.000	0.11900	1.1000
Std Deviation		13.233	0.032891	0.36487
Std Error		3.4168	0.0084924	0.094209

LC_DC1 (E288270)

statistic	sample_date	TOTAL SUSPENDED SOLIDS, LAB (N)	TURBIDITY, LAB (N)	URANIUM (D)	URANIUM (T)	VANADIUM (D)	VANADIUM (T)
	4/7/2015	1.9	1.28	0.369	0.372	< 0.50	0.79
	4/13/2015	1.3	0.57	0.350	0.338	< 0.50	0.57
	4/20/2015	6.6	2.52	0.281	0.282	0.87	1.41
	4/27/2015	3.2	1.17	0.250	0.254	0.80	1.10
	4/28/2015	1.8	1.07	0.241	0.263	0.73	0.90
	5/4/2015	2.5	4.51	0.242	0.248	0.76	1.19
	5/5/2015	3.6	3.59	0.244	0.253	0.81	1.23
	5/11/2015	1.2	1.56	0.247	0.223	0.74	0.88
	5/19/2015	2.0	2.78	0.256	0.256	0.76	1.03
	5/25/2015	6.5	5.21	0.226	0.238	0.76	1.43
	6/1/2015	13	35.9				
	6/1/2015	13.2	19.1	0.232	0.262	0.87	2.28
	6/8/2015	8.7	10.5	0.229	0.246	0.82	1.70
	6/15/2015	3.0	3.20	0.257	0.250	0.75	1.13
	6/22/2015	1.9	1.54	0.263	0.266	0.69	0.92
	6/29/2015	1.7	0.92	0.291	0.283	0.68	0.94
Average Sample Result		4.5063	5.9638	0.26520	0.26893	0.73600	1.1667
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		13.2	35.9	0.369	0.372	0.87	2.28
Minimum Sample Result		1.2	0.57	0.226	0.223	0.5	0.57
Sample Count		16	16	15	15	15	15
Sample Range		12.000	35.330	0.14300	0.14900	0.37000	1.7100
Std Deviation		3.9897	9.2723	0.042361	0.038625	0.11057	0.41790
Std Error		0.99743	2.3181	0.010938	0.0099730	0.028549	0.10790

LC_DC1 (E288270)

statistic	sample_date	ZINC (D)	ZINC (T)
	4/7/2015	< 3.0	< 3.0
	4/13/2015	< 3.0	< 3.0
	4/20/2015	< 3.0	< 3.0
	4/27/2015	< 3.0	< 3.0
	4/28/2015	< 3.0	< 3.0
	5/4/2015	< 3.0	< 3.0
	5/5/2015	< 3.0	< 3.0
	5/11/2015	< 3.0	< 3.0
	5/19/2015	< 3.0	< 3.0
	5/25/2015	< 3.0	3.1
	6/1/2015		
	6/1/2015	< 3.0	9.6
	6/8/2015	< 3.0	3.4
	6/15/2015	< 3.0	< 3.0
	6/22/2015	< 3.0	< 3.0
	6/29/2015	3.4	< 3.0
Average Sample Result		3.0267	3.4733
Exceedance Count		0	0
Maximum Sample Result		3.4	9.6
Minimum Sample Result		3	3
Sample Count		15	15
Sample Range		0.40000	6.6000
Std Deviation		0.10328	1.6981
Std Error		0.026667	0.43845

LC_DCDS (E295210)

statistic	sample_date	ALKALINITY, TOTAL (As CaCO3) (N)	ALUMINUM (D)	ALUMINUM (T)	ANTIMONY (D)	ANTIMONY (T)	ARSENIC (D)
	4/7/2015	108	0.0137	0.152	0.22	0.23	0.27
	4/13/2015	95.4	0.0141	0.0987	0.22	0.24	0.28
	4/20/2015	92.2	0.0248	0.102	0.19	0.21	0.28
	4/28/2015	74.9	0.0158	0.0679	0.17	0.21	0.26
	5/4/2015	108	0.0092	0.0604	0.13	0.14	0.22
	5/5/2015	92.0	0.0288	0.176	0.15	0.19	0.27
	5/11/2015	100	0.0132	0.0646	0.15	0.16	0.27
	5/19/2015	98.5	0.0133	0.111	0.16	0.17	0.26
	5/25/2015	75.6	0.0367	0.264	0.16	0.19	0.24
	6/1/2015	92.5	0.108	1.13	0.15	0.30	0.25
	6/8/2015	78.6	0.0590	0.454	0.16	0.25	0.30
	6/15/2015	107	0.0174	0.105	0.18	0.18	0.24
	6/22/2015	116	0.0058	0.0379	0.14	0.16	0.22
	6/29/2015	116	0.0083	0.0290	0.17	0.21	0.27
Average Sample Result		96.764	0.026293	0.20375	0.16786	0.20286	0.25929
Exceedance Count		0	1	0	0	0	0
Maximum Sample Result		116	0.108	1.13	0.22	0.3	0.3
Minimum Sample Result		74.9	0.0058	0.029	0.13	0.14	0.22
Sample Count		14	14	14	14	14	14
Sample Range		41.100	0.10220	1.1010	0.090000	0.16000	0.080000
Std Deviation		13.673	0.027365	0.28874	0.026941	0.042504	0.023027
Std Error		3.6542	0.0073137	0.077168	0.0072003	0.011360	0.0061541

LC_DCDS (E295210)

statistic	sample_date	ARSENIC (T)	BARIUM (D)	BARIUM (T)	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)	BISMUTH (T)	BORON (D)
	4/7/2015	0.30	0.120	0.132	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/13/2015	0.31	0.118	0.116	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/20/2015	0.36	0.0901	0.0902	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/28/2015	0.30	0.0937	0.0911	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/4/2015	0.25	0.156	0.153	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/5/2015	0.36	0.0933	0.0961	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/11/2015	0.28	0.0990	0.0990	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/19/2015	0.30	0.102	0.103	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/25/2015	0.38	0.0971	0.0998	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/1/2015	0.68	0.102	0.130	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/8/2015	0.43	0.111	0.113	< 0.10	< 0.10	< 0.000050	< 0.000050	0.011
	6/15/2015	0.29	0.119	0.116	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/22/2015	0.27	0.149	0.147	< 0.10	< 0.10	< 0.000050	< 0.000050	0.012
	6/29/2015	0.31	0.130	0.126	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
Average Sample Result		0.34429	0.11287	0.11516	0.10000	0.10000	0.000050000	0.000050000	0.010214
Exceedance Count		0	0	0	0	0	0	0	0
Maximum Sample Result		0.68	0.156	0.153	0.1	0.1	5e-005	5e-005	0.012
Minimum Sample Result		0.25	0.0901	0.0902	0.1	0.1	5e-005	5e-005	0.01
Sample Count		14	14	14	14	14	14	14	14
Sample Range		0.43000	0.065900	0.062800	0.0000	0.0000	0.0000	0.0000	0.0020000
Std Deviation		0.10797	0.020613	0.020159	0.0000000014612	0.0000000014612	0.0000	0.0000	0.00057893
Std Error		0.028856	0.0055090	0.0053878	3.9052E-10	3.9052E-10	0.0000	0.0000	0.00015473

LC_DCDS (E295210)

statistic	sample_date	BORON (T)	BROMIDE (D)	CADMIUM (D)	CADMIUM (T)	CALCIUM (T)	CARBON, DISSOLVED ORGANIC (D)	CHLORIDE (D)
	4/7/2015	0.010	< 0.050	0.0385	0.0462	33.2	2.07	1.2
	4/13/2015	< 0.010	< 0.050	0.0315	0.0517	28.2	2.12	< 1.0
	4/20/2015	< 0.010	< 0.050	0.0416	0.0509	24.5	2.78	1.2
	4/28/2015	< 0.010	< 0.050	0.0444	0.0550	23.5	2.54	1.1
	5/4/2015	< 0.010	< 0.050	0.0220	0.0522	26.7	2.21	< 1.0
	5/5/2015	< 0.010	< 0.050	0.0385	0.0671	24.8	2.20	1.1
	5/11/2015	< 0.010	< 0.050	0.0319	0.0598	25.7	2.07	1.2
	5/19/2015	< 0.010	< 0.050	0.0369	0.0759	26.0	2.11	< 1.0
	5/25/2015	< 0.010	< 0.050	0.0339	0.0929	25.7	1.39	< 1.0
	6/1/2015	0.010	< 0.050	0.0314	0.273	25.7	2.92	2.2
	6/8/2015	0.012	< 0.050	0.121	0.137	25.8	2.15	1.0
	6/15/2015	< 0.010	< 0.050	0.0314	0.0653	28.0	1.91	1.1
	6/22/2015	0.012	< 0.050	0.0382	0.0510	29.8	1.75	< 1.0
	6/29/2015	< 0.010	< 0.050	0.0232	0.0483	30.1	1.83	< 1.0
Average Sample Result		0.010286	0.050000	0.040314	0.080450	26.979	2.1464	1.1500
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.012	0.05	0.121	0.273	33.2	2.92	2.2
Minimum Sample Result		0.01	0.05	0.022	0.0462	23.5	1.39	1
Sample Count		14	14	14	14	14	14	14
Sample Range		0.0020000	0.0000	0.099000	0.22680	9.7000	1.5300	1.2000
Std Deviation		0.00072627	7.3059E-10	0.024064	0.060449	2.6204	0.39814	0.31317
Std Error		0.00019410	1.9526E-10	0.0064314	0.016156	0.70033	0.10641	0.083699

LC_DCDS (E295210)

statistic	sample_date	CHROMIUM (D)	CHROMIUM (T)	COBALT (D)	COBALT (T)	CONDUCTIVITY, FIELD (N)	CONDUCTIVITY, LAB (N)
	4/7/2015	0.13	0.34	< 0.10	< 0.10	215.2	235
	4/13/2015	< 0.10	0.26	< 0.10	< 0.10	192.1	215
	4/20/2015	0.10	0.30	< 0.10	< 0.10	169.0	178
	4/28/2015	< 0.10	0.18	< 0.10	< 0.10	179.6	191
	5/4/2015	< 0.10	0.21	< 0.10	< 0.10	177.4	217
	5/5/2015	0.12	0.42	< 0.10	< 0.10	170.5	189
	5/11/2015	0.10	0.22	< 0.10	< 0.10	178.4	194
	5/19/2015	< 0.10	0.34	< 0.10	< 0.10	182.0	202
	5/25/2015	< 0.10	0.54	< 0.10	0.19	178.3	191
	6/1/2015	0.15	2.18	< 0.10	0.46	185.5	183
	6/8/2015	0.13	0.98	0.13	0.20	196.5	202
	6/15/2015	< 0.10	0.27	< 0.10	< 0.10	223.3	193
	6/22/2015	< 0.10	0.20	< 0.10	< 0.10	166.8	234
	6/29/2015	< 0.10	0.14	< 0.10	< 0.10	216.3	237
Average Sample Result		0.10929	0.47000	0.10214	0.13929	187.92	204.36
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.15	2.18	0.13	0.46	223.3	237
Minimum Sample Result		0.1	0.14	0.1	0.1	166.8	178
Sample Count		14	14	14	14	14	14
Sample Range		0.050000	2.0400	0.030000	0.36000	56.500	59.000
Std Deviation		0.016392	0.53597	0.0080178	0.098486	18.405	19.898
Std Error		0.0043808	0.14324	0.0021429	0.026321	4.9191	5.3180

LC_DCDS (E295210)

statistic	sample_date	COPPER (D)	COPPER (T)	DISSOLVED OXYGEN, FIELD (N)	FLUORIDE (D)	Hardness, Total or Dissolved CaCO3 (N)
	4/7/2015	< 0.50	< 0.50	13.38	0.102	122
	4/13/2015	< 0.50	< 0.50	11.83	0.101	112
	4/20/2015	< 0.50	0.64	12.27	0.092	93.2
	4/28/2015	< 0.50	< 0.50	11.85	0.089	91.9
	5/4/2015	< 0.50	< 0.50	10.10	0.099	108
	5/5/2015	< 0.50	0.59	10.25	0.093	95.6
	5/11/2015	< 0.50	< 0.50	11.92	0.097	101
	5/19/2015	< 0.50	0.51	10.84	0.094	103
	5/25/2015	< 0.50	0.96	10.08	0.095	101
	6/1/2015	< 0.50	2.27	10.44	0.099	97.7
	6/8/2015	0.68	1.23	8.83	0.101	100
	6/15/2015	< 0.50	0.52	10.46	0.097	112
	6/22/2015	< 0.50	< 0.50	9.40	0.102	119
	6/29/2015	< 0.50	< 0.50	9.34	0.102	119
Average Sample Result		0.51286	0.73000	10.785	0.097357	105.39
Exceedance Count		0	0	0	0	0
Maximum Sample Result		0.68	2.27	13.38	0.102	122
Minimum Sample Result		0.5	0.5	8.83	0.089	91.9
Sample Count		14	14	14	14	14
Sample Range		0.18000	1.7700	4.5500	0.013000	30.100
Std Deviation		0.048107	0.49342	1.2938	0.0042173	9.9978
Std Error		0.012857	0.13187	0.34579	0.0011271	2.6720

LC_DCDS (E295210)

statistic	sample_date	INSTANTANEOUS FLOW (N)	IRON (D)	IRON (T)	LEAD (D)	LEAD (T)	LITHIUM (D)	LITHIUM (T)	MAGNESIUM (T)
	4/7/2015		< 0.010	0.066	< 0.050	0.054	0.0079	0.0094	11.1
	4/13/2015		< 0.010	0.051	< 0.050	< 0.050	0.0080	0.0079	10.2
	4/20/2015		0.011	0.099	< 0.050	0.092	0.0049	0.0048	8.01
	4/28/2015		< 0.010	0.051	< 0.050	0.053	0.0055	0.0053	7.94
	5/4/2015		< 0.010	0.058	< 0.050	0.068	0.0121	0.0113	9.61
	5/5/2015		0.014	0.144	< 0.050	0.126	0.0051	0.0051	8.42
	5/11/2015		< 0.010	0.067	< 0.050	0.073	0.0064	0.0062	8.64
	5/19/2015		< 0.010	0.095	< 0.050	0.133	0.0061	0.0060	8.90
	5/25/2015		0.010	0.262	< 0.050	0.310	0.0061	0.0061	8.66
	6/1/2015	0.559	0.040	0.914	< 0.050	0.912	0.0064	0.0070	8.74
	6/8/2015		0.040	0.394	0.197	0.409	0.0069	0.0067	8.72
	6/15/2015		< 0.010	0.104	< 0.050	0.113	0.0083	0.0079	9.51
	6/22/2015		< 0.010	0.041	< 0.050	0.068	0.0118	0.0117	10.7
	6/29/2015		< 0.010	0.021	< 0.050	< 0.050	0.0081	0.0077	10.2
Average Sample Result		0.55900	0.014643	0.16907	0.060500	0.17936	0.0074000	0.0073643	9.2393
Exceedance Count		0	0	0	0	0	0	0	0
Maximum Sample Result		0.559	0.04	0.914	0.197	0.912	0.0121	0.0117	11.1
Minimum Sample Result		0.559	0.01	0.021	0.05	0.05	0.0049	0.0048	7.94
Sample Count		1	14	14	14	14	14	14	14
Sample Range		0.0000	0.030000	0.89300	0.14700	0.86200	0.0072000	0.0069000	3.1600
Std Deviation		0	0.010796	0.23680	0.039287	0.23613	0.0022212	0.0021568	0.99429
Std Error		0	0.0028854	0.063289	0.010500	0.063109	0.00059365	0.00057642	0.26573

LC_DCDS (E295210)

statistic	sample_date	MANGANESE (D)	MANGANESE (T)	MERCURY (D)	MERCURY (T)	MOLYBDENUM (D)	MOLYBDENUM (T)	NICKEL (D)
	4/7/2015	0.00052	0.00111	< 0.0050	< 0.0050	0.000940	0.00103	0.82
	4/13/2015	0.00047	0.00101	< 0.0050	< 0.0050	0.000986	0.00101	0.60
	4/20/2015	0.00055	0.00205	< 0.0050	< 0.0050	0.000786	0.000791	0.76
	4/28/2015	0.00056	0.00118	< 0.0050	< 0.0050	0.000777	0.000793	0.73
	5/4/2015	0.00029	0.00107	< 0.0050	< 0.0050	0.000943	0.000909	0.50
	5/5/2015	0.00080	0.00250	< 0.0050	< 0.0050	0.000784	0.000826	0.64
	5/11/2015	0.00054	0.00136	< 0.0050	< 0.0050	0.000864	0.000883	0.59
	5/19/2015	0.00049	0.00215	< 0.0050	< 0.0050	0.000867	0.000810	0.56
	5/25/2015	0.00211	0.00800	< 0.0050	0.0056	0.000870	0.000929	0.52
	6/1/2015	0.00301	0.0153	< 0.0050	0.0117	0.000857	0.000953	0.58
	6/8/2015	0.00530	0.00666	< 0.0050	< 0.0050	0.000754	0.000923	0.95
	6/15/2015	0.00078	0.00238	< 0.0050	< 0.0050	0.000929	0.000912	0.60
	6/22/2015	0.00036	0.00120	< 0.0050	< 0.0050	0.000890	0.000929	0.56
	6/29/2015	0.00025	0.00107	< 0.0050	< 0.0050	0.00106	0.00102	0.65
Average Sample Result		0.0011450	0.0033600	0.0050000	0.0055214	0.00087907	0.00090843	0.64714
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.0053	0.0153	0.005	0.0117	0.00106	0.00103	0.95
Minimum Sample Result		0.00025	0.00101	0.005	0.005	0.000754	0.000791	0.5
Sample Count		14	14	14	14	14	14	14
Sample Range		0.0050500	0.014290	0.0000	0.0067000	0.00030600	0.00023900	0.45000
Std Deviation		0.0014254	0.0040606	1.1185E-10	0.0017855	0.000087392	0.000080787	0.12603
Std Error		0.00038094	0.0010853	2.9893E-11	0.00047719	0.000023356	0.000021591	0.033683

LC_DCDS (E295210)

statistic	sample_date	NICKEL (T)	NITRATE NITROGEN (NO3), AS N (N)	NITRITE NITROGEN (NO2), AS N (N)	NITROGEN, AMMONIA (AS N) (N)
	4/7/2015	0.75	0.325	< 0.0010	< 0.0050
	4/13/2015	0.69	0.319	< 0.0010	< 0.0050
	4/20/2015	0.87	0.348	< 0.0010	< 0.0050
	4/28/2015	0.82	0.267	< 0.0010	< 0.0050
	5/4/2015	0.70	0.148	< 0.0010	< 0.0050
	5/5/2015	1.02	0.236	< 0.0010	< 0.0050
	5/11/2015	0.67	0.206	< 0.0010	< 0.0050
	5/19/2015	0.88	0.177	< 0.0010	< 0.0050
	5/25/2015	1.23	0.162	< 0.0010	< 0.0050
	6/1/2015	2.97	0.162	< 0.0010	< 0.0050
	6/8/2015	1.59	0.177	< 0.0010	< 0.0050
	6/15/2015	0.88	0.173	< 0.0010	< 0.0050
	6/22/2015	0.67	0.125	< 0.0010	< 0.0050
	6/29/2015	0.70	0.0995	0.0015	< 0.0050
Average Sample Result		1.0314	0.20889	0.0010357	0.0050000
Exceedance Count		0	0	0	0
Maximum Sample Result		2.97	0.348	0.0015	0.005
Minimum Sample Result		0.67	0.0995	0.001	0.005
Sample Count		14	14	14	14
Sample Range		2.3000	0.24850	0.00050000	0.0000
Std Deviation		0.61413	0.078205	0.00013363	1.1185E-10
Std Error		0.16413	0.020901	0.000035714	2.9893E-11

LC_DCDS (E295210)

statistic	sample_date	ORTHO-PHOSPHATE (N)	pH, Field (N)	pH, LAB (N)	PHOSPHORUS (N)	POTASSIUM (T)	SELENIUM (D)	SELENIUM (T)
	4/7/2015	0.0283	8.76	8.31	0.0326	1.04	1.18	1.29
	4/13/2015	0.0329	8.36	8.16	0.0382	0.965	1.15	1.18
	4/20/2015	0.0351	7.93	8.25	0.0406	0.890	0.892	0.969
	4/28/2015	0.0293	8.34	8.30	0.0294	0.772	1.16	1.24
	5/4/2015	0.0179	8.27	8.34	0.0231	0.777	1.36	1.41
	5/5/2015	0.0314	8.19	8.27	0.0479	0.871	1.3	1.35
	5/11/2015	0.0293	8.16	8.29	0.0366	0.818	1.36	1.37
	5/19/2015	0.0266	8.44	8.31	0.0387	0.825	1.45	1.5
	5/25/2015	0.0224	9.36	8.25	0.0497	0.905	1.4	1.45
	6/1/2015	0.0271	8.51	8.18	0.0911	1.08	1.3	1.5
	6/8/2015	0.0279	9.05	8.32	0.0725	0.999	1.25	1.4
	6/15/2015	0.0277	8.36	8.23	0.0384	0.901	1.39	1.32
	6/22/2015	0.0246	8.17	8.35	0.0240	0.931	1.38	1.49
	6/29/2015	0.0187	8.32	8.27	0.0290	0.949	1.43	1.5
Average Sample Result		0.027086	8.4443	8.2736	0.042271	0.90879	1.2859	1.3549
Exceedance Count		0	2	0	0	0	0	0
Maximum Sample Result		0.0351	9.36	8.35	0.0911	1.08	1.45	1.5
Minimum Sample Result		0.0179	7.93	8.16	0.0231	0.772	0.892	0.969
Sample Count		14	14	14	14	14	14	14
Sample Range		0.017200	1.4300	0.19000	0.068000	0.30800	0.55800	0.53100
Std Deviation		0.0048993	0.37882	0.055968	0.018813	0.093289	0.15032	0.15036
Std Error		0.0013094	0.10124	0.014958	0.0050279	0.024932	0.040176	0.040186

LC_DCDS (E295210)

statistic	sample_date	SILVER (D)	SILVER (T)	SODIUM (T)	STRONTIUM (D)	STRONTIUM (T)	SULFATE (AS SO4) (D)	TEMPERATURE, FIELD (N)
	4/7/2015	< 0.010	< 0.010	1.18	0.0376	0.0405	7.59	1.5
	4/13/2015	< 0.010	< 0.010	0.956	0.0372	0.0405	6.78	1.9
	4/20/2015	< 0.010	< 0.010	0.582	0.0302	0.0306	6.25	2.3
	4/28/2015	< 0.010	< 0.010	0.566	0.0310	0.0310	7.09	3.2
	5/4/2015	< 0.010	< 0.010	1.51	0.0390	0.0388	6.94	4.0
	5/5/2015	< 0.010	< 0.010	0.584	0.0321	0.0330	8.65	4.8
	5/11/2015	< 0.010	< 0.010	0.640	0.0347	0.0346	8.94	4.2
	5/19/2015	< 0.010	< 0.010	0.625	0.0353	0.0347	9.33	5.9
	5/25/2015	< 0.010	0.017	0.530	0.0362	0.0371	9.37	6.5
	6/1/2015	< 0.010	0.044	0.552	0.0344	0.0395	7.97	7.1
	6/8/2015	< 0.010	0.020	0.672	0.0348	0.0362	7.73	11.6
	6/15/2015	< 0.010	< 0.010	0.785	0.0372	0.0370	7.77	6.5
	6/22/2015	< 0.010	< 0.010	1.27	0.0369	0.0389	7.85	10.1
	6/29/2015	< 0.010	< 0.010	0.821	0.0409	0.0406	8.56	12.4
Average Sample Result		0.010000	0.013643	0.80521	0.035536	0.036643	7.9157	5.8571
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.01	0.044	1.51	0.0409	0.0406	9.37	12.4
Minimum Sample Result		0.01	0.01	0.53	0.0302	0.0306	6.25	1.5
Sample Count		14	14	14	14	14	14	14
Sample Range		0.0000	0.034000	0.98000	0.010700	0.010000	3.1200	10.900
Std Deviation		2.2370E-10	0.0092787	0.31008	0.0029912	0.0034355	0.96021	3.4844
Std Error		5.9785E-11	0.0024798	0.082873	0.00079942	0.00091818	0.25663	0.93125

LC_DCDS (E295210)

statistic	sample_date	THALLIUM (D)	THALLIUM (T)	TIN (D)	TIN (T)	TITANIUM (D)	TITANIUM (T)
	4/7/2015	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/13/2015	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/20/2015	< 0.010	0.011	< 0.00010	< 0.00010	< 10	< 10
	4/28/2015	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/4/2015	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/5/2015	< 0.010	0.012	< 0.00010	< 0.00010	< 10	< 10
	5/11/2015	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/19/2015	< 0.010	0.010	< 0.00010	< 0.00010	< 10	< 10
	5/25/2015	< 0.010	0.022	< 0.00010	< 0.00010	< 10	13
	6/1/2015	< 0.010	0.051	< 0.00010	< 0.00010	< 10	39
	6/8/2015	< 0.010	0.024	< 0.00010	< 0.00010	< 10	
	6/15/2015	< 0.010	0.010	< 0.00010	< 0.00010	< 10	< 10
	6/22/2015	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/29/2015	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
Average Sample Result		0.010000	0.015000	0.00010000	0.00010000	10.000	12.462
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.01	0.051	0.0001	0.0001	10	39
Minimum Sample Result		0.01	0.01	0.0001	0.0001	10	10
Sample Count		14	14	14	14	14	13
Sample Range		0.0000	0.041000	0.0000	0.0000	0.0000	29.000
Std Deviation		2.2370E-10	0.011354	0.0000	0.0000	0.0000	8.0168
Std Error		5.9785E-11	0.0030346	0.0000	0.0000	0.0000	2.2235

LC_DCDS (E295210)

statistic	sample_date	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)	TOTAL KJELDAHL NITROGEN (N)	TOTAL ORGANIC CARBON (T)
	4/7/2015	129	0.156	1.85
	4/13/2015	123	0.079	2.01
	4/20/2015	101	0.125	2.53
	4/28/2015	110	0.076	2.57
	5/4/2015	127	0.084	2.51
	5/5/2015	114	0.136	2.94
	5/11/2015	112	0.156	2.50
	5/19/2015	121	0.151	2.77
	5/25/2015	116	0.206	4.02
	6/1/2015	121	0.267	5.92
	6/8/2015	114	0.202	2.52
	6/15/2015	132	0.141	2.61
	6/22/2015	131	0.087	1.82
	6/29/2015	131	0.149	1.79
Average Sample Result		120.14	0.14393	2.7400
Exceedance Count		0	0	0
Maximum Sample Result		132	0.267	5.92
Minimum Sample Result		101	0.076	1.79
Sample Count		14	14	14
Sample Range		31.000	0.19100	4.1300
Std Deviation		9.3632	0.054653	1.0783
Std Error		2.5024	0.014607	0.28818

LC_DCDS (E295210)

statistic	sample_date	TOTAL SUSPENDED SOLIDS, LAB (N)	TURBIDITY, LAB (N)	URANIUM (D)	URANIUM (T)	VANADIUM (D)	VANADIUM (T)
	4/7/2015	< 1.0	3.40	0.303	0.330	1.28	1.99
	4/13/2015	< 1.0	3.49	0.299	0.294	1.26	1.73
	4/20/2015	2.4	4.02	0.184	0.191	1.46	2.23
	4/28/2015	1.9	2.87	0.162	0.165	1.32	1.55
	5/4/2015	1.0	4.94	0.253	0.251	0.72	1.11
	5/5/2015	3.9	10.7	0.178	0.196	1.28	2.07
	5/11/2015	1.1	4.36	0.183	0.188	1.18	1.53
	5/19/2015	2.3	7.63	0.200	0.198	1.17	1.74
	5/25/2015	7.5	12.9	0.189	0.210	1.15	2.49
	6/1/2015	25.3	58.1	0.207	0.296	1.51	6.71
	6/8/2015	14.1	27.3	0.191	0.231	1.49	3.44
	6/15/2015	3.5	8.78	0.201	0.205	1.27	1.89
	6/22/2015	< 1.0	3.17	0.220	0.228	1.03	1.29
	6/29/2015	1.1	1.54	0.239	0.228	1.40	1.58
Average Sample Result		4.7929	10.943	0.21493	0.22936	1.2514	2.2393
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		25.3	58.1	0.303	0.33	1.51	6.71
Minimum Sample Result		1	1.54	0.162	0.165	0.72	1.11
Sample Count		14	14	14	14	14	14
Sample Range		24.300	56.560	0.14100	0.16500	0.79000	5.6000
Std Deviation		6.9176	15.101	0.043629	0.047726	0.20561	1.4088
Std Error		1.8488	4.0360	0.011660	0.012755	0.054951	0.37653

LC_DCDS (E295210)

statistic	sample_date	ZINC (D)	ZINC (T)
	4/7/2015	< 3.0	< 3.0
	4/13/2015	< 3.0	< 3.0
	4/20/2015	< 3.0	< 3.0
	4/28/2015	< 3.0	< 3.0
	5/4/2015	< 3.0	< 3.0
	5/5/2015	< 3.0	3.4
	5/11/2015	< 3.0	< 3.0
	5/19/2015	< 3.0	< 3.0
	5/25/2015	< 3.0	5.0
	6/1/2015	< 3.0	11.3
	6/8/2015	3.3	5.5
	6/15/2015	< 3.0	< 3.0
	6/22/2015	< 3.0	< 3.0
	6/29/2015	< 3.0	< 3.0
Average Sample Result		3.0214	3.9429
Exceedance Count		0	0
Maximum Sample Result		3.3	11.3
Minimum Sample Result		3	3
Sample Count		14	14
Sample Range		0.30000	8.3000
Std Deviation		0.080178	2.2677
Std Error		0.021429	0.60608

APPENDIX F – Chain-of-Custody Forms

Nautilus

Chain Of Custody Record

COC ID: February_2015_Monthly_West | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	~~Greenhills Operation~~ Line Creek	Lab Name	Nautilus Environmental	Send Invoice To	
Project Number		Contact Name	Kryst pearcy	Address	
Contact Name	~~Zahir Jina~~	Address	Burnaby BC		
Address	P.O. BOX ~~3000~~ 2003			City	State
		City	Burnaby State BC	Postal Code	Country
City	~~Elkford~~ Sparwood State BC	Postal Code	Country Canada	Task Code	
V0B2G0 Postal Code	~~V0B1H0~~ Country Canada	Phone Number	604-420-8773	Shipping Company	
Phone Number	~~250-865-3316~~ 250-425-6111	Email Address	krysta@nautilusenvironmental.com	Tracking Number	
Email EDD To	~~Zahir.Jina@teck.com~~	Quote Number		CC Hardcopy To	
Email Report To	~~Zahir.Jina@teck.com~~ jenny.hutchinson@teck.com			CC Hardcopy To	

SAMPLE DETAILS | ANALYSIS REQUESTED | ADDITIONAL INFORMATION

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30 day early life stage RT pass fail	7day RT development dilution series									
~~GH_ERT_WS_2015-04-28_N~~	~~WS~~	~~2015/04/28~~		~~G~~	~~6~~	~~X~~	~~X~~									
LC_DC1_WS_2015-04-28_N	WS		0949	G	3		X								3x20L	3x20L rec'd ku
LC_DCDS_WS_2015-04-28_N			0910		3		X								3x20L	3x20L rec'd ku
LC_FRDSDC_WS_2015-04-28_N			0919		3		X								3x20L	3x20L rec'd ku
LC_LC3_2015-04-28_N			1506		3		X								3x20L	3x20L rec'd k
LC_LC5_2015-04-28_N			1024		3		X								3x20L	3x20L rec'd ku
LC_LCDSSLCC_WS_2015-28_N			1027		8	X	X								8x20L	8x20L rec'd ku
						WO# 15364	WO# 15365									

Mercestra 40L extra

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
* Contact V. Mercer for EMS number comparison. to above sample IDs *	V. Mercer	Apr 28/15	1800	Krysta Pearcy Nautilus Environmental	Apr 29/15	0720	8.0	Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Tyler Phillips	Mobile #	1 250 919 0965	Temp in °C	Samples on ice? / Sample intact? / Trip Blank?
Sampler's Signature		Date/Time	Apr 28, 15		

Chain Of Custody Record

COC ID:

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Line Creek Operations			Lab Name	Nautilus Environmental			Send Invoice To			
Contact Name	Jay Jones			Contact Name	Krysta			Address			
Address	Box 2003			Address	8664 commerce Court						
City	Sparwood	Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada	City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425-6111			Postal Code	V5A 4N7	Country	Canada	Task Code			
Email EDD To	jay.jones@teck.com			Phone Number				Shipping Company			
				Email Address				Tracking Number			
				PO Number				CC Hardcopy To			
								CC Hardcopy To			

SAMPLE DETAILS / **ANALYSIS REQUESTED** / **ADDITIONAL INFORMATION**

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS PRESERV	96 hr ~~Rainbow trout~~ NY Pass/Fail 30d EA test P/F 15364	48 hr Daphnia Pass/Fail	7 d C. dubia 15376	72 h P. subcapitata 15377	30 d fathead minnow	28 d H. Azteca	7 d. minor plant growth (dilution series) 15378			Temp	ADDITIONAL INFORMATION
LC_DC1_WS_2015-05-05_N	WS	May 5, 2015	11:41	G	1				✓	✓			✓			6.3	
LC_LC5_WS_2015-05-06_N	WS	"	14:02	G	1				✓	✓			✓			6.8	
LC_DCDS_WS_2015-05-05_N	WS	"	11:14	G	1				✓	✓			✓			7.8	
LC_FRDSDC_WS_2015-05-05_N	WS	"	13:32	G	1				✓	✓			✓			6.0	
LC_LCDSSLCC_WS_2015-05-06_N	WS	"	14:34	G	4		✓		✓	✓			✓			7.0	
LC_LC3_WS_2015-05-06_N	WS	"	14:49	G	1				✓	✓			✓			6.8	

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	T. Phillips/Nupqu							Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
	Sampler's Name	Tyler Phillips		Mobile #	250-919-0965		Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
	Sampler's Signature	[signature]		Date/Time						

4x20L

Received - NY - Nair Yamamoto - Nautilus

Section B-6: 4th Quarter 2015 Line Creek Operation Samples

Nautilus Environmental

Toxicity testing on Line Creek Operations samples with *Ceriodaphnia dubia*, *Oncorhynchus mykiss*, *Lemna minor* and *Pseudokirchneriella subcapitata*

4th Quarter, 2015

Final Report

Report date: March 31, 2016

Submitted to:

Teck Coal Ltd.
Sparwood, BC

8664 Commerce Court
Burnaby, BC
V5A 4N7

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APPENDIX F – Chain-of-Custody Forms

SIGNATURE PAGE

Krysta Pearcy, B.Sc.
Testing Manager

James Elphick, R.P.Bio.
Senior Reviewer

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

1.0 INTRODUCTION

Nautilus Environmental conducted toxicity tests for Teck Coal Ltd. on samples collected from the Line Creek Operations as part of a toxicity testing program required under BC Ministry of Environment permit number 106970, Section 5.2. Test types included survival and reproduction of a cladoceran (*Ceriodaphnia dubia*), embryo development of rainbow trout (*Oncorhynchus mykiss*), population growth of a unicellular green alga (*Pseudokirchneriella subcapitata*) and growth of a freshwater plant (*Lemna minor*). Table 1 outlines the toxicity tests that were conducted on each sample and Figure 1 shows the locations of sample sites. Samples were transported in 20-L plastic containers in coolers containing ice packs. Samples were received at temperatures ranging from 2.5 to 4.5°C and were stored in the dark at 4 ± 2°C prior to testing.

Table 1. Summary of toxicity testing program.

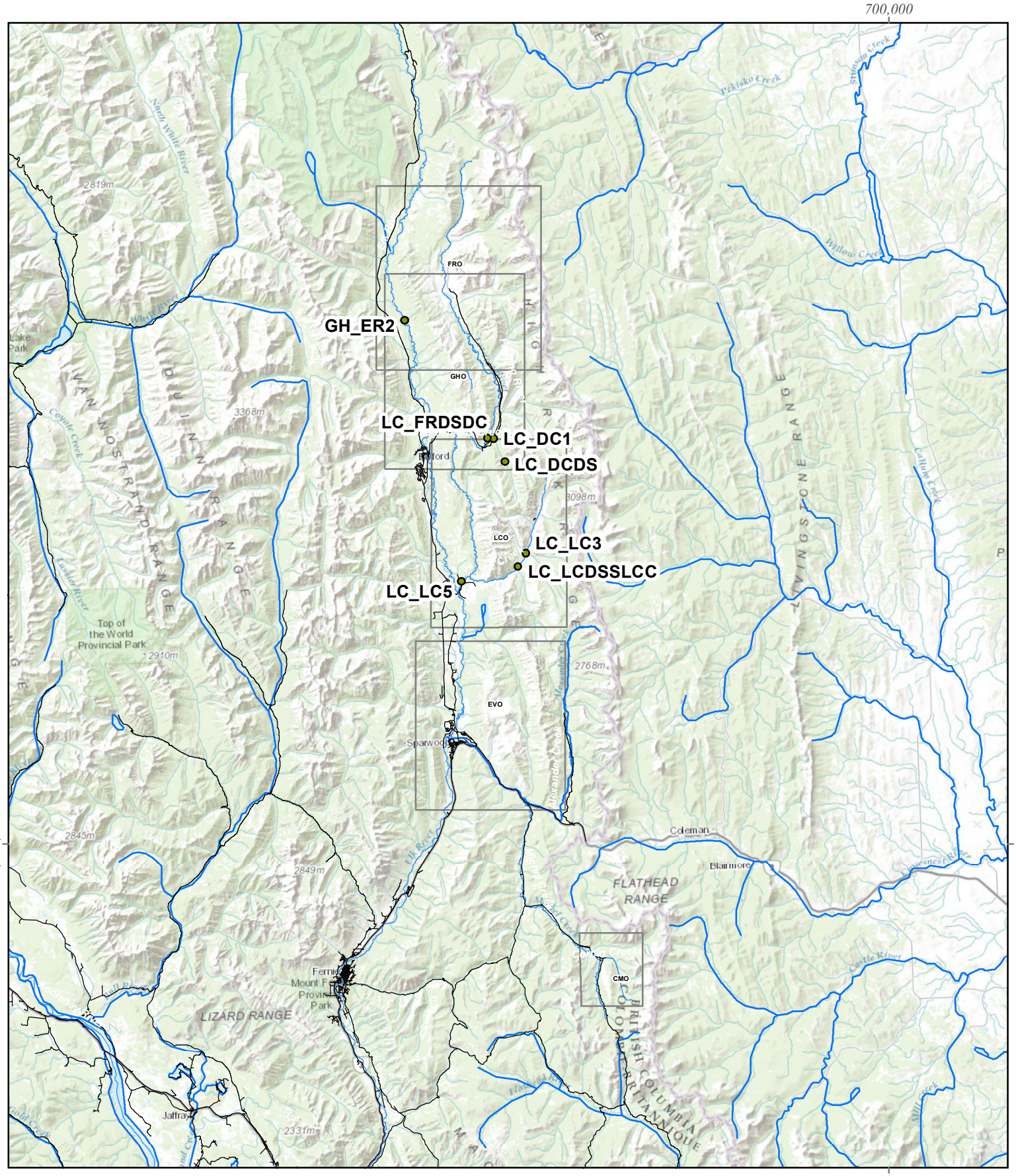
Sample ID	EMS #	Location Description	Species Tested	Sample Collection Date
GH_ER2*	200389	Elk River upstream of Greenhill Operations	*C. dubia*, *O. mykiss*, and *P. subcapitata*	October 26, 2015
LC_LCDSSLCC	297110	Line Creek downstream of South Line Creek	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 26, 2015
LC_DC1	E288270	Dry Creek near mouth	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 26, 2015
LC_FRDSDC	E288272	Fording River downstream of Dry Creek	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 26, 2015
LC_DCDS	E295210	Dry Creek downstream of sedimentation ponds	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 26, 2015
LC_LC5	200028	Lower Fording River (downstream of Line Creek)	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 26, 2015

*Reference site. Conducted as a single concentration toxicity test.

The Line Creek Operations samples were tested using serial dilutions of the sample with laboratory control water. Sample GH_ER2 was tested using only a single (100%) concentration with no dilution. GH_ER2 is an upstream reference location that is not required as part of the Line Creek Operations testing program, but the data for this sample were included here as a basis for comparison to Line Creek Operations mine-influenced samples.

This report describes the results of the toxicity tests. Copies of laboratory data sheets and printouts of statistical analyses are provided in Appendices A through D. Results of analytical chemistry that was performed on the samples tested in this program have been uploaded to the

were collected by Teck personnel at the same time the samples were collected for toxicity testing. The chain-of-custody forms are provided in Appendix F.



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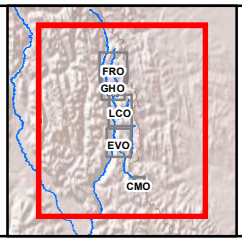

Line Creek Chronic Toxicity Monitoring Locations

- Roads
- Rivers
- Monitoring Locations

N

0 2.5 5 10 15 Kilometers

DATE:	MINE OPERATION:
8/28/2015	Elk Valley
SCALE:	COORDINATE SYSTEM:
1:550,000	NAD 1983 UTM Zone 11N

Document Path: \\teckcominco\CGO\Groups\TCGIS\Data\Operations\SPO\Dan_Vasiga\BaseLandscape_letter_v2.mxd

2.0 METHODS

Methods for the toxicity tests are summarized in Tables 2 through 5. Testing was conducted according to procedures described by Environment Canada protocols (1998, 2007a, 2007b and 2007c). Statistical analyses for the tests were performed using CETIS (Tidepool Scientific Software, 2013).

Table 2. Summary of test conditions: *Ceriodaphnia dubia* survival and reproduction test.

Test organism	*Ceriodaphnia dubia*
Test organism source	In-house culture
Test organism age	<24 h old neonates produced within 12 h
Test type	Static-renewal
Test duration	7 ± 1 day
Test vessel	20 mL test tube
Test volume	15 mL
Test replicates	10
Number of organisms	1 per replicate
Control water	20% Perrier water
Test solution renewal	Daily
Test temperature	25 ± 1°C
Feeding	*Pseudokirchneriella subcapitata* and YCT
Light intensity	100 to 600 lux at water surface
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test protocol	Environment Canada (2007a)
Statistical software	CETIS
Test endpoint	Survival and reproduction
Test acceptability criteria for controls	≥80% survival; ≥15 young per surviving control producing three broods; ≥60% of controls producing three or more broods
Reference toxicant	Sodium chloride

Table 3. Summary of test conditions: rainbow trout (*Oncorhynchus mykiss*) embryo viability test.

Test organism	*Oncorhynchus mykiss*
Test organism source	Vancouver Island Trout Hatchery, Duncan, BC
Test organism age	<30 min post fertilization, <24 h old gametes
Test type	Static renewal
Test duration	7 days
Test vessel	2 L plastic containers
Test volume	2 L
Test replicates	4
Number of organisms	30 eggs per replicate
Control water	Dechlorinated tapwater (hardness ~12 mg/L $CaCO_3$)
Test solution renewal	Daily
Test temperature	14 ± 1°C
Feeding	None
Light intensity	Dark
Photoperiod	24 hours dark
Aeration	6.5 ± 1 mL/min/L
Test protocol	Environment Canada (1998); Canaria et al. (1999)
Statistical software	CETIS
Test endpoint	Embryo viability
Test acceptability criteria for controls	Embryo viability ≥70%
Reference toxicant	Sodium dodecyl sulphate

Table 4. Summary of test conditions: *Lemna minor* growth inhibition test.

Test organism	*Lemna minor*, strain CPCC# 490
Test organism source	In-house culture, obtained from Canadian Phycological Culture Centre, and originally isolated from Wainfleet, Stinking Barn, Niagara Peninsula, Ontario, Canada
Test organism age	7-to 10-day old
Test type	Static
Test duration	7 days
Test vessel	250 mL glass containers
Test volume	100 mL
Test replicates	4
Number of organisms	Two 3-frond plants per replicate
Control water	Deionized water with added nutrients
Test solution renewal	None
Test temperature	25 ± 2°C
Feeding	None
Light intensity	4000 to 5600 lux full spectrum light
Photoperiod	24 hours light
Aeration	None
Test protocol	Environment Canada (2007b)
Statistical software	CETIS
Test endpoint	Number of fronds and dry weight
Test acceptability criteria for controls	≥ 8-fold increase in number of fronds
Reference toxicant	Potassium chloride

Table 5. Summary of test conditions: *Pseudokirchneriella subcapitata* growth inhibition test.

Test organism	*Pseudokirchneriella subcapitata*, strain UTCC #37
Test organism source	In-house culture, obtained from Canadian Phycological Culture Centre, and originally isolated from Nitelva River, Norway.
Test organism age	3-to 7-day old culture in logarithmic growth phase
Test type	Static
Test duration	72 hours
Test vessel	Microplate
Test volume	220 µL
Test replicates	4 for samples; 8 for control
Number of organisms	10, 000 cells/mL
Control water	Deionized water with added nutrients
Test solution renewal	None
Test temperature	24 ± 2°C
Feeding	None
Light intensity	3600 to 4400 lux
Photoperiod	24 hours light
Sample filtration	Through a preconditioned membrane filter of 0.45 µm using a vacuum pump
Aeration	None
pH adjustment	None
Test protocol	Environment Canada (2007c)
Statistical software	CETIS
Test endpoint	Algal cell growth inhibition
Test acceptability criteria for controls	>16-fold increase in number of algal cells; CV ≤20%; no trend when analyzed using Mann-Kendall test
Reference toxicant	Zinc

3.0 RESULTS

The results of the toxicity tests and associated statistical analyses are provided in Appendices A through D, with the exception of data for sample GH_ER2 for *C. dubia* and *P. subcapitata*, which are reproduced here, but the raw data are provided a separate report (Nautilus Environmental, 2015).

There were no adverse effects in any samples for any endpoints for *C. dubia, O. mykiss or P. subcapitata.* For *L. minor*, an adverse effect on frond count was observed in three of five samples, but there was no effect on dry weight.

Results of the toxicity tests using *C. dubia* are provided in Table 6. There were no adverse effects on survival or reproduction of *C. dubia* in the samples; the IC25, IC50 and LC50 values were >100%.

Results of the toxicity tests using *O. mykiss* are provided in Table 7. There were no adverse effects on embryo viability in the samples; the EC25 and EC50 values were >100%.

Results of the toxicity tests using *L. minor* are provided in Table 8; the highest test concentraton was 97% as a result of dilution associated with addition of nutrients, as required in the method. There were no adverse effects on *L. minor* dry weight in the samples; the IC25 and IC50 values were >97%. An adverse effect on frond count was observed in three of the five samples (LC_LCDSSLCC, LC_FRDSDC and LC_LC5). The IC25 and IC50 values for LC_LCDSSLCC were 50.3 and 90.3%, respectively. For LC_FRDSDC the IC25 was 69.2% and the IC50 was >97%. For LC_LC5 the IC25 and IC50 values were 82.5 and >97%, respectively.

Results of the toxicity tests using *P. subcapitata* are provided in Tables 9; the highest test concentraton was 95.2% as a result of dilution associated with addition of nutrients. Consequently, the IC25 and IC50 values for cell yield were >95.2% in the samples.

For reference sample GH_ER2, which was only tested at full strength with *C. dubia*, *O. mykiss* and *P. subcapitata*, there were no significant adverse effects in the results compared to the laboratory controls. In the *P. subcapitata* test, the site water control produced 3.1-fold greater growth than the laboratory water control. This finding is not unusual, since the higher ionic strength associated with the site water control would be expected to stimulate cell growth of this species relative to the very low ionic strength associated with the laboratory control water,

and growth enhancement of *P. subcapitata* was observed in this reference sample in a similar manner to that observed in the samples.

Table 6. Results: *Ceriodaphnia dubia* survival and reproduction test.

Concentration (% v/v)	GH_ER2		LC_LCDSSLCC		LC_DC1	
	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)
Control	100	17.8 ± 4.6	100	18.8 ± 3.5	90	18.4 ± 7.0
1.56	NT	NT	100	18.1 ± 3.8	100	20.9 ± 2.5
3.12	NT	NT	100	20.3 ± 4.4	100	21.8 ± 3.3
6.25	NT	NT	100	20.4 ± 3.7	100	21.9 ± 2.5
12.5	NT	NT	100	18.1 ± 5.2	100	20.1 ± 7.5
25	NT	NT	100	21.4 ± 3.2	100	22.3 ± 4.4
50	NT	NT	100	17.0 ± 3.8	100	17.8 ± 7.7
100	100	19.5 ± 5.5	100	15.9 ± 4.9	100	19.1 ± 4.1
Test endpoint (% v/v)						
LC50	--	--	>100	--	>100	--
IC25	--	--	--	>100	--	>100
IC50	--	--	--	>100	--	>100

NT = Not Tested, SD = Standard Deviation, LC = Lethal Concentration, IC = Inhibition Concentration

Table 6. (continued) Results: *Ceriodaphnia dubia* survival and reproduction test.

Concentration (% v/v)	LC_FRDSDC		LC_DCDS		LC_LC5	
	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)
Control	100	17.9 ± 4.1	90	17.3 ± 6.3	100	21.2 ± 2.0
1.56	100	21.9 ± 1.4	100	20.5 ± 3.4	100	21.1 ± 2.2
3.12	100	22.0 ± 2.3	100	19.9 ± 2.0	100	20.4 ± 7.5
6.25	100	19.8 ± 4.5	100	16.4 ± 8.6	100	22.2 ± 1.2
12.5	100	20.6 ± 3.8	100	21.0 ± 3.8	100	21.2 ± 4.4
25	100	18.8 ± 5.2	100	17.4 ± 7.7	100	18.9 ± 3.3
50	100	19.3 ± 5.1	100	18.5 ± 6.7	100	20.9 ± 3.5
100	100	18.9 ± 4.4	100	17.9 ± 4.6	100	16.4 ± 8.9
Test endpoint (% v/v)						
LC50	>100	--	>100	--	>100	--
IC25	--	>100	--	>100	--	>100
IC50	--	>100	--	>100	--	>100

SD = Standard Deviation, LC = Lethal Concentration, IC = Inhibition Concentration

Table 7. Results: rainbow trout embryo (*Oncorhynchus mykiss*) viability test.

Concentration (% v/v)	Embryo Viability (Mean ± SD)					
	GH_ER2	**LC_LCDSSLCC**	**LC_DC1**	**LC_FRDSDC**	**LC_DCDS**	**LC_LC5**
Control	87.5 ± 10.0	82.5 ± 5.0	93.3 ± 5.4	95.8 ± 3.3	87.5 ± 3.2	91.7 ± 4.3
6.25	NT	90.0 ± 5.4	84.2 ± 5.7	86.7 ± 4.7	90.0 ± 9.4	89.2 ± 7.4
12.5	NT	88.3 ± 6.9	91.7 ± 6.9	90.8 ± 5.0	86.7 ± 7.2	96.7 ± 3.8
25	NT	88.3 ± 4.3	85.8 ± 3.2	86.7 ± 3.8	87.5 ± 5.0	91.7 ± 6.4
50	NT	85.0 ± 4.3	85.0 ± 4.3	95.0 ± 1.9	83.3 ± 11.9	87.5 ± 8.3
100	88.3 ± 1.9	84.2 ± 7.9	90.8 ± 3.2	88.2 ± 3.4	82.5 ± 4.2	86.7 ± 15.9
Test endpoint (% v/v)						
EC25	-	>100	>100	>100	>100	>100
EC50	-	>100	>100	>100	>100	>100

NT = Not Tested, SD = Standard Deviation, EC = Effective Concentration

Table 8. Results: *Lemna minor* growth inhibition test.

Concentration (% v/v)	LC_LCDSSLCC		LC_DC1		LC_FRDSDC	
	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Control	82.0 ± 4.1	6.8 ± 0.3	69.0 ± 1.8	4.6 ± 0.3	79.2 ± 8.1	6.0 ± 0.8
1.5	74.8 ± 1.7	6.2 ± 0.2	59.8 ± 1.0	4.0 ± 0.2	72.8 ± 11.1	5.6 ± 0.9
3.0	74.8 ± 12.3	6.2 ± 1.0	68.8 ± 8.1	4.7 ± 0.6	69.8 ± 9.5	5.3 ± 0.6
6.1	90.2 ± 1.9	7.4 ± 0.3	55.2 ± 6.9	4.1 ± 0.7	71.0 ± 0.8	5.5 ± 0.2
12.1	78.5 ± 8.2	6.3 ± 0.8	66.0 ± 6.5	4.9 ± 0.6	79.5 ± 7.6	6.0 ± 0.6
24.2	78.5 ± 7.4	6.8 ± 0.3	69.5 ± 9.7	5.0 ± 0.9	70.8 ± 3.9	5.5 ± 0.3
48.5	62.8 ± 14.3	5.5 ± 1.2	68.0 ± 11.2	5.0 ± 0.6	66.2 ± 4.9	5.8 ± 0.6
97	38.5 ± 2.1	5.5 ± 0.3	66.8 ± 9.2	5.2 ± 0.7	37.5 ± 2.4	4.5 ± 0.3
Test endpoint (% v/v [with 95% CL])						
IC25	50.3 (27.5 – 68.7)	>97	>97	>97	69.2 (57.7 – 79.3)	>97
IC50	90.3 (76.4 - 97.0)	>97	>97	>97	>97	>97

SD = Standard Deviation, IC = Inhibition Concentration, CL = Confidence Limits

Table 8. (continued) Results: *Lemna minor* growth inhibition test.

Concentration (% v/v)	LC_DCDS		LC_LC5	
	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Control	111.0 ± 16.4	8.8 ± 1.2	68.8 ± 6.7	4.9 ± 0.4
1.5	109.5 ± 16.6	8.5 ± 1.7	60.8 ± 8.4	4.5 ± 0.6
3.0	93.2 ± 13.8	7.1 ± 1.0	71.2 ± 16.0	4.9 ± 1.1
6.1	91.8 ± 11.2	7.4 ± 1.0	61.5 ± 8.3	4.6 ± 0.7
12.1	89.2 ± 9.6	7.0 ± 1.3	65.8 ± 4.6	4.6 ± 0.3
24.2	112.3 ± 14.7	9.3 ± 1.8	66.8 ± 3.9	4.9 ± 0.2
48.5	99.8 ± 28.9	8.0 ± 2.5	64.0 ± 6.9	4.7 ± 0.3
97	89.8 ± 7.1	7.6 ± 0.5	40.5 ± 3.9	4.3 ± 0.4
Test endpoint (% v/v [with 95% CL])				
IC25	>97	>97	82.5 (60.5 – >97.0)	>97
IC50	>97	>97	>97	>97

SD = Standard Deviation, IC = Inhibition Concentration, CL = Confidence Limits

Table 9. Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Concentration (% v/v)	GH_ER2		LC_LCDSSLCC		LC_DC1		LC_FRDSDC	
	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)
Control	32.2 ± 1.8	--	29.8 ± 1.5	--	30.5 ± 1.7	--	29.0 ± 1.1	--
1.5	NT	NT	62.2 ± 2.9*	109.2	55.2 ± 4.3*	81.2	51.0 ± 2.4*	75.9
3.0	NT	NT	69.5 ± 3.9*	133.6	67.5 ± 4.4*	121.3	69.2 ± 5.0*	138.8
6.0	NT	NT	84.5 ± 3.4*	184.0	78.0 ± 5.5*	155.7	71.0 ± 5.0*	144.8
11.9	NT	NT	99.5 ± 6.6*	234.5	90.0 ± 3.9*	195.1	88.0 ± 5.3*	203.4
23.8	NT	NT	102.0 ± 6.2*	242.9	107.8 ± 7.0*	253.3	102.3 ± 3.6*	252.6
47.6	NT	NT	111.8 ± 5.3*	275.6	127.0 ± 5.1*	316.4	110.8 ± 4.9*	281.9
95.2	132.1 ± 4.5*	309.7	112.0 ± 8.4*	276.5	118.0 ± 1.8*	286.9	117.8 ± 1.7*	306.0
Test endpoint (% v/v)								
IC25	--	--	>95.2	--	>95.2	--	>95.2	--
IC50	--	--	>95.2	--	>95.2	--	>95.2	--

NT = Not Tested, SD = Standard Deviation, IC = Inhibition Concentration
*Indicates cell yield that were significantly greater than the control

Table 9. (continued) Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Concentration (% v/v)	LC_DCDS Cell Yield x10⁴ (Mean ± SD)	LC_DCDS Stimulation (%)	LC_LC5 Cell Yield x10⁴ (Mean ± SD)	LC_LC5 Stimulation (%)
Control	29.5 ± 2.0	--	29.5 ± 1.2	--
1.5	52.5 ± 3.1*	78.0	47.5 ± 2.6*	61.0
3.0	63.5 ± 4.1*	115.3	59.0 ± 1.8*	100.0
6.0	74.2 ± 4.1*	151.7	69.0 ± 4.2*	133.9
11.9	77.5 ± 4.8*	162.7	91.0 ± 7.1*	208.5
23.8	89.0 ± 4.8*	201.7	99.0 ± 3.9*	235.6
47.6	116.5 ± 4.8*	294.9	99.5 ± 6.4*	237.3
95.2	118.3 ± 6.7*	300.8	102.3 ± 5.7*	246.6
Test endpoint (% v/v)				
IC25	>95.2	--	>95.2	--
IC50	>95.2	--	>95.2	--

SD = Standard Deviation, IC = Inhibition Concentration
*Indicates cell yield that were significantly greater than the control

4.0 QA/QC

The health history of the test organisms used in the exposures was acceptable and met the requirements of the Environment Canada protocols. The tests met all control acceptability criteria and water quality parameters remained within ranges specified in the protocols throughout the tests. There were no deviations from the test methodologies. Uncertainty associated with these tests is best described by the standard deviation around the mean and/or the confidence intervals around the point estimates.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 10. Results for these tests fell within the acceptable range for organism performance of mean and two standard deviations, based on historical results obtained by the laboratory with these tests. Thus, the sensitivity of the organisms used in these tests was considered appropriate.

Table 10. Reference toxicant test results.

Test Species	Endpoint	Historical Mean (2 SD Range)	CV (%)	Test Date
C. dubia	Survival (LC50): 2.0 g/L NaCl	2.0 (1.8 – 2.2)	5	November 3, 2015
	Reproduction (IC50): 1.4 g/L NaCl	1.5 (1.2 – 2.0)	14	
O.mykiss	Embryo viability (EC50): 3.0 mg/L SDS	4.0 (2.2 – 7.4)	36	October 27, 2015
L. minor	Number of fronds (IC50): 4.3 g/L KCl	4.2 (3.2 – 5.5)	14	October 21, 2015
P. subcapitata	Growth (IC50) 35.7 µg/L Zn	28.5 (16.2 – 50.1)	32	November 3, 2015

SD = Standard Deviation, CV = Coefficient of Variation, IC = Inhibition Concentration, EC= Effective Concentration, LC = Lethal Concentration

5.0 REFERENCES

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Environment Canada. 2007b. Biological test method: tests for measuring the inhibition of growth using the freshwater macrophyte, *Lemna minor*. Environmental Protection Series, Report EPS 1/RM/37. Second Edition. January 2007. Environment Canada, Method Development and Application Section, Environmental Technology Centre, Ottawa, ON. 112 pp.

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6.0 END OF REPORT

APPENDIX A – *Ceriodaphnia dubia* Toxicity Test Data

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal (Line Creek Op) Start Date/Time: October 27/15 @ 1215h
Work Order No.: 15870 Set up by: EMM

Test Validity Criteria:
1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:
T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Sample Information:

Sample ID: LC-LCDSSLLC-WS-2015-10-26-1
Sample Date: October 26/15
Date Received: October 27/15
Sample Volume: 8 x 20L

Test Organism Information:

Broodstock No.: 101415A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 33
Mortality (%) in previous 7 d: 5
Individual female # used ≥8 young on test day: 1,3,4,5,7,16,18,19

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd136
Stock Solution ID: 15Na03
Date Initiated: Nov 3/15

7-d LC50 (95% CL): 2.0 (1.7-2.3) g/L NaCL
7-d IC50 (95% CL): 1.4 (1.1-1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-2.0) g/L NaCL CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: JOL Date reviewed: Nov-18/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC_LCRSSLLC_WS-20151026N
Work Order #: 15870
Start Date & Time: Oct 27/15@1215h
Stop Date & Time: Nov 2/15@1230h
Test Species: *Ceriodaphnia dubia*

Concentration: Control

	Days 0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.5	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.9	8.0	7.9	8.0	7.6	8.1	7.7	8.0	7.6	8.0	7.6		
pH	8.0	7.9	8.0	7.9	8.0	7.8	8.1	7.8	7.9	7.9	8.0	7.8		
Cond. (µS/cm)	223	224		222		222		222		221		224		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration: 1.56%(v/v)

	Days 0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.5	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.9	8.1	7.9	8.1	7.8	8.1	7.6	7.8	7.6	8.0	7.6		
pH	8.0	7.9	8.0	7.8	8.0	8.0	8.1	7.8	8.0	7.9	8.0	7.9		
Cond. (µS/cm)	237	235		234		232		234		231		235		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration: 12.5%(v/v)

	Days 0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.5	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.9	8.2	7.9	8.2	7.6	8.1	7.6	7.8	7.6	8.0	7.6		
pH	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.1	7.9		
Cond. (µS/cm)	313	310		312		320		312		318		320		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration: 100%(v/v)

	Days 0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.5	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.2	7.9	8.2	7.9	8.2	7.6	8.2	7.7	8.1	7.6	8.0	7.5		
pH	8.2	8.2	8.2	8.1	8.1	8.1	8.1	8.1	8.2	8.1	8.1	8.1		
Cond. (µS/cm)	868	863		848		855		846		850		849		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Thermometer: 4 **DO meter:** 1 **pH meter:** 2 **Conductivity meter:** 1

	Control	100%(v/v)		
Hardness*	100	480		
Alkalinity*	96	192		

* mg/L as CaCO3

Analysts: EMM, AWP, MLT, JW, MK
Reviewed by: JW
Date reviewed: Nov. 18/15

Sample Description: clear

Comments: **Broodboard Used:** 10145A CH# 1,3,4,5,7,12,8,19

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck
Sample ID: LC_LCDSSLCC_WS20150-26N
Work Order: 15870

Start Date & Time: Oct 27/15 @ 1215h
Stop Date & Time: Nov 2/15 @ 1350h 1230h
Set up by: EMM emm

% (v/v)

Concentration: Control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MT
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	4	✓	✓	✓	✓	✓	EMM
4	✓	3	4	3	✓	3	4	✓	3	4	JW
5	3	6	7	7	6	8	6	5	6	8	EMM
6	9	10	9	8	12	11	10	9	9	11	EMM
7											
8											
Total	12	19	20	18	22	22	20	14	18	23	EMM

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MT
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	3	✓	✓	✓	✓	✓	✓	EMM
4	3	3	4	✓	3	4	3	3	2	3	JW
5	8	7	6	6	7	7	8	6	6	9	EMM
6	10	9	11	10	11	✓	✓	10	12	7	EMM
7											
8											
Total	21	19	21	19	21	11	11	19	20	19	EMM

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MT
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	5	3	4	3	2	4	3	✓	3	4	JW
5	9	8	8	6	7	7	6	4	6	✓	EMM
6	10	12	10	13	12	14	13	9	10	8	EMM
7											
8	er										
Total	23 24	23	22	22	21	25	22	13	19	12	EMM

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MT
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	4	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	✓	3	3	4	4	3	3	3	4	JW
5	8	6	6	9	6	5	6	8	6	7	EMM
6	11	15	10	8	10	14	12	11	12	✓	EMM
7											
8											
Total	22	25	19	20	20	23	21	22	21	11	EMM

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MT
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	4	3	4	4	4	2	3	3	4	JW
5	8	7	7	6	8	8	7	7	6	✓	EMM
6	10	11	13	✓	✓	13	10	10	8	8	EMM
7											
8											
Total	21	22	23	10	12	25	19	20	17	12	EMM

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MT
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	4	5	4	4	✓	3	4	3	4	JW
5	8	6	8	9	9	7	8	6	7	3	EMM
6	14	10	11	11	10	9	14	9	12	10	EMM
7											
8											
Total	25	20	24	24	23	16	24	19	22	17	EMM

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MT
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	2	4	3	4	5	3	3	3	4	✓	JW
5	✓	8	7	6	6	7	4	6	6	3	EMM
6	9	10	9	8	11	✓	9	10	7	10	EMM
7											
8											
Total	15	22	19	18	22	10	15	19	17	13	EMM

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MT
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	3	✓	✓	✓	✓	✓	✓	✓	EMM
4	4	✓	✓	3	3	3	3	3	3	4	JW
5	8	6	8	7	7	9	8	6	8	7	EMM
6	10	9	10	8	11	✓	✓	✓	8	✓	EMM
7											
8											
Total	22	15	21	18	21	12	11	9	19	11	EMM

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: clear

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JOe

Date reviewed: Nov. 18/15

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	12-9339-0333	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 11:49	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	20-5930-5291	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 12:15	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 12:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	13-5006-3600	**Code:**	507855F0	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	36h (2.5 °C)	**Station:**	LC_LCDSSLCC_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1166128	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

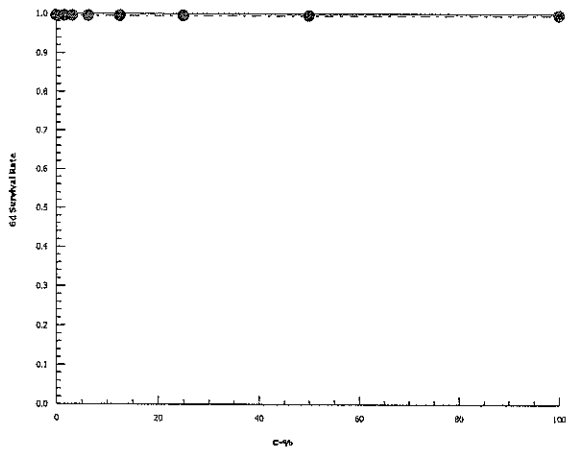
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 12-9339-0333 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 03 Nov-15 11:49 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Analyst:_____ QA: Nov. 18/15

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	05-0956-1532	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 11:53	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	20-5930-5291	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 12:15	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 12:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	13-5006-3600	**Code:**	507855F0	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	36h (2.5 °C)	**Station:**	LC_LCDSSLCC_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1821847	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	32.76	1.238	78.91	3.052	1.267	80.76
IC10	42.84	12.07	N/A	2.334	NA	8.284
IC15	64.83	35.87	N/A	1.543	NA	2.788
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	18.8	12	23	1.114	3.521	18.73%	0.0%
1.56		10	18.1	11	21	1.215	3.843	21.23%	3.72%
3.12		10	20.3	12	25	1.399	4.423	21.79%	-7.98%
6.25		10	20.4	11	25	1.176	3.718	18.22%	-8.51%
12.5		10	18.1	10	25	1.636	5.174	28.58%	3.72%
25		10	21.4	16	25	1.013	3.204	14.97%	-13.83%
50		10	17	10	22	1.211	3.83	22.53%	9.57%
100		10	15.9	9	22	1.545	4.886	30.73%	15.43%

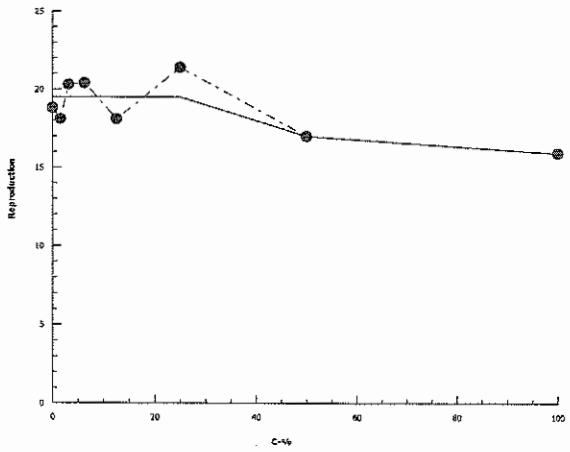
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	12	19	20	18	22	22	20	14	18	23
1.56		21	19	21	19	21	11	11	19	20	19
3.12		24	23	22	22	21	25	22	13	19	12
6.25		22	25	19	20	20	23	21	22	21	11
12.5		21	22	23	10	12	25	19	20	17	12
25		25	20	24	24	23	16	24	19	22	17
50		15	22	19	18	22	10	15	19	17	13
100		22	15	21	18	21	12	11	9	19	11

Ceriodaphnia 7-d Survival and Reproduction Test | **Nautilus Environmental**

Analysis ID:	05-0956-1532	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 11:53	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Ceriodaphnia dubia Summary Sheet

Client: Teck Coal (Line Creek Op) Start Date/Time: October 27/15 @ 1230h
Work Order No.: 15870 Set up by: EMM

Sample Information:

Sample ID: LC-DC-LWS-20151076-10
Sample Date: October 26/15
Date Received: October 27/15
Sample Volume: 5 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 101415B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: EMM 34 36
Mortality (%) in previous 7 d: 5
Individual female # used ≥8 young on test day 21, 22, 23, 25, 26, 27, 29, 30

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd136
Stock Solution ID: 15Na03
Date Initiated: Nov 3/15

7-d LC50 (95% CL): 2.0 (1.7-2.3) g/L NaCL
7-d IC50 (95% CL): 1.4 (1.1-1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-2.0) g/L NaCL CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: JBL Date reviewed: Nov. 18/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LL-DC1-WS-2015-10-26N
Work Order #: 15870

Start Date & Time: Oct 27/15 @ 1230h
Stop Date & Time: Nov 2/15 @ 1600h
Test Species: *Ceriodaphnia dubia*

Concentration Control	Days 0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.8	8.0	7.7	8.0	7.7	8.1	7.8	8.0	7.6	8.0	7.6		
pH	8.0	7.9	8.0	7.8	8.0	7.9	8.1	7.9	7.9	7.9	8.0	7.8		
Cond. (µS/cm)	223	224		222		222		222		222		221		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration 1.56% (v/v)	Days 0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.8	8.1	7.7	8.2	7.7	8.2	7.7	7.8	7.6	8.1	7.6		
pH	8.0	7.9	8.0	7.9	8.0	7.9	8.0	7.9	8.1	8.0	8.0	8.0		
Cond. (µS/cm)	235	227		225		229		223		228		228		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration 12.5% (v/v)	Days 0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.8	8.1	7.7	8.2	7.8	8.2	7.7	7.8	7.6	8.1	7.6		
pH	8.0	8.0	8.1	7.9	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.0		
Cond. (µS/cm)	243	239		239		237		236		237		238		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration 100% (v/v)	Days 0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.2	7.8	8.1	7.7	8.2	7.8	8.2	7.7	8.0	7.6	8.2	7.6		
pH	8.2	8.2	8.3	8.1	8.2	8.1	8.2	8.1	8.2	8.1	8.1	8.1		
Cond. (µS/cm)	337	333		328		328		328		329		328		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Thermometer: 4 DO meter: 1 pH meter: 2 Conductivity meter: 1

	Control	100% (v/v)		
Hardness*	100	186		
Alkalinity*	96	180		

* mg/L as CaCO3

Analysts: EMM, AWD, MLT, JW, YYL, KL
Reviewed by: JGU
Date reviewed: Nov. 18/15

Sample Description: Clear

Comments: Broodboard Used: 101415B (CH# 21, 22, 23, 25, 26, 27, 29, 30)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck
Sample ID: LC-DC1-WS-2015-10-26_JW
Work Order: 15870

Start Date & Time: Oct 27/15 @ 1230h
Stop Date & Time: Nov 2/15 @ 1600h
Set up by: EMM

% (v/v)

Concentration: Control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	5	4	4	2	4	4	5	4	5	3	JW
5	8	X	6	6	8	6	6	8	4	4	EMM
6	10	↓	11	11	12	13	10	11	10	✓	EMM
7											
8											
Total	23	4X	21	19	24	23	21	23	19	7	EMM

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	5	3	4	4	5	2	5	4	2	4	JW
5	8	6	8	7	6	6	7	6	5	8	EMM
6	13	10	10	9	10	11	11	12	10	8	EMM
7											
8											
Total	26	19	22	20	21	19	23	22	17	20	EMM

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	4	2	4	3	5	5	5	3	4	3	JW
5	8	6	6	5	7	7	7	6	8	6	EMM
6	14	10	10	9	11	12	12	10	14	12	EMM
7											
8											
Total	26	18	20	17	23	24	24	19	26	21	EMM

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	4	5	3	3	4	4	5	4	5	4	JW
5	8	9	9	8	6	6	8	6	✓	5	EMM
6	9	10	14	12	12	11	11	10	12	12	EMM
7											
8											
Total	21	24	26	23	22	21	24	20	17	21	EMM

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	5	4	4	5	4	5	4	✓	4	JW
5	6	8	8	7	7	6	5	6	✓	8	EMM
6	12	14	11	13	13	10	10	12	✓	10	EMM
7											
8											
Total	18	27	23	24	25	20	20	22	0	22	EMM

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	4	3	3	4	5	✓	5	6	4	JW
5	9	8	8	7	6	8	4	9	8	6	EMM
6	11	12	10	10	9	14	10	13	14	10	EMM
7											
8					19						
Total	23	24	21	20	19	27	14	27	28	20	EMM

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	2	✓	✓	4	4	5	✓	5	4	JW
5	4	6	✓	7	8	8	6	5	9	8	EMM
6	8	11	✓	9	10	9	11	10	13	12	EMM
7											
8											
Total	12	19	0	16	22	21	22	15	27	24	EMM

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	✓	3	3	4	4	3	3	✓	3	JW
5	4	4	6	7	8	7	8	8	4	9	EMM
6	10	9	10	10	9	8	12	10	11	14	EMM
7											
8											
Total	14	13	19	20	21	19	23	21	15	26	EMM

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: clear

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JW

Date reviewed: Nov. 18/15

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	10-2079-9200	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:12	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	06-3157-0784	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 12:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	16-9503-3844	**Code:**	650829F4	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (2.5 °C)	**Station:**	LC_DC1_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	279773	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
1.56		10	1	1	1	0	0	0.0%	-11.11%	10	10
3.12		10	1	1	1	0	0	0.0%	-11.11%	10	10
6.25		10	1	1	1	0	0	0.0%	-11.11%	10	10
12.5		10	1	1	1	0	0	0.0%	-11.11%	10	10
25		10	1	1	1	0	0	0.0%	-11.11%	10	10
50		10	1	1	1	0	0	0.0%	-11.11%	10	10
100		10	1	1	1	0	0	0.0%	-11.11%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	0	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

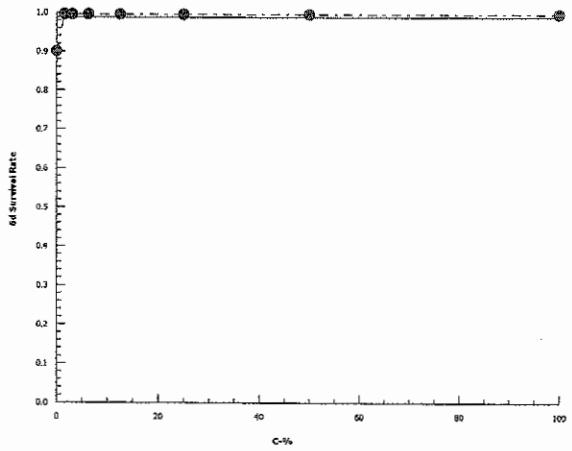
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	10-2079-9200	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:12	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	06-2841-9881	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:13	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	06-3157-0784	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 12:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	16-9503-3844	**Code:**	650829F4	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (2.5 °C)	**Station:**	LC_DC1_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	953721	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	33.66	8.808	N/A	2.971	NA	11.35
IC10	45.19	15.43	N/A	2.213	NA	6.479
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

7100% (IW) emm

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	18.4	4	24	2.227	7.043	38.28%	0.0%
1.56		10	20.9	17	26	0.7951	2.514	12.03%	-13.59%
3.12		10	21.8	17	26	1.031	3.259	14.95%	-18.48%
6.25		10	21.9	17	26	0.7951	2.514	11.48%	-19.02%
12.5		10	20.1	0	27	2.383	7.534	37.48%	-9.24%
25		10	22.3	14	28	1.383	4.373	19.61%	-21.2%
50		10	17.8	0	27	2.43	7.685	43.18%	3.26%
100		10	19.1	13	26	1.295	4.095	21.44%	-3.8%

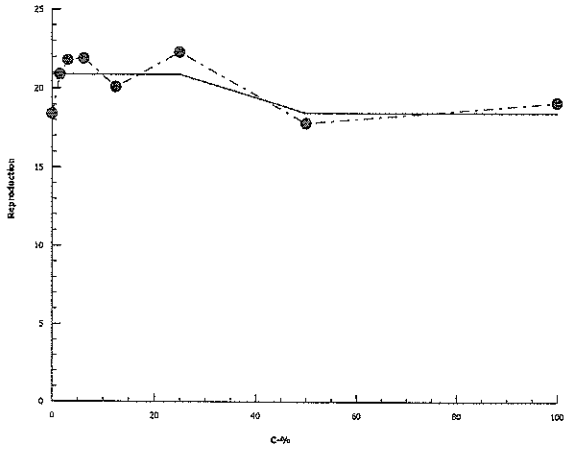
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	23	4	21	19	24	23	21	23	19	7
1.56		26	19	22	20	21	19	23	22	17	20
3.12		26	18	20	17	23	24	24	19	26	21
6.25		21	24	26	23	22	21	24	20	17	21
12.5		18	27	23	24	25	20	20	22	0	22
25		23	24	21	20	19	27	14	27	28	20
50		12	19	0	16	22	21	22	15	27	24
100		14	13	19	20	21	19	23	21	15	26

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	06-2841-9881	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:13	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Test Code: 15870b | 17-0849-0976

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	11-1972-2653	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:14	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	06-3157-0784	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 12:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	16-9503-3844	**Code:**	650829F4	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (2.5 °C)	**Station:**	LC_DC1_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	100	>100	NA	1

Nemenyi-Damico-Wolfe Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.56	17.5	243.2	13		0.8276	Asymp	Non-Significant Effect
		3.12	88	243.2	13		0.5488	Asymp	Non-Significant Effect
		6.25	107.5	243.2	13		0.4591	Asymp	Non-Significant Effect
		12.5	79.5	243.2	13		0.5876	Asymp	Non-Significant Effect
		25	120.5	243.2	13		0.4003	Asymp	Non-Significant Effect
		50	-36.5	243.2	13		0.9430	Asymp	Non-Significant Effect
		100	-60.5	243.2	13		0.9689	Asymp	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Treatment Effect	Fligner-Wolfe	0.5765	1.645	0.2821	Non-significant Overall Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	205.0875	29.29821	7	1.044	0.4088	Non-Significant Effect
Error	2021.3	28.07361	72			
Total	2226.387		79			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	24.5	18.48	0.0009	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8774	0.9579	<0.0001	Non-normal Distribution

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	10	18.4	13.36	23.44	21	4	24	2.227	38.28%	0.0%
1.56		10	20.9	19.1	22.7	20.5	17	26	0.7951	12.03%	-13.59%
3.12		10	21.8	19.47	24.13	22	17	26	1.031	14.95%	-18.48%
6.25		10	21.9	20.1	23.7	21.5	17	26	0.7951	11.48%	-19.02%
12.5		10	20.1	14.71	25.49	22	0	27	2.383	37.48%	-9.24%
25		10	22.3	19.17	25.43	22	14	28	1.383	19.61%	-21.2%
50		10	17.8	12.3	23.3	20	0	27	2.43	43.18%	3.26%
100		10	19.1	16.17	22.03	19.5	13	26	1.295	21.44%	-3.8%

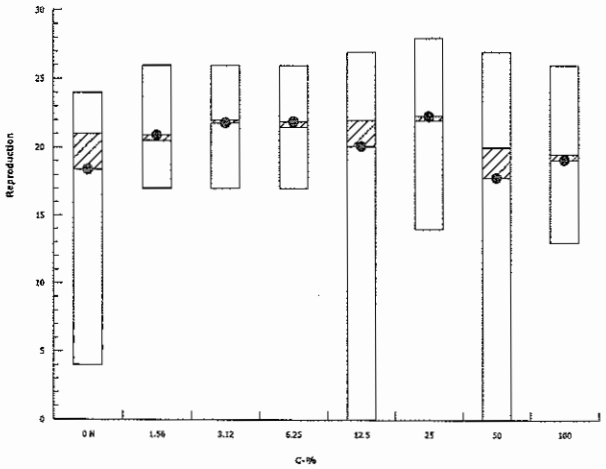
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

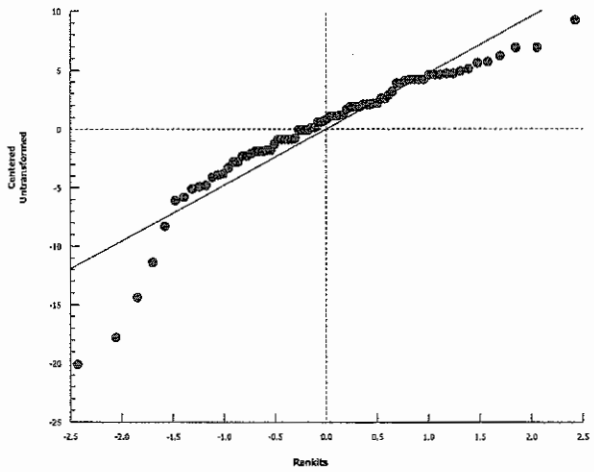
Analysis ID:	11-1972-2653	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:14	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	23	4	21	19	24	23	21	23	19	7
1.56		26	19	22	20	21	19	23	22	17	20
3.12		26	18	20	17	23	24	24	19	26	21
6.25		21	24	26	23	22	21	24	20	17	21
12.5		18	27	23	24	25	20	20	22	0	22
25		23	24	21	20	19	27	14	27	28	20
50		12	19	0	16	22	21	22	15	27	24
100		14	13	19	20	21	19	23	21	15	26

Graphics





Ceriodaphnia dubia Summary Sheet

Client: Teck Coal (Line Creek Op) Start Date/Time: October 27/15 @ 1245h
Work Order No.: 15870 Set up by: EMM

Sample Information:

Sample ID: LC_FRDSOCWS_2015-1026N
Sample Date: October 26/15
Date Received: October 27/15
Sample Volume: 5 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 101415B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 34
Mortality (%) in previous 7 d: 5
Individual female # used ≥8 young on test day: 31/32/33/34/37/38/39/40

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd136
Stock Solution ID: 15Na03
Date Initiated: Nov 3/15

7-d LC50 (95% CL): 2.0 (1.7-2.3) g/L NaCL
7-d IC50 (95% CL): 1.4 (1.1-1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-2.0) g/L NaCL CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	7100	
IC25 % (v/v) (95% CL)		7100
IC50 % (v/v) (95% CL)		>100

Reviewed by: JCL Date reviewed: Nov. 19/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-FRDSDC-US-2015-10-26N
Work Order #: 15870

Start Date & Time: Oct 27/15 @ 1245h
Stop Date & Time: Nov 2/15 @ 1300h
Test Species: *Ceriodaphnia dubia*

Concentration Control	Days 0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.8	8.0	7.9	8.0	7.8	8.1	7.8	8.0	7.8	8.0	7.6		
pH	8.0	8.0	8.0	8.0	8.0	7.9	8.1	7.9	7.9	7.9	8.0	7.8		
Cond. (µS/cm)	223	224		222		222		222		222		220		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration 1.56% (v/v)	Days 0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.8	8.1	7.9	8.1	7.8	8.2	7.8	7.8	7.7	8.1	7.6		
pH	8.0	8.0	8.0	8.0	8.0	7.9	8.0	8.0	8.0	8.0	8.0	8.0		
Cond. (µS/cm)	237	234		230		229		230		229		228		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration 12.5% (v/v)	Days 0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.2	7.8	8.0	7.9	8.1	7.8	8.2	7.8	7.8	7.6	8.1	7.5		
pH	8.0	8.0	8.1	8.0	8.1	8.0	8.0	8.0	8.0	8.0	8.0	8.0		
Cond. (µS/cm)	290	289		296		295		290		291		291		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration 100% (v/v)	Days 0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.2	7.7	8.0	7.8	8.1	7.7	8.2	7.8	8.0	7.6	8.1	7.5		
pH	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1		
Cond. (µS/cm)	736	741		714		715		722		716		718		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Thermometer: 4 DO meter: 1 pH meter: 2 Conductivity meter: 1

	Control	100% (v/v)		
Hardness*	100	520		
Alkalinity*	96	176		

* mg/L as CaCO3

Analysts: EMM, AWD, MLT, JW, YML, KL
Reviewed by: JOW
Date reviewed: Nov. 19/15

Sample Description: Clear

Comments: **Broodboard Used:** 101415B (#31-34, 37-40)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck
Sample ID: LC ERD30C WS 205-10-26.N
Work Order: 15870

Start Date & Time: Oct 27/15 @ 1245h
Stop Date & Time: Nov 2/15 @ 1300h
Set up by: EMM

% Cv(v)

Concentration: Control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	4	✓	4	3	4	✓	3	✓	3	EMM
4	2	✓	4	✓	5	✓	✓	✓	4	✓	JW
5	7	8	6	6	✓	6	3	6	9	6	EMM
6	10	10	✓	9	8	11	9	10	9	10	EMM
7											
8											
Total	19	22	10	19	16	21	12	19	22	19	EMM

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	4	4	✓	✓	3	✓	✓	EMM
4	4	4	7	✓	✓	2	4	✓	4	4	JW
5	8	8	5	8	7	6	6	7	8	6	EMM
6	9	10	10	11	12	13	10	13	12	10	EMM
7											
8											
Total	21	22	22	23	23	21	20	23	24	20	EMM

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	4	✓	✓	3	5	✓	4	✓	4	EMM
4	4	✓	4	3	✓	✓	5	✓	4	✓	JW
5	8	9	6	6	4	6	7	6	6	8	EMM
6	11	12	10	10	12	13	11	13	10	12	EMM
7											
8											
Total	23	25	20	19	19	24	23	23	20	24	EMM

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	4	4	✓	4	3	EMM
4	3	3	2	4	2	✓	✓	5	✓	7	JW
5	8	8	6	7	6	7	7	6	8	✓	EMM
6	10	9	✓	10	11	10	10	12	13	9	EMM
7											
8											
Total	21	20	8	21	19	21	21	23	25	19	EMM

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	4	✓	5	✓	✓	✓	✓	✓	EMM
4	4	4	✓	4	✓	3	3	6	4	4	JW
5	8	9	6	6	7	9	8	8	6	4	EMM
6	✓	10	9	12	11	10	9	12	11	10	EMM
7											
8											
Total	12	23	19	22	23	22	20	26	21	18	EMM

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	4	4	✓	✓	✓	5	✓	✓	✓	✓	EMM
4	✓	✓	3	✓	✓	4	✓	5	4	4	JW
5	6	8	9	4	4	✓	6	8	9	6	EMM
6	8	11	10	9	9	10	4	9	13	12	EMM
7											
8											
Total	18	23	22	13	13	19	10	22	26	22	EMM

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	4	✓	4	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	6	✓	5	3/6	5/7	2/3	4	4	4	JW
5	8	9	8	6	6	7	6	8	6	7	EMM
6	13	8	11	12	8	10	10	✓11		✓	EMM
7											
8											
Total	25	23	23	23	14	22	19	12	21	11	EMM

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	3	✓	✓	✓	✓	✓	5	✓	✓	EMM
4	4	✓	5	4	4	3	4	✓	5	✓	JW
5	6	8	6	9	9	6	4	3	8	6	EMM
6	13	14	12	10	✓9	9	10	✓	10		EMM
7											
8											
Total	23	25	23	23	13	18	17	18	13	16	EMM

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: Clear

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JW

Date reviewed: Nov-19/15

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	10-0965-9155	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:27	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	09-4264-1689	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 12:45	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	10-5788-9285	**Code:**	3F0E1C05	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (2.5 °C)	**Station:**	LC_FRDSDC_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1801201	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

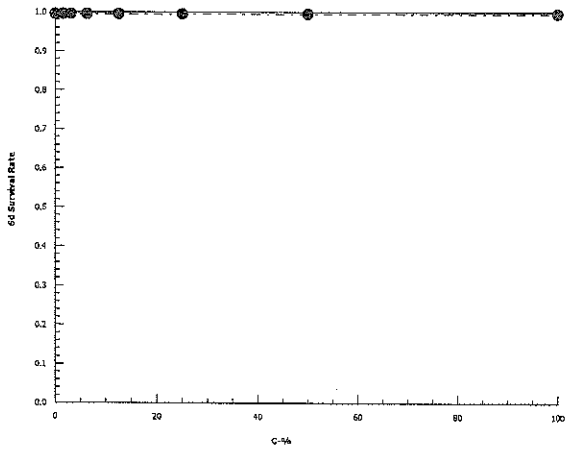
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	10-0965-9155	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:27	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	07-1541-9612	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:27	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	09-4264-1689	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 12:45	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	10-5788-9285	**Code:**	3F0E1C05	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (2.5 °C)	**Station:**	LC_FRDSDC_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	806353	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	~~18.33~~	~~4.198~~	~~N/A~~	~~5.455~~	~~NA~~	~~23.82~~
IC10	>100	N/A	N/A	<1	NA	NA
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

> 100% (v/v)
emm

Reproduction Summary

			Calculated Variate						
C-%	**Control Type**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**
0	Negative Control	10	17.9	10	22	1.286	4.067	22.72%	0.0%
1.56		10	21.9	20	24	0.4333	1.37	6.26%	-22.35%
3.12		10	22	19	25	0.7149	2.261	10.28%	-22.91%
6.25		10	19.8	8	25	1.428	4.517	22.81%	-10.61%
12.5		10	20.6	12	26	1.194	3.777	18.34%	-15.08%
25		10	18.8	10	26	1.652	5.224	27.79%	-5.03%
50		10	19.3	11	25	1.613	5.1	26.43%	-7.82%
100		10	18.9	13	25	1.378	4.358	23.06%	-5.59%

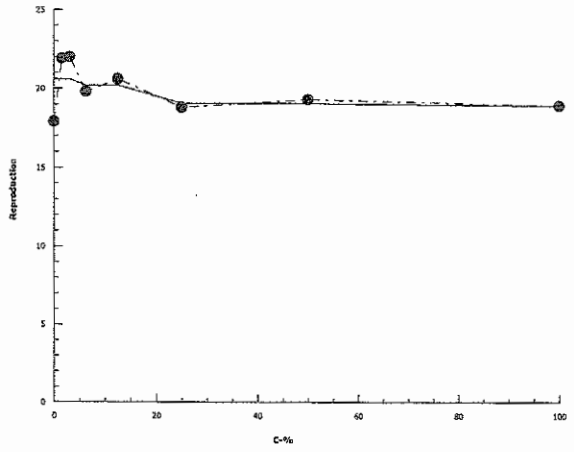
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	19	22	10	19	16	21	12	19	22	19
1.56		21	22	22	23	23	21	20	23	24	20
3.12		23	25	20	19	19	24	23	23	20	24
6.25		21	20	8	21	19	21	21	23	25	19
12.5		12	23	19	22	23	22	20	26	21	18
25		18	23	22	13	13	19	10	22	26	22
50		25	23	23	23	14	22	19	12	21	11
100		23	25	23	23	13	18	17	18	13	16

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID:	07-1541-9612	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:27	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	19-4655-8486	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:28	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	09-4264-1689	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 12:45	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	10-5788-9285	**Code:**	3F0E1C05	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (2.5 °C)	**Station:**	LC_FRDSDC_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	100	>100	NA	1

Nemenyi-Damico-Wolfe Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.56*	249.5	243.2	13		0.0432	Asymp	Significant Effect
		3.12*	266	243.2	13		0.0288	Asymp	Significant Effect
		6.25	124.5	243.2	13		0.3826	Asymp	Non-Significant Effect
		12.5	166.5	243.2	13		0.2179	Asymp	Non-Significant Effect
		25	94.5	243.2	13		0.5189	Asymp	Non-Significant Effect
		50	141.5	243.2	13		0.3108	Asymp	Non-Significant Effect
		100	85.5	243.2	13		0.5603	Asymp	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Treatment Effect	Fligner-Wolfe	2.058	1.645	0.0198	Significant Overall Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	154.8	22.11429	7	1.356	0.2374	Non-Significant Effect
Error	1174.4	16.31111	72			
Total	1329.2		79			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	18.01	18.48	0.0119	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9421	0.9579	0.0012	Non-normal Distribution

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	10	17.9	14.99	20.81	19	10	22	1.286	22.72%	0.0%
1.56		10	21.9	20.92	22.88	22	20	24	0.4333	6.26%	-22.35%
3.12		10	22	20.38	23.62	23	19	25	0.7149	10.28%	-22.91%
6.25		10	19.8	16.57	23.03	21	8	25	1.428	22.81%	-10.61%
12.5		10	20.6	17.9	23.3	21.5	12	26	1.194	18.34%	-15.08%
25		10	18.8	15.06	22.54	20.5	10	26	1.652	27.79%	-5.03%
50		10	19.3	15.65	22.95	21.5	11	25	1.613	26.43%	-7.82%
100		10	18.9	15.78	22.02	18	13	25	1.378	23.06%	-5.59%

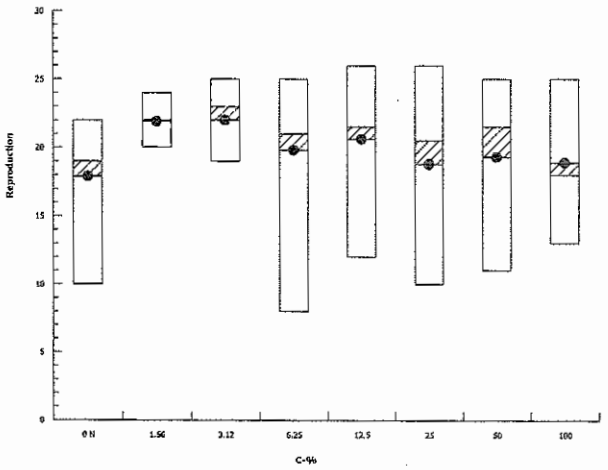
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

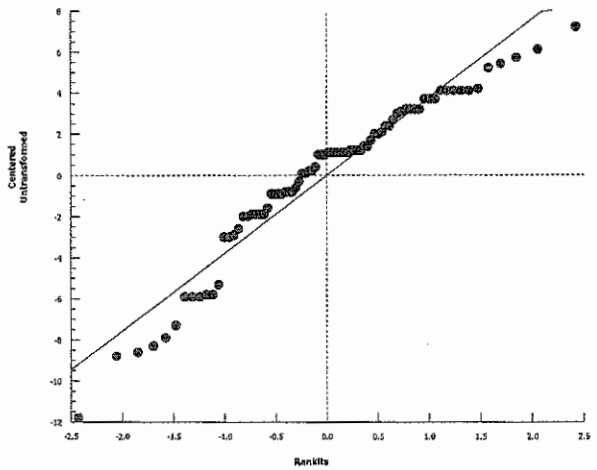
Analysis ID:	19-4655-8486	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:28	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	19	22	10	19	16	21	12	19	22	19
1.56		21	22	22	23	23	21	20	23	24	20
3.12		23	25	20	19	19	24	23	23	20	24
6.25		21	20	8	21	19	21	21	23	25	19
12.5		12	23	19	22	23	22	20	26	21	18
25		18	23	22	13	13	19	10	22	26	22
50		25	23	23	23	14	22	19	12	21	11
100		23	25	23	23	13	18	17	18	13	16

Graphics





Analyst:_____ QA: JCW 11/3/15

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal (Line Creek Op) Start Date/Time: October 27/15 @ 1300h
Work Order No.: 15870 Set up by: EMM

Sample Information:

Sample ID: LC-DCDS-US 20151026N
Sample Date: October 26/15
Date Received: October 27/15
Sample Volume: 5 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 101615A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 24
Mortality (%) in previous 7 d: 5
Individual female # used ≥8 young on test day: 3/4/5/13/15/16/19

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd136
Stock Solution ID: 15Na03
Date Initiated: Nov 3/15

7-d LC50 (95% CL): 2.0 (1.7-2.3) g/L NaCL
7-d IC50 (95% CL): 1.4 (1.1-1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-2.0) g/L NaCL CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: JDL Date reviewed: Nov-19/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC_DCDS_WS_2015-1076_N
Work Order #: 15870

Start Date & Time: Oct 27/15 @ 1300h
Stop Date & Time: Nov 2/15 @ 1500h
Test Species: *Ceriodaphnia dubia*

Concentration Control	Days 0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.9	8.0	7.7	8.0	7.6	8.1	7.7	8.0	7.6	8.0	7.6		
pH	8.0	7.9	8.0	7.9	8.0	7.9	8.1	7.9	7.9	7.9	8.0	7.8		
Cond. (µS/cm)	223	224		222		222		222		222		222		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration 1.56% (v/v)	Days 0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.9	8.2	7.7	8.2	7.6	8.2	7.6	7.8	7.7	8.1	7.6		
pH	8.0	7.9	8.0	7.9	8.0	7.9	8.1	7.9	8.1	7.9	8.0	8.0		
Cond. (µS/cm)	227	226		224		222		222		222		225		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration 12.5% (v/v)	Days 0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.8	8.2	7.7	8.1	7.6	8.2	7.7	7.8	7.6	8.1	7.6		
pH	8.1	8.0	8.1	7.9	8.1	7.9	8.1	8.0	8.1	8.0	8.1	8.0		
Cond. (µS/cm)	232	230		228		227		227		227		229		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration 100% (v/v)	Days 0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.9	7.9	7.8	8.1	7.7	8.2	7.7	8.0	7.6	8.1	7.6		
pH	8.4	8.1	8.4	8.1	8.3	8.1	8.3	8.0	8.3	8.1	8.3	8.1		
Cond. (µS/cm)	273	276		259		258		262		259		263		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Thermometer: 4 DO meter: 1 pH meter: 2 Conductivity meter: 1

	Control	100% (v/v)		
Hardness*	100	158		
Alkalinity*	96	132		

* mg/L as CaCO3

Analysts: EMM, AWD, MLT, JW, YYL, KL
Reviewed by: JGL
Date reviewed: Nov. 19/15

Sample Description: Clear

Comments: Broodboard Used: 101615A (#3,4,5,13,15,16,19)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck
Sample ID: LC_DCDS_WS_2015-10-26_N
Work Order: 15870

Start Date & Time: Oct 27/15 @ 1300h
Stop Date & Time: Nov 2/15 @ 1500h
Set up by: Emm

% (v/v)

Concentration: Control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	✓	✓	✓	X	✓	✓	✓	✓	✓	✓	Emm
4	5	2	4	|	3	3	3	3	4	4	JW
5	8	7	6	|	6	6	6	5	4	6	Emm
6	10	10	9	|	11	11	8	10	9	10	Emm
7											
8											
Total	23	19	19	8X	20	20	17	18	17	20	Emm

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Emm
4	✓	4	4	4	5	3	3	3	3	6	JW
5	4	8	8	6	7	8	6	7	7	6	Emm
6	9	10	13	12	10	10	10	8	9	12	Emm
7											
8											
Total	13	22	25	22	22	21	19	18	19	29	Emm

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	✓	✓	✓	✓	✓	✓	✓	✓	3	✓	Emm
4	3	3	4	4	4	3	4	3	✓	3	JW
5	8	6	3	5	6	7	7	6	9	6	Emm
6	10	11	9	10	11	9	12	11	10	9	Emm
7											
8											
Total	21	20	16	19	21	19	23	20	22	18	Emm

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	✓	3	✓	✓	✓	✓	✓	✓	✓	✓	Emm
4	✓	✓	✓	3	4	4	✓	4	2	3	JW
5	✓	8	✓	8	7	7	5	7	6	6	Emm
6	✓	13	2	12	12	10	10	10	9	9	Emm
7											
8											
Total	0	24	2	23	23	21	15	24	17	18	Emm

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	Emm
4	✓	4	4	3	4	3	3	4	4	4	JW
5	9	8	7	7	9	8	6	9	8	9	Emm
6	11	9	✓	12	9	10	11	10	9	12	Emm
7											
8								8F			
Total	24	21	11	22	22	21	20	22 23	21	25	Emm

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Emm
4	7	4	3	2	✓	2	2	3	3	6	JW
5	9	6	6	✓	✓	6	8	9	9	✓	Emm
6	10	8	10	8	✓	10	11	11	12	9	Emm
7											
8											
Total	26	18	19	10	0	18	21	23	24	15	Emm

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Emm
4	3	4	3	✓	4	4	4	3	3	4	JW
5	6	9	9	✓	8	7	6	6	7	6	Emm
6	10	9	10	0	9	11	9	9	10	12	Emm
7											
8											
Total	19	22	22	0	21	22	19	18	20	22	Emm

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	✓	✓	4	✓	✓	✓	✓	✓	✓	✓	Emm
4	5	5	✓	4	✓	4	3	4	4	4	JW
5	6	6	8	✓	4	8	7	6	6	5	Emm
6	✓	12	12	8	9	9	7	8	11	10	Emm
7											
8											
Total	11	23	24	12	13	21	17	18	21	19	Emm

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: clear

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JW

Date reviewed: Nov. 19/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-2872-9407	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:05	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	17-7402-5534	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 15:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	11-3850-9437	**Code:**	43DC467D	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (3.5 °C)	**Station:**	LC_DCDS_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	976422	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
1.56		10	1	1	1	0	0	0.0%	-11.11%	10	10
3.12		10	1	1	1	0	0	0.0%	-11.11%	10	10
6.25		10	1	1	1	0	0	0.0%	-11.11%	10	10
12.5		10	1	1	1	0	0	0.0%	-11.11%	10	10
25		10	1	1	1	0	0	0.0%	-11.11%	10	10
50		10	1	1	1	0	0	0.0%	-11.11%	10	10
100		10	1	1	1	0	0	0.0%	-11.11%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	0	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

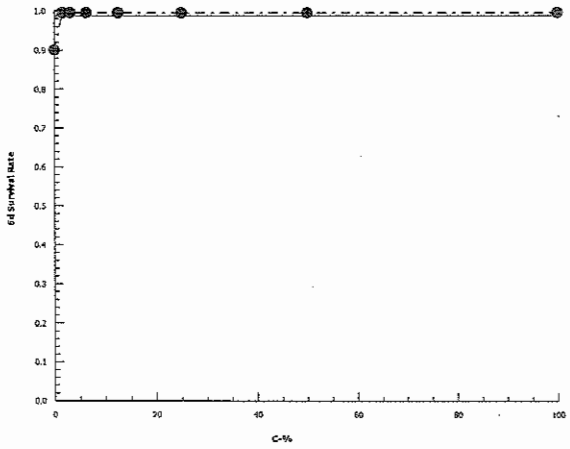
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-2872-9407	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:05	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Analyst:_____ QA: Nov. 19/15

CETIS Analytical Report

Report Date:	03 Nov-15 12:06 (p 1 of 2)
Test Code:	15870d | 04-3659-0393

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	13-5341-8243	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:05	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	17-7402-5534	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 15:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h

Sample ID:	11-3850-9437	**Code:**	43DC467D	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (3.5 °C)	**Station:**	LC_DCDS_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1232969	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	~~18.63~~	~~3.304~~	~~N/A~~	~~5.368~~	~~NA~~	~~30.26~~
IC10	>100	N/A	N/A	<1	NA	NA
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

>100 / (CVV)
em

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	17.3	0	23	2	6.325	36.56%	0.0%
1.56		10	20.5	13	25	1.088	3.44	16.78%	-18.5%
3.12		10	19.9	16	23	0.6403	2.025	10.18%	-15.03%
6.25		10	16.4	0	24	2.725	8.618	52.55%	5.2%
12.5		10	21	11	25	1.211	3.83	18.24%	-21.39%
25		10	17.4	0	26	2.423	7.662	44.04%	-0.58%
50		10	18.5	0	22	2.11	6.671	36.06%	-6.94%
100		10	17.9	11	24	1.456	4.606	25.73%	-3.47%

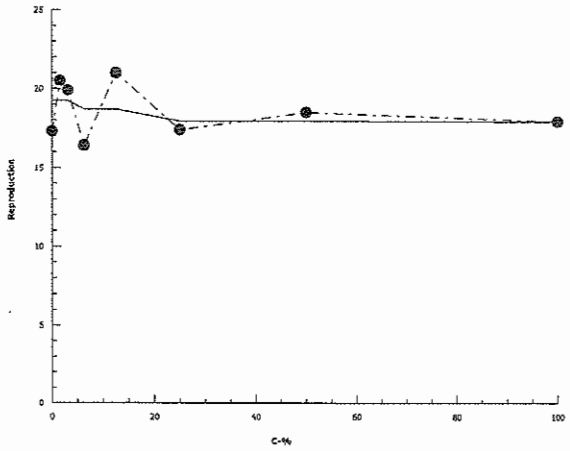
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	23	19	19	0	20	20	17	18	17	20
1.56		13	22	25	22	22	21	19	18	19	24
3.12		21	20	16	19	21	19	23	20	22	18
6.25		0	24	2	23	23	21	15	21	17	18
12.5		24	21	11	22	22	21	20	23	21	25
25		26	18	19	10	0	18	21	23	24	15
50		19	22	22	0	21	22	19	18	20	22
100		11	23	24	12	13	21	17	18	21	19

Ceriodaphnia 7-d Survival and Reproduction Test | **Nautilus Environmental**

Analysis ID:	13-5341-8243	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:05	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	09-8983-8365	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:07	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	17-7402-5534	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 15:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	11-3850-9437	**Code:**	43DC467D	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (3.5 °C)	**Station:**	LC_DCDS_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	100	>100	NA	1

Nemenyi-Damico-Wolfe Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.56	170.5	243.2	13		0.2047	Asymp	Non-Significant Effect
		3.12	98	243.2	13		0.5028	Asymp	Non-Significant Effect
		6.25	61	243.2	13		0.6687	Asymp	Non-Significant Effect
		12.5	229.5	243.2	13		0.0679	Asymp	Non-Significant Effect
		25	61	243.2	13		0.6687	Asymp	Non-Significant Effect
		50	109.5	243.2	13		0.4499	Asymp	Non-Significant Effect
		100	30.5	243.2	13		0.7859	Asymp	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Treatment Effect	Fligner-Wolfe	1.385	1.645	0.0830	Non-significant Overall Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	195.2875	27.89821	7	0.8288	0.5668	Non-Significant Effect
Error	2423.7	33.6625	72			
Total	2618.988		79			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	22.85	18.48	0.0018	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8187	0.9579	<0.0001	Non-normal Distribution

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	10	17.3	12.78	21.82	19	0	23	2	36.56%	0.0%
1.56		10	20.5	18.04	22.96	21.5	13	25	1.088	16.78%	-18.5%
3.12		10	19.9	18.45	21.35	20	16	23	0.6403	10.18%	-15.03%
6.25		10	16.4	10.24	22.56	19.5	0	24	2.725	52.55%	5.2%
12.5		10	21	18.26	23.74	21.5	11	25	1.211	18.24%	-21.39%
25		10	17.4	11.92	22.88	18.5	0	26	2.423	44.04%	-0.58%
50		10	18.5	13.73	23.27	20.5	0	22	2.11	36.06%	-6.94%
100		10	17.9	14.61	21.19	18.5	11	24	1.456	25.73%	-3.47%

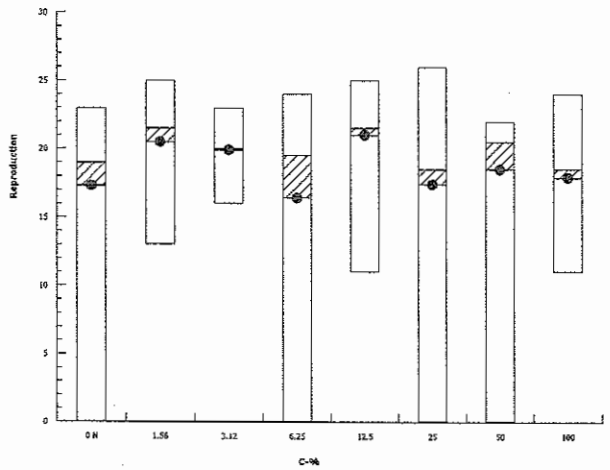
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

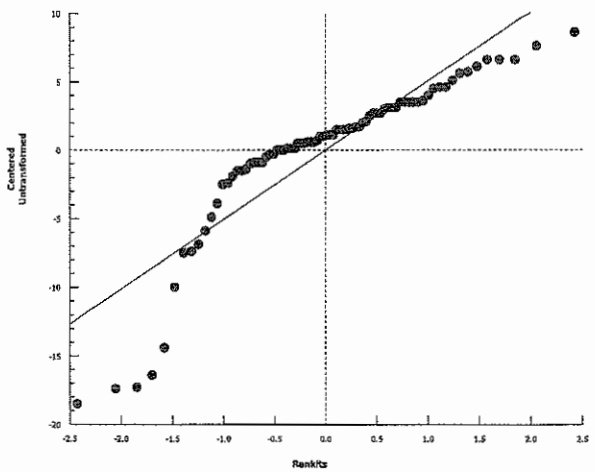
Analysis ID:	09-8983-8365	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:07	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	23	19	19	0	20	20	17	18	17	20
1.56		13	22	25	22	22	21	19	18	19	24
3.12		21	20	16	19	21	19	23	20	22	18
6.25		0	24	2	23	23	21	15	21	17	18
12.5		24	21	11	22	22	21	20	23	21	25
25		26	18	19	10	0	18	21	23	24	15
50		19	22	22	0	21	22	19	18	20	22
100		11	23	24	12	13	21	17	18	21	19

Graphics





Analyst:_____ QA: JOL Nov. 19/15

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal (Line Creek) Start Date/Time: October 27/15 @ 1200h
Work Order No.: 15870 Set up by: EMM

Sample Information:

Sample ID: LC-LC5_WS_2015-10-26_N
Sample Date: October 26/15
Date Received: October 27/15
Sample Volume: 5 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 101415A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 33
Mortality (%) in previous 7 d: 5
Individual female # used ≥8 young on test day: 1,3,4,5,7,8,9,10,11,12,13,14,15,16,18,19

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd136
Stock Solution ID: 15NaD3
Date Initiated: NOV 3/15

7-d LC50 (95% CL): 2.0 (1.7-2.3) g/L NaCL
7-d IC50 (95% CL): 1.4 (1.1-1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-2.0) g/L NaCL CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: JOH Date reviewed: Nov. 20/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: U-LC5-WS-101515-26.1
Work Order #: 15870
Start Date & Time: Oct 27/15 @ 1200h
Stop Date & Time: Nov 2/15 @ 1500h
Test Species: *Ceriodaphnia dubia*

Concentration: Control

	Days														
	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.9	8.0	7.9	8.0	7.8	8.1	7.6	8.0	7.6	8.0	7.6		
pH	8.0	7.9	8.0	8.0	8.0	7.9	8.1	7.8	7.9	7.9	8.0	8.0		
Cond. (µS/cm)	223	224		222		222		JW JW 222		222		221		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration: 1.56% (v/v)

	Days														
	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.9	8.2	7.9	8.2	7.8	8.1	7.6	7.8	7.6	8.0	7.6		
pH	8.0	7.9	8.0	8.0	8.0	8.0	8.1	7.9	8.1	7.8	8.0	7.9		
Cond. (µS/cm)	226	229		232		730		231		230		230		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration: 12.5% (v/v)

	Days														
	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.9	8.2	7.9	8.2	7.8	8.1	7.6	7.8	7.6	8.0	7.5		
pH	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.1	7.9	8.1	7.9		
Cond. (µS/cm)	288	280		290		291		287		290		289		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration: 100% (v/v)

	Days														
	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	7.9	7.8	8.2	7.9	8.2	7.8	8.2	7.6	8.1	7.6	8.1	7.5		
pH	8.2	8.1	8.2	8.1	8.2	8.2	8.2	8.1	8.2	8.2	8.2	8.1		
Cond. (µS/cm)	721	711		710		717		715		716		717		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Thermometer: 4 **DO meter:** 1 **pH meter:** 2 **Conductivity meter:** 1

	Control	100% (v/v)		
Hardness*	100	380		
Alkalinity*	96	162		

* mg/L as CaCO3

Analysts: EMM, AWB, MLT, JW, MH, KL
Reviewed by: JW
Date reviewed: NOV. 19/15

Sample Description: clear

Comments: **Broodboard Used:** 101415A (#'s 1, 3, 4, 7-16, 18, 19)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck
Sample ID: LC_WS_WS 2015-10-16_N
Work Order: 15870

Start Date & Time: Oct 27/15 @ 1200h
Stop Date & Time: Oct 28/15 @ 1300h
Set up by: EMM

% Cv(v)

Concentration: Control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	4	3	2	✓	4	4	4	4	4	JW
5	8	6	6	7	9	8	7	6	6	6	EMM
6	10	9	11	10	12	12	14	10	11	11	EMM
7											
8											
Total	22	19	20	19	21	24	25	20	21	21	EMM

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	4	4	4	4	3	4	4	2	4	5	JW
5	9	8	8	6	7	6	7	6	7	2	EMM
6	10	9	11	12	8	13	12	12	10	10	EMM
7											
8											
Total	23	21	23	22	18	23	23	20	21	17	EMM

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	4	3	3	2	5	3	5	4	4	3	JW
5	7	6	5	✓	8	9	8	8	10	8	EMM
6	13	10	11	✓	12	12	12	10	11	10	EMM
7											
8											
Total	24	19	19	0	25	24	25	22	25	21	EMM

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	3	4	3	4	3	4	4	4	4	JW
5	8	8	6	9	6	7	6	6	9	7	EMM
6	11	10	13	11	13	11	10	12	11	12	EMM
7											
8											
Total	22	21	23	23	23	21	20	22	24	23	EMM

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	5	4	✓	3	4	4	3	4	4	JW
5	9	9	8	4	6	7	8	8	7	6	EMM
6	10	12	11	6	12	10	11	12	13	9	EMM
7											
8											
Total	22	26	23	10	21	21	23	23	24	19	EMM

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	4	✓	4	3	5	3	4	✓	2	JW
5	3	8	6	5	6	7	8	7	6	7	EMM
6	10	10	11	9	12	9	10	11	8	11	EMM
7											
8											
Total	13	22	17	18	21	21	21	22	14	20	EMM

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	4	4	3	6	6	3	3	5	2	4	JW
5	8	9	6	7	8	8	9	8	5	6	EMM
6	10	11	13	10	✓	12	9	11	8	11	EMM
7											
8											
Total	22	24	22	23	14	23	21	24	15	21	EMM

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	6	4	3	4	✓	✓	2	2	3	JW
5	3	7	6	6	8	✓	✓	7	5	6	EMM
6	10	14	10	13	10	2	✓	12	10	11	EMM
7											
8											
Total	13	27	20	22	22	2	0	21	17	20	EMM

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: Clear
Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JGL

Date reviewed: Nov. 19/15

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	04-8053-7222	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 11:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-6441-8940	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 1h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	09-9298-8395	**Code:**	3B2FCCEB	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	36h (2.5 °C)	**Station:**	LC_LC5_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	218918	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

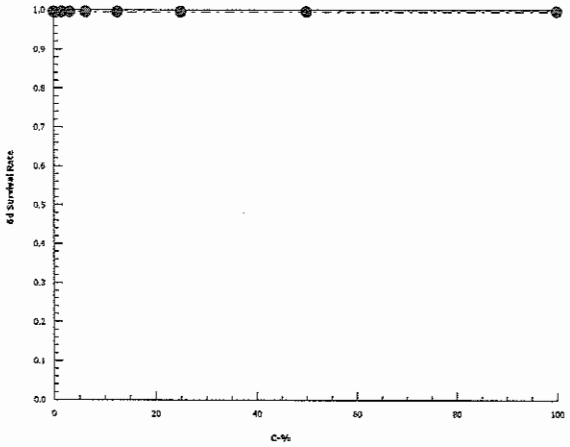
Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 04-8053-7222 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 03 Nov-15 11:59 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	15-0956-3323	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-6441-8940	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 1h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	09-9298-8395	**Code:**	3B2FCCEB	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	36h (2.5 °C)	**Station:**	LC_LC5_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1556147	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	21.76	1.436	N/A	4.595	NA	69.64
IC10	58.59	9.088	N/A	1.707	NA	11
IC15	72.31	44.14	N/A	1.383	NA	2.266
IC20	89.19	58.26	N/A	1.121	NA	1.717
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	21.2	19	25	0.6289	1.989	9.38%	0.0%
1.56		10	21.1	17	23	0.6904	2.183	10.35%	0.47%
3.12		10	20.4	0	25	2.386	7.545	36.99%	3.77%
6.25		10	22.2	20	24	0.3887	1.229	5.54%	-4.72%
12.5		10	21.2	10	26	1.381	4.367	20.6%	0.0%
25		10	18.9	13	22	1.038	3.281	17.36%	10.85%
50		10	20.9	14	24	1.12	3.542	16.95%	1.42%
100		10	16.4	0	27	2.81	8.884	54.17%	22.64%

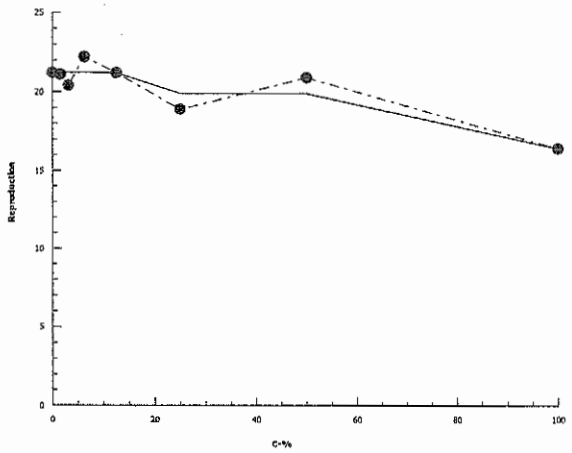
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	22	19	20	19	21	24	25	20	21	21
1.56		23	21	23	22	18	23	23	20	21	17
3.12		24	19	19	0	25	24	25	22	25	21
6.25		22	21	23	23	23	21	20	22	24	23
12.5		22	26	23	10	21	21	23	23	24	19
25		13	22	17	18	21	21	21	22	14	20
50		22	24	22	23	14	23	21	24	15	21
100		13	27	20	22	22	2	0	21	17	20

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID:	15-0956-3323	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Client: Teck Coal (Cline Creek)

W.O.#: 15870

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
LC_LCDSSLCC_WS_2015-10-26_N	Oct. 27/15	50	9.7	9.8	192		①10	4.8	480	KL
LC_DC1_WS_2015-10-26_N	Oct. 27/15	50	9.1	9.2	180		50	9.3	186	"
LC_FRDSDC_WS_2015-10-26_N	Oct. 27/15	50	8.9	9.0	176		①10	5.2	520	"
LC_DCDS_WS_2015-10-26_N	Oct. 27/15	50	6.8	7.0	132		50	7.9	158	"
LC_LC5_WS_2015-10-26_N	Oct. 27/15	50	8.3	8.5	162		①10	3.8	380	"
20% Perrier control water	Oct. 27/15	50	4.9	5.0	96		50	5.0	100	↓

Notes: ① Diluted sample to 100 mL with D.I. water.

Reviewed by: JOL

Date Reviewed: Nov. 18/15

APPENDIX B – Rainbow Trout Embryo *(Oncorhynchus mykiss)* Toxicity Test Data

Rainbow Trout Embryo Summary Sheet

Client: Teck

Start Date/Time: October 27, 2015 @ 1615h

Work Order No.: 15869

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: GH_ER2_WS_2015_10_26_N
Sample Date: October 26, 2015
Date Received: October 27, 2015
Sample Volume: 6 x 20 L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 10

Test Organism Information:

Batch No.: 102715
Source: Vancouver Island Trout Hatchery, Duncan, B.C.
Loading Density: 1.00 g/L
Number of male broodstock used: 3
Number of female broodstock used: 4

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE80
Stock Solution ID: 15S01
Date Initiated: October 27, 2015
7-d EC50 (95% CL): 3.0 (2.9-3.2) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.2-7.4) mg/L SDS
Reference Toxicant CV (%): 36

Test Results:

Embryo viability (mean ± SD)	Sample ID		
	Control	GH_ER2_WS_2015_10-26-N	
EC25 % (v/v) ~~(95% CL)~~	87.5 ± 10.0	88.3 ± 1.9	
~~EC50 % (v/v)~~ (95% CL)	—	—	

Reviewed by: JGu

Date reviewed: Nov. 20/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: GH-FR2-WS-2015-10-26-N
Work Order #: 15869
Start Date & Time: Oct 27/15 @ 1615h
Stop Date & Time: Nov 3/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

0% (UI) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.8	9.9	9.8	10.0	9.7	9.9	9.8	9.8	9.9	9.8	9.9	9.6	9.7	9.8
pH	6.8	6.9	7.1	6.9	7.0	6.9	7.0	6.9	7.1	6.9	7.1	6.8	7.0	7.0
Cond. (µS/cm)	33	35		34		33		35		35		34		35
Initials	YML	A		YML		SSD		A		A		YML		YML

Concentration (100)	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.5	14.5	14.5	14.5	13.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.1	9.8	9.9	9.9	9.8	10.2	9.9	9.8	9.9	9.8	9.8	9.8	9.7	9.8
pH	8.1	8.1	8.2	8.0	8.1	7.9	7.9	8.0	8.0	8.1	8.2	7.9	8.1	8.1
Cond. (µS/cm)	307	305		308		310		312		310		312		313
Initials	YML	A		YML		SSD		A		A		YML		YML

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: Temp-7 DO meter: DO-2/3 pH meter: pH-1/3 Conductivity meter: C-2/3

	Control	100%		
Hardness*	10	164		
Alkalinity*	10	156		

* mg/L as CaCO3

Analysts: SSD, AWD, YML
Reviewed by: [illegible]
Date reviewed: Nov-20/15

Sample Description: clear

Comments:

Embryo-~~Alevin-Fry~~ Toxicity Test
Daily Mortality

Client: Teck
Start Date & Time: Oct 26/15 @ 1615h (7 dph)
Sample ID: GH-EEL-WS-2015-10-26-N
Stop Date: Nov. 3/15 @ 1100h
Work Order #: 15869
Test Species: O. mykiss

Treatments % (v/v)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead ~~Fish~~ Eggs	Total Undeveloped	Total No. ~~Fry~~ Embryo	Total Exposed
Control	A	0	0	0	0	0	0	0	0	0	330	30
	B	↓	↓	↓	↓	↓	↓	↓	0	3	27	30
	C								0	7	23	30
	D								0	5	25	30
100	A								0	4	26	30
	B								0	3	27	30
	C								0	3	27	30
	D	↓	↓	↓	↓	↓	↓	↓	0	4	26	30
	A											
	B											
	C											
	D											
	A											
	B											
	C											
	D											
	A											
	B											
	C											
	D											
	A											
	B											
	C											
	D											
	A											
	B											
	C											
	D											
	A											
	B											
	C											
	D											
Tech Initials		YML	YML	KL	[illegible]	[illegible]	KL	KL	YML	YML	YML	YML

Comments:

Reviewed by: [signature] **Date reviewed:** Nov. 20/15

CETIS Summary Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Batch ID:	00-8430-3542	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 Nov-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	17-3819-8852	**Code:**	GH_ER2	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (4.5 °C)	**Station:**	GH_ER2_WS_2015_10_26_N		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
03-3005-0191	Proportion Normal	100	>100	NA	NA	1	Fisher Exact Test

Proportion Normal Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.875	0.7166	1	0.7667	1	0.04977	0.09954	11.38%	0.0%
100		4	0.8833	0.8527	0.914	0.8667	0.9	0.009623	0.01925	2.18%	-0.95%

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	0.9	0.7667	0.8333
100		0.8667	0.9	0.9	0.8667

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	30/30	27/30	23/30	25/30
100		26/30	27/30	27/30	26/30

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	03-3005-0191	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 12:50	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	00-8430-3542	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 Nov-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	17-3819-8852	**Code:**	GH_ER2	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (4.5 °C)	**Station:**	GH_ER2_WS_2015_10_26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	Passes proportion normal

Fisher Exact Test

Control	vs	C-%	Test Stat	P-Value	P-Type	Decision(α:5%)
Negative Control		100	1	1.0000	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Negative Contr	105	15	120	0.875	0.125	0.0%
100		106	14	120	0.8833	0.1167	-0.95%

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	0.9	0.7667	0.8333
100		0.8667	0.9	0.9	0.8667

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	30/30	27/30	23/30	25/30
100		26/30	27/30	27/30	26/30

Client: Teck

W.O.#: 15869

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
GH_ER2	Oct-27/15	50	7.6	7.7	150		50	8.2	164	KL
Dechlor	↓	↓	0.6	0.7	10		↓	0.5	10	EC

Notes:

Reviewed by: JM

Date Reviewed: Nov-20/15

Rainbow Trout Embryo Summary Sheet

Client: Teck (Line Creek) Start Date/Time: October 27, 2015 @ 1615h

Work Order No.: 15873 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_LCDSSLCC_WS_2015-10-26_N
Sample Date: October 26, 2015
Date Received: October 27, 2015
Sample Volume: x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 10

Test Organism Information:

Batch No.: 102715
Source: Vancouver Island Trout Hatchery, Duncan, BC
Loading Density: 1.00 g/L
Number of male broodstock used: 3
Number of female broodstock used: 4

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE80
Stock Solution ID: 15501
Date Initiated: October 27, 2015
7-d EC50 (95% CL): 3.0 (2.9-3.2) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.2-7.4) mg/L SDS
Reference Toxicant CV (%): 36

Test Results:

	Sample ID		
	LC_LCDSSLCC_WS_2015-10-26_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JCh Date reviewed: Nov. 20/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-LCDSSLCC-WS2015-10-26-N
Work Order #: 15813

Start Date & Time: Oct 28/15 @ 1615h
Stop Date & Time: Nov 3/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration: Control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.8	9.9	9.6	10.0	9.9	9.9	9.9	9.8	9.9	9.8	9.8	9.6	9.7	9.9
pH	6.8	6.9	7.0	6.9	6.9	7.0	6.9	7.0	7.1	7.0	7.1	6.8	6.9	6.8
Cond. (µS/cm)	33	35		34		33		35		35		34		35
Initials	YYL	YML		YML		SSD		A		A		YML		YML

Concentration: 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.1	10.0	9.8	10.0	9.9	9.9	9.9	9.8	9.8	9.5	9.9	9.8	9.7	9.9
pH	7.3	7.1	7.1	7.2	7.1	7.2	7.0	7.1	7.2	7.2	7.3	7.1	7.1	7.0
Cond. (µS/cm)	100	97		98		96		100		105		98		109
Initials	YYL	YML		YML		SSD		A		A		YML		YML

Concentration: 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.1	9.9	9.8	9.9	9.9	9.9	10.0	9.8	9.9	9.9	9.9	9.8	9.8	9.9
pH	7.9	7.7	7.5	7.7	7.4	7.6	7.3	7.3	7.5	7.4	7.5	7.5	7.4	7.3
Cond. (µS/cm)	277	264		278		274		280		282		281		288
Initials	YYL	YML		YML		SSD		A		A		YML		YML

Concentration: 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.5	14.5	14.5	15.0	14.5	14.0	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.2	10.0	9.8	9.9	10.0	9.9	10.0	9.9	9.8	9.9	9.8	9.8	9.9	9.9
pH	8.1	8.1	8.1	8.0	8.1	8.1	8.0	8.0	8.0	8.1	8.0	8.1	7.9	8.0
Cond. (µS/cm)	862	861		864		867		872		870		867		868
Initials	YYL	YML		YML		SSD		A		A		YML		YML

Thermometer: Temp-7 **DO meter:** DO-2/3 **pH meter:** pH 1/3 **Conductivity meter:** C-2/3

	Control	100 %		
Hardness*	10	480		
Alkalinity*	10	192		

* mg/L as CaCO3

Analysts: YYL, AMD, SSD
Reviewed by: JCL
Date reviewed: Nov-20/15

Sample Description: clear

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_LCDSSLCC_WS2015-10-26_N
Work Order #: 15873
Start Date & Time: Oct 26/15 @ 1615h
Stop Date & Time: Nov 3rd/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	0	0	0	0	0	6	24	30
	2	↓	↓	↓	↓	↓	↓	↓	0	4	26	30
	3	↓	↓	↓	↓	↓	↓	↓	0	7	23	30
	4	↓	↓	↓	↓	↓	↓	↓	0	4	26	30
6.25	1	↓	↓	↓	↓	↓	↓	↓	0	5	25	30
	2	↓	↓	↓	↓	↓	↓	↓	0	3	27	30
	3	↓	↓	↓	↓	↓	↓	↓	0	1	29	30
	4	↓	↓	↓	↓	↓	↓	↓	0	3	27	30
12.5	1	↓	↓	↓	↓	↓	↓	↓	0	4	26	30
	2	↓	↓	↓	↓	↓	↓	↓	0	6	24	30
	3	↓	↓	↓	↓	↓	↓	↓	0	1	29	30
	4	↓	↓	↓	↓	↓	↓	↓	0	3	27	30
25	1	↓	↓	↓	↓	↓	↓	↓	0	5	25	30
	2	↓	↓	↓	↓	↓	↓	↓	0	4	26	30
	3	↓	↓	↓	↓	↓	↓	↓	0	2	28	30
	4	↓	↓	↓	↓	↓	↓	↓	0	3	27	30
50	1	↓	↓	↓	↓	↓	↓	↓	0	5	25	30
	2	↓	↓	↓	↓	↓	↓	↓	0	6	24	30
	3	↓	↓	↓	↓	↓	↓	↓	0	3	27	30
	4	↓	↓	↓	↓	↓	↓	↓	0	4	26	30
100	1	↓	↓	↓	↓	↓	↓	↓	0	3	27	30
	2	↓	↓	↓	↓	↓	↓	↓	0	5	25	30
	3	↓	↓	↓	↓	↓	↓	1	1	2	27	30
	4	↓	↓	↓	↓	↓	↓	0	0	8	22	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		KL	KL	SSD	A	AD	KL	KL	YMC	YMC	YMC	YMC

Comments:

Reviewed by: JOL **Date reviewed:** Nov-20/15

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	11-5678-4505	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 7:50	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	04-0695-8960	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 Nov-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	13-5006-3600	**Code:**	507855F0	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (2.5 °C)	**Station:**	LC_LCDSSLCC_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	205503	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.825	0.7667	0.8667	0.025	0.05	6.06%	0.0%	99	120
6.25		4	0.9	0.8333	0.9667	0.02722	0.05443	6.05%	-9.09%	108	120
12.5		4	0.8833	0.8	0.9667	0.03469	0.06939	7.86%	-7.07%	106	120
25		4	0.8833	0.8333	0.9333	0.02152	0.04303	4.87%	-7.07%	106	120
50		4	0.85	0.8	0.9	0.02152	0.04303	5.06%	-3.03%	102	120
100		4	0.8417	0.7333	0.9	0.03938	0.07876	9.36%	-2.02%	101	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.8	0.8667	0.7667	0.8667
6.25		0.8333	0.9	0.9667	0.9
12.5		0.8667	0.8	0.9667	0.9
25		0.8333	0.8667	0.9333	0.9
50		0.8333	0.8	0.9	0.8667
100		0.9	0.8333	0.9	0.7333

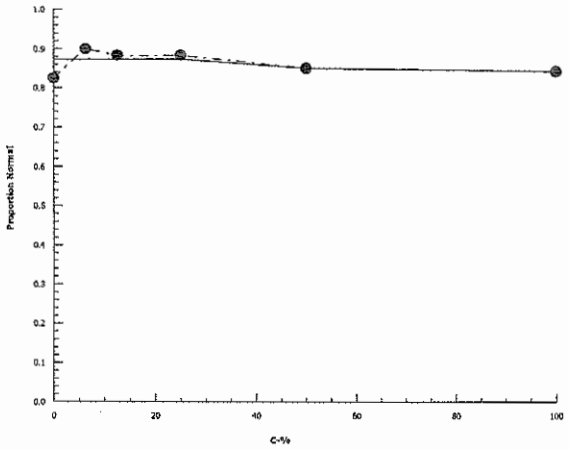
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	24/30	26/30	23/30	26/30
6.25		25/30	27/30	29/30	27/30
12.5		26/30	24/30	29/30	27/30
25		25/30	26/30	28/30	27/30
50		25/30	24/30	27/30	26/30
100		27/30	25/30	27/30	22/30

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	11-5678-4505	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 7:50	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Rainbow Trout Embryo Summary Sheet

Client: Teck (Line Creek) Start Date/Time: October 27, 2015 @ 1615h

Work Order No.: 15873 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_DCI_WS_2015-10-26_N
Sample Date: October 26, 2015
Date Received: October 27, 2015
Sample Volume: ~~x~~ 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 10

Test Organism Information:

Batch No.: 102715
Source: Vancouver Island Trout Hatchery, Duncan, BC
Loading Density: 1.00 g/L
Number of male broodstock used: 3
Number of female broodstock used: 4

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE80
Stock Solution ID: 15501
Date Initiated: October 27, 2015
7-d EC50 (95% CL): 3.0 (2.9-3.2) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.2-7.4) mg/L SDS
Reference Toxicant CV (%): 36

Test Results:

	Sample ID		
	LC-DCI_WS_2015-10-26_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JBL Date reviewed: Nov. 20/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-DCI-WS-2015-10-26-N
Work Order #: 15873

Start Date & Time: Oct 26/15 @ 1615h
Stop Date & Time: Nov 3/15 @ 1130h
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration: Control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.8	9.8	9.7	10.0	9.9	9.9	9.9	9.8	9.6	9.8	9.9	9.6	9.8	10.0
pH	6.8	6.9	6.9	6.9	6.9	7.0	6.9	7.0	7.1	7.0	7.1	6.8	7.0	7.0
Cond. (µS/cm)	33	35		34		33		36		35		34		35
Initials	YYL	YYL		YYL		SSD		A		A		YYL		YYL

Concentration: 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.9	9.9	9.8	10.0	9.8	10.0	9.9	9.9	9.5	9.8	9.8	9.6	9.9	10.0
pH	7.1	7.2	7.2	7.2	7.2	7.2	7.1	7.2	7.2	7.2	7.3	7.2	7.2	7.2
Cond. (µS/cm)	53	52		51		52		55		54		55		55
Initials	YYL	YYL		YYL		SSD		A		A		YYL		YYL

Concentration: 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.9	9.8	9.8	9.9	9.8	10.0	10.0	9.9	9.8	9.8	9.8	9.6	9.9	10.0
pH	7.5	7.5	7.5	7.6	7.5	7.5	7.4	7.5	7.5	7.6	7.7	7.6	7.6	7.6
Cond. (µS/cm)	108	108		106		112		115		116		111		112
Initials	YYL	YYL		YYL		SSD		A		A		YYL		YYL

Concentration: 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.5	14.0	14.5	14.5	14.5	14.0	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.1	10.0	9.9	10.1	9.9	10.0	10.0	9.9	9.8	9.9	9.9	9.4	9.8	10.1
pH	8.1	8.2	8.0	8.1	8.1	8.2	8.0	8.1	8.0	8.1	8.1	8.1	8.0	7.9
Cond. (µS/cm)	326	325		328		326		329		330		330		332
Initials	YYL	YYL		YYL		SSD		A		A		YYL		YYL

Thermometer: Temp-7 DO meter: DO-2/3 pH meter: pH 1/3 Conductivity meter: C-2/3

	Control	100 %		
Hardness*	10	180		
Alkalinity*	10	180		

* mg/L as CaCO3

Analysts: YYL, AMD, SSD

Reviewed by: JCL

Date reviewed: Nov. 20/15

Sample Description: clear

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_DC1_WS_2015-10-26_N
Work Order #: 15873
Start Date & Time: Oct 26/15 @ 1615h
Stop Date & Time: Nov 3rd/15 @ 1130h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	0	0	0	0	0	2	28	30
	2								0	4	26	30
	3								0	0	30	30
	4								0	2	28	30
6.25	1								0	5	25	30
	2								0	4	26	30
	3					1			1	6	23	30
	4					0			0	3	27	30
12.5	1								0	0	30	30
	2								0	3	27	30
	3								0	2	28	30
	4								0	5	25	30
25	1								0	5	25	30
	2								0	4	26	30
	3								0	3	27	30
	4								0	5	25	30
50	1					↓			0	4	26	30
	2					0		↓	0	3	27	30
	3					1		1	2	3	25	30
	4					1		0	1	5	24	30
100	1					5			0	2	28	30
	2					2	↓		0	2	28	30
	3					0	1	↓	1	2	27	30
	4	↓	↓	↓	↓	2	0	1	1	3	26	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		KL	KL	SSD	A	A	KL	KL	YML	YML	YML	YML

Comments:

Reviewed by: JOL **Date reviewed:** Nov. 20/15

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	02-5088-1826	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 7:54	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	08-3967-2525	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 Nov-15 11:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	16-9503-3844	**Code:**	650829F4	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (2.5 °C)	**Station:**	LC_DC1_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	67131	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	4.511	0.001655	N/A	22.17	NA	60430
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9333	0.8667	1	0.02722	0.05443	5.83%	0.0%	112	120
6.25		4	0.8417	0.7667	0.9	0.02846	0.05693	6.76%	9.82%	101	120
12.5		4	0.9167	0.8333	1	0.03469	0.06939	7.57%	1.79%	110	120
25		4	0.8583	0.8333	0.9	0.01596	0.03191	3.72%	8.04%	103	120
50		4	0.85	0.8	0.9	0.02152	0.04303	5.06%	8.93%	102	120
100		4	0.9083	0.8667	0.9333	0.01596	0.03191	3.51%	2.68%	109	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.9333	0.8667	1	0.9333
6.25		0.8333	0.8667	0.7667	0.9
12.5		1	0.9	0.9333	0.8333
25		0.8333	0.8667	0.9	0.8333
50		0.8667	0.9	0.8333	0.8
100		0.9333	0.9333	0.9	0.8667

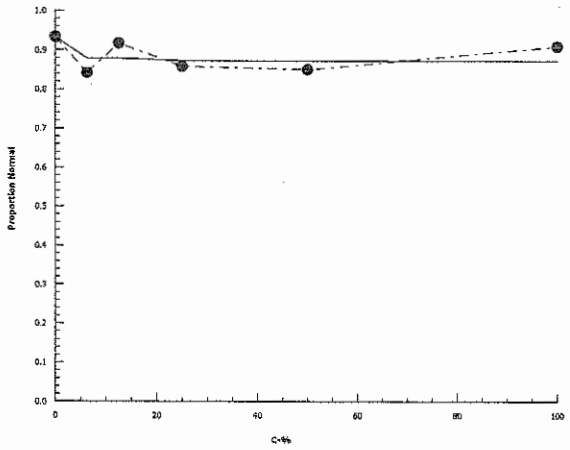
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	28/30	26/30	30/30	28/30
6.25		25/30	26/30	23/30	27/30
12.5		30/30	27/30	28/30	25/30
25		25/30	26/30	27/30	25/30
50		26/30	27/30	25/30	24/30
100		28/30	28/30	27/30	26/30

Salmonid Embryo Survival and Development Test | **Nautilus Environmental**

Analysis ID:	02-5088-1826	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 7:54	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



 Analyst:_____ QA: Nov. 20/15

Rainbow Trout Embryo Summary Sheet

Client: Teck (Line Creek) Start Date/Time: October 27, 2015 @ 1615h

Work Order No.: 15873 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_FRDSDC_WS_2015-10-26_N
Sample Date: October 26, 2015
Date Received: October 27, 2015
Sample Volume: ~~x~~ 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 10

Test Organism Information:

Batch No.: 102715
Source: Vancouver Island Trout Hatchery, Duncan, BC
Loading Density: 1.00 g/L
Number of male broodstock used: 3
Number of female broodstock used: 4

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE80
Stock Solution ID: 15501
Date Initiated: October 27, 2015
7-d EC50 (95% CL): 3.0 (2.9-3.2) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.2-7.4) mg/L SDS
Reference Toxicant CV (%): 36

Test Results:

	Sample ID		
	LC-FRDSDC_WS-2015-10-26-N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JBL Date reviewed: Nov-20/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-FRDSDC-WS-2015 10-26 N
Work Order #: 15873
Start Date & Time: Oct 26/15 @ 1615h
Stop Date & Time: Nov 3/15 @ 1145h
Test Species: *Oncorhynchus mykiss*

Concentration: 0% (WS) (control)

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.8	9.9	9.8	10.0	10.0	9.9	9.9	9.8	9.9	9.8	9.9	9.6	9.7	9.8
pH	6.8	6.9	6.9	6.9	6.9	7.0	6.9	7.0	7.1	7.0	7.0	6.8	6.9	7.0
Cond. (µS/cm)	33	35		34		33		35		35		34		35
Initials	YYL	YWL		YWL		SSD		A		A		YWL		YWL

Concentration: 6.25

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.8	9.8	9.7	9.8	9.9	10.0	9.8	9.8	9.8	9.9	9.9	9.8	9.7	9.8
pH	7.0	7.2	7.1	7.3	7.1	7.2	7.0	7.2	7.1	7.1	7.2	7.3	7.2	7.2
Cond. (µS/cm)	87	85 ~~85~~ YWL		87		86		90		91		89		90
Initials	YYL	YWL		YWL		SSD		A		A		YWL		YWL

Concentration: 25

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.6	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.0	9.8	9.8	9.7	9.9	9.9	9.8	9.9	9.9	9.9	9.8	9.8	9.6	9.9
pH	7.4	7.6	7.5	7.7	7.5	7.6	7.4	7.7	7.3	7.6	7.7	7.6	7.6	7.6
Cond. (µS/cm)	231	236		241		236		235		240		244		241
Initials	YYL	YWL		YWL		SSD		A		A		YWL		YWL

Concentration: 100

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.0	14.5	14.5	14.5	14.0	14.5	14.5	14.5	14.6	14.5	14.5	14.5	14.5
DO (mg/L)	10.2	10.1	9.9	9.9	10.0	10.1	9.9	9.9	9.8	10.0	9.8	9.8	9.7	9.9
pH	8.0	8.1	8.0	8.1	8.1	8.1	8.0	8.1	8.0	8.1	8.1	8.0	8.1	8.0
Cond. (µS/cm)	732	732		733		731		733		735		739		733
Initials	YYL	YWL		YWL		SSD		A		A		YWL		YWL

Thermometer: Temp-7 **DO meter:** DO-2/3 **pH meter:** pH 1/3 **Conductivity meter:** C-2/3

	Control	100 %		
Hardness*	10	520		
Alkalinity*	10	176		

* mg/L as CaCO3

Analysts: YYL, AWD, SSD
Reviewed by: JDC
Date reviewed: Nov. 20/15

Sample Description: clear

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC-FRDSDC-WS-2015-10-26-N
Work Order #: 15973
Start Date & Time: Oct 26/15 @ 1615h
Stop Date & Time: Nov 3rd/15 @ 1145h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	0	0	0	0	0	0	30	30
	2	↓	↓	↓	↓	↓	↓	↓	0	2	27	29
	3								0	1	29	30
	4								0	2	28	30
6.25	1								0	5	25	30
	2								0	2	28	30
	3						↓		0	5	25	30
	4								1	3	26	30
12.5	1						0		0	1	29	30
	2								0	2	28	30
	3								0	4	26	30
	4								0	4	26	30
25	1								0	5	25	30
	2								0	5	25	30
	3								0	3	27	30
	4								0	3	27	30
50	1								0	2	28	30
	2								0	2	28	30
	3								0	1	29	30
	4								0	1	29	30
100	1								0	2	28	30
	2								0	4	26	30
	3						↓		0	4	26	30
	4	↓	↓	↓	↓	↓	2	↓	2	2	25	29
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		KL	KL	SSD	A	AD	KL	KL	yw	yw	yw	yw

Comments:

Reviewed by: JCL **Date reviewed:** Nov. 20/15

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	03-1104-3745	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 7:56	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	13-5183-1846	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 Nov-15 11:45	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	10-5788-9285	**Code:**	3F0E1C05	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (2.5 °C)	**Station:**	LC_FRDSDC_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1984984	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	3.854	0.7596	129.9	25.95	0.7699	131.6
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9578	0.931	1	0.01626	0.03253	3.4%	0.0%	114	119
6.25		4	0.8667	0.8333	0.9333	0.02357	0.04714	5.44%	9.51%	104	120
12.5		4	0.9083	0.8667	0.9667	0.025	0.05	5.51%	5.16%	109	120
25		4	0.8667	0.8333	0.9	0.01924	0.03849	4.44%	9.51%	104	120
50		4	0.95	0.9333	0.9667	0.009622	0.01924	2.03%	0.81%	114	120
100		4	0.8822	0.8621	0.9333	0.01708	0.03417	3.87%	7.89%	105	119

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	0.931	0.9667	0.9333
6.25		0.8333	0.9333	0.8333	0.8667
12.5		0.9667	0.9333	0.8667	0.8667
25		0.8333	0.8333	0.9	0.9
50		0.9333	0.9333	0.9667	0.9667
100		0.9333	0.8667	0.8667	0.8621

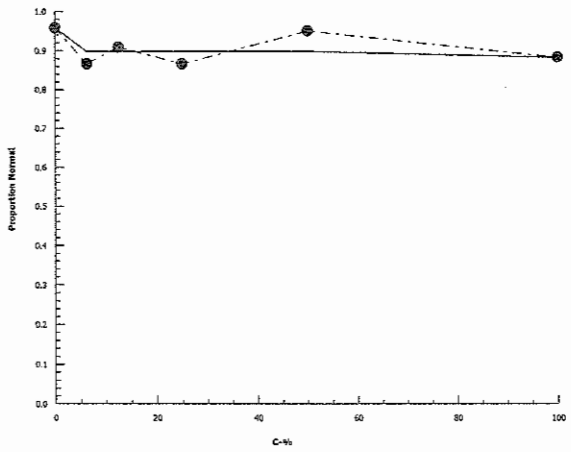
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	30/30	27/29	29/30	28/30
6.25		25/30	28/30	25/30	26/30
12.5		29/30	28/30	26/30	26/30
25		25/30	25/30	27/30	27/30
50		28/30	28/30	29/30	29/30
100		28/30	26/30	26/30	25/29

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	03-1104-3745	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 7:56	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Rainbow Trout Embryo Summary Sheet

Client: Teck (Line Creek) Start Date/Time: October 27, 2015 @ 1615h

Work Order No.: 15873 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC-DCDS-WS-2015-10-26-N
Sample Date: October 26, 2015
Date Received: October 27, 2015
Sample Volume: x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 10

Test Organism Information:

Batch No.: 102715
Source: Vancouver Island Trout Hatchery, Duncan, BC
Loading Density: 1.00 g/L
Number of male broodstock used: 3
Number of female broodstock used: 4

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE80
Stock Solution ID: 15501
Date Initiated: October 27, 2015
7-d EC50 (95% CL): 3.0 (2.9-3.2) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.2-7.4) mg/L SDS
Reference Toxicant CV (%): 36

Test Results:

	Sample ID		
	LC-DCDS-WS-2015-10-26-N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JBL Date reviewed: Nov. 20/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC_DCDS_WS_2015-10-26_N
Work Order #: 15873

Start Date & Time: Oct 26/15 @ 1615h
Stop Date & Time: Nov 3/15 @ 1200h
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration: Control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.8	9.9	9.7	10.0	9.9	9.9	9.8	9.8	9.7	9.8	9.9	9.6	9.7	9.8
pH	6.8	6.9	6.9	6.9	7.0	7.0	7.0	7.0	6.9	7.0	7.1	6.8	6.9	7.1
Cond. (µS/cm)	33	35		34		33		35		35		34		35
Initials	YYL	YYL		YYL		SSD		A		A		YYL		YYL

Concentration: 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.8	9.7	9.6	9.7	9.9	10.0	9.9	9.9	9.7	9.9	9.8	9.5	9.8	9.9
pH	7.0	7.1	7.1	7.2	7.1	7.3	7.1	7.2	7.2	7.2	7.3	7.3	7.2	7.3
Cond. (µS/cm)	49	50		50		48		49		52		51		51
Initials	YYL	YYL		YYL		SSD		A		A		YYL		YYL

Concentration: 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.8	9.8	9.7	9.7	10.0	10.0	9.9	9.9	9.8	9.9	9.8	9.6	9.8	9.8
pH	7.3	7.5	7.4	7.5	7.4	7.5	7.3	7.6	7.4	7.7	7.8	7.5	7.5	7.5
Cond. (µS/cm)	90	99		96		95		100		102		101		117
Initials	YYL	YYL		YYL		SSD		A		A		YYL		YYL

Concentration: 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.5	14.5	14.5	14.0	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.0	10.1	9.7	9.9	10.1	10.0	9.8	9.9	9.9	9.8	9.3	9.6	9.9	9.7
pH	8.3	8.4	7.9	8.3	7.9	8.3	7.8	8.2	7.9	8.2	8.2	8.2	8.0	7.9
Cond. (µS/cm)	258	257		259		258		262		265		264		267
Initials	YYL	YYL		YYL		SSD		A		A		YYL		YYL

Thermometer: Temp-7 **DO meter:** DO-2/3 **pH meter:** pH 1/3 **Conductivity meter:** C-2/3

	Control	100 %		
Hardness*	10	158		
Alkalinity*	10	132		

* mg/L as CaCO3

Analysts: YYL, AWD, SSD

Reviewed by: JOC

Date reviewed: Nov. 20/15

Sample Description: Clear

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_DCDS_WS_2015-10-26
Work Order #: 15873
Start Date & Time: Oct 26/15 @ 1615h
Stop Date & Time: Nov 7/15 @ 1200h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	0	0	0	0	0	5	25	30
	2								0	4	26	30
	3								0	3	27	30
	4								0	3	27	30
6.25	1								0	1	29	30
	2								0	7	23	30
	3								0	1	29	30
	4								0	3	27	30
12.5	1								0	4	26	30
	2								0	1	29	30
	3								0	5	25	30
	4								0	6	24	30
25	1								0	3	27	30
	2							↓	0	5	25	30
	3							1	1	4	25	30
	4							0	0	2	28	30
50	1								0	9	21	30
	2								0	7	23	30
	3								0	2	28	30
	4								0	2	28	30
100	1								0	4	26	30
	2								0	5	25	30
	3								0	7	23	30
	4	↓	↓	↓	↓	↓	↓	↓	0	5	25	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		KL	KL	SSD	A	AD	KL	KL	YMK	YMK	YMK	YMK

Comments:

Reviewed by: JCh **Date reviewed:** Nov. 20/15

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	10-2180-6082	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 7:58	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	09-8627-5619	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 Nov-15 12:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	11-3850-9437	**Code:**	43DC467D	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (3.5 °C)	**Station:**	LC_DCDS_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1164262	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	41.77	N/A	N/A	2.394	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.875	0.8333	0.9	0.01596	0.03191	3.65%	0.0%	105	120
6.25		4	0.9	0.7667	0.9667	0.04714	0.09428	10.48%	-2.86%	108	120
12.5		4	0.8667	0.8	0.9667	0.036	0.07201	8.31%	0.95%	104	120
25		4	0.875	0.8333	0.9333	0.025	0.05	5.71%	0.0%	105	120
50		4	0.8333	0.7	0.9333	0.05932	0.1186	14.24%	4.76%	100	120
100		4	0.825	0.7667	0.8667	0.02097	0.04194	5.08%	5.71%	99	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.8333	0.8667	0.9	0.9
6.25		0.9667	0.7667	0.9667	0.9
12.5		0.8667	0.9667	0.8333	0.8
25		0.9	0.8333	0.8333	0.9333
50		0.7	0.7667	0.9333	0.9333
100		0.8667	0.8333	0.7667	0.8333

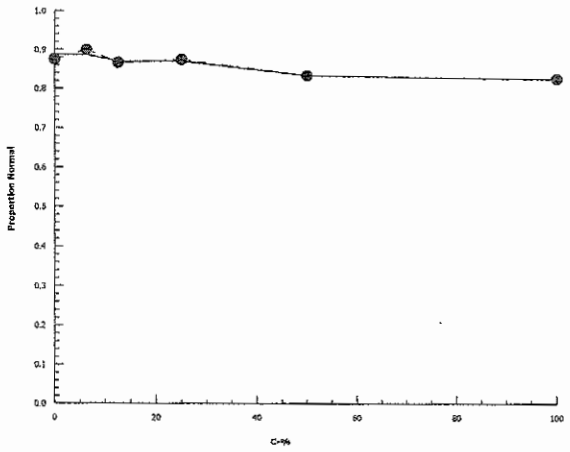
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	25/30	26/30	27/30	27/30
6.25		29/30	23/30	29/30	27/30
12.5		26/30	29/30	25/30	24/30
25		27/30	25/30	25/30	28/30
50		21/30	23/30	28/30	28/30
100		26/30	25/30	23/30	25/30

Salmonid Embryo Survival and Development Test | **Nautilus Environmental**

Analysis ID:	10-2180-6082	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 7:58	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Rainbow Trout Embryo Summary Sheet

Client: Teck (Line Creek) Start Date/Time: October 27, 2015 @ 1615h

Work Order No.: 15873 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC-LCS-WS-2015-10-26-N
Sample Date: October 26, 2015
Date Received: October 27, 2015
Sample Volume: x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 10

Test Organism Information:

Batch No.: 102715
Source: Vancouver Island Trout Hatchery, Duncan, BC
Loading Density: 1.00 g/L
Number of male broodstock used: 3
Number of female broodstock used: 4

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE80
Stock Solution ID: 15501
Date Initiated: October 27, 2015
7-d EC50 (95% CL): 3.0 (2.9-3.2) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.2-7.4) mg/L SDS
Reference Toxicant CV (%): 36

Test Results:

	Sample ID		
	LC-LCS-WS-2015-10-26-N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JOH Date reviewed: Nov. 20/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC_LCS_WS_2015-10-26_N
Work Order #: 15873
Start Date & Time: Oct 26/15 @ 1615h
Stop Date & Time: Nov 3/15 @ 1215h
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration: Control	Days														
	0	1		2		3		4		5		6		7	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.6	14.5	14.6	14.5	14.5	14.5	
DO (mg/L)	9.8	9.9	9.9	10.0	9.7	9.9	9.9	9.8	9.8	9.8	9.7	9.6	9.9	9.8	
pH	6.8	6.9	7.0	6.9	7.0	7.0	6.9	7.0	7.1	7.0	7.1	6.8	7.0	7.1	
Cond. (µS/cm)	33	35		34		33		35		35		34		34	
Initials	YYL	YYL		YWL		SSD		A		A		YWL		YWL	

Concentration: 6.25	Days														
	0	1		2		3		4		5		6		7	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.6	14.5	14.5	14.5	
DO (mg/L)	9.8	9.8	9.8	10.0	9.8	9.9	10.0	9.9	9.9	9.8	9.8	9.7	9.8	9.8	
pH	7.2	7.2	7.1	7.2	7.0	7.2	6.9	7.2	7.1	7.3	7.4	7.3	7.2	7.3	
Cond. (µS/cm)	86	84		87		85		86		90		86		87	
Initials	YYL	YWL		YWL		SSD		A		A		YWL		YWL	

Concentration: 25	Days														
	0	1		2		3		4		5		6		7	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)	14.5	14.0	14.5	14.5	14.5	14.5	14.5	14.5	14.6	14.5	14.5	14.5	14.5	14.5	
DO (mg/L)	9.8	9.8	9.8	10.0	9.8	9.9	9.9	9.8	9.9	9.8	9.8	9.7	9.9	9.8	
pH	7.6	7.7	7.6	7.8	7.5	7.7	7.3	7.6	7.2	7.7	7.8	7.6	7.7	7.6	
Cond. (µS/cm)	232	237		244		236		244		242		246		245	
Initials	YYL	YWL		YWL		SSD		A		A		YWL		YWL	

Concentration: 100	Days														
	0	1		2		3		4		5		6		7	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)	14.0	13.5	14.5	14.0	14.5	14.0	14.5	14.5	14.5	14.5	14.6	14.5	14.5	14.5	
DO (mg/L)	9.7	9.9	9.9	10.1	9.8	10.0	9.9	9.9	9.8	9.9	9.9	9.6	9.9	9.9	
pH	8.1	8.2	8.0	8.2	8.0	8.0	8.0	8.1	7.9	8.0	8.1	8.2	8.1	8.0	
Cond. (µS/cm)	727	728		722		718		734		730		724		730	
Initials	YYL	YWL		YWL		SSD		A		A		YWL		YWL	

Thermometer: Temp-7 **DO meter:** DO-2/3 **pH meter:** pH 1/3 **Conductivity meter:** C-2/3

	Control	100 %		
Hardness*	10	380		
Alkalinity*	10	162		

* mg/L as CaCO3

Analysts: YYL, AWD, SSD
Reviewed by: JCK
Date reviewed: Nov-20/15

Sample Description: clear

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC-LCS_WS_2015-10-26_N
Work Order #: 15873
Start Date & Time: Oct 26/15 @ 1615h
Stop Date & Time: Nov 3rd/15 @ 1215h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	0	0	0	0	0	2	28	30
	2								0	1	29	30
	3								0	4	26	30
	4								0	3	27	30
6.25	1								0	5	25	30
	2								0	0	30	30
	3								0	4	26	30
	4								0	4	26	30
12.5	1								0	0	30	30
	2								0	0	30	30
	3								0	2	28	30
	4								0	2	28	30
25	1								0	1	29	30
	2								0	5	25	30
	3								0	1	29	30
	4								0	3	27	30
50	1								0	7	23	30
	2								0	4	26	30
	3								0	3	27	30
	4							↓	0	1	29	30
100	1								1	0	29	30
	2					↓		0	0	1	29	30
	3						↓		0	3	27	30
	4	↓	↓	↓	↓	1	6	↓	7	4	19	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		KL	KL	SSD	A	A	KL	KL	MMC	MMC	MMC	MMC

Comments:

Reviewed by: JCh **Date reviewed:** Nov. 20/15

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	03-0076-6746	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 8:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	11-6257-3757	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 Nov-15 12:15	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	09-9298-8395	**Code:**	3B2FCCEB	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (2.5 °C)	**Station:**	LC_LC5_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1861063	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	47	4.375	N/A	2.128	NA	22.86
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)							
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9167	0.8667	0.9667	0.02152	0.04303	4.7%	0.0%	110	120
6.25		4	0.8917	0.8333	1	0.03696	0.07391	8.29%	2.73%	107	120
12.5		4	0.9667	0.9333	1	0.01924	0.03849	3.98%	-5.46%	116	120
25		4	0.9167	0.8333	0.9667	0.03191	0.06383	6.96%	0.0%	110	120
50		4	0.875	0.7667	0.9667	0.04167	0.08333	9.52%	4.55%	105	120
100		4	0.8667	0.6333	0.9667	0.07935	0.1587	18.31%	5.46%	104	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.9333	0.9667	0.8667	0.9
6.25		0.8333	1	0.8667	0.8667
12.5		1	1	0.9333	0.9333
25		0.9667	0.8333	0.9667	0.9
50		0.7667	0.8667	0.9	0.9667
100		0.9667	0.9667	0.9	0.6333

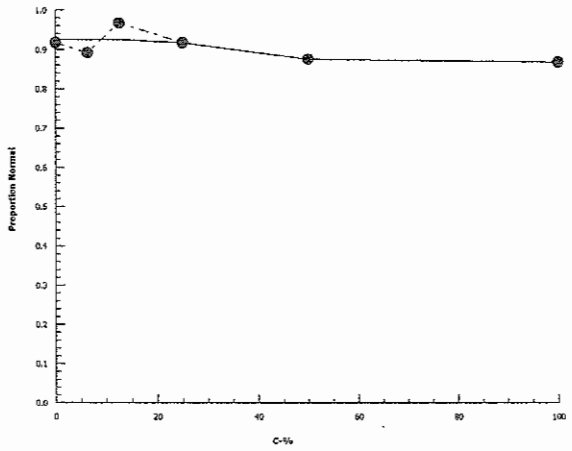
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	28/30	29/30	26/30	27/30
6.25		25/30	30/30	26/30	26/30
12.5		30/30	30/30	28/30	28/30
25		29/30	25/30	29/30	27/30
50		23/30	26/30	27/30	29/30
100		29/30	29/30	27/30	19/30

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	03-0076-6746	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 8:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Client: Teck (Line Creek)

W.O.#: 15873

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID WS-2015-10-26-N	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/L CaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
LC_LCDSSLCC_A	Oct27/15	50	9.7	9.8	192		100①	4.8	480	KL
LC_DC1_WS-2015-10-26-N	↓	↓	9.1	9.2	180		50	9.3	186	↓
LC_FRDSDC_WS-2015-10-26-N			8.9	9.0	176		100①	5.2	520	
LC_DCDS_WS-2015-10-26-N			6.8	7.0	132		50	7.9	158	
LC_LC5_WS-2015-10-26-N			8.3	8.5	162		100①	3.8	380	
Dechlor	Oct. 27/15	50	0.6	0.7	10		50	0.5	10	EC

Notes: ① Sample diluted w/ DI up to 100mL

Reviewed by: JM Date Reviewed: Nov. 20/15

APPENDIX C – ***Lemna minor*** **Toxicity Test Data**

Lemna minor Summary Sheet

Client: Teck Coal
Work Order No.: 15872

Start Date: October 29, 2015
Set up by: JW

Sample Information:

Sample ID: LC_LCDSSLCC_WS_2015-10-26_N
Sample Date: October 26, 2015
Date Received: October 27, 2015
Sample Volume: 8x20L

Test Organism Information:

Culture Date: 102215
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (29 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 125
Date Initiated: October 21, 2015

7-d No. of Fronds IC50 (95% CL): 4.3 (3.9-4.7) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.2 (3.2-5.5) g/L KCl CV (%): 14

		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v) (95% CL)	50.3 ~~(28.1-69.5)~~ (27.5-68.7)	>97
	IC50 %(v/v) (95% CL)	90.3 ~~(78.6-99.1)~~ (76.4-97)	>97

Reviewed by: JW
Date reviewed: Nov. 20/15

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: JW

Sample ID: LC_ LCDSSLCC_WS_2015-10-26_N | Test Date: Oct 29, 2015

Work Order No.: 15872 | Test Species: *Lemna minor*

Culture Source: CPCC # 490

Test Culture Age: 7 days | > 8X Growth? (Y/N): Y (29 fronds)

Light Intensity Range: 4030 - 4730 lux | Date Measured: Oct 28, 2015

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	26.0	27.0	26.0	26.0	26.0	26.0	27.0	27.0 26.0
Initials	JW	ML	JW		ML	ML	ML	ML

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	26.5	Aeration?: 20 min	26.5
DO (mg/L)	8.1	Nutrients added?: Y →	7.9
pH	8.1		8.0
Conductivity (µS)	865		1589

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	26.0	25.0	8.3	8.9	895
1.5	25.5	25.0	8.2	9.3	902
3.0	25.5	25.0	8.2	9.6	920
6.1	25.5	25.0	8.2	9.1	945
12.1	25.5	25.0	8.2	9.2	991
24.2	25.5	25.0	8.2	9.0	1082
48.5	26.0	25.0	8.1	9.8 8	1257
97	26.5	25.0	8.0	8.5	1589
Initials	JW	KL	JW	KL	JW

Instruments: Thermometer: CER-4 Cond. Meter: C-4 pH meter: PH-2

Sample Description: Clear

Comments: Light Meter = Lit-1

Reviewed: JW Date Reviewed: Nov. 19/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - LCDSSLCC - WS - 2015 - 10 - 26 - N
Work Order #: 15872

Start Date: October 29 , 2015
Termination Date: November 5 , 2015
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	88										MG
	B	6	88										
	C	6	93										
	D	6	83										
1.5	A	6	80										
	B	6	83										
	C	6	81										
	D	6	79										
3.0	A	6	79										
	B	6	66										
	C	6	96										
	D	6	82										
6.1	A	6	96										
	B	6	99										
	C	6	95										
	D	6	95										
12.1	A	6	75			X							
	B	6	83										
	C	6	85										
	D	6	95										
24.2	A	6	75		X								
	B	6	93										
	C	6	86										
	D	6	84										↓

Comments:

Reviewed by: JGa

Date Reviewed: Nov 19/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - LCDSSLCC - WS - 2015 - 10 - 26 - N
Work Order #: 15872

Start Date: October 29 , 2015
Termination Date: November 5 , 2015
Test set up by: JW

Concentration %o (v/v)	Rep	No. of fronds Day 0	No. of fronds Day 7	Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
48·5	A	6	50			X			X				MLT
	B	6	74		X	X							
	C	6	84			X							
	D	6	67		X	X							
97	A	6	47		X								
	B	6	45		X								
	C	6	42		X								
	D	6	44		X								↓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JCh

Date Reviewed: Nov. 19/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Start Date: October 29 , 2015
Sample ID: LC - LCDSSLCC - WS - 2015 - 10 - 26 - N
Termination Date: November 5 , 2015
WO #: 15872
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		CC Black			
	A	1	975.10	981.98	JW / RMT
Control	B	2	987.26	993.94	
	C	3	980.23	987.45	
	D	4	976.45	982.93	
1.5	A	5	994.769 JW	1000.76	
	B	6	971.98	978.15	
	C	7	985.78	992.25	
	D	8	971.64	977.53	
3.0	A	9	964.14	970.13	
	B	10	1008.65	1013.54	
	C	11	978.95	985.98	
	D	12	995.03	1001.98	
6.1	A	13	991.73	999.32	
	B	14	960.90	968.48	
	C	15	971.38	978.35	
	D	16	977.31	984.62	
12.1	A	17	988.42	993.69	
	B	18	987.84	994.14	
	C	19	1046.20	1052.32	
	D	20	1018.54	1025.88	
24.2	A	21	1028.70	1035.00	
	B	22	1005.78	1012.85	
	C	23	988.96	995.66	
	D	24	1018.75	1025.70	
48.5	A	25	1039.09	1043.08	
	B	26	1038.29	1044.44	
	C	27	1024.39	1031.22	
	D	28	985.14	990.26	↓

Comments: 10% reweigh: #2: 993.94, #12: 1001.92, #26: 1044.32

Reviewed by: JOL
Date Reviewed: Nov. 19/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Start Date: October 29 , 2015
Sample ID: LC_LCDSSLCC_WS_2015-10-26_N
Termination Date: November 5 , 2015
WO #: 15872
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		CC Block			
	A	29	1037.45	1043.15	JW / MC
97	B	30	1045.22	1050.73	
	C	31	1027.91	1033.01	
	D	32	1049.56	1055.26	
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments: 10% reweigh: #32: 1055.20

Reviewed by: JCh
Date Reviewed: Nov. 19/15

Lemna Growth Inhibition Test

Nautilus Environmental

Analysis ID:	16-0116-7324	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 14:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-8226-0060	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	29 Oct-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	05 Nov-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	13-5006-3600	**Code:**	507855F0	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	72h (2.5 °C)	**Station:**	LC_LCDSSLCC_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	89256	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	24.86	N/A	31.77	4.023	3.148	NA
IC10	29.82	7.735	60.54	3.353	1.652	12.93
IC15	35.75	21.17	63.29	2.797	1.58	4.724
IC20	42.81	25.04	65.85	2.336	1.519	3.994
IC25	50.27	27.49	68.71	1.989	1.455	3.637
IC40	71.5	35.67	83.25	1.399	1.201	2.803
IC50	90.34	76.39	98.99	1.107	1.01	1.309

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	82	77	87	2.041	4.082	4.98%	0.0%
1.5		4	74.75	73	77	0.8539	1.708	2.29%	8.84%
3		4	74.75	60	90	6.156	12.31	16.47%	8.84%
6.1		4	90.25	89	93	0.9465	1.893	2.1%	-10.06%
12.1		4	78.5	69	89	4.113	8.226	10.48%	4.27%
24.2		4	78.5	69	87	3.708	7.416	9.45%	4.27%
48.5		4	62.75	44	78	7.157	14.31	22.81%	23.48%
97		4	38.5	36	41	1.041	2.082	5.41%	53.05%

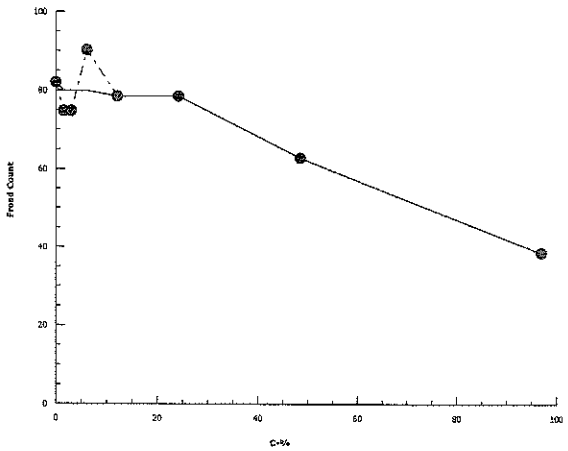
Frond Count Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	82	82	87	77
1.5		74	77	75	73
3		73	60	90	76
6.1		90	93	89	89
12.1		69	77	79	89
24.2		69	87	80	78
48.5		44	68	78	61
97		41	39	36	38

Lemna Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	16-0116-7324	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 14:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	05-2327-6649	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 14:56	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-8226-0060	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	29 Oct-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	05 Nov-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	13-5006-3600	**Code:**	507855F0	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	72h (2.5 °C)	**Station:**	LC_LCDSSLCC_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1177875	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	24.76	N/A	57.71	4.04	1.733	NA
IC10	31.48	N/A	83.64	3.176	1.196	NA
IC15	39.97	26.3	123.7	2.502	0.8081	3.803
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.815	6.48	7.22	0.1578	0.3156	4.63%	0.0%
1.5		4	6.15	5.89	6.47	0.1214	0.2427	3.95%	9.76%
3		4	6.215	4.89	7.03	0.5009	1.002	16.12%	8.81%
6.1		4	7.362	6.97	7.59	0.146	0.2921	3.97%	-8.03%
12.1		4	6.258	5.27	7.34	0.425	0.85	13.58%	8.18%
24.2		4	6.755	6.3	7.07	0.1701	0.3402	5.04%	0.88%
48.5		4	5.515	3.99	6.83	0.6176	1.235	22.4%	19.08%
97		4	5.503	5.1	5.7	0.1415	0.2829	5.14%	19.26%

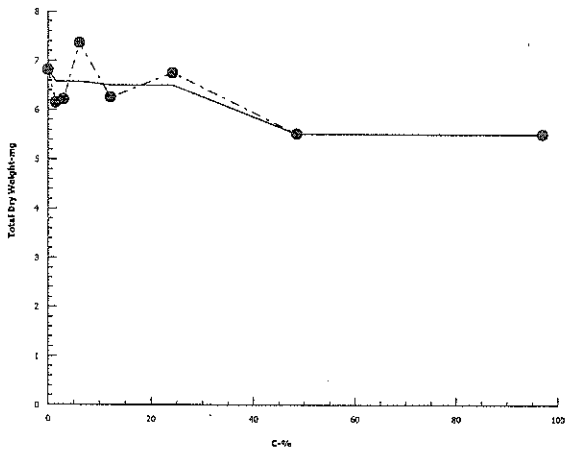
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.88	6.68	7.22	6.48
1.5		6.07	6.17	6.47	5.89
3		5.99	4.89	7.03	6.95
6.1		7.59	7.58	6.97	7.31
12.1		5.27	6.3	6.12	7.34
24.2		6.3	7.07	6.7	6.95
48.5		3.99	6.12	6.83	5.12
97		5.7	5.51	5.1	5.7

Lemna Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	05-2327-6649	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 14:56	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA: JOL Nov-19/15

Lemna minor Summary Sheet

Client: Teck Coal
Work Order No.: 15872

Start Date: October 28 , 2015
Set up by: JW

Sample Information:

Sample ID: LC - DC L - WS - 2015 - 10 - 26 - N
Sample Date: October 26, 2015
Date Received: October 27, 2015
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: 102115
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (29 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: LM 125
Date Initiated: October 21, 2015

7-d No. of Fronds IC50 (95% CL): 4.3 (3.9 - 4.7) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.2 (3.2 - 5.5) g/L KCl CV (%): 14

		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v) (95% CL)	>97	>97
	IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: JOH

Date reviewed: NOV. 19/15

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck Coal

Sample ID: LC_DCL_WS_2015-10-26_N

Work Order No.: 15872

Culture Source: CPCC # 490

Test Culture Age: 7 days

Light Intensity Range: 4000 - 4680 lux

Setup by: JW

Test Date: Oct 28 , 2015

Test Species: *Lemna minor*

> 8X Growth? (Y/N): Y (29 fronds)

Date Measured: Oct 28 , 2015

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	26.0	27.0	26.0	26.0	26.0	26.0	27.0
Initials	JW	JW	MLT	JW	A	MLT	MLT	MLT

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	27.0	Aeration?: 20 min	25.0
DO (mg/L)	9.0	Nutrients added?: Y →	8.2
pH	8.1		8.0
Conductivity (µS)	331		1146

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	25.5	26.5	8.2	8.3	884
1.5	25.0	26.5	8.2	8.4	885
3.0	25.0	26.5	8.2	8.7	890
6.1	25.0	26.5	8.2	8.5	900
12.1	25.0	26.5	8.2	8.5	920
24.2	25.0	26.5	8.1	8.6	951
48.5	25.0	26.5	8.1	8.7	1013
97	25.0	26.5	8.0	9.0	1146
Initials	JW	JW	JW	JW	JW

Instruments: Thermometer: CER - 4 Cond. Meter: C-4 pH meter: PH - 2

Sample Description: Clear

Comments: Light Meter = Lit - L

Reviewed: JOL Date Reviewed: Nov. 19/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - DCL - WS - 2015 - 10 - 26 - N
Work Order #: 15872

Start Date: October 28, 2015
Termination Date: November 4, 2015
Test set up by: JW

Concentration % (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	76										JW
	B	6	77										
	C	6	73										
	D	6	74										
1.5	A	6	67										
	B	6	65										
	C	6	66										
	D	6	65										
3.0	A	6	83										
	B	6	74										
	C	6	64										
	D	6	78										
6.1	A	6	64										
	B	6	64										
	C	6	66										
	D	6	51		X								
12.1	A	6	80										
	B	6	74										
	C	6	65										
	D	6	69										
24.2	A	6	73										
	B	6	66										
	C	6	89										
	D	6	74										↓

Comments:

Reviewed by: JW

Date Reviewed: Nov. 19/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - DCL - WS - 2015 - 10 - 26 - N
Work Order #: 15872

Start Date: October 28 , 2015
Termination Date: November 4 , 2015
Test set up by: JW

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	61										JW
	B	6	76										
	C	6	88										
	D	6	71										
97	A	6	74										
	B	6	82										
	C	6	75										
	D	6	60										
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JCL

Date Reviewed: Nov. 19/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - DC 1 - WS - 2015 - 10 - 26 - N
WO #: 15872

Start Date: October 28 , 2015
Termination Date: November 4 , 2015
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		DC1 Green			
Control	A	1	990.21	994.70	JW / ML
	B	2	987.70	992.71	
	C	3	983.65	988.36	
	D	4	982.32	986.65	
1.5	A	5	1035.27	1039.44	
	B	6	1026.82	1030.66	
	C	7	1027.12	1031.29	
	D	8	986.05	989.99	
3.0	A	9	978.57	983.53	
	B	10	982.29	986.37	
	C	11	981.02	985.39	
	D	12	989.35	994.75	
6.1	A	13	991.64	995.84	
	B	14	977.64	982.35	
	C	15	988.27	992.61	
	D	16	985.83	988.88	
12.1	A	17	987.02	992.42	
	B	18	1037.62	1042.77	
	C	19	1006.91	1011.02	
	D	20	1024.44	1029.26	
24.2	A	21	1025.58	1030.43	
	B	22	981.73	986.16	
	C	23	991.84	998.12	
	D	24	975.~~60~~ 58 JW	979.90	
48.5	A	25	987.27	991.~~35~~ 40	
	B	26	979.02	984.44	
	C	27	979.00	984.56	
	D	28	979.94	984.94	↓

Comments: 10% re-weigh: #4: 986.67, #13: 995.82, #27: 984.56

Reviewed by: JW Date Reviewed: Nov-19/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC_DC1_WS_2015-10-26_N
WO #: 15872

Start Date: October 28, 2015
Termination Date: November 4, 2015
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)					
	A	29	981.95	987.25	JW / MLT
	B	30	978.46	984.56	↓
97	C	31	985.18	990.20	
	D	32	983.89	988.40	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments: 10% re-weigh: ✓ #32: 988.33

Reviewed by: JOH

Date Reviewed: Nov. 19/15

Lemna Growth Inhibition Test

Nautilus Environmental

Analysis ID:	00-3191-7811	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 16:33	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-0870-2690	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	28 Oct-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	04 Nov-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	16-9503-3844	**Code:**	650829F4	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (2.5 °C)	**Station:**	LC_DC1_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1663458	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	1.145	0.3383	N/A	87.35	NA	295.6
IC10	>97	N/A	N/A	<1.031	NA	NA
IC15	>97	N/A	N/A	<1.031	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	69	67	71	0.9129	1.826	2.65%	0.0%
1.5		4	59.75	59	61	0.4787	0.9574	1.6%	13.41%
3		4	68.75	58	77	4.029	8.057	11.72%	0.36%
6.1		4	55.25	45	60	3.449	6.898	12.49%	19.93%
12.1		4	66	59	74	3.24	6.481	9.82%	4.35%
24.2		4	69.5	60	83	4.839	9.678	13.93%	-0.72%
48.5		4	68	55	82	5.612	11.22	16.51%	1.45%
97		4	66.75	54	76	4.608	9.215	13.81%	3.26%

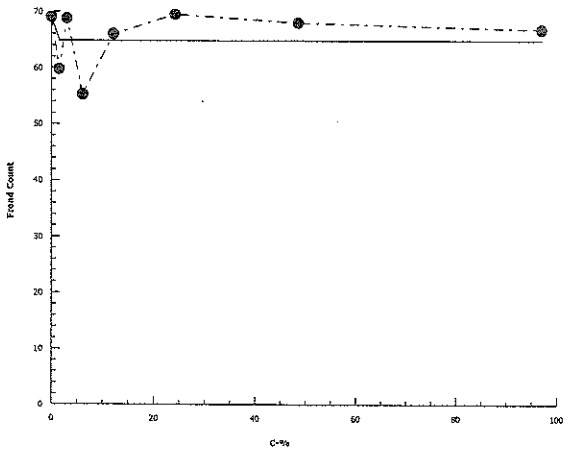
Frond Count Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	70	71	67	68
1.5		61	59	60	59
3		77	68	58	72
6.1		58	58	60	45
12.1		74	68	59	63
24.2		67	60	83	68
48.5		55	70	82	65
97		68	76	69	54

Lemna Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	00-3191-7811	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 16:33	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA: Nov. 19/15

Lemna Growth Inhibition Test

Nautilus Environmental

Analysis ID:	12-2663-0271	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 16:34	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-0870-2690	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	28 Oct-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	04 Nov-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	16-9503-3844	**Code:**	650829F4	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (2.5 °C)	**Station:**	LC_DC1_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	343248	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>97	N/A	N/A	<1.031	NA	NA
IC10	>97	N/A	N/A	<1.031	NA	NA
IC15	>97	N/A	N/A	<1.031	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	4.635	4.33	5.01	0.1473	0.2946	6.36%	0.0%
1.5		4	4.03	3.84	4.17	0.08335	0.1667	4.14%	13.05%
3		4	4.703	4.08	5.4	0.2959	0.5919	12.59%	-1.46%
6.1		4	4.075	3.05	4.71	0.3582	0.7164	17.58%	12.08%
12.1		4	4.87	4.11	5.4	0.2798	0.5596	11.49%	-5.07%
24.2		4	4.97	4.32	6.28	0.4513	0.9027	18.16%	-7.23%
48.5		4	5.027	4.13	5.56	0.322	0.6439	12.81%	-8.47%
97		4	5.232	4.51	6.1	0.3322	0.6644	12.7%	-12.89%

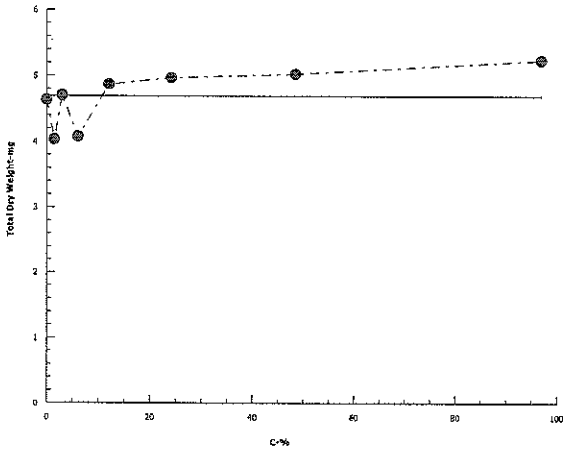
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	4.49	5.01	4.71	4.33
1.5		4.17	3.84	4.17	3.94
3		4.96	4.08	4.37	5.4
6.1		4.2	4.71	4.34	3.05
12.1		5.4	5.15	4.11	4.82
24.2		4.85	4.43	6.28	4.32
48.5		4.13	5.42	5.56	5
97		5.3	6.1	5.02	4.51

Lemna Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	12-2663-0271	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 16:34	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	02-3519-0387	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 16:36	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	07-0870-2690	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	28 Oct-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	04 Nov-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	16-9503-3844	**Code:**	650829F4	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (2.5 °C)	**Station:**	LC_DC1_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	23.0%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-1.406	2.482	1.068	6	0.9973	CDF	Non-Significant Effect
		3	0.1569	2.482	1.068	6	0.8316	CDF	Non-Significant Effect
		6.1	-1.302	2.482	1.068	6	0.9962	CDF	Non-Significant Effect
		12.1	0.5462	2.482	1.068	6	0.6881	CDF	Non-Significant Effect
		24.2	0.7786	2.482	1.068	6	0.5843	CDF	Non-Significant Effect
		48.5	0.9122	2.482	1.068	6	0.5219	CDF	Non-Significant Effect
		97	1.389	2.482	1.068	6	0.3105	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.343897	0.7634138	7	2.062	0.0882	Non-Significant Effect
Error	8.886062	0.3702525	24			
Total	14.22996		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	7.625	18.48	0.3668	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9873	0.9081	0.9630	Normal Distribution

Total Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	4.635	4.166	5.104	4.6	4.33	5.01	0.1473	6.36%	0.0%
1.5		4	4.03	3.765	4.295	4.055	3.84	4.17	0.08335	4.14%	13.05%
3		4	4.703	3.761	5.644	4.665	4.08	5.4	0.2959	12.59%	-1.46%
6.1		4	4.075	2.935	5.215	4.27	3.05	4.71	0.3582	17.58%	12.08%
12.1		4	4.87	3.98	5.76	4.985	4.11	5.4	0.2798	11.49%	-5.07%
24.2		4	4.97	3.534	6.406	4.64	4.32	6.28	0.4513	18.16%	-7.23%
48.5		4	5.027	4.003	6.052	5.21	4.13	5.56	0.322	12.81%	-8.47%
97		4	5.232	4.175	6.29	5.16	4.51	6.1	0.3322	12.7%	-12.89%

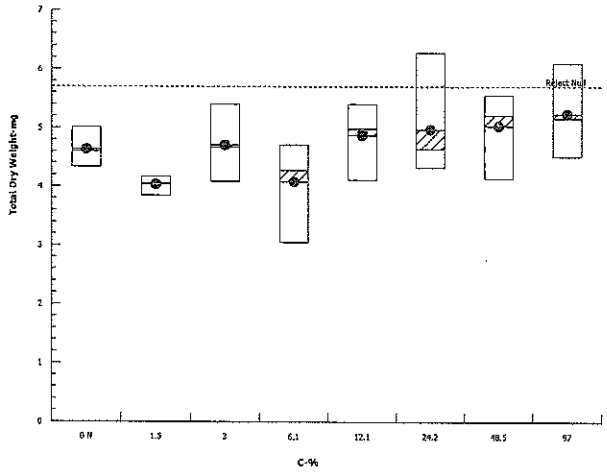
Total Dry Weight-mg Detail

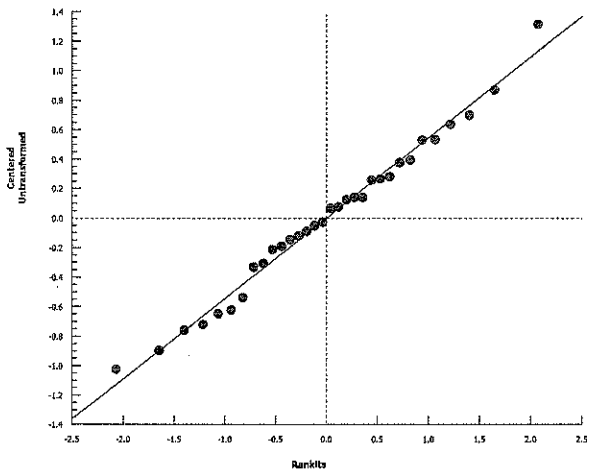
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	4.49	5.01	4.71	4.33
1.5		4.17	3.84	4.17	3.94
3		4.96	4.08	4.37	5.4
6.1		4.2	4.71	4.34	3.05
12.1		5.4	5.15	4.11	4.82
24.2		4.85	4.43	6.28	4.32
48.5		4.13	5.42	5.56	5
97		5.3	6.1	5.02	4.51

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	02-3519-0387	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 16:36	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Lemna minor Summary Sheet

Client: Teck Coal
Work Order No.: 15872

Start Date: October 29, 2015
Set up by: JW

Sample Information:

Sample ID: LC-FRDSDC_WS_2015-10-26_N
Sample Date: October 26, 2015
Date Received: October 27, 2015
Sample Volume: 5x20L

Test Organism Information:

Culture Date: 102215
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (29 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 125
Date Initiated: October 21, 2015

7-d No. of Fronds IC50 (95% CL): 4.3 (3.9-4.7) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.2 (3.2-5.5) g/L KCl CV (%): 14

		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v) (95% CL)	69.2 (57.7-79.3)	>97
	IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: JOh
Date reviewed: Nov. 20/15

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck Coal
Setup by: JW
Sample ID: LC_FRDSDC_WS_2015-10-26-N
Test Date: Oct 29, 2015
Work Order No.: 15872
Test Species: *Lemna minor*
Culture Source: CPCC # 490
Test Culture Age: 7 days
> 8X Growth? (Y/N): Y (29 fronds)
Light Intensity Range: 4000 - 4390 lux
Date Measured: Oct 28, 2015

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	26.0	27.0	26.0	26.0	26.0	26.0	27.0	MLT 27.0 26.0
Initials	JW	MLT	JW	A	MLT	MLT	MLT	MLT

Sample Characteristics: Initial Water Quality

	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	26.5	Aeration?: 20 min	26.5
DO (mg/L)	8.2	Nutrients added?: Y →	7.9
pH	8.0		7.9
Conductivity (µS)	727		1480

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	26.0	25.0	8.3	9.1	895
1.5	25.5	25.0	8.1	9.4	904
3.0	25.5	25.0	8.1	8.8	917
6.1	25.5	25.0	8.1	8.8	936
12.1	25.5	25.0	8.1	9.1	975
24.2	25.5	25.0	8.1	9.0	1051
48.5	26.0	25.0	8.0	9.1	1194
97	26.5	25.0	7.9	8.8	1480
Initials	JW	MLT	JW	MLT	JW

Instruments: Thermometer: CER-4 Cond. Meter: C-4 pH meter: pH-2
Sample Description: clear
Comments: Light Meter : Lt-L
Reviewed: JW **Date Reviewed:** Nov-19/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - FRDSDC - WS - 2015 - 10 - 26 - N
Work Order #: 15872

Start Date: October 29 , 2015
Termination Date: November 5 , 2015
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds Day 0	No. of fronds Day 7	Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
control	A	6	85										MG
	B	6	92										
	C	6	90										
	D	6	74										
1.5	A	6	95										
	B	6	70										
	C	6	76										
	D	6	74										
3.0	A	6	84										
	B	6	83										
	C	6	64										
	D	6	72										
6.1	A	6	77										
	B	6	78										
	C	6	77										
	D	6	76										
12.1	A	6	96										
	B	6	81										
	C	6	86										
	D	6	79										
24.2	A	6	78										
	B	6	80										
	C	6	78			X							
	D	6	71		X								

Comments:

Reviewed by: JW

Date Reviewed: Nov. 19/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - FRDSDC . INS - 2015 - 10 - 26 . N
Work Order #: 15872

Start Date: October 29 , 2015
Termination Date: November 5 , 2015
Test set up by: JW

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	76		X	X							ML7
	B	6	74			X							
	C	6	65		X								
	D	6	74		X								
97	A	6	42		X								
	B	6	43		X								
	C	6	47		X								
	D	6	42		X								↓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JW

Date Reviewed: Nov. 19/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - FRDSDC - INS - 2015 - 10 - 26 - N
WO #: 15872

Start Date: October 29 , 2015
Termination Date: November 5 , 2015
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		DC - Blue			JN / KL
Control	A	1	1017.85	KL ~~1024~~ 1023.92	
	B	2	1006.40	1013.03	
	C	3	996.32	1002.61	
	D	4	983.52	988.37	
1.5	A	5	993.34	1000.16 KL 7	
	B	6	1004.63	1009.53	
	C	7	1010.43	1015.92	
	D	8	1003.81	1008.91	
3.0	A	9	1035.44	1041.13	
	B	10	JN ~~1035~~ 1003.64	1009.44	
	C	11	1018.00	1022.38 KL 46	
	D	12	1024.90	1030.03	
6.1	A	13	1054.29	KL ~~1059~~ 1060.01	
	B	14	1029.50	1035.09	
	C	15	1044.69	1049.88	
	D	16	1005.60	1011.13	
12.1	A	17	980.57	987.45	
	B	18	992.78	998.25	
	C	19	1046.72	1052.74	
	D	20	1004.98	1010.54	
24.2	A	21	1015.38	1020.87	
	B	22	996.~~3~~29 JN	1002.01	
	C	23	1019.23	KL ~~1025~~ 1025.00	
	D	24	1023.05	1028.19	
48.5	A	25	1004.50	1011.~~18~~ KL 20	
	B	26	1021.33	1026.67	
	C	27	997.10	1002.50	
	D	28	1039.~~8~~78	1045.~~6~~70	

JN KL

Comments: 10% re-weighs: #3: 1002.58, #12: ~~1029~~ 1030.03, #27: 1002.38

Reviewed by: JOH

Date Reviewed: Nov. 19/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - FRDSDC - WS - 2015 - 10 - 26 - N
WO #: 15872

Start Date: October 29 , 2015
Termination Date: November 5 , 2015
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		DC - Blue			
	A	29	1013.79	1018.17	JW / KL
97	B	30	1011.51	1015.76	"
	C	31	1007.56	1012.39	"
	D	32	1019.24	1023.67	"
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments: 10% re-weigh: #32: 1023.73

Reviewed by: JGa

Date Reviewed: Nov. 19/15

Lemna Growth Inhibition Test

Nautilus Environmental

Analysis ID:	18-2673-7727	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 11:35	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	03-8226-0060	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	29 Oct-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	05 Nov-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	10-5788-9285	**Code:**	3F0E1C05	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	72h (2.5 °C)	**Station:**	LC_FRDSDC_WS_2015-10-26_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
3P Log-Gompertz EV [Y=A*exp(log(0.5)(X/D)^C)]	None	None	Box-Cox [W=Y^(2Z-2)]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
10	-74.06	155	158.5	0.7687	Yes	1.114	2.621	0.3793	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL	
IC5	35.25	N/A	47.75	2.837	2.094	NA	
IC10	46.72	25.93	59.4	2.14	1.683	3.857	
IC15	55.35	38.57	67.62	1.807	1.479	2.593	
IC20	62.66	48.71	74.02	1.596	1.351	2.053	
IC25	69.21	57.7	79.3	1.445	1.261	1.733	
IC40	86.64	81.61	91.59	1.154	1.092	1.225	
IC50	~~97.63~~	~~94.8~~	~~100.5~~	~~1.024~~	~~0.9953~~	~~1.055~~	>97 % (v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	74.16	1.749	70.73	77.59	42.41	<0.0001	Significant Parameter
C	2.556	0.648	1.286	3.826	3.944	0.0005	Significant Parameter
D	97.63	1.901	93.9	101.4	51.35	<0.0001	Significant Parameter
Z	-1.1						

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	9.39E-05	9.39E-05	1	105	<0.0001	Significant
Lack of Fit	4.88E-06	9.76E-07	5	1.114	0.3793	Non-Significant
Pure Error	2.10E-05	8.77E-07	24			
Residual	2.59E-05	8.94E-07	29			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	12.59	14.07	0.0827	Equal Variances
	Mod Levene Equality of Variance	0.747	2.423	0.6354	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9669	0.9338	0.4179	Normal Distribution
	Anderson-Darling A2 Normality	0.4328	2.492	0.3079	Normal Distribution

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 18-2673-7727 **Endpoint:** Frond Count **CETIS Version:** CETISv1.8.7
Analyzed: 12 Nov-15 11:35 **Analysis:** Nonlinear Regression **Official Results:** Yes

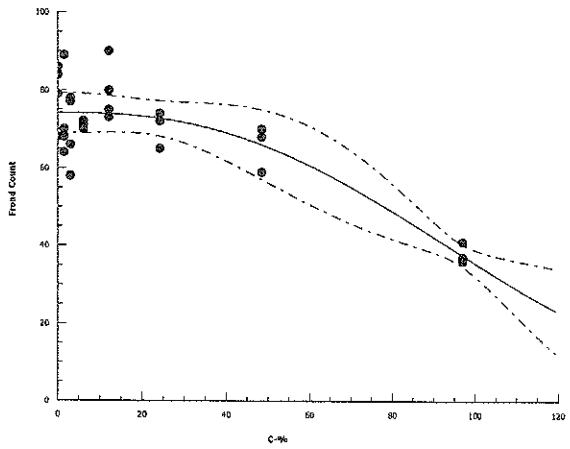
Frond Count Summary

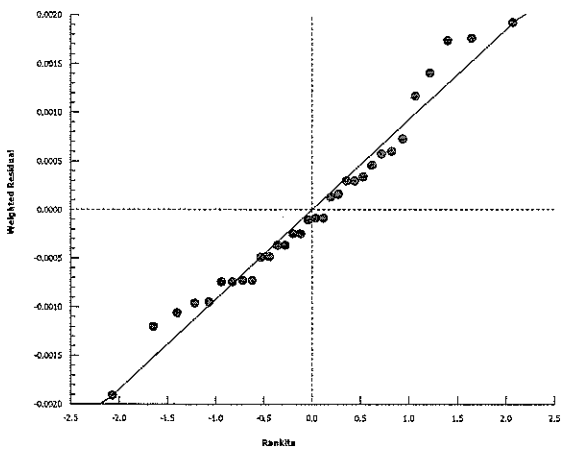
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	79.25	68	86	4.029	8.057	10.17%	0.0%
1.5		4	72.75	64	89	5.558	11.12	15.28%	8.2%
3		4	69.75	58	78	4.768	9.535	13.67%	11.99%
6.1		4	71	70	72	0.4082	0.8165	1.15%	10.41%
12.1		4	79.5	73	90	3.797	7.594	9.55%	-0.32%
24.2		4	70.75	65	74	1.974	3.948	5.58%	10.73%
48.5		4	66.25	59	70	2.462	4.924	7.43%	16.4%
97		4	37.5	36	41	1.19	2.38	6.35%	52.68%

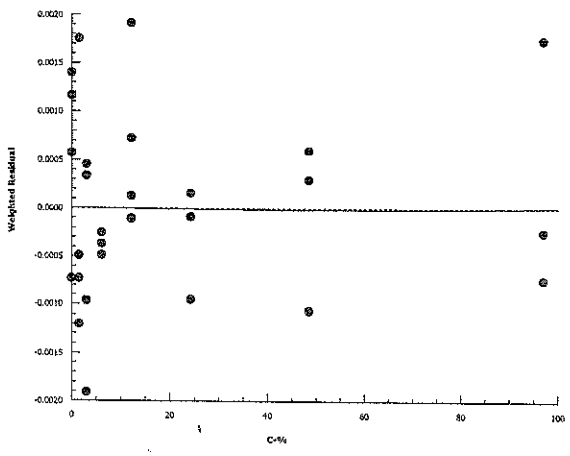
Frond Count Detail

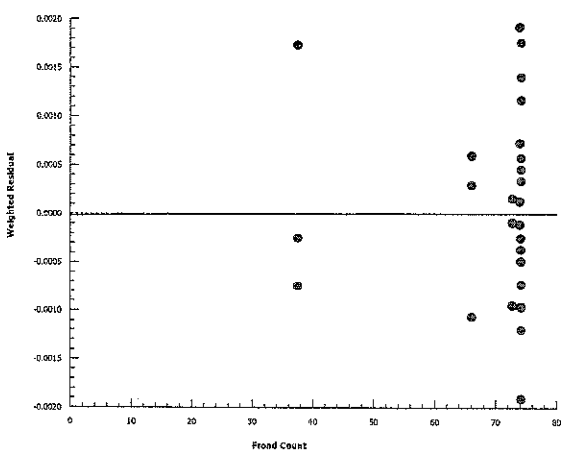
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	79	86	84	68
1.5		89	64	70	68
3		78	77	58	66
6.1		71	72	71	70
12.1		90	75	80	73
24.2		72	74	72	65
48.5		70	68	59	68
97		36	37	41	36

Graphics 3P Log-Gompertz EV [Y=A*exp(log(0.5)(X/D)^C)]









CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-9542-5229	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 11:22	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	03-8226-0060	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	29 Oct-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	05 Nov-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	10-5788-9285	**Code:**	3F0E1C05	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	72h (2.5 °C)	**Station:**	LC_FRDSDC_WS_2015-10-26_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
2P Exponential EV [Y=A*exp(log(0.5)*X/D)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
5	0.03042	4.353	6.871	0.1861	Yes	1.715	2.508	0.1608	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	27.62	6.315	49.8	3.621	2.008	15.84
IC10	56.73	23.89	91.71	1.763	1.09	4.185
IC15	87.51	36.59	143.8	1.143	0.6956	2.733
IC20	120.2	49.06	202.1	0.8323	0.4948	2.038
IC25	154.9	62.55	266.5	0.6455	0.3753	1.599
IC40	275.1	113.9	506.2	0.3636	0.1976	0.8781
IC50	373.2	161.4	727.6	0.2679	0.1374	0.6198

MLT
>97 %(v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	5.761	0.142	5.482	6.039	40.57	<0.0001	Significant Parameter
D	373.2	139.8	99.3	647.2	2.67	0.0121	Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	3.168394	3.168394	1	8.09	0.0079	Significant
Lack of Fit	3.525404	0.587567	6	1.715	0.1608	Non-Significant
Pure Error	8.224374	0.342682	24			
Residual	11.74978	0.391659	30			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	8.642	14.07	0.2794	Equal Variances
	Mod Levene Equality of Variance	0.7627	2.423	0.6234	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9755	0.9338	0.6615	Normal Distribution
	Anderson-Darling A2 Normality	0.3685	2.492	0.4333	Normal Distribution

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	5.96	4.85	6.63	0.3875	0.775	13.0%	0.0%
1.5		4	5.58	4.9	6.83	0.4343	0.8686	15.57%	6.38%
3		4	5.27	4.46	5.8	0.3073	0.6145	11.66%	11.58%
6.1		4	5.508	5.19	5.72	0.113	0.226	4.1%	7.59%
12.1		4	5.982	5.47	6.88	0.3225	0.645	10.78%	-0.38%
24.2		4	5.53	5.14	5.77	0.1436	0.2872	5.19%	7.22%
48.5		4	5.84	5.34	6.7	0.3148	0.6297	10.78%	2.01%
97		4	4.473	4.25	4.83	0.1251	0.2501	5.59%	24.96%

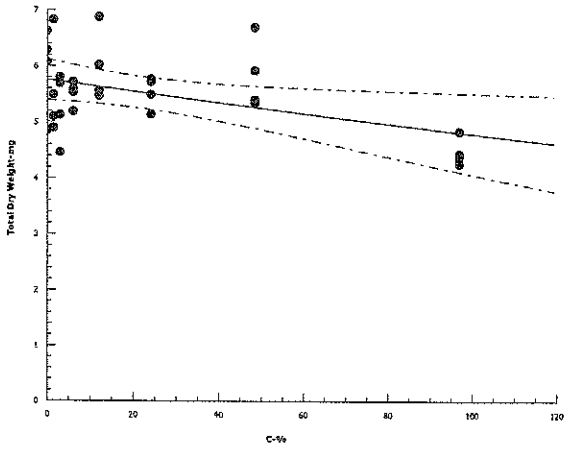
Lemna Growth Inhibition Test — **Nautilus Environmental**

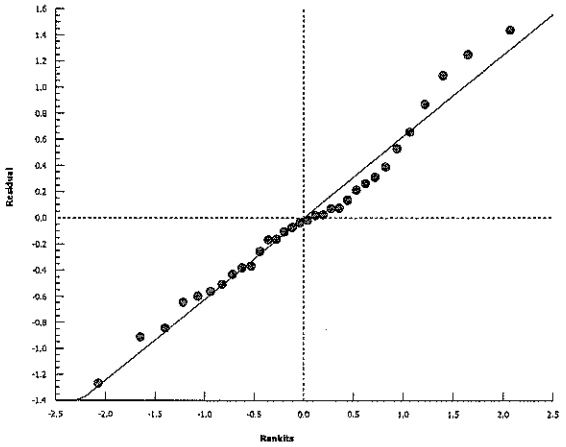
Analysis ID:	06-9542-5229	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 11:22	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes

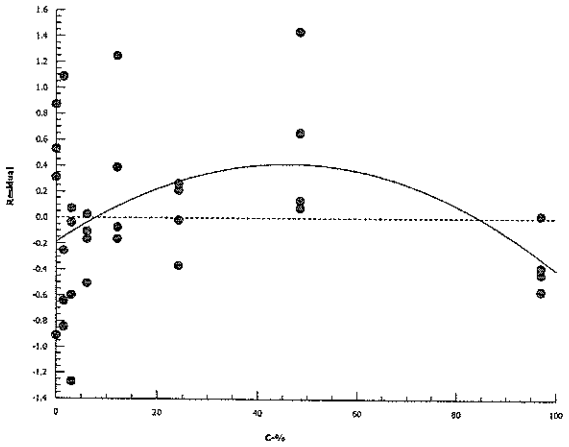
Total Dry Weight-mg Detail

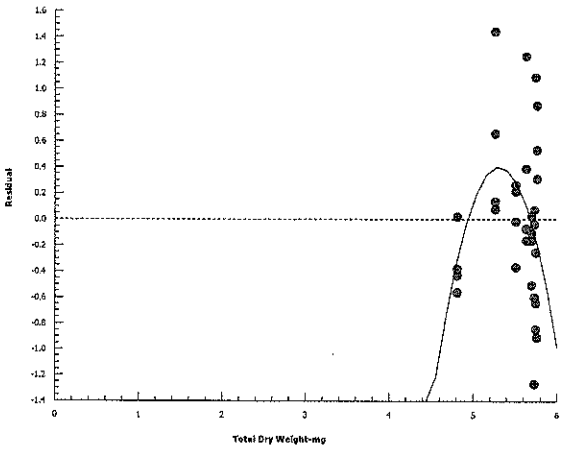
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.07	6.63	6.29	4.85
1.5		6.83	4.9	5.49	5.1
3		5.69	5.8	4.46	5.13
6.1		5.72	5.59	5.19	5.53
12.1		6.88	5.47	6.02	5.56
24.2		5.49	5.72	5.77	5.14
48.5		6.7	5.34	5.4	5.92
97		4.38	4.25	4.83	4.43

Graphics — 2P Exponential EV [Y=A*exp(log(0.5)*X/D)]









Analyst:_____ QA: JCL Nov. 19/15

Lemna minor Summary Sheet

Client: Teck Coal
Work Order No.: 15872

Start Date: October 28, 2015
Set up by: JW

Sample Information:

Sample ID: LC - DCDS_WS_2015-10-26_N
Sample Date: October 26, 2015
Date Received: October 27, 2015
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: 102115
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (29 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: LM 125
Date Initiated: October 21, 2015

7-d No. of Fronds IC50 (95% CL): 4.3 (3.9 - 4.7) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.2 (3.2 - 5.5) g/L KCl CV (%): 14

		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v) (95% CL)	>97	>97
	IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: JCW
Date reviewed: Nov-19/15

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal

Sample ID: LC_DCDS_WS_2015-10-26-N

Work Order No.: 15872

Culture Source: CPCC # 490

Test Culture Age: 7 days

Light Intensity Range: 4260 - 4940 lux

Setup by: JW

Test Date: Oct 28, 2015

Test Species: *Lemna minor*

> 8X Growth? (Y/N): Y (29 fronds)

Date Measured: Oct 28, 2015

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	26.0	27.0	26.0	26.0	26.0	26.0	27.0
Initials	JW	JW	MLT	JW	[illegible]	MLT	MLT	MLT

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	27.0	Aeration?: 20 min	26.0
DO (mg/L)	8.2		8.0
pH	8.3	Nutrients added?: Y →	8.0
Conductivity (µS)	263		1084

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	24.0	26.5	8.3	9.3	860
1.5	24.5	26.5	8.2	9.2	865
3.0	24.5	26.5	8.2	9.4	868
6.1	24.0	26.5	8.2	9.3	875
12.1	24.0	26.5	8.2	9.2	888
24.2	24.0	26.5	8.2	9.3	915
48.5	25.0	26.5	8.2	9.5	970
97	26.0	26.5	8.0	9.2	1084
Initials	JW	JW	JW	JW	JW

Instruments: Thermometer: CER-4 Cond. Meter: C-4 pH meter: pH-2

Sample Description: Clear

Comments: Light Meter = Lt-L

Reviewed: JW Date Reviewed: Nov. 19/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - DCDS - WS - 2015 - 10 - 26 - N
Work Order #: 15872

Start Date: October 28 , 2015
Termination Date: November 4 , 2015
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	122										JW
	B	6	104										
	C	6	138										
	D	6	104										
1.5	A	6	98										
	B	6	138										
	C	6	114										
	D	6	112										
3.0	A	6	120										
	B	6	92										
	C	6	93										
	D	6	92										
6.1	A	6	91										
	B	6	86										
	C	6	104										
	D	6	110										
12.1	A	6	87										
	B	6	94										
	C	6	109										
	D	6	91										
24.2	A	6	125										
	B	6	118										
	C	6	132										
	D	6	98										↓

Comments:

Reviewed by: JOe

Date Reviewed: Nov-19/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - DCDS - NS - 2015 - 10 - 26 - N
Work Order #: 15872

Start Date: October 28 , 2015
Termination Date: November 4 , 2015
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	123										JW
	B	6	132										
	C	6	67						X				
	D	6	101										
97	A	6	92										
	B	6	95										
	C	6	90										
	D	6	106										↓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JGL

Date Reviewed: Nov. 19/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - DCDS_WS - 2015 - 10 - 26_N
WO #: 15872

Start Date: October 28 , 2015
Termination Date: November 4 , 2015
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		DS - Brown			
	A	1	990.48	999.43	JW / MLT
	B	2	998.15	1005.59	
Control	C	3	975.73	986.16	
	D	4	1015.16	1023.69	
	A	5	1037.75	1044.52	
	B	6	984.18	994.92	
1.5	C	7	1004.62	1012.65	
	D	8	989.25	997.82	
	A	9	992.92	1001.57	
	B	10	1008.21	1015.15	
3.0	C	11	1003.920 JW	1010.53	
	D	12	1027.53	1033.90	
	A	13	1010.18	1017.79	
	B	14	983.30	989.49	
6.1	C	15	987.90	995.24	
	D	16	1017.17	1025.71	
	A	17	1001.88	1007.86	
	B	18	1006.21	1013.14	
12.1	C	19	967.40	976.19	
	D	20	1004.66	1010.82	
	A	21	1004.72	1014.67	
	B	22	990.18	999.63	
24.2	C	23	1009.76	1020.79	
	D	24	1015.36	1022.24	
	A	25	1027.09	1036.48	
	B	26	1011.86	1022.14	
48.5	C	27	1026.32	1030.88	
	D	28	1005.54	1013.41	↓

Comments: 10% re-weigh: #2: 1005.63 , #12: 1034.02 , #26: 1022.08

Reviewed by: JW

Date Reviewed: Nov. 19/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - DCDS - ~~201~~ WS - 2015 - 10-26_N
WO #: 15872 JW
Start Date: October 28 , 2015
Termination Date: November 4 , 2015
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		DS - Brown			
	A	29	1018.98	1026.08	JW / MH
97	B	30	999.79	1007.40	
	C	31	990.43	997.70	
	D	32	999.77	1008.11	
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments: 10% Re-weigh: #32: 1008.05

Reviewed by: JCL
Date Reviewed: Nov. 19/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-6851-6544	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 15:03	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	07-0870-2690	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	28 Oct-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	04 Nov-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	11-3850-9437	**Code:**	43DC467D	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (3.5 °C)	**Station:**	LC_DCDS_WS_2015-10-26_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
2P Exponential EV [Y=A*exp(log(0.5)*X/D)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
5	-105.5	215.5	218	0.0047	Yes	1.588	2.508	0.1937	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	49.26	N/A	128.9	2.03	0.776	NA
IC10	101.2	N/A	275.9	0.9883	0.3624	NA MD
IC15	156.1	N/A	458.4	0.6407	0.2182	NA
IC20	214.3	N/A	677.5	0.4667	0.1476	NA
IC25	276.3	N/A	948.6	0.362	0.1054	NA
IC40	490.6	N/A	2958	0.2039	0.0338	NA
IC50	665.6	N/A	N/A	0.1502	NA	NA

>97 %(v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	102	3.811	94.56	109.5	26.77	<0.0001	Significant Parameter
D	665.6	641.6	-591.8	1923	1.038	0.3078	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	328.9604	328.9604	1	1.146	0.2929	Non-Significant
Lack of Fit	2447.415	407.9024	6	1.588	0.1937	Non-Significant
Pure Error	6163.5	256.8125	24			
Residual	8610.914	287.0305	30			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	6.785	14.07	0.4516	Equal Variances
	Mod Levene Equality of Variance	1.095	2.423	0.3976	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9635	0.9338	0.3415	Normal Distribution
	Anderson-Darling A2 Normality	0.4477	2.492	0.2840	Normal Distribution

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	111	98	132	8.185	16.37	14.75%	0.0%
1.5		4	109.5	92	132	8.302	16.6	15.16%	1.35%
3		4	93.25	86	114	6.921	13.84	14.84%	15.99%
6.1		4	91.75	80	104	5.573	11.15	12.15%	17.34%
12.1		4	89.25	81	103	4.802	9.605	10.76%	19.59%
24.2		4	112.3	92	126	7.33	14.66	13.06%	-1.13%
48.5		4	99.75	61	126	14.46	28.93	29.0%	10.14%
97		4	89.75	84	100	3.568	7.136	7.95%	19.14%

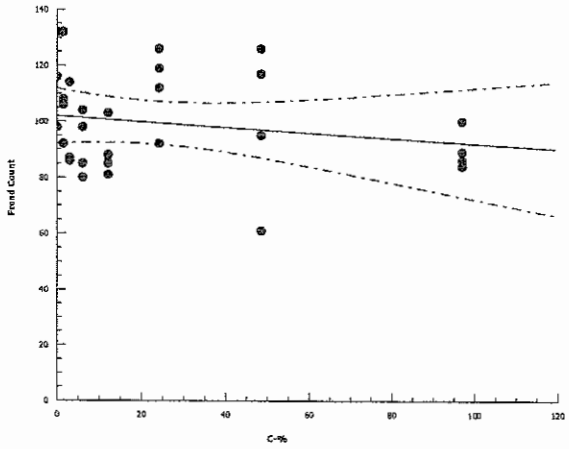
Lemna Growth Inhibition Test — **Nautilus Environmental**

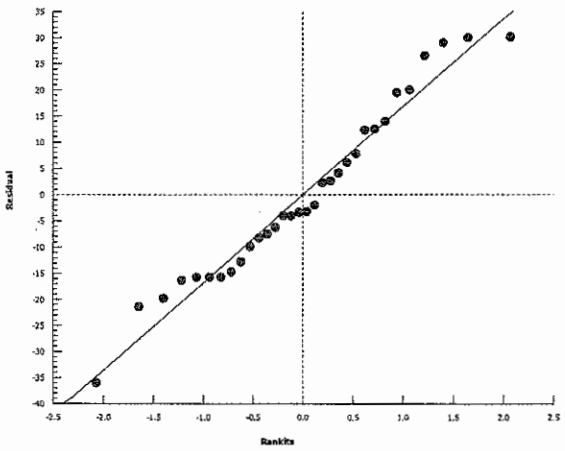
Analysis ID:	00-6851-6544	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 15:03	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes

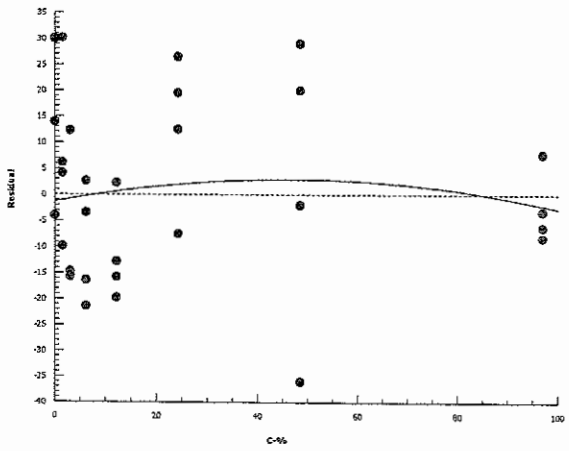
Frond Count Detail

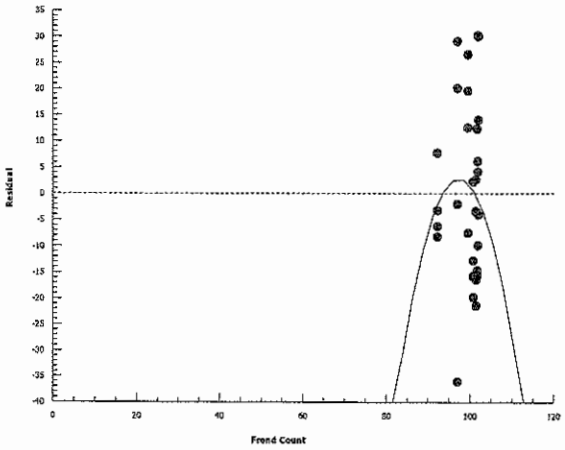
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	116	98	132	98
1.5		92	132	108	106
3		114	86	87	86
6.1		85	80	98	104
12.1		81	88	103	85
24.2		119	112	126	92
48.5		117	126	61	95
97		86	89	84	100

Graphics — 2P Exponential EV [Y=A*exp(log(0.5)*X/D)]









CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-7555-3602	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 15:04	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	07-0870-2690	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	28 Oct-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	04 Nov-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	11-3850-9437	**Code:**	43DC467D	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (3.5 °C)	**Station:**	LC_DCDS_WS_2015-10-26_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
2P Exponential EV [Y=A*exp(log(0.5)*X/D)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
6	-29.18	62.77	65.28		Yes	1.509	2.508	0.2175	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	154.6	N/A	1207	0.6468	0.08287	NA
IC10	317.6	N/A	3452	0.3149	0.02897	NA
IC15	489.9	N/A	N/A	0.2041	NA	NA
IC20	672.6	N/A	N/A	0.1487	NA	NA
IC25	867.2	N/A	N/A	0.1153	NA	NA
IC40	1540	N/A	N/A	0.06494	NA	NA
IC50	2089	N/A	N/A	0.04786	NA	NA

nil

>97 %(v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	8.042	0.3481	7.36	8.725	23.1	<0.0001	Significant Parameter
D	2089	7022	-11670	15850	0.2975	0.7681	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	0.222163	0.222163	1	0.09141	0.7645	Non-Significant
Lack of Fit	19.97686	3.329477	6	1.509	0.2175	Non-Significant
Pure Error	52.93645	2.205686	24			
Residual	72.91331	2.430444	30			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	6.998	14.07	0.4291	Equal Variances
	Mod Levene Equality of Variance	0.791	2.423	0.6019	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9789	0.9338	0.7667	Normal Distribution
	Anderson-Darling A2 Normality	0.2894	2.492	0.6442	Normal Distribution

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	8.838	7.44	10.43	0.6189	1.238	14.01%	0.0%
1.5		4	8.528	6.77	10.74	0.8283	1.657	19.43%	3.51%
3		4	7.148	6.37	8.65	0.5142	1.028	14.39%	19.12%
6.1		4	7.42	6.19	8.54	0.4839	0.9678	13.04%	16.04%
12.1		4	6.965	5.98	8.79	0.6423	1.285	18.44%	21.19%
24.2		4	9.327	6.88	11.03	0.8799	1.76	18.87%	-5.54%
48.5		4	8.025	4.56	10.28	1.258	2.515	31.34%	9.19%
97		4	7.58	7.1	8.34	0.2746	0.5492	7.25%	14.23%

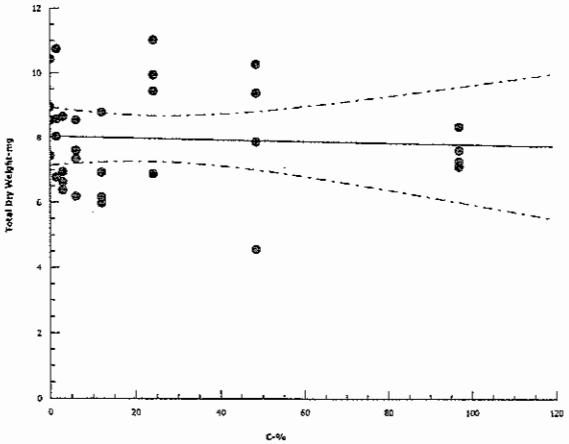
Lemna Growth Inhibition Test — **Nautilus Environmental**

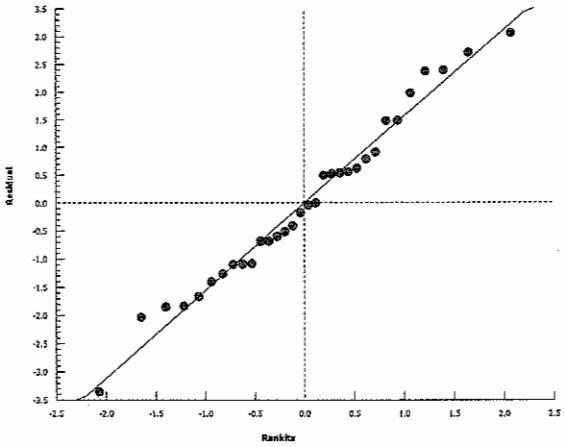
Analysis ID: 11-7555-3602 **Endpoint:** Total Dry Weight-mg **CETIS Version:** CETISv1.8.7
Analyzed: 12 Nov-15 15:04 **Analysis:** Nonlinear Regression **Official Results:** Yes

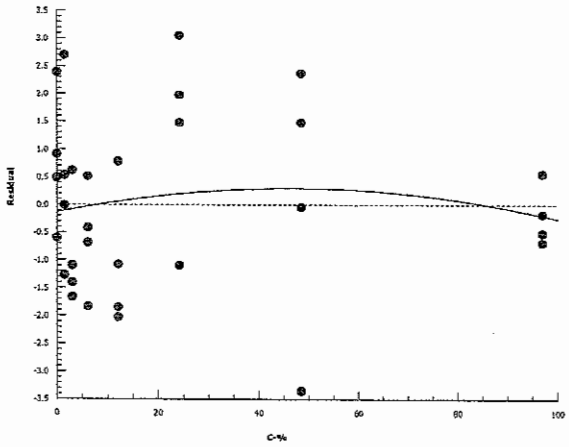
Total Dry Weight-mg Detail

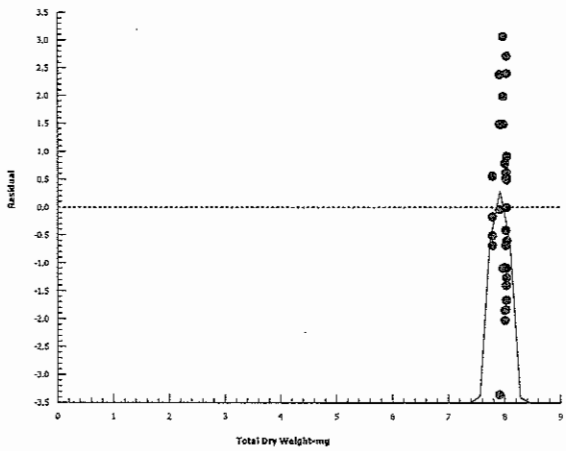
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	8.95	7.44	10.43	8.53
1.5		6.77	10.74	8.03	8.57
3		8.65	6.94	6.63	6.37
6.1		7.61	6.19	7.34	8.54
12.1		5.98	6.93	8.79	6.16
24.2		9.95	9.45	11.03	6.88
48.5		9.39	10.28	4.56	7.87
97		7.1	7.61	7.27	8.34

Graphics 2P Exponential EV [Y=A*exp(log(0.5)*X/D)]









Lemna minor Summary Sheet

Client: Teck Coal
Work Order No.: 15872

Start Date: October 28, 2015
Set up by: JW

Sample Information:

Sample ID: LC_LC5_WS_2015-10-26_N
Sample Date: October 26, 2015
Date Received: October 27, 2015
Sample Volume: 5 x >6L

Test Organism Information:

Culture Date: 102115
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (29 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 125
Date Initiated: October 21, 2015

7-d No. of Fronds IC50 (95% CL): 4.3 (3.9-4.7) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.2 (3.2-5.5) g/L KCl CV (%): 14

		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v) (95% CL)	82.5 (60.5-97)	>97
	IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: JOh

Date reviewed: Nov. 20/15

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal — Setup by: JW

Sample ID: LC - LC5_WS_2015_10-26_N — Test Date: Oct 28, 2015

Work Order No.: 15872 — Test Species: *Lemna minor*

Culture Source: CPCC # 490

Test Culture Age: 7 days — > 8X Growth? (Y/N): Y (29 fronds)

Light Intensity Range: 4100 - 4950 lux — Date Measured: Oct 28, 2015

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	26.0	27.0	26.0	26.0	26.0	26.0	27.0
Initials	JW	JW	MLT	JW	A	MLT	MLT	MLT

Sample Characteristics: Initial Water Quality

Temperature (°C): 26.0
DO (mg/L): 8.6
pH: 8.2
Conductivity (µS): 716

Aeration?: 20 min
Nutrients added?: Y

Adjusted Water Quality

~~25.0~~	26.0
~~8.2~~	7.9
~~8.0~~	8.0
~~1446~~	1484

JW

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	25.5	26.0	8.2	8.6	884
1.5	25.0	26.0	8.1	8.5	889
3.0	25.5	26.0	8.2	8.6	904
6.1	25.5	26.0	8.2	8.5	923
12.1	25.5	26.0	8.2	8.7	964
24.2	25.0	26.0	8.2	8.8	1045
48.5	25.0	26.0	8.1	8.8	1197
97	26.0	26.0	8.0	8.7	1484 ~~1446~~ JW
Initials	JW	JW	JW	JW	JW

Instruments: Thermometer: CER - 4 Cond. Meter: C-4 pH meter: PH-2

Sample Description: Clear

Comments: Light Meter = Lt - L

Reviewed: JW Date Reviewed: Nov. 19/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - LC5 - WS - 2015 - 10 - 26 - N
Work Order #: 15872

Start Date: October 28 , 2015
Termination Date: November 4 , 2015
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	71										JW
	B	6	83										
	C	6	68										
	D	6	77										
1.5	A	6	60										
	B	6	75										
	C	6	73										
	D	6	59										
3.0	A	6	90										
	B	6	61										
	C	6	66										
	D	6	92										
6.1	A	6	79										
	B	6	61										
	C	6	62										
	D	6	68										
12.1	A	6	71										
	B	6	67										
	C	6	71										
	D	6	78										
24.2	A	6	71										
	B	6	68										
	C	6	76										
	D	6	76										↓

Comments:

Reviewed by: JW

Date Reviewed: Nov. 19/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - LC5 - WS - 2015 - 10 - 26 - N
Work Order #: 15872

Start Date: October 28 , 2015
Termination Date: November 4 , 2015
Test set up by: JW

Concentration %v (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	66										JW
	B	6	80										
	C	6	65										
	D	6	69										
97	A	6	42			X			X				
	B	6	48			X			X				
	C	6	45		X								
	D	6	51		X	X							↓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JW

Date Reviewed: Nov. 19/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - LC5 - INS - 2015 - 10 - 26 - N
WO #: 15872

Start Date: October 28 , 2015
Termination Date: November 4 , 2015
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		LC5 - Red			
Control	A	1	1000.21	1004.66	JW / MLT
	B	2	979.97	984.92	
	C	3	1006.86	1011.62	
	D	4	978.76	984.22	
1.5	A	5	1002.24	1006.44	
	B	6	998.08	1003.17	
	C	7	974.70	979.56	
	D	8	944.43	948.25	
3.0	A	9	963.22	968.97	
	B	10	960.01	963.86	
	C	11	992.41	996.66	
	D	12	959.13	965.07	
6.1	A	13	945.11	950.48	
	B	14	988.564 JW	992.32	
	C	15	971.33	975.68	
	D	16	977.14	982.12	
12.1	A	17	992.17	996.38	
	B	18	996.05	1000.62	
	C	19	981.98	986.59	
	D	20	995.09	MLT ~~44~~ 1000.12	
24.2	A	21	986.75	991.40	
	B	22	999.10	1003.92	
	C	23	978.91	984.11	
	D	24	982.74	987.62	
48.5	A	25	996.89	1001.56	
	B	26	982.30	987.38	
	C	27	1020.34	MLT ~~100~~ 1024.58	
	D	28	1024.24	1028.88	↓

Comments: 10% re-weigh: #1: 1004.86, #12: 965.10, #27: 1024.61

Reviewed by: JW

Date Reviewed: Nov. 19/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC_LC5_WS_2015-10-26_N
WO #: 15872

Start Date: October 28, 2015
Termination Date: November 4, 2015
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		LC5 - Red			
	A	29	1002.45	1006.31	JW / MT
97	B	30	1013.78	1018.56	↓
	C	31	1026.88	1030.89	↓
	D	32	978.28	982.75	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments: 10% re-weigh: #32: 982.80

Reviewed by: JOL

Date Reviewed: Nov 19/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	01-2281-2372	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 16:26	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	07-0870-2690	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	28 Oct-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	04 Nov-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	09-9298-8395	**Code:**	3B2FCCEB	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (2.5 °C)	**Station:**	LC_LC5_WS_2015-10-26_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
3P Cumulative Log-Normal EV [Y=A*(1- Φ(log(X/D)/C))]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
12	-81.77	170.4	173.9	0.4981	Yes	0.9889	2.621	0.4451	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	54.7	N/A	79.1	1.828	1.264	NA
IC10	63.81	N/A	89.53	1.567	1.117	NA
IC15	70.8	N/A	95.3	1.412	1.049	NA
IC20	76.9	N/A	98.7	1.3	1.013	NA
IC25	82.54	60.52	100.9	1.211	0.9913	1.652
IC40	~~98.68~~	~~84.93~~	~~113.2~~	~~1.013~~	~~0.8833~~	1.177
IC50	~~109.9~~	~~86.78~~	~~139.1~~	~~0.9102~~	~~0.7189~~	~~1.152~~ >97 % (v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	65.79	1.68	62.5	69.08	39.16	<0.0001	Significant Parameter
C	0.424	0.2804	-0.1256	0.9735	1.512	0.1413	Non-Significant Parameter
D	109.9	12.34	85.68	134.1	8.902	<0.0001	Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	2204.667	2204.667	1	32.77	<0.0001	Significant
Lack of Fit	333.3015	66.6603	5	0.9889	0.4451	Non-Significant
Pure Error	1617.75	67.40625	24			
Residual	1951.052	67.27764	29			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	9.358	14.07	0.2279	Equal Variances
	Mod Levene Equality of Variance	4.675	2.423	0.0020	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9536	0.9338	0.1825	Normal Distribution
	Anderson-Darling A2 Normality	0.4897	2.492	0.2251	Normal Distribution

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 01-2281-2372 **Endpoint:** Frond Count **CETIS Version:** CETISv1.8.7
Analyzed: 12 Nov-15 16:26 **Analysis:** Nonlinear Regression **Official Results:** Yes

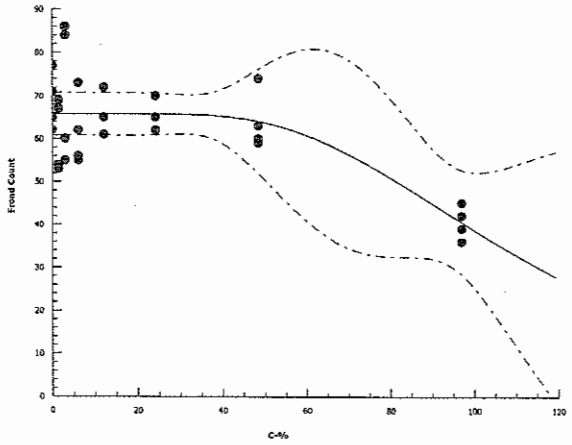
Frond Count Summary

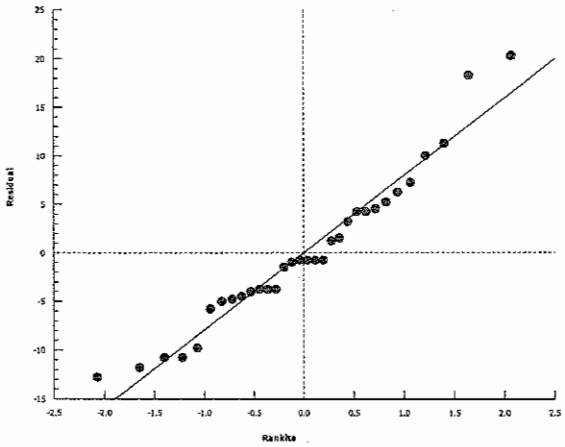
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	68.75	62	77	3.326	6.652	9.68%	0.0%
1.5		4	60.75	53	69	4.211	8.421	13.86%	11.64%
3		4	71.25	55	86	8.014	16.03	22.5%	-3.64%
6.1		4	61.5	55	73	4.133	8.266	13.44%	10.55%
12.1		4	65.75	61	72	2.287	4.573	6.96%	4.36%
24.2		4	66.75	62	70	1.974	3.948	5.91%	2.91%
48.5		4	64	59	74	3.44	6.88	10.75%	6.91%
97		4	40.5	36	45	1.936	3.873	9.56%	41.09%

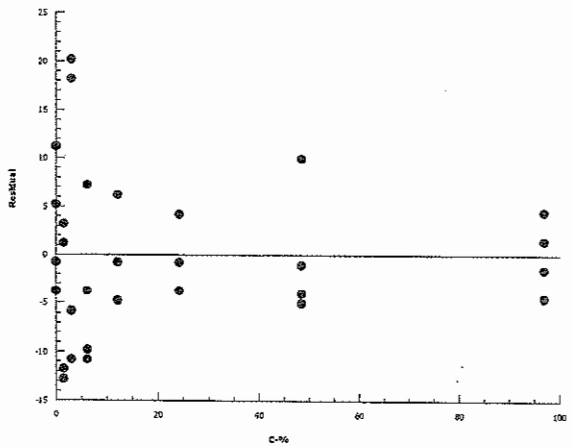
Frond Count Detail

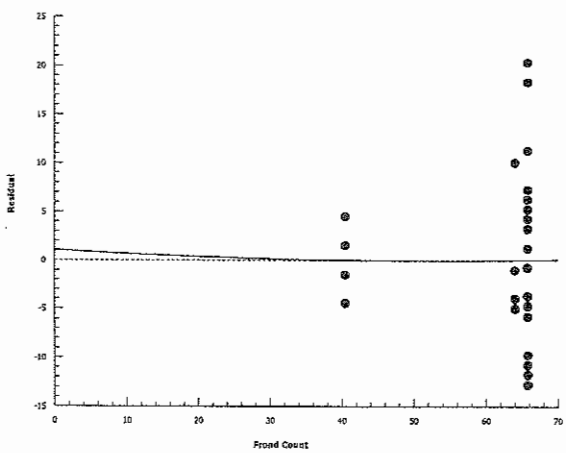
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	65	77	62	71
1.5		54	69	67	53
3		84	55	60	86
6.1		73	55	56	62
12.1		65	61	65	72
24.2		65	62	70	70
48.5		60	74	59	63
97		36	42	39	45

Graphics 3P Cumulative Log-Normal EV [Y=A*(1- Φ(log(X/D)/C))]









CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	02-2025-7806	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 16:27	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	07-0870-2690	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	28 Oct-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	04 Nov-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	09-9298-8395	**Code:**	3B2FCCEB	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (2.5 °C)	**Station:**	LC_LC5_WS_2015-10-26_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
2P Exponential EV [Y=A*exp(log(0.5)*X/D)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
4	4.973	-5.533	-3.015	0.0335	Yes	0.4562	2.508	0.8334	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	54.38	N/A	117.9	1.839	0.8485	NA
IC10	111.7	N/A	252.8	0.8952	0.3956	NA
IC15	172.3	N/A	411.6	0.5804	0.243	NA
IC20	236.6	N/A	593.3	0.4227	0.1685	NA
IC25	305	N/A	803.9	0.3279	0.1244	NA
IC40	541.6	N/A	1772	0.1846	0.05643	NA
IC50	734.9	31.42	3747	0.1361	0.02669	3.183

IC10 >97% (v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	4.78	0.1205	4.543	5.016	39.66	<0.0001	Significant Parameter
D	734.9	524.8	-293.7	1763	1.4	0.1717	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	0.596286	0.596286	1	2.074	0.1602	Non-Significant
Lack of Fit	0.883241	0.147207	6	0.4562	0.8334	Non-Significant
Pure Error	7.743819	0.322659	24			
Residual	8.62706	0.287569	30			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	8.895	14.07	0.2603	Equal Variances
	Mod Levene Equality of Variance	5.222	2.423	0.0010	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9807	0.9338	0.8198	Normal Distribution
	Anderson-Darling A2 Normality	0.2307	2.492	0.8348	Normal Distribution

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	4.905	4.45	5.46	0.2118	0.4235	8.63%	0.0%
1.5		4	4.492	3.82	5.09	0.2929	0.5859	13.04%	8.41%
3		4	4.947	3.85	5.94	0.526	1.052	21.26%	-0.87%
6.1		4	4.62	3.78	5.37	0.3501	0.7001	15.15%	5.81%
12.1		4	4.605	4.21	5.03	0.1678	0.3356	7.29%	6.12%
24.2		4	4.888	4.65	5.2	0.115	0.23	4.71%	0.36%
48.5		4	4.657	4.24	5.08	0.1716	0.3432	7.37%	5.05%
97		4	4.28	3.86	4.78	0.2112	0.4224	9.87%	12.74%

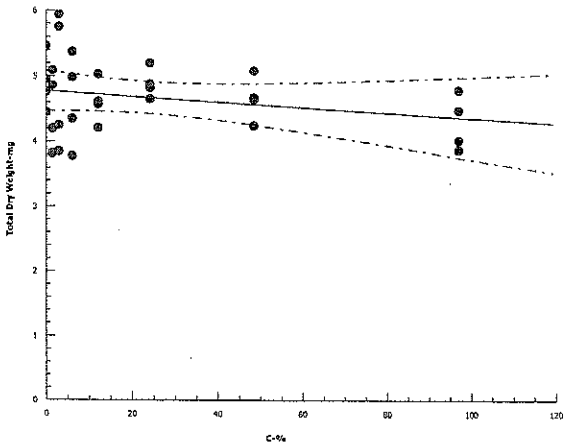
Lemna Growth Inhibition Test — **Nautilus Environmental**

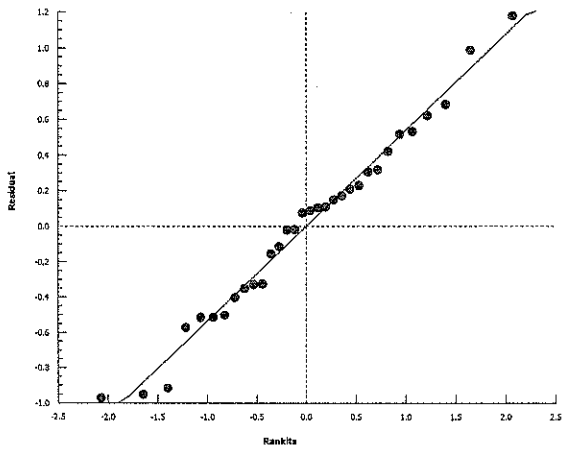
Analysis ID:	02-2025-7806	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 16:27	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes

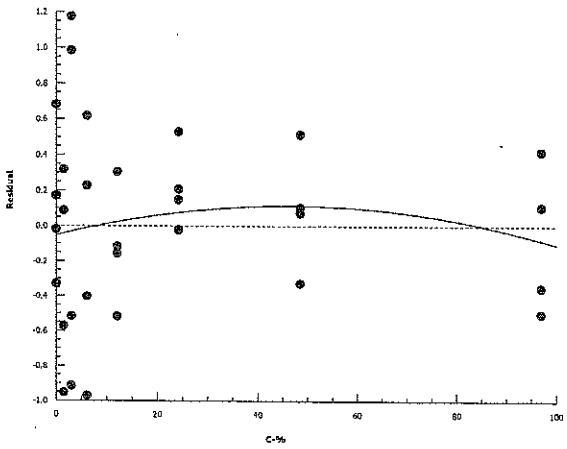
Total Dry Weight-mg Detail

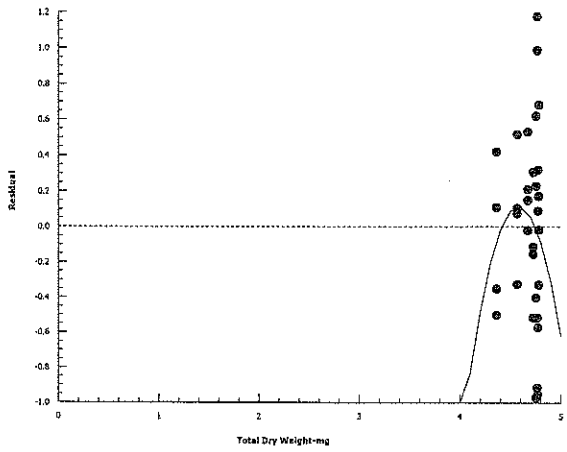
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	4.45	4.95	4.76	5.46
1.5		4.2	5.09	4.86	3.82
3		5.75	3.85	4.25	5.94
6.1		5.37	3.78	4.35	4.98
12.1		4.21	4.57	4.61	5.03
24.2		4.65	4.82	5.2	4.88
48.5		4.67	5.08	4.24	4.64
97		3.86	4.78	4.01	4.47

Graphics 2P Exponential EV [Y=A*exp(log(0.5)*X/D)]









APPENDIX D – *Pseudokirchneriella subcapitata* Toxicity Test Data

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15871

Start Date: Oct 27/15
Set up by: MT / EMM

Sample Information:

Sample ID: LC_LCDSSLCC_WS_2015-10-26_N
Sample Date: Oct 26/15
Date Received: Oct 27/15
Sample Volume: 8 x 20L

Test Organism Information:

Culture Date: Oct 23/15
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC135
Stock Solution ID: 15Zn03
Date Initiated: NOV 3/15

72-h IC50 (95% CL): 35.7 (30.6 - 41.4) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 28.5 (16.2 - 50.1) ug/L Zn CV (%): 32

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JCh

Date reviewed: Nov-19/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck | Setup by: MLT/EMM

Sample ID: LC-LCDSSLCC_WS_2015-10-26_N | Test Date/Time: Oct 27/15 @ ~~1440h~~ MLT 1640h

Work Order No.: 15871 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 23/15 | Age of Culture: 4d | Culture Health: Good

Culture Count: 1 289 2 312 | Average: 300.5 | Culture Cell Density (c1): 300.5 x 10^4 cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 300.5x10^4 cells/ml = 7.32mL

Time Zero Counts: 1 18 2 23 | Average: 20.5

No. of Cells/mL: 20.5 x10^4 | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9318 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.1	23.0	24.5	24.5	25.0	25.0	✓	✓	✓	✓
1.5	7.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.2	23.0					✓	✓	✓	✓
6.0	7.3	23.0					✓	✓	✓	✓
11.9	7.5	23.0					✓	✓	✓	✓
23.8	7.7	23.0					✓	✓	✓	✓
47.6	8.0	23.0					✓	✓	✓	✓
95.2	8.2	23.0					✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 7.1 | Well 2: 7.1

Final control pH: Well 1: 7.2 | Well 2: 7.2

Light intensity (lux): 4100 | Date measured: Oct 27/15

Instruments: Thermometer 4 | pH meter 2 | Light meter 1

Sample Description: clear

Comments:

Reviewed: JCK | Date reviewed: Nov-19/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck
Start Date/Time: Oct 27/15 @ 1640h
Work Order #: 15871
Termination Date: Oct 30/15 @ 1640h
Sample ID: LL_LCDSSLCC_WS_2015-10-26_N
Test set up by: MG/Emm

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	29					MG
	B	33					
	C	31					
	D	30					
	E	29					
	F	30					
	G	32					
	H	32					
1.5	A	64					
	B	65					
	C	59					
	D	65					
3.0	A	76					
	B	69					
	C	70					
	D	67					
6.0	A	90					
	B	84					
	C	82					
	D	86					
11.9	A	98					
	B	99					
	C	95					
	D	110					
23.8	A	96					
	B	102					
	C	111					
	D	103					
47.6	A	119					
	B	107					
	C	110					
	D	115					
95.2	A	124					
	B	114					
	C	104					
	D	110					

Comments:

Reviewed by: JCK
Date Reviewed: Nov. 19/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	27-Oct-15 @ 1640h
WO#:	15871	Termination Date:	30-Oct-15 @ 1640h
Sample ID:	LC_LCDSSLCC_WS_2015-10-26_N		
		Initial Cell Density:	9318 cell/mL

									205000
									0.22
									0.01
Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9318.182
Control	A	29				29	28.1	mean	29.8
	B	33				33	32.1	SD	1.488048
	C	31				31	30.1	CV	4.990404
	D	30				30	29.1		
	E	29				29	28.1		
	F	30				30	29.1		
	G	32				32	31.1		
	H	32				32	31.1		
1.5	A	64				64	63.1		
	B	65				65	64.1		
	C	59				59	58.1		
	D	65				65	64.1		
3	A	76				76	75.1		
	B	69				69	68.1		
	C	70				70	69.1		
	D	67				67	66.1		
6	A	90				90	89.1		
	B	84				84	83.1		
	C	82				82	81.1		
	D	86				86	85.1		
11.9	A	98				98	97.1		
	B	99				99	98.1		
	C	95				95	94.1		
	D	110				110	109.1		
23.8	A	96				96	95.1		
	B	102				102	101.1		
	C	111				111	110.1		
	D	103				103	102.1		
47.6	A	119				119	118.1		
	B	107				107	106.1		
	C	110				110	109.1		
	D	115				115	114.1		
95.2	A	124				124	123.1		
	B	114				114	113.1		
	C	104				104	103.1		
	D	110				110	109.1		

JCL
Nov. 19/15

CETIS Analytical Report

EC Alga Growth Inhibition Test — Nautilus Environmental

Analysis ID:	06-4934-4653	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:12	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-2153-9277	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 16:40	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 16:40	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	13-5006-3600	**Code:**	507855F0	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	41h (2.5 °C)	**Station:**	LC_LCDSSLCC_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	431451	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9087	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	29.75	28	32	0.5261	1.488	5.0%	0.0%
1.5		4	62.25	58	64	1.436	2.872	4.61%	-109.2%
3		4	69.5	66	75	1.936	3.873	5.57%	-133.6%
6		4	84.5	81	89	1.708	3.416	4.04%	-184.0%
11.9		4	99.5	94	109	3.279	6.557	6.59%	-234.5%
23.8		4	102	95	110	3.082	6.164	6.04%	-242.9%
47.6		4	111.8	106	118	2.658	5.315	4.76%	-275.6%
95.2		4	112	103	123	4.203	8.406	7.51%	-276.5%

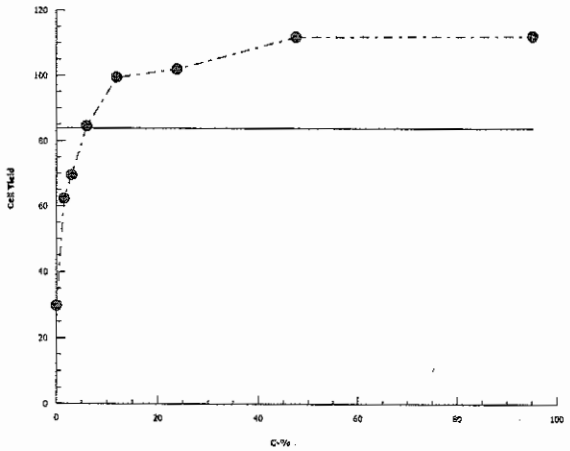
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	28	32	30	29	28	29	31	31
1.5		63	64	58	64				
3		75	68	69	66				
6		89	83	81	85				
11.9		97	98	94	109				
23.8		95	101	110	102				
47.6		118	106	109	114				
95.2		123	113	103	109				

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	06-4934-4653	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:12	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	05-6907-1498	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:12	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	03-2153-9277	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 16:40	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 16:40	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	13-5006-3600	**Code:**	507855F0	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	41h (2.5 °C)	**Station:**	LC_LCDSSLCC_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	25.2%	<1.5	1.5	NA	>66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5*	10.93	2.526	7.511	10	<0.0001	CDF	Significant Effect
		3*	13.37	2.526	7.511	10	<0.0001	CDF	Significant Effect
		6*	18.42	2.526	7.511	10	<0.0001	CDF	Significant Effect
		11.9*	23.46	2.526	7.511	10	<0.0001	CDF	Significant Effect
		23.8*	24.3	2.526	7.511	10	<0.0001	CDF	Significant Effect
		47.6*	27.58	2.526	7.511	10	<0.0001	CDF	Significant Effect
		95.2*	27.66	2.526	7.511	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9087	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	33407.55	4772.508	7	202.5	<0.0001	Significant Effect
Error	660	23.57143	28			
Total	34067.55		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	14.42	18.48	0.0442	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9636	0.9166	0.2772	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	29.75	28.51	30.99	29.5	28	32	0.5261	5.0%	0.0%
1.5		4	62.25	57.68	66.82	63.5	58	64	1.436	4.61%	-109.2%
3		4	69.5	63.34	75.66	68.5	66	75	1.936	5.57%	-133.6%
6		4	84.5	79.06	89.94	84	81	89	1.708	4.04%	-184.0%
11.9		4	99.5	89.07	109.9	97.5	94	109	3.279	6.59%	-234.5%
23.8		4	102	92.19	111.8	101.5	95	110	3.082	6.04%	-242.9%
47.6		4	111.8	103.3	120.2	111.5	106	118	2.658	4.76%	-275.6%
95.2		4	112	98.62	125.4	111	103	123	4.203	7.51%	-276.5%

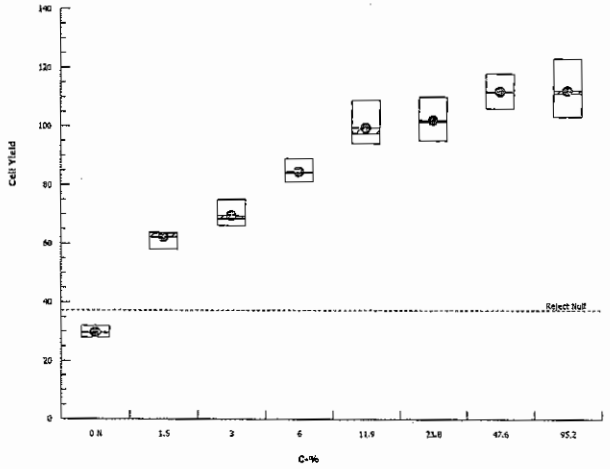
EC Alga Growth Inhibition Test — **Nautilus Environmental**

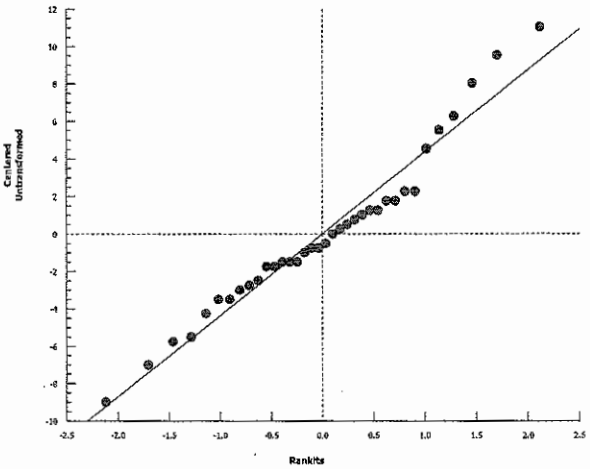
Analysis ID:	05-6907-1498	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:12	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	28	32	30	29	28	29	31	31
1.5		63	64	58	64				
3		75	68	69	66				
6		89	83	81	85				
11.9		97	98	94	109				
23.8		95	101	110	102				
47.6		118	106	109	114				
95.2		123	113	103	109				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15871

Start Date: Oct 27/15
Set up by: MLT / EMM

Sample Information:

Sample ID: LC-PCI_WS 2015-10-26_N
Sample Date: Oct 26/15
Date Received: Oct 27/15
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: Oct 23/15
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC135
Stock Solution ID: 15Zn03
Date Initiated: NOV 3/15

72-h IC50 (95% CL): 35.7 (30.6-41.4) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 28.5 (16.2-50.1) ug/L Zn CV (%): 32

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JCh

Date reviewed: Nov. 19/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck | Setup by: MLT/EMM

Sample ID: LC-DC1-WS-2015-10-26-N | Test Date/Time: Oct 27/15 @ ~~1450h~~ 1650h MLT

Work Order No.: 15871 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 23/15 | Age of Culture: 4d | Culture Health: Good

Culture Count: 1 289 2 312 | Average: 300.5 | Culture Cell Density (c1): 300.5 x 10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 300.5 x 10⁴ cells/ml = 7.32mL

Time Zero Counts: 1 18 2 23 | Average: 20.5

No. of Cells/mL: 20.5 x 10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9318 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.1	23.0	24.5	24.5	25.0	25.0	✓	✓	✓	✓
1.5	7.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.1	23.0					✓	✓	✓	✓
6.0	7.2	23.0					✓	✓	✓	✓
11.9	7.4	23.0					✓	✓	✓	✓
23.8	7.6	23.0					✓	✓	✓	✓
47.6	7.9	23.0					✓	✓	✓	✓
95.2	8.2	23.0					✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 7.1 Well 2: 7.1

Final control pH: Well 1: 7.2 Well 2: 7.2

Light intensity (lux): 4100 | Date measured: Oct 27/15

Instruments: Thermometer 4 | pH meter 2 | Light meter 1

Sample Description: clear

Comments:

Reviewed: JCL | Date reviewed: Nov. 19/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck | Start Date/Time: Oct 27/15 @ 1650h

Work Order #: ~~LC_DC1~~ 15871 | Termination Date: Oct 30/15 @ 1650h

Sample ID: LC_DC1_WS_2015-10-26_N | Test set up by: ML7

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	31					ML7
	B	32					
	C	35					
	D	31					
	E	31					
	F	32					
	G	29					
	H	31					
1.5	A	58					
	B	60					
	C	57					
	D	50					
3.0	A	74					
	B	70					
	C	64					
	D	66					
6.0	A	85					
	B	76					
	C	82					
	D	73					
11.9	A	95					
	B	86					
	C	93					
	D	90					
23.8	A	108					
	B	100					
	C	117					
	D	110					
47.6	A	128					
	B	135					
	C	126					
	D	123					
95.2	A	121					
	B	117					
	C	118					
	D	120					

Comments:

Reviewed by: JCL | Date Reviewed: Nov-19/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	27-Oct-15 @ 1650h		
WO#:	15871	Termination Date:	30-Oct-15 @ 1650h		
Sample ID:	LC_DC1_WS_2015-10-26_N				
		Initial Cell Density:	9318 cell/mL		205000
					0.22
					0.01
					9318.182

Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		
Control	A	31				31	30.1	mean	30.6
	B	32				32	31.1	SD	1.690309
	C	35				35	34.1	CV	5.529634
	D	31				31	30.1		
	E	31				31	30.1		
	F	32				32	31.1		
	G	29				29	28.1		
	H	31				31	30.1		
1.5	A	58				58	57.1		
	B	60				60	59.1		
	C	57				57	56.1		
	D	50				50	49.1		
3	A	74				74	73.1		
	B	70				70	69.1		
	C	64				64	63.1		
	D	66				66	65.1		
6	A	85				85	84.1		
	B	76				76	75.1		
	C	82				82	81.1		
	D	73				73	72.1		
11.9	A	95				95	94.1		
	B	86				86	85.1		
	C	93				93	92.1		
	D	90				90	89.1		
23.8	A	108				108	107.1		
	B	100				100	99.1		
	C	117				117	116.1		
	D	110				110	109.1		
47.6	A	128				128	127.1		
	B	135				135	134.1		
	C	126				126	125.1		
	D	123				123	122.1		
95.2	A	121				121	120.1		
	B	117				117	116.1		
	C	118				118	117.1		
	D	120				120	119.1		

JGH
Nov. 19/15

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	03-4935-7833	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:16	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	19-9937-6694	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 16:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 16:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	16-9503-3844	**Code:**	650829F4	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	41h (2.5 °C)	**Station:**	LC_DC1_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1457012	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.2202	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	30.5	28	34	0.5976	1.69	5.54%	0.0%
1.5		4	55.25	49	59	2.175	4.349	7.87%	-81.15%
3		4	67.5	63	73	2.217	4.435	6.57%	-121.3%
6		4	78	72	84	2.739	5.477	7.02%	-155.7%
11.9		4	90	85	94	1.958	3.916	4.35%	-195.1%
23.8		4	107.8	99	116	3.497	6.994	6.49%	-253.3%
47.6		4	127	122	134	2.55	5.099	4.02%	-316.4%
95.2		4	118	116	120	0.9129	1.826	1.55%	-286.9%

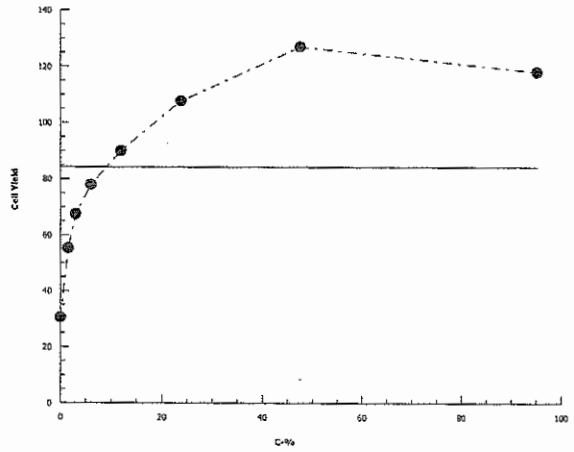
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	30	31	34	30	30	31	28	30
1.5		57	59	56	49				
3		73	69	63	65				
6		84	75	81	72				
11.9		94	85	92	89				
23.8		107	99	116	109				
47.6		127	134	125	122				
95.2		120	116	117	119				

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	03-4935-7833	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:16	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	16-5476-7242	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:16	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	19-9937-6694	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 16:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 16:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	16-9503-3844	**Code:**	650829F4	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	41h (2.5 °C)	**Station:**	LC_DC1_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	21.6%	<1.5	1.5	NA	>66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5*	9.503	2.526	6.58	10	<0.0001	CDF	Significant Effect
		3*	14.21	2.526	6.58	10	<0.0001	CDF	Significant Effect
		6*	18.24	2.526	6.58	10	<0.0001	CDF	Significant Effect
		11.9*	22.84	2.526	6.58	10	<0.0001	CDF	Significant Effect
		23.8*	29.66	2.526	6.58	10	<0.0001	CDF	Significant Effect
		47.6*	37.05	2.526	6.58	10	<0.0001	CDF	Significant Effect
		95.2*	33.6	2.526	6.58	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.2202	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	40678.72	5811.246	7	321.3	<0.0001	Significant Effect
Error	506.5	18.08928	28			
Total	41185.22		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	11.21	18.48	0.1297	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.989	0.9166	0.9720	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	30.5	29.09	31.91	30	28	34	0.5976	5.54%	0.0%
1.5		4	55.25	48.33	62.17	56.5	49	59	2.175	7.87%	-81.15%
3		4	67.5	60.44	74.56	67	63	73	2.217	6.57%	-121.3%
6		4	78	69.28	86.72	78	72	84	2.739	7.02%	-155.7%
11.9		4	90	83.77	96.23	90.5	85	94	1.958	4.35%	-195.1%
23.8		4	107.8	96.62	118.9	108	99	116	3.497	6.49%	-253.3%
47.6		4	127	118.9	135.1	126	122	134	2.55	4.02%	-316.4%
95.2		4	118	115.1	120.9	118	116	120	0.9129	1.55%	-286.9%

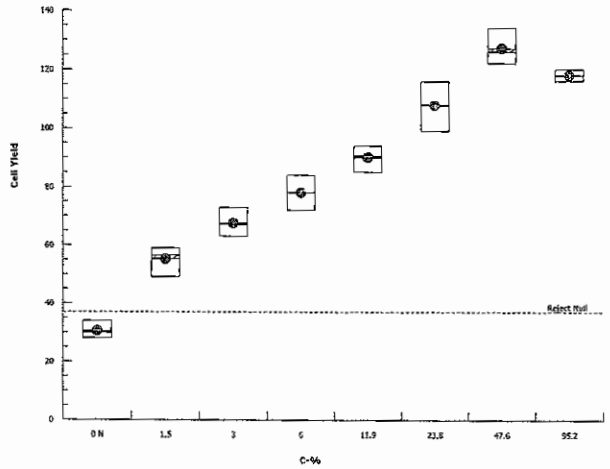
EC Alga Growth Inhibition Test | **Nautilus Environmental**

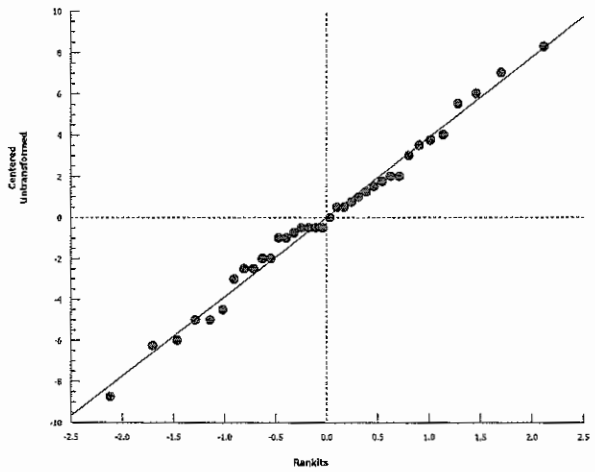
Analysis ID:	16-5476-7242	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:16	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	30	31	34	30	30	31	28	30
1.5		57	59	56	49				
3		73	69	63	65				
6		84	75	81	72				
11.9		94	85	92	89				
23.8		107	99	116	109				
47.6		127	134	125	122				
95.2		120	116	117	119				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15871

Start Date: Oct 27/15
Set up by: MLT / EMM

Sample Information:

Sample ID: LC_FRDSPC_WS_2015-10-26_N
Sample Date: Oct 26/15
Date Received: Oct 27/15
Sample Volume: 5 X 20L

Test Organism Information:

Culture Date: Oct 23/15
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC135
Stock Solution ID: 15Zn03
Date Initiated: NOV 3/15

72-h IC50 (95% CL): 35.7 (30.6 - 41.4) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 28.5 (16.2 - 50.1) ug/L Zn CV (%): 32

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JGL

Date reviewed: Nov-19/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck | Setup by: MLT/EMM

Sample ID: LC-FRDSDC_WS_2015-10-26_N | Test Date/Time: Oct 27/15 @ 1450h MLT 1620h

Work Order No.: 15871 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 23/15 | Age of Culture: 4d | Culture Health: Good

Culture Count: 1 289 2 312 | Average: 300.5 | Culture Cell Density (c1): 300.5

v1 = 220,000 cells/ml x 100 ml / (c1) 300,5 x10⁴ cells/ml = 7.32mL

Time Zero Counts: 1 18 2 23 | Average: 20.5

No. of Cells/mL: 20,5 x10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9318 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.1	23.0	24.5	24.5	25.0	25.0	✓	✓	✓	✓
1.5	7.2	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.3	23.0					✓	✓	✓	✓
6.0	7.4	23.0					✓	✓	✓	✓
11.9	7.5	23.0					✓	✓	✓	✓
23.8	7.6	23.0					✓	✓	✓	✓
47.6	~~8.0~~ MLT 7.9	23.0					✓	✓	✓	✓
95.2	8.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 7.1 Well 2: 7.1

Final control pH: Well 1: 7.2 Well 2: 7.2

Light intensity (lux): 4080 Date measured: Oct 27/15

Instruments: Thermometer 4 pH meter 2 Light meter 1

Sample Description: clear

Comments:

Reviewed: JOL Date reviewed: Nov. 19/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck
Start Date/Time: Oct 27/15 @ 1620h
Work Order #: ~~LC_PRDSDC~~ 15871
Termination Date: Oct 30/15 @ 1620h
Sample ID: LC_PRDSDC_WS_2015-10-26_N
Test set up by: ML
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	29					ML
	B	32					
	C	30					
	D	29					
	E	30					
	F	31					
	G	30					
	H	29					
1.5	A	50					
	B	55					
	C	50					
	D	53					
3.0	A	74					
	B	75					
	C	65					
	D	67					
6.0	A	70					
	B	77					
	C	75					
	D	66					
11.9	A	96					
	B	84					
	C	90					
	D	86					
23.8	A	106					
	B	104					
	C	105					
	D	98					
47.6	A	118					
	B	106					
	C	111					
	D	112					
95.2	A	118					
	B	121					
	C	119					
	D	117					

Comments:

Reviewed by: JCL
Date Reviewed: Nov. 19/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	27-Oct-15 @ 1620h
WO#:	15871	Termination Date:	30-Oct-15 @ 1620h
Sample ID:	LC_FRDSDC_WS_2015-10-26_N		
		Initial Cell Density:	9318 cell/mL

									205000
									0.22
									0.01
Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Mean	Cell Yield		9318.182
% v/v		(x 10^4)	(x 10^4)	(x 10^4)	(x 10^4)	(x 10^4)	(x 10^4) cell/mL		
Control	A	29				29	28.1	mean	29.1
	B	32				32	31.1	SD	1.069045
	C	30				30	29.1	CV	3.677715
	D	29				29	28.1		
	E	30				30	29.1		
	F	31				31	30.1		
	G	30				30	29.1		
	H	29				29	28.1		
1.5	A	50				50	49.1		
	B	55				55	54.1		
	C	50				50	49.1		
	D	53				53	52.1		
3	A	74				74	73.1		
	B	75				75	74.1		
	C	65				65	64.1		
	D	67				67	66.1		
6	A	70				70	69.1		
	B	77				77	76.1		
	C	75				75	74.1		
	D	66				66	65.1		
11.9	A	96				96	95.1		
	B	84				84	83.1		
	C	90				90	89.1		
	D	86				86	85.1		
23.8	A	106				106	105.1		
	B	104				104	103.1		
	C	105				105	104.1		
	D	98				98	97.1		
47.6	A	118				118	117.1		
	B	106				106	105.1		
	C	111				111	110.1		
	D	112				112	111.1		
95.2	A	118				118	117.1		
	B	121				121	120.1		
	C	119				119	118.1		
	D	117				117	116.1		

Nov. 19/15

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	18-8201-4006	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:19	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	04-9241-0522	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 16:20	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 16:20	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	10-5788-9285	**Code:**	3F0E1C05	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (2.5 °C)	**Station:**	LC_FRDSDC_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	718437	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.4937	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	29	28	31	0.378	1.069	3.69%	0.0%
1.5		4	51	49	54	1.225	2.449	4.8%	-75.86%
3		4	69.25	64	74	2.496	4.992	7.21%	-138.8%
6		4	71	65	76	2.483	4.967	7.0%	-144.8%
11.9		4	88	83	95	2.646	5.292	6.01%	-203.4%
23.8		4	102.3	97	105	1.797	3.594	3.52%	-252.6%
47.6		4	110.8	105	117	2.462	4.924	4.45%	-281.9%
95.2		4	117.8	116	120	0.8539	1.708	1.45%	-306.0%

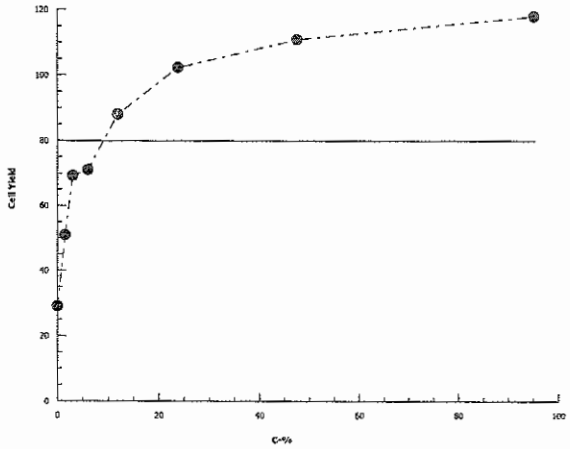
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	28	31	29	28	29	30	29	28
1.5		49	54	49	52				
3		73	74	64	66				
6		69	76	74	65				
11.9		95	83	89	85				
23.8		105	103	104	97				
47.6		117	105	110	111				
95.2		117	120	118	116				

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	18-8201-4006	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:19	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	12-7775-1414	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:19	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	04-9241-0522	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 16:20	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 16:20	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	10-5788-9285	**Code:**	3F0E1C05	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (2.5 °C)	**Station:**	LC_FRDSDC_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	19.6%	<1.5	1.5	NA	>66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5*	9.765	2.526	5.692	10	<0.0001	CDF	Significant Effect
		3*	17.87	2.526	5.692	10	<0.0001	CDF	Significant Effect
		6*	18.64	2.526	5.692	10	<0.0001	CDF	Significant Effect
		11.9*	26.19	2.526	5.692	10	<0.0001	CDF	Significant Effect
		23.8*	32.51	2.526	5.692	10	<0.0001	CDF	Significant Effect
		47.6*	36.29	2.526	5.692	10	<0.0001	CDF	Significant Effect
		95.2*	39.39	2.526	5.692	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.4937	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	35475.22	5067.889	7	374.4	<0.0001	Significant Effect
Error	379	13.53571	28			
Total	35854.22		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	15.17	18.48	0.0339	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9777	0.9166	0.6663	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	29	28.11	29.89	29	28	31	0.378	3.69%	0.0%
1.5		4	51	47.1	54.9	50.5	49	54	1.225	4.8%	-75.86%
3		4	69.25	61.31	77.19	69.5	64	74	2.496	7.21%	-138.8%
6		4	71	63.1	78.9	71.5	65	76	2.483	7.0%	-144.8%
11.9		4	88	79.58	96.42	87	83	95	2.646	6.01%	-203.4%
23.8		4	102.3	96.53	108	103.5	97	105	1.797	3.52%	-252.6%
47.6		4	110.8	102.9	118.6	110.5	105	117	2.462	4.45%	-281.9%
95.2		4	117.8	115	120.5	117.5	116	120	0.8539	1.45%	-306.0%

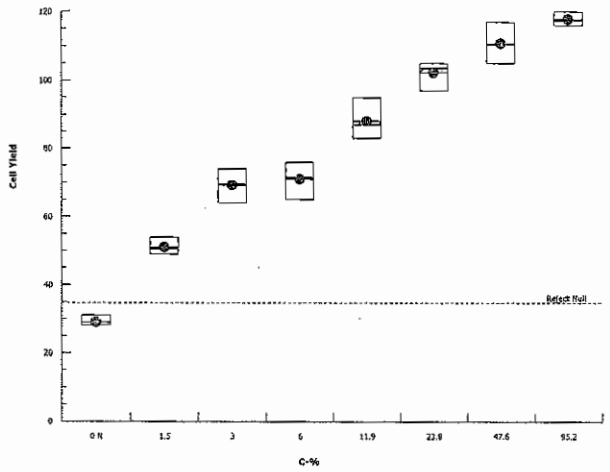
EC Alga Growth Inhibition Test — **Nautilus Environmental**

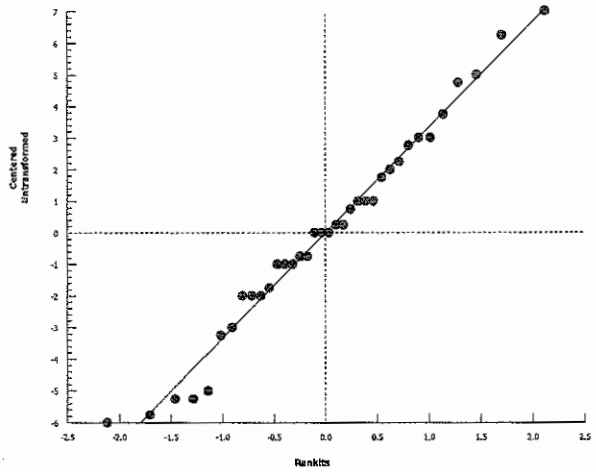
Analysis ID:	12-7775-1414	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:19	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	28	31	29	28	29	30	29	28
1.5		49	54	49	52				
3		73	74	64	66				
6		69	76	74	65				
11.9		95	83	89	85				
23.8		105	103	104	97				
47.6		117	105	110	111				
95.2		117	120	118	116				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15871

Start Date: Oct 27/15
Set up by: MLT/EMM

Sample Information:

Sample ID: LC_DCDS_WS_2015-10-26_N
Sample Date: Oct 26/15
Date Received: Oct 27/15
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: Oct 23/15
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC135
Stock Solution ID: 15Zn03
Date Initiated: NOV 3/15

72-h IC50 (95% CL): 35.7 (30.6 - 41.4) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 28.5 (16.2-50.1) ug/L Zn CV (%): 32

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JGL

Date reviewed: Nov 19/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck | Setup by: MLT/EMM

Sample ID: LC_DCDS_WS_2015-10-26_N | Test Date/Time: Oct 27/15 @ ~~1430~~ MLT 1630h

Work Order No.: 15871 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 23/15 | Age of Culture: 4d | Culture Health: Good

Culture Count: 1 289 2 312 | Average: 300.5 | Culture Cell Density (c1): 300.5 x 10^4 cells/mL

v1 = 220,000 cells/ml x 160 ml / (c1) 300.5 x 10^4 cells/ml = 7.32mL

Time Zero Counts: 1 18 2 23 | Average: 20.5

No. of Cells/mL: 20.5 x 10^4 | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9318 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.1	23.0	24.5	24.5	25.0	25.0	✓	✓	✓	✓
1.5	7.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.2	23.0					✓	✓	✓	✓
6.0	7.3	23.0					✓	✓	✓	✓
11.9	7.5	23.0					✓	✓	✓	✓
23.8	7.7	23.0					✓	✓	✓	✓
47.6	7.9	23.0					✓	✓	✓	✓
95.2	8.2	23.0					✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 7.1 Well 2: 7.1

Final control pH: Well 1: 7.2 Well 2: 7.2

Light intensity (lux): 3900 | Date measured: Oct 27/15

Instruments: Thermometer 4 | pH meter 2 | Light meter 1

Sample Description: clear

Comments:

Reviewed: JOL | Date reviewed: Nov 19/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck
Start Date/Time: Oct 27/15 @ 1630h
Work Order #: ~~LC-DCDS~~ 15871
Termination Date: Oct 30/15 @ 1630h
Sample ID: LC_DCDS_WS_2015-10-26_N
Test set up by: ML

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	30					ML
	B	33					
	C	30					
	D	34					
	E	30					
	F	28					
	G	29					
	H	30					
1.5	A	55					
	B	56					
	C	49					
	D	54					
3.0	A	61					
	B	61					
	C	69					
	D	67					
6.0	A	76					
	B	75					
	C	70					
	D	80					
11.9	A	74					
	B	81					
	C	75					
	D	84					
23.8	A	94					
	B	83					
	C	92					
	D	91					
47.6	A	117					
	B	111					
	C	120					
	D	122					
95.2	A	110					
	B	125					
	C	123					
	D	119					

Comments:

Reviewed by: JDL
Date Reviewed: Nov. 19/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	27-Oct-15 @ 1630h
WO#:	15871	Termination Date:	30-Oct-15 @ 1630h
Sample ID:	LC_DCDS_WS_2015-10-26_N		
		Initial Cell Density:	9318 cell/mL

									205000
									0.22
									0.01
Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9318.182
Control	A	30				30	29.1	mean	29.6
	B	33				33	32.1	SD	2
	C	30				30	29.1	CV	6.764028
	D	34				34	33.1		
	E	30				30	29.1		
	F	28				28	27.1		
	G	29				29	28.1		
	H	30				30	29.1		
1.5	A	55				55	54.1		
	B	56				56	55.1		
	C	49				49	48.1		
	D	54				54	53.1		
3	A	61				61	60.1		
	B	61				61	60.1		
	C	69				69	68.1		
	D	67				67	66.1		
6	A	76				76	75.1		
	B	75				75	74.1		
	C	70				70	69.1		
	D	80				80	79.1		
11.9	A	74				74	73.1		
	B	81				81	80.1		
	C	75				75	74.1		
	D	84				84	83.1		
23.8	A	94				94	93.1		
	B	83				83	82.1		
	C	92				92	91.1		
	D	91				91	90.1		
47.6	A	117				117	116.1		
	B	111				111	110.1		
	C	120				120	119.1		
	D	122				122	121.1		
95.2	A	110				110	109.1		
	B	125				125	124.1		
	C	123				123	122.1		
	D	119				119	118.1		

JCL
Nov-19/15

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	05-4531-8232	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:23	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	06-8284-1356	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 16:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 16:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	11-3850-9437	**Code:**	43DC467D	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (3.5 °C)	**Station:**	LC_DCDS_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1815716	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.1869	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	29.5	27	33	0.7071	2	6.78%	0.0%
1.5		4	52.5	48	55	1.555	3.109	5.92%	-77.97%
3		4	63.5	60	68	2.062	4.123	6.49%	-115.3%
6		4	74.25	69	79	2.056	4.113	5.54%	-151.7%
11.9		4	77.5	73	83	2.398	4.796	6.19%	-162.7%
23.8		4	89	82	93	2.415	4.83	5.43%	-201.7%
47.6		4	116.5	110	121	2.398	4.796	4.12%	-294.9%
95.2		4	118.3	109	124	3.326	6.652	5.63%	-300.8%

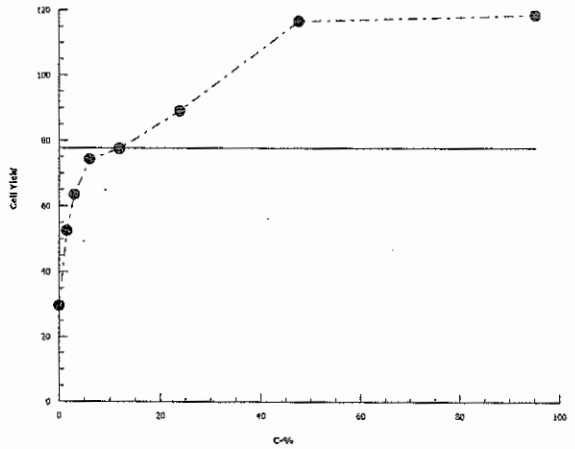
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	29	32	29	33	29	27	28	29
1.5		54	55	48	53				
3		60	60	68	66				
6		75	74	69	79				
11.9		73	80	74	83				
23.8		93	82	91	90				
47.6		116	110	119	121				
95.2		109	124	122	118				

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	05-4531-8232	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:23	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	08-7660-8054	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:23	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	06-8284-1356	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 16:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 16:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	11-3850-9437	**Code:**	43DC467D	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (3.5 °C)	**Station:**	LC_DCDS_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	22.1%	<1.5	1.5	NA	>66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5*	8.892	2.526	6.534	10	<0.0001	CDF	Significant Effect
		3*	13.15	2.526	6.534	10	<0.0001	CDF	Significant Effect
		6*	17.3	2.526	6.534	10	<0.0001	CDF	Significant Effect
		11.9*	18.56	2.526	6.534	10	<0.0001	CDF	Significant Effect
		23.8*	23	2.526	6.534	10	<0.0001	CDF	Significant Effect
		47.6*	33.64	2.526	6.534	10	<0.0001	CDF	Significant Effect
		95.2*	34.31	2.526	6.534	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.1869	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	34031.72	4861.675	7	272.5	<0.0001	Significant Effect
Error	499.5	17.83928	28			
Total	34531.22		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.766	18.48	0.4536	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9582	0.9166	0.1886	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	29.5	27.83	31.17	29	27	33	0.7071	6.78%	0.0%
1.5		4	52.5	47.55	57.45	53.5	48	55	1.555	5.92%	-77.97%
3		4	63.5	56.94	70.06	63	60	68	2.062	6.49%	-115.3%
6		4	74.25	67.71	80.79	74.5	69	79	2.056	5.54%	-151.7%
11.9		4	77.5	69.87	85.13	77	73	83	2.398	6.19%	-162.7%
23.8		4	89	81.31	96.69	90.5	82	93	2.415	5.43%	-201.7%
47.6		4	116.5	108.9	124.1	117.5	110	121	2.398	4.12%	-294.9%
95.2		4	118.3	107.7	128.8	120	109	124	3.326	5.63%	-300.8%

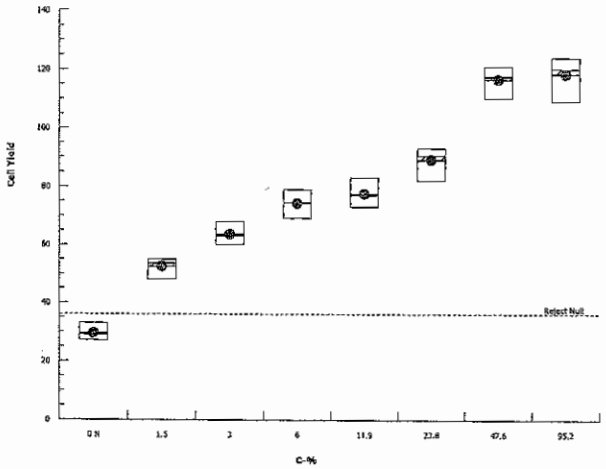
EC Alga Growth Inhibition Test — **Nautilus Environmental**

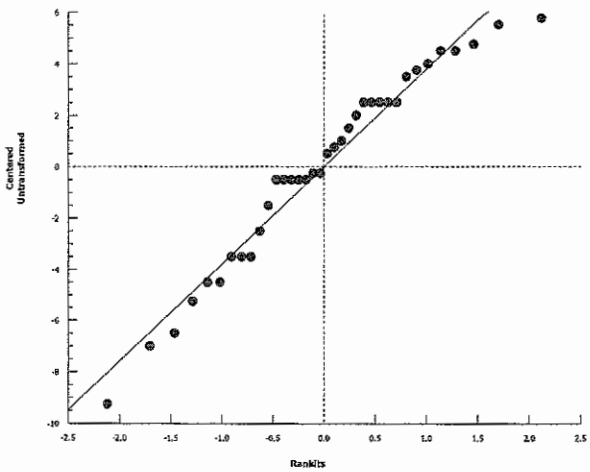
Analysis ID:	08-7660-8054	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:23	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	29	32	29	33	29	27	28	29
1.5		54	55	48	53				
3		60	60	68	66				
6		75	74	69	79				
11.9		73	80	74	83				
23.8		93	82	91	90				
47.6		116	110	119	121				
95.2		109	124	122	118				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15871

Start Date: Oct 27/15
Set up by: MIT/EMM

Sample Information:

Sample ID: LC_LC5_WS_2015-10-26_N
Sample Date: Oct 26/15
Date Received: Oct 27/15
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: Oct 23/15
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC135
Stock Solution ID: 152n03
Date Initiated: NOV 3/15

72-h IC50 (95% CL): 35.7 (30.6 - 41.4) ug/L ~~Zn~~

72-h IC50 Reference Toxicant Mean and Range: 28.5 (16.2 - 50.1) ug/L Zn CV (%): 32

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JOL

Date reviewed: Nov-19/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck | Setup by: MLT / EMM

Sample ID: LC_LCG_WS_2015-10-26_N | Test Date/Time: Oct 27/15 @ ~~1410h~~ MG 1610h

Work Order No.: 15871 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 23/15 | Age of Culture: 4d | Culture Health: Good

Culture Count: 1 289 2 312 | Average: 300.5 | Culture Cell Density (c1): 300.5 x 10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 300.5 x 10⁴ cells/ml = 7.32mL

Time Zero Counts: 1 18 2 23 | Average: 20.5

No. of Cells/mL: 20.5 x 10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9318 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.1	23.0	24.5	24.5	25.0	25.0	✓	✓	✓	✓
1.5	7.2	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.2	23.0					✓	✓	✓	✓
6.0	7.4	23.0					✓	✓	✓	✓
11.9	7.5	23.0					✓	✓	✓	✓
23.8	7.7	23.0					✓	✓	✓	✓
47.6	MG ~~7~~ 8.0	23.0					✓	✓	✓	✓
95.2	8.2	23.0					✓	✓	✓	✓
Initials	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG

Initial control pH: Well 1: 7.1 Well 2: 7.1

Final control pH: Well 1: 7.2 Well 2: 7.2

Light intensity (lux): 3900 | Date measured: Oct 27/15

Instruments: Thermometer 4 | pH meter 2 | Light meter 1

Sample Description: clear

Comments:

Reviewed: JOL | Date reviewed: Nov 19/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Start Date/Time: Oct 27/15 @ ~~1653~~ MLT 1610h

Work Order #: 15871 Termination Date: Oct 30/15 @ 1610h

Sample ID: LC_LC5_WS_2015-10-26_N Test set up by: MLT

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	31					MLT
	B	30					
	C	30					
	D	33					
	E	30					
	F	30					
	G	31					
	H	29					
1.5	A	50					
	B	51					
	C	45					
	D	48					
3.0	A	59					
	B	62					
	C	58					
	D	61					
6.0	A	69					
	B	71					
	C	75 ~~74~~ MLT					
	D	65					
11.9	A	88 ~~98~~ MLT					
	B	84					
	C	98					
	D	98					
23.8	A	101					
	B	105					
	C	96					
	D	98					
47.6	A	109					
	B	101					
	C	94					
	D	98					
95.2	A	103					
	B	96					
	C	110					
	D	104					✓

Comments:

Reviewed by: JCH Date Reviewed: Nov-19/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	27-Oct-15 @ 1610h
WO#:	15871	Termination Date:	30-Oct-15 @ 1610h
Sample ID:	LC_LC5_WS_2015-10-26_N		
		Initial Cell Density:	9318 cell/mL

									205000
									0.22
									0.01
Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9318.182
Control	A	31				31	30.1	mean	29.6
	B	30				30	29.1	SD	1.195229
	C	30				30	29.1	CV	4.04228
	D	33				33	32.1		
	E	30				30	29.1		
	F	30				30	29.1		
	G	31				31	30.1		
	H	29				29	28.1		
1.5	A	50				50	49.1		
	B	51				51	50.1		
	C	45				45	44.1		
	D	48				48	47.1		
3	A	59				59	58.1		
	B	62				62	61.1		
	C	58				58	57.1		
	D	61				61	60.1		
6	A	69				69	68.1		
	B	71				71	70.1		
	C	75				75	74.1		
	D	65				65	64.1		
11.9	A	88				88	87.1		
	B	84				84	83.1		
	C	98				98	97.1		
	D	98				98	97.1		
23.8	A	101				101	100.1		
	B	105				105	104.1		
	C	96				96	95.1		
	D	98				98	97.1		
47.6	A	109				109	108.1		
	B	101				101	100.1		
	C	94				94	93.1		
	D	98				98	97.1		
95.2	A	103				103	102.1		
	B	96				96	95.1		
	C	110				110	109.1		
	D	104				104	103.1		

JOL
Nov-19/15

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	08-3035-8367	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 16:26	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	02-2850-6043	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 16:10	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 16:10	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	09-9298-8395	**Code:**	3B2FCCEB	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (2.5 °C)	**Station:**	LC_LC5_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	245839	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.2202	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	29.5	28	32	0.4226	1.195	4.05%	0.0%
1.5		4	47.5	44	50	1.323	2.646	5.57%	-61.02%
3		4	59	57	61	0.9129	1.826	3.09%	-100.0%
6		4	69	64	74	2.082	4.163	6.03%	-133.9%
11.9		4	91	83	97	3.559	7.118	7.82%	-208.5%
23.8		4	99	95	104	1.958	3.916	3.96%	-235.6%
47.6		4	99.5	93	108	3.175	6.351	6.38%	-237.3%
95.2		4	102.3	95	109	2.869	5.737	5.61%	-246.6%

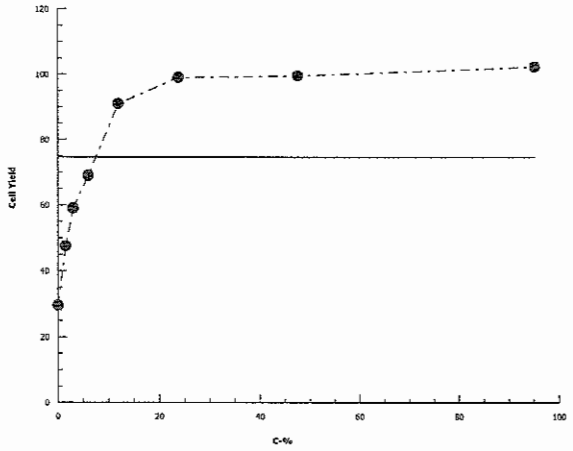
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	30	29	29	32	29	29	30	28
1.5		49	50	44	47				
3		58	61	57	60				
6		68	70	74	64				
11.9		87	83	97	97				
23.8		100	104	95	97				
47.6		108	100	93	97				
95.2		102	95	109	103				

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	08-3035-8367	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 16:26	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA: 10 Nov. 15/11

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	09-6263-7117	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 16:27	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	02-2850-6043	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 16:10	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 16:10	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	09-9298-8395	**Code:**	3B2FCCEB	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (2.5 °C)	**Station:**	LC_LC5_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	22.4%	<1.5	1.5	NA	>66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5*	6.882	2.526	6.607	10	<0.0001	CDF	Significant Effect
		3*	11.28	2.526	6.607	10	<0.0001	CDF	Significant Effect
		6*	15.1	2.526	6.607	10	<0.0001	CDF	Significant Effect
		11.9*	23.51	2.526	6.607	10	<0.0001	CDF	Significant Effect
		23.8*	26.57	2.526	6.607	10	<0.0001	CDF	Significant Effect
		47.6*	26.76	2.526	6.607	10	<0.0001	CDF	Significant Effect
		95.2*	27.82	2.526	6.607	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.2202	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	28398	4056.857	7	222.4	<0.0001	Significant Effect
Error	510.75	18.24107	28			
Total	28908.75		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	17.25	18.48	0.0158	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9733	0.9166	0.5213	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	29.5	28.5	30.5	29	28	32	0.4226	4.05%	0.0%
1.5		4	47.5	43.29	51.71	48	44	50	1.323	5.57%	-61.02%
3		4	59	56.09	61.91	59	57	61	0.9129	3.09%	-100.0%
6		4	69	62.38	75.62	69	64	74	2.082	6.03%	-133.9%
11.9		4	91	79.67	102.3	92	83	97	3.559	7.82%	-208.5%
23.8		4	99	92.77	105.2	98.5	95	104	1.958	3.96%	-235.6%
47.6		4	99.5	89.39	109.6	98.5	93	108	3.175	6.38%	-237.3%
95.2		4	102.3	93.12	111.4	102.5	95	109	2.869	5.61%	-246.6%

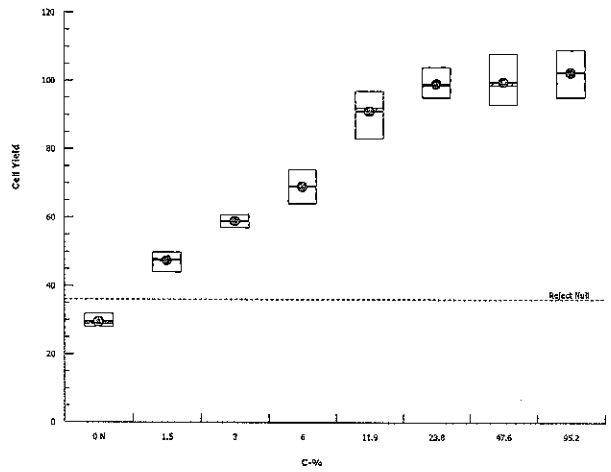
EC Alga Growth Inhibition Test — Nautilus Environmental

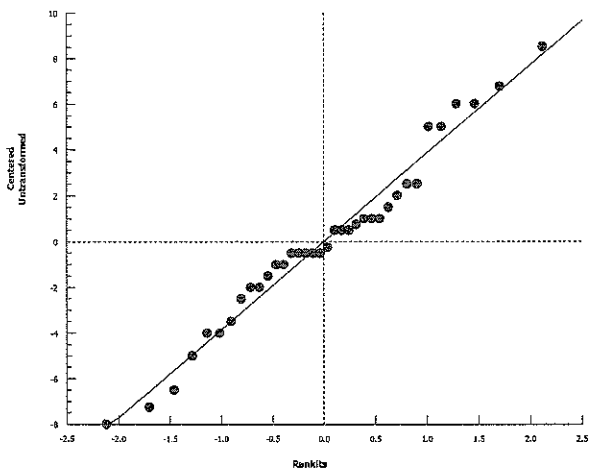
Analysis ID:	09-6263-7117	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 16:27	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	30	29	29	32	29	29	30	28
1.5		49	50	44	47				
3		58	61	57	60				
6		68	70	74	64				
11.9		87	83	97	97				
23.8		100	104	95	97				
47.6		108	100	93	97				
95.2		102	95	109	103				

Graphics





APPENDIX E – Analytical Chemistry

Analytical chemistry data has been uploaded to EMS.

APPENDIX F – Chain-of-Custody Forms

Chain Of Custody Record

COC ID: Quarterly_FR1_F.Minnow_HydroQual, Re-Fresh #1

Page: 1 of 1

Turnaround Time: Rush:

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Greenhills Operation	Lab Name	Nautilus Environmental Laboratories Lt	Send Invoice To	
Project Number		Contact Name	Kryst Pearcy	Address	
Contact Name	Leigh Stickney	Address	8664 Commerce Court		
Address	P.O. BOX 5000			City	State
		City	Burnaby State BC	Postal Code	Country
City	Elkford State BC	Postal Code	V5A 4N7 Country Canada	Task Code	
Postal Code	V0B1H0 Country Canada	Phone Number		Shipping Company	
Phone Number	250-865-3274	Email Address		Tracking Number	
Email EDD To	Leigh.Stickney@Teck.com	Quote Number		CC Hardcopy To	
Email Report To	Leigh.Stickney@Teck.com			CC Hardcopy To	

SAMPLE DETAILS / ANALYSIS REQUESTED / ADDITIONAL INFORMATION

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV. / ANALYSIS	30 d early life stage, fathead minnow Pass/Fail	28 d Hyalella Pass Fail:	72 h P. subcapitata Pass fail	7 d C. dubia Pass fail	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail	30 Day rainbow trout Early Life stage Pass Fail	7 day Rainbow trout Pass Fail	Lemna minor Pass Fail		ADDITIONAL INFORMATION Initial - PASS/FAIL
GH_ER2_WS_2015_10_26_N	WS	10/26/2015		G	6			X	X	X			X	X	X		
						WO #		15867	15865	15864			15866	15869			

Temp. 4.5°C

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
				Nautilus	Oct 27/15	10:10		Y / N	Y / N	Y / N
				NY - Nau Yamamoto				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				6X 20L				Y / N	Y / N	Y / N
	Sampler's Name	Leigh Stickney		Mobile #	250 910 0627		Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
	Sampler's Signature			Date/Time						

Chain Of Custody Record

COC ID: Nautilus_2015-10-26_chronic | Page: 1 of 1

Turnaround Time:

PROJECT/CLIENT INFO					LABORATORY				OTHER INFO			
Facility Name	Line Creek Operations				Lab Name	Nautilus Environmental			Send Invoice To			
Contact Name	Jay Jones				Contact Name	Krysta Pearcy			Address			
Address	Box 2003				Address	8664 commerce Court						
City	Sparwood	Prov.	BC						City		State	
Postal Code	V0B 2G0	Country	Canada		City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425-6111				Postal Code	V5A 4N7	Country	Canada	Task Code			
Email EDD To	jay.jones@teck.com				Phone Number				Shipping Company			
	cait.good@teck.com				Email Address	Krysta@NautilusEnvironmental.com			Tracking Number			
					PO Number				CC Hardcopy To			
									CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						ANALYSIS	7-d *C. dubia* dilution series	72-h *P. subcapitata* dilution series	7-d *L. minor* plant growth dilution series	7-d *O. mykiss* development dilution series	30-d *O. mykiss* embryo-alevin (semi-annual) pass/fail				Temp °C	
LC_LCDSSLCC_WS_2015-10-26_N	WS	26-Oct-15		20L	8 ✓		X	X	X	X	X					2.5	
LC_DC1_WS_2015-10-26_N	WS	26-Oct-15		20L	5 ✓		X	X	X	X						2.5	
LC_FRDSDC_WS_2015-10-26_N	WS	26-Oct-15		20L	5 ✓		X	X	X	X						2.5	
LC_DCDS_WS_2015-10-26_N	WS	26-Oct-15		20L	5 ✓		X	X	X	X						3.5	
LC_LC6_WS_2015-10-26_N	WS	26-Oct-15		20L	5 ✓		X	X	X	X						2.5	
							15870	15871	15872	15873	15866						

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	T. Phillips/ Nupqu	26/10/2015		Nautilus N4 - Nan Yamamoto.	Oct 27/15	10:10		Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

						Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Name	Tyler Phillips	Mobile #	(250) 919-0965						
Sampler's Signature		Date/Time	26-Oct-15						

APPENDIX C

Fathead Minnow Toxicity Identification Evaluation

Nautilus Environmental

January 21, 2016

Memo: Update of Toxicity Identification Evaluation efforts for fathead minnow tests

To	Cait Good	*From*	James Elphick
Affiliation	Teck Coal Ltd.	*Tel*	250-480-3941
e-mail	cait.good@teck.com	*e-mail*	james@nautilusenvironmental.com

BC Ministry of Environment permit #107517 requires that Teck Coal Ltd. conduct toxicity tests using a suite of test species on ambient samples collected from specific locations in the Elk Valley. As part of this requirement, 32-day tests using fathead minnows (*Pimephales promelas*) have been completed for the first three quarters of 2015. These toxicity tests have demonstrated that tests using site water collected from four locations in the Elk Valley have shown effects to survival that are consistently different than survival of the test organisms in the laboratory water control. However, samples from stations that are downstream of mine operations have not consistently shown effects that are greater than upstream water. For example, the four upstream and downstream site waters had similar effects to one another in the first quarter (Table 1); the upstream site water control had lower effects than two of the other three stations in the second quarter (Table 2); and the upstream site water control had somewhat lower effects than one station, somewhat greater effects than one station, and similar effects to the third station in the third quarter (Table 3).

In each case, survival was the only adverse effect that was observed, with surviving fish growing as well as in the control. Although biomass was reduced in some cases relative to the control, this endpoint was affected as a result of decreased survival, and not as a result of lower growth of the surviving fish (note that the biomass endpoint incorporates both the survival and growth endpoints). The mortalities consistently occurred predominantly between day 6 and 12 of the 32-day tests.

Fathead minnows are known to be susceptible to adverse effects caused by fungi and microbes in laboratory toxicity testing (Grothe and Johnson, 1996; Ksoz et al., 2997; Downey et al. 2000). These effects have been termed "sporadic mortality phenomenon", and are associated with mortalities that generally occur beginning on day 4 of the 7-day test with this species (Downey et al. 2000); this age is equivalent to day 6 of the 32-day test, which starts with an earlier life-stage. Effects associated with this phenomenon are generally associated with a high degree of between-replicate variability, as has been observed in the 32-day tests with samples from the Elk Valley. Thus, the pattern of effects observed with laboratory testing of the water samples from the Elk Valley is consistent with effects caused by sporadic mortality phenomenon.

Nautilus Environmental Company Inc.
8664 Commerce Court
Burnaby, BC
V5A 4N7

Toxicity Identification Evaluation (TIE) efforts focused on determining whether sporadic mortality phenomenon might be the cause of effects observed in these samples. The TIE test design was consistent with the 32 day test method with this species, with the exception that the duration was limited to 14 days, because no adverse survival effects have been observed beyond 14 days in the tests.

Treatments that were conducted on the samples included: filtration through a 0.45 µm filter; disinfection using 1 mg/L chlorine for 30 minutes, followed by dechlorination using sodium thiosulphate; UV sterilization; and amendment using 60 µg/L copper for the first seven days and 30 µg/L copper for the subsequent seven days. Each of these treatments would be expected to curtail growth of microbes in the samples.

Results of the TIE treatments are summarized in Table 4. In Test 1, filtration of a sample from GH_FR1_WS_N through a 0.45 µm filter reduced the toxicity of the sample, suggesting that the cause of toxicity could be at least partially removed by filtration. Chlorination followed by dechlorination was conducted on one sample in Test 2, on two samples in Test 3, and on four samples in each of Tests 4 and 5. This treatment reduced toxicity in all cases with the exception of two of the samples in Test 4 (i.e., in 9 out of 11 samples). The somewhat lower effectiveness of this treatment in Test 4 may have resulted from application of this treatment on a weekly basis in this test, rather than on a daily basis, which was the case in the remaining tests.

UV sterilization performed in Test 4 was not an effective treatment, since there were significant adverse effects in the UV-treated control; thus, the extent to which adverse effects from the UV treatment itself might have contributed to toxicity. However, three of the four samples that were treated with UV demonstrated improved survival, indicating that this treatment did appear to reduce toxicity in the samples. Amendment of the samples with copper reduced toxicity in all four of the samples in Test 5; survival in the four samples ranged from 85.0 to 96.7%, compared with 35.0 to 71.7% in the untreated samples.

Treatment of the samples using filtration, chlorine, UV and copper each demonstrated a reduction in toxicity. It is highly unlikely that these four treatments would each interact with a chemical toxicant in a manner that would cause the reduction in adverse effects seen here. Thus, the results presented here indicate that it is highly likely that adverse effects in these tests have been caused by microbiological components of the samples, rather than by chemical toxicants. This conclusion is supported by the fact that adverse effects have been observed in samples from the upstream reference station, as well as in samples that are downstream of mine operations, and that this type of effect has been documented elsewhere and is not uncommon with this test species.

Amendment of the samples with copper provided the most effective and consistent treatment to remove the confounding effect of microbes in the samples. It is recommended that future samples that are tested using this species be amended with 20 µg/L copper prior to testing in

order to remove the confounding influence of microbes on the test organisms. Addition of copper would not be expected to influence the sensitivity of the test species to detect effects from other constituents of interest. This recommended addition rate is lower than the addition rate used in the TIE testing (i.e., 60 µg/L for the first seven days and 30 µg/L for the subsequent seven days) to reduce the potential for adverse effects due to the copper addition. The copper-treated control in Test 5 produced a lower rate of survival than the control, indicating that copper may have contributed an adverse effect in itself. It would be appropriate to include a copper-treated control with subsequent tests in order to confirm that amendment with a 20 µg/L concentration of copper does not adversely affect the test organisms.

Please feel free to contact me should you have any questions regarding this project.

Yours truly,

James Elphick, R.P.Bio.
Environmental Toxicologist

Table1. First quarter results for fathead minnow (*Pimephales promelas*) tests.

Sample ID	Hatch (%) (Mean ± SD)	Survival (%) (Mean ± SD)	Biomass (mg) (Mean ± SD)	Length (mm) (Mean ± SD)	Normal development (%) (Mean ± SD)
Laboratory Control	100.0 ± 0.0	98.3 ± 3.3	10.9 ± 0.6	18.4 ± 0.3	100.0 ± 0.0
Site Control (FR_UFR1)	96.7 ± 3.8	73.3 ± 16.3 *	10.7 ± 0.4	19.6 ± 1.2	100.0 ± 0.0
FR_FRCP1	96.7 ± 3.8	70.0 ± 20.7 *	10.7 ± 1.2	19.2 ± 1.3	98.1 ± 3.8
CM_MC2	100.0 ± 0.0	80.0 ± 14.4 *	10.7 ± 0.7	19.2 ± 1.1	100.0 ± 0.0
GH_FR1	98.3 ± 3.3	58.3 ± 19.9 *	10.2 ± 1.2	20.4 ± 1.0	100.0 ± 0.0

* Survival was significantly lower than the laboratory control.

Table 2. Second quarter results for fathead minnow (*Pimephales promelas)* tests.

Sample ID	Hatch (%) (Mean ± SD)	Survival (%) (Mean ± SD)	Biomass (mg) (Mean ± SD)	Length (mm) (Mean ± SD)	Normal development (%) (Mean ± SD)
Laboratory Control	98.3 ± 3.3	83.3 ± 20.7	3.7 ± 0.2	12.6 ± 1.0	100.0 ± 0.0
Site Control (FR_UFR1)	93.3 ± 5.4	73.3 ± 12.2	4.0 ± 0.4	12.7 ± 1.2	100.0 ± 0.0
FR_FRCP1	98.3 ± 3.3	31.7 ± 8.4 *, α	2.4 ± 0.3 *, α	14.2 ± 1.1	100.0 ± 0.0
GH_FR1	96.7 ± 3.8	25.0 ± 22.0 *, α	1.9 ± 1.3 *, α	15.0 ± 1.8	100.0 ± 0.0
CM_MC2	100.0 ± 0.0	65.0 ± 8.4	4.7 ± 0.2	13.4 ± 0.7	100.0 ± 0.0

* Result was significantly lower than the laboratory control
α Result was significantly lower than the site control FR_UFR1

Table 3. Third quarter results for fathead minnow (*Pimephales promelas*) tests.

Sample ID	Hatch (%) (Mean ± SD)	Survival (%) (Mean ± SD)	Biomass (mg) (Mean ± SD)	Length (mm) (Mean ± SD)	Normal development (%) (Mean ± SD)
Laboratory Control	96.7 ± 3.8	95.0 ± 3.3	3.0 ± 0.1	11.2 ± 0.5	100.0 ± 0.0
Site Control (FR_UFR1)	85.0 ± 22.0	25.0 ± 50.0	0.8 ± 1.5 *	11.0 ± 0.0	100.0 ± 0.0
FR_FRCP1	96.7 ± 3.8	13.3 ± 26.7 *	0.6 ± 1.3 *	13.0 ± 0.0	100.0 ± 0.0
GH_FR1	98.3 ± 3.3	53.3 ± 14.4 *	3.0 ± 0.1	12.8 ± 0.5	100.0 ± 0.0
CM_MC2	95.0 ± 3.3	23.3 ± 20.7 *	2.3 ± 1.5	15.3 ± 2.5	100.0 ± 0.0

* Result was significantly lower than the laboratory control

Table 4. Toxicity Identification Evaluation results for fathead minnow (*Pimephales promelas*) tests.

Sample ID	Collection date	Treatment	Survival at Day 14 (%) (Mean ± SD)	
			Untreated	Treated
Test 1				
Control	--	None	96.7 ± 3.8	Not tested
GH_FR1_WS_N	Aug 19, 2015	Filtration	43.3 ± 17.6	60.0 ± 40.4
Test 2				
Control	--	Chlor/dechlor	83.3 ± 11.5	71.7 ± 11.4
GH_FR1_WS_NP	Sept 1, 2015	Chlor/dechlor	20.0 ± 12.2	60.0 ± 9.4
Test 3				
Control	--	Chlor/dechlor	95.0 ± 6.3	91.8 ± 9.9
GH_FR1_WS	Sept 17, 2015	Chlor/dechlor	50.3 ± 11.6	91.5 ± 3.0
FR-UFR1-WS	Sept 21, 2015	Chlor/dechlor	75.0 ± 16.1	85.0 ± 14.6
Test 4				
Control	--	Chlor/dechlor	90.0 ± 8.6	91.7 ± 6.4
FR_FRCP1	Oct 26, 2015	Chlor/dechlor	85.0 ± 14.8	51.7 ± 32.8
FR-UFR1	Oct 26, 2015	Chlor/dechlor	73.3 ± 23.7	83.3 ± 13.9
GH_FR1_WS	Oct 26, 2015	Chlor/dechlor	41.7 ± 31.0	76.7 ± 19.2
CM_MC2_WS	Oct 26, 2015	Chlor/dechlor	28.3 ± 22.7	18.3 ± 14.8
Control	--	UV	90.0 ± 8.6	45.0 ± 30.5
FR_FRCP1	Oct 26, 2015	UV	85.0 ± 14.8	45.0 ± 35.8
FR-UFR1	Oct 26, 2015	UV	73.3 ± 23.7	90.0 ± 11.5
GH_FR1_WS	Oct 26, 2015	UV	41.7 ± 31.0	65.0 ± 29.0
CM_MC2_WS	Oct 26, 2015	UV	28.3 ± 22.7	81.7 ± 15.8

Test 5

Control	--	Chlor/dechlor	96.7 ± 3.8	95.0 ± 6.4
FR_FRCP1	Nov 9, 2015	Chlor/dechlor	46.7 ± 17.2	63.3 ± 30.1
FR-UFR1	Nov 9, 2015	Chlor/dechlor	71.7 ± 11.4	81.7 ± 23.3
GH_FR1_WS	Nov 9, 2015	Chlor/dechlor	35.0 ± 31.4	91.7 ± 3.3
CM_MC2_WS	Nov 9, 2015	Chlor/dechlor	50.0 ± 8.6	76.7 ± 33.8
Control	--	Copper	96.7 ± 3.8	80.0 ± 9.4
FR_FRCP1	Nov 9, 2015	Copper	46.7 ± 17.2	93.3 ± 9.4
FR-UFR1	Nov 9, 2015	Copper	71.7 ± 11.4	86.7 ± 9.4
GH_FR1_WS	Nov 9, 2015	Copper	35.0 ± 31.4	96.7 ± 3.8
CM_MC2_WS	Nov 9, 2015	Copper	50.0 ± 8.6	85.0 ± 12.6

SD = Standard Deviation

References

Downey PJ, Flemmin K, Guinn R, Chapman N, Varner P, Cooney JD. 2000. Sporadic mortality in chronic toxicity tetss using *Pimephales promelas* (Rafinesque): Cases of characterization and control. *Environ Toxicol Chem* 19:248-255.

Grothe DR, Johnson DE. 1996. Bacterial interference in whole-effluent toxicity tests. *Environ Toxicol Chem* 15:761-764.

Kszos LA, Stewart AJ, Sumner JR. 1997 Evidence that variability in ambient fathead minnow short-term chronic tests is due to pathogenic infection. *Environ Toxicol Chem* 6:351-356

APPENDIX D

Concentration-Response Analysis

Table D-1. *C. dubia* reproduction paired with water quality

Quarter	Sample ID	Mean Number of Neonates	ACIDITY TO pH 8.3 (As CaCO3)-N-mg/l	ALKALINITY, BICARBONATE (As CaCO3), lab measured.-N-mg/l	ALKALINITY, CARBONATE (As CaCO3), lab measured.-N-mg/l	ALKALINITY, HYDROXIDE (As CaCO3), lab measured.-N-mg/l	ALKALINITY, TOTAL (As CaCO3), lab measured.-N-mg/l	ALUMINUM-D-mg/l	ALUMINUM-T-mg/l	ANTIMONY-D-mg/l	ANTIMONY-T-mg/l	ARSENIC-D-mg/l	ARSENIC-T-mg/l
References													
Q1	Reference (FR_UFR1)	23	< 1.0	147	2.3	< 1.0	149	< 0.0030	0.0032	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Q1	Reference (FR_UFR1)	25	< 1.0	147	2.3	< 1.0	149	< 0.0030	0.0032	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Q1	Reference (FR_UFR1)	31	< 1.0	144	1.3	< 1.0	145	< 0.0030	0.0059	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Q2	Reference (FR_UFR1)	21	< 1.0	116	2.8	< 1.0	119	0.0092	0.083	< 0.00010	< 0.00010	0.00012	0.00014
Q3	Reference (FR_UFR1)	20	< 1.0	152	7.4	< 1.0	159	< 0.0030	0.0078	< 0.00010	< 0.00010	0.00011	0.00012
Q4	Reference (FR_UFR1)	20	< 1.0	138	7.6	< 1.0	146	< 0.0030	0.0046	< 0.00010	< 0.00010	< 0.00010	0.0001
Q2	Reference (GH_ER2)	21	< 1.0	151	6.2	< 1.0	157	< 0.0030	0.076	< 0.00010	< 0.00010	0.00011	0.00016
Q4	Reference (GH_ER2)	20	< 1.0	147	< 1.0	< 1.0	147	< 0.0030	0.0046	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Tests that were not statistically different than reference													
Q1	CM_MC2	20	1.8	205	8.4	< 1.0	213	0.0097	0.032	0.00017	0.00019	0.00017	0.00022
Q3	CM_MC2	20	< 1.0	188	11	< 1.0	198	< 0.0030	0.016	0.00018	0.00021	0.00019	0.00021
Q1	EV_HC1	30	1.0	131	4.3	1.0	135	0.003	0.009	0.0001	0.0001	0.00013	0.00014
Q2	EV_HC1	22	1.3	103	6.7	1.0	110	0.0032	0.05	0.0001	0.0001	0.00013	0.00016
Q3	EV_HC1	23	< 1.0	182	9.8	< 1.0	192	0.0049	0.034	< 0.00010	0.00011	0.00017	0.00024
Q4	EV_HC1	21	< 1.0	187	8.0	< 1.0	195	< 0.0030	0.0058	< 0.00010	0.00012	0.00014	0.00015
Q1	EV_MC2	26	3.4	193	< 1.0	< 1.0	193	0.0037	0.019	< 0.00010	< 0.00010	0.00015	0.00018
Q2	EV_MC2	20	1.6	112	3.7	< 1.0	116	< 0.0070	0.36	< 0.00010	0.00011	0.00018	0.00033
Q3	EV_MC2	22	3.2	194	< 1.0	< 1.0	194	0.003	0.0085	0.00041	0.00044	0.00016	0.00023
Q4	EV_MC2	20	3.0	193	< 1.0	< 1.0	193	< 0.0030	0.0056	0.00035	0.00038	0.00014	0.00019
Q2	FR_FRCP1	21	< 1.0	142	5.0	< 1.0	147	< 0.0030	0.073	0.00022	0.00022	< 0.00010	0.00015
Q3	FR_FRCP1	23	< 1.0	187	11	< 1.0	198	< 0.0030	0.022	0.00027	0.00033	0.0001	0.00019
Q1	GH_ERC	22	2.6	155	< 1.0	< 1.0	155	< 0.0030	0.028	< 0.00010	0.00012	< 0.00010	0.00015
Q2	GH_ERC	20	< 1.0	157	4.8	< 1.0	161	< 0.0030	0.13	< 0.00010	< 0.00010	< 0.00010	0.00017
Q3	GH_ERC	19	< 1.0	142	< 1.0	< 1.0	142	< 0.0030	0.083	< 0.00010	< 0.00010	< 0.00010	0.00017
Q4	GH_ERC	21	< 1.0	151	< 1.0	< 1.0	151	< 0.0030	0.007	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Q1	GH_FR1	22	1.7	202	< 1.0	< 1.0	202	< 0.0030	0.0048	0.00014	0.00014	< 0.00010	0.00014
Q2	GH_FR1	23	< 1.0	159	8.0	< 1.0	167	< 0.0030	0.053	0.00017	0.00017	0.0001	0.00014
Q3	GH_FR1	22	< 1.0	174	8.2	< 1.0	182	< 0.0030	0.013	0.00022	0.00025	0.00014	0.0002
Q4	GH_FR1	22	< 1.0	183	4.8	< 1.0	188	< 0.0030	0.004	0.00011	0.00015	< 0.00010	0.00014
Q1	LC_LCDSSLCC	22	< 1.0	193	2.7	< 1.0	195	< 0.0030	0.0052	0.00022	0.00022	0.00011	0.00013
Q3	LC_LCDSSLCC	20	< 1.0	171	10	< 1.0	181	< 0.0030	0.013	0.00019	0.00026	< 0.00010	0.00011
Q4	LC_LCDSSLCC	16	< 1.0	197	< 1.0	< 1.0	197	< 0.0050	< 0.015	< 0.00050	< 0.00050	< 0.00050	< 0.00050
Tests with significant results													
Q2	CM_MC2	12	< 1.0	143	4.9	< 1.0	148	0.0044	0.31	0.00012	0.00013	0.00017	0.00031
Q4	CM_MC2	12	< 1.0	209	6.4	< 1.0	215	< 0.0030	0.0054	0.00013	0.00013	0.00018	0.00022
Q1	FR_FRCP1	11	5.1	337	< 1.0	< 1.0	337	< 0.0030	< 0.0060	0.00048	0.00051	< 0.00020	0.00022
Q4	FR_FRCP1	10	< 1.0	211	< 1.0	< 1.0	211	< 0.0030	0.0035	0.00025	0.00026	< 0.00010	< 0.00010
Q2	LC_LCDSSLCC	18	< 1.0	144	5.5	< 1.0	150	< 0.0030	0.0163	0.00015	0.00017	< 0.00010	< 0.00010

% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-1. *C. dubia* reproduction paired with water quality

Quarter	Sample ID	BARIUM-D-mg/l	BARIUM-T-mg/l	BERYLLIUM-D-mg/l	BERYLLIUM-T-mg/l	BISMUTH-D-mg/l	BISMUTH-T-mg/l	BORON-D-mg/l	BORON-T-mg/l	BROMIDE-D-mg/l	CADMIUM-D-mg/l	CADMIUM-T-mg/l
References												
Q1	Reference (FR_UFR1)	0.077	0.077	< 0.00010	< 0.00010	< 0.00050	< 0.00050	< 0.010	< 0.010	< 0.050	< 0.000010	0.000011
Q1	Reference (FR_UFR1)	0.077	0.077	< 0.00010	< 0.00010	< 0.00050	< 0.00050	< 0.010	< 0.010	< 0.050	< 0.000010	0.000011
Q1	Reference (FR_UFR1)	0.075	0.078	< 0.00010	< 0.00010	< 0.00050	< 0.00050	< 0.010	< 0.010	< 0.050	0.000011	< 0.000010
Q2	Reference (FR_UFR1)	0.042	0.043	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000074	0.000013
Q3	Reference (FR_UFR1)	0.076	0.076	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000057	0.0000083
Q4	Reference (FR_UFR1)	0.074	0.075	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050	0.0000083
Q2	Reference (GH_ER2)	0.046	0.048	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050	0.000016
Q4	Reference (GH_ER2)	0.047	0.049	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000053	0.0000069
Tests that were not statistically different than reference												
Q1	CM_MC2	0.072	0.072	< 0.00010	< 0.00010	< 0.00050	< 0.00050	0.024	0.025	< 0.10	0.000022	0.000023
Q3	CM_MC2	0.069	0.069	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.027	0.029	< 0.10	0.0000099	0.000018
Q1	EV_HC1	0.041	0.042	0.0001	0.0001	0.0005	0.0005	0.01	0.01	0.05	0.000017	0.000016
Q2	EV_HC1	0.025	0.025	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.05	0.000013	0.000021
Q3	EV_HC1	0.058	0.059	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	0.011	< 0.050	0.000017	0.000025
Q4	EV_HC1	0.06	0.063	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	0.01	< 0.25	0.000013	0.000018
Q1	EV_MC2	0.11	0.11	< 0.00010	< 0.00010	< 0.00050	< 0.00050	0.014	0.016	< 0.050	0.000055	0.000044
Q2	EV_MC2	0.062	0.067	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.000018	0.000064
Q3	EV_MC2	0.1	0.1	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.016	0.018	< 0.10	0.000049	0.000056
Q4	EV_MC2	0.11	0.11	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.016	0.016	< 0.25	0.000037	0.000047
Q2	FR_FRCP1	0.064	0.065	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.00003	0.00005
Q3	FR_FRCP1	0.076	0.076	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.013	0.014	< 0.10	0.000038	0.000047
Q1	GH_ERC	0.055	0.056	< 0.00010	< 0.00010	< 0.00050	< 0.00050	< 0.010	< 0.010	< 0.050	< 0.000010	< 0.000010
Q2	GH_ERC	0.05	0.051	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.000007	0.000022
Q3	GH_ERC	0.046	0.049	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000059	0.000016
Q4	GH_ERC	0.058	0.06	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050	0.0000073
Q1	GH_FR1	0.12	0.13	< 0.00010	< 0.00010	< 0.00050	< 0.00050	0.012	< 0.010	< 0.10	0.000021	0.000024
Q2	GH_FR1	0.085	0.087	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.000021	0.000035
Q3	GH_FR1	0.098	0.10	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.01	0.011	< 0.050	0.000019	0.000021
Q4	GH_FR1	0.12	0.12	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	0.011	< 0.25	0.000015	0.000024
Q1	LC_LCDSSLCC	0.096	0.093	< 0.00010	< 0.00010	< 0.00050	< 0.00050	0.013	0.014	< 0.10	0.000086	0.00011
Q3	LC_LCDSSLCC	0.06	0.063	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.012	0.013	< 0.10	0.00025	0.00026
Q4	LC_LCDSSLCC	0.0845	0.0912	< 0.00050	< 0.00050	< 0.00025	< 0.00025	< 0.050	< 0.050	< 0.050	0.000243	0.000261
Tests with significant results												
Q2	CM_MC2	0.044	0.046	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.014	0.015	< 0.050	0.000036	0.00006
Q4	CM_MC2	0.09	0.092	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.026	0.027	< 0.25	0.0000075	0.0000093
Q1	FR_FRCP1	0.036	0.037	< 0.00020	< 0.00020	< 0.0010	< 0.0010	< 0.020	< 0.020	< 1.0	< 0.000020	0.000053
Q4	FR_FRCP1	0.08	0.078	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.011	0.016	< 0.25	0.00004	0.000055
Q2	LC_LCDSSLCC	0.041	0.042	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.000135	0.000139

% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-1. *C. dubia* reproduction paired with water quality

Quarter	Sample ID	CALCIUM-D-mg/l	CALCIUM-T-mg/l	CARBON, DISSOLVED ORGANIC-D-mg/l	CHLORIDE-D-mg/l	CHROMIUM-D-mg/l	CHROMIUM-T-mg/l	COBALT-D-mg/l	COBALT-T-mg/l	CONDUCTIVITY, LAB-N-us/cm	COPPER-D-mg/l	COPPER-T-mg/l
References												
Q1	Reference (FR_UFR1)	56	56	0.84	< 1.0	0.00017	0.00017	< 0.00010	< 0.00010	367	< 0.00050	< 0.00050
Q1	Reference (FR_UFR1)	56	56	0.84	< 1.0	0.00017	0.00017	< 0.00010	< 0.00010	367	< 0.00050	< 0.00050
Q1	Reference (FR_UFR1)	56	57	< 0.50	< 1.0	0.00013	0.00015	< 0.00010	< 0.00010	353	< 0.00050	< 0.00050
Q2	Reference (FR_UFR1)	37	38	1.8	< 1.0	0.00014	0.00046	< 0.00010	< 0.00010	245	< 0.00050	< 0.00050
Q3	Reference (FR_UFR1)	54	55	0.75	1.0	0.00013	0.00013	< 0.00010	< 0.00010	342	< 0.00050	< 0.00050
Q4	Reference (FR_UFR1)	54	56	0.6	< 1.0	0.00011	0.00036	< 0.00010	< 0.00010	354	< 0.00050	< 0.00050
Q2	Reference (GH_ER2)	47	48	0.84	1.0	0.00022	0.00037	< 0.00010	< 0.00010	303	< 0.00050	< 0.00050
Q4	Reference (GH_ER2)	50	51	0.61	1.2	0.00022	0.00034	< 0.00010	< 0.00010	314	< 0.00050	< 0.00050
Tests that were not statistically different than reference												
Q1	CM_MC2	105	106	0.93	3.4	0.00019	0.00024	0.00074	0.00079	826	< 0.00050	< 0.00050
Q3	CM_MC2	102	104	0.86	2.1	0.00019	0.00023	0.00026	0.00034	802	< 0.00050	< 0.00050
Q1	EV_HC1	60	60	0.82	1.5	0.00014	0.00018	0.0001	0.0001	453	0.0005	0.0005
Q2	EV_HC1	48	47	1.1	1.3	0.00013	0.00021	0.0001	0.0001	350	0.0005	0.0005
Q3	EV_HC1	82	75	1.1	1.4	0.00015	0.00024	< 0.00010	< 0.00010	625	< 0.00050	< 0.00050
Q4	EV_HC1	92	93	0.63	1.8	0.00013	0.00022	< 0.00010	< 0.00010	732	< 0.00050	< 0.00050
Q1	EV_MC2	95	91	1.7	11	0.00012	< 0.00020	< 0.00010	< 0.00010	665	0.0012	0.00076
Q2	EV_MC2	43	44	1.9	2.9	0.0002	0.0007	< 0.00010	0.00022	299	< 0.00050	0.00073
Q3	EV_MC2	95	87	1.0	9.6	0.00013	0.00019	< 0.00010	< 0.00010	686	< 0.00050	< 0.00050
Q4	EV_MC2	102	102	0.6	8.7	0.00012	0.00015	< 0.00010	< 0.00010	733	< 0.00050	< 0.00050
Q2	FR_FRCP1	73	73	1.6	1.2	< 0.00010	0.00028	< 0.00010	0.00012	573	< 0.00050	< 0.00050
Q3	FR_FRCP1	107	109	0.93	1.5	0.0001	0.00017	< 0.00010	< 0.00010	815	< 0.00050	< 0.00050
Q1	GH_ERC	55	55	0.64	< 1.0	0.00029	0.00034	< 0.00010	< 0.00010	345	< 0.00050	< 0.00050
Q2	GH_ERC	52	53	0.96	< 1.0	0.00017	0.00054	< 0.00010	< 0.00010	338	< 0.00050	< 0.00050
Q3	GH_ERC	47	49	0.75	< 1.0	0.00019	0.00037	< 0.00010	< 0.00010	284	< 0.00050	< 0.00050
Q4	GH_ERC	56	58	< 0.50	1.2	0.00022	0.00026	< 0.00010	< 0.00010	355	< 0.00050	< 0.00050
Q1	GH_FR1	112	114	1.1	2.6	0.00021	0.00015	< 0.00010	< 0.00010	851	< 0.00050	< 0.00050
Q2	GH_FR1	79	81	1.4	1.4	< 0.00010	0.0002	< 0.00010	< 0.00010	614	< 0.00050	< 0.00050
Q3	GH_FR1	89	90	0.87	1.6	0.00012	0.00015	< 0.00010	< 0.00010	657	< 0.00050	< 0.00050
Q4	GH_FR1	105	106	< 0.50	1.7	0.00012	0.00013	< 0.00010	< 0.00010	760	< 0.00050	< 0.00050
Q1	LC_LCDSSLCC	126	123	1.1	2.7	0.00016	0.00021	< 0.00010	< 0.00010	940	< 0.00050	< 0.00050
Q3	LC_LCDSSLCC	88	92	0.83	2.0	0.00011	0.0002	< 0.00010	< 0.00010	660	< 0.00050	< 0.00050
Q4	LC_LCDSSLCC	116	117	0.74	2.22	< 0.00050	< 0.00050	< 0.00050	< 0.00050	770	< 0.0010	< 0.0025
Tests with significant results												
Q2	CM_MC2	61	60	1.5	1.2	0.0002	0.00058	0.00037	0.00061	484	< 0.00050	0.00053
Q4	CM_MC2	118	115	0.56	3.2	0.00019	0.0002	< 0.00010	< 0.00010	876	< 0.00050	< 0.00050
Q1	FR_FRCP1	331	337	1.4	2.6	< 0.00020	< 0.00020	< 0.00020	< 0.00020	2680	< 0.00050	< 0.0010
Q4	FR_FRCP1	131	130	0.65	2.2	< 0.00010	0.00027	< 0.00010	< 0.00010	1030	< 0.00050	< 0.00050
Q2	LC_LCDSSLCC	67	68	1.24	1.4	< 0.00010	0.00019	< 0.00010	< 0.00010	535	< 0.00050	< 0.00050

% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-1. *C. dubia* reproduction paired with water quality

Quarter	Sample ID	FLUORIDE-D-mg/l	Hardness, Total or Dissolved CaCO3-N-mg/l	IRON-D-mg/l	IRON-T-mg/l	LEAD-D-mg/l	LEAD-T-mg/l	LITHIUM-D-mg/l	LITHIUM-T-mg/l	MAGNESIUM-D-mg/l	MAGNESIUM-T-mg/l	MAJOR ANION SUM-N-meq/l
References												
Q1	Reference (FR_UFR1)	0.14	197	< 0.010	< 0.010	< 0.000050	< 0.000050	0.0019	0.0016	14	15	4.0
Q1	Reference (FR_UFR1)	0.14	197	< 0.010	< 0.010	< 0.000050	< 0.000050	0.0019	0.0016	14	15	4.0
Q1	Reference (FR_UFR1)	0.14	197	< 0.010	< 0.010	< 0.000050	< 0.000050	0.0015	0.0017	14	14	3.9
Q2	Reference (FR_UFR1)	0.15	129	< 0.010	0.052	< 0.000050	< 0.000050	< 0.0010	0.0012	9.0	9.2	2.7
Q3	Reference (FR_UFR1)	0.15	188	< 0.010	< 0.010	0.000055	< 0.000050	0.002	0.002	13	13	3.9
Q4	Reference (FR_UFR1)	0.16	190	< 0.010	< 0.010	< 0.000050	< 0.000050	0.0015	0.0015	14	14	3.9
Q2	Reference (GH_ER2)	0.15	160	< 0.010	0.066	< 0.000050	< 0.000050	0.0017	0.0016	10	11	3.6
Q4	Reference (GH_ER2)	0.16	170	< 0.010	< 0.010	< 0.000050	< 0.000050	0.0016	0.0018	11	11	3.4
Tests that were not statistically different than reference												
Q1	CM_MC2	0.14	445	< 0.010	0.031	< 0.000050	< 0.000050	0.011	0.011	44	46	9.7
Q3	CM_MC2	0.12	458	< 0.010	0.022	< 0.000050	< 0.000050	0.013	0.014	49	51	9.4
Q1	EV_HC1	0.15	274	0.01	0.013	0.00005	0.00005	0.0047	0.0047	30	31	8.2
Q2	EV_HC1	0.13	205	0.01	0.051	0.00005	0.000056	0.0044	0.0042	21	21	5.8
Q3	EV_HC1	0.21	373	< 0.010	0.027	< 0.000050	< 0.000050	0.0069	0.0068	41	41	7.4
Q4	EV_HC1	0.2	431	< 0.010	< 0.010	< 0.000050	< 0.000050	0.0069	0.0067	49	50	8.6
Q1	EV_MC2	0.15	381	< 0.010	0.024	< 0.000050	< 0.000050	0.015	0.015	35	33	7.5
Q2	EV_MC2	0.12	159	< 0.010	0.39	< 0.000050	0.00028	0.0054	0.0052	12	13	3.3
Q3	EV_MC2	0.18	384	< 0.010	0.018	< 0.000050	< 0.000050	0.022	0.021	36	35	8.1
Q4	EV_MC2	0.16	415	< 0.010	0.014	< 0.000050	< 0.000050	0.023	0.022	39	39	8.3
Q2	FR_FRCP1	0.2	302	< 0.010	0.11	< 0.000050	0.00014	0.019	0.018	29	29	6.1
Q3	FR_FRCP1	0.2	471	< 0.010	0.033	< 0.000050	< 0.000050	0.03	0.031	50	51	9.5
Q1	GH_ERC	0.15	191	< 0.010	0.036	< 0.000050	0.0002	0.0019	0.002	13	13	3.8
Q2	GH_ERC	0.15	179	< 0.010	0.15	< 0.000050	0.00011	0.0022	0.0023	12	12	3.8
Q3	GH_ERC	0.16	160	< 0.010	0.088	< 0.000050	0.00007	0.0017	0.002	10	11	3.3
Q4	GH_ERC	0.16	190	< 0.010	< 0.010	< 0.000050	< 0.000050	0.002	0.0021	12	13	3.9
Q1	GH_FR1	0.18	475	< 0.010	< 0.010	< 0.000050	< 0.000050	0.016	0.015	48	49	9.9
Q2	GH_FR1	0.17	332	< 0.010	0.07	< 0.000050	0.000063	0.014	0.014	33	34	6.7
Q3	GH_FR1	0.18	374	< 0.010	0.016	< 0.000050	< 0.000050	0.015	0.015	37	37	7.6
Q4	GH_FR1	0.16	436	< 0.010	< 0.010	< 0.000050	< 0.000050	0.017	0.017	42	43	8.5
Q1	LC_LCDSSLCC	0.24	536	< 0.010	< 0.010	< 0.000050	< 0.000050	0.031	0.031	54	53	11
Q3	LC_LCDSSLCC	0.24	355	< 0.010	< 0.010	< 0.000050	< 0.000050	0.021	0.023	33	34	7.5
Q4	LC_LCDSSLCC	0.184	499	< 0.050	< 0.050	< 0.00025	< 0.00025	0.0361	0.0361	50.8	54.3	9.85
Tests with significant results												
Q2	CM_MC2	0.1	248	< 0.010	0.3	< 0.000050	0.00017	0.0064	0.0067	23	23	5.4
Q4	CM_MC2	0.11	505	< 0.010	< 0.010	< 0.000050	< 0.000050	0.011	0.012	51	51	10
Q1	FR_FRCP1	0.45	1880	< 0.020	< 0.020	< 0.00010	< 0.00010	0.054	0.056	257	261	40
Q4	FR_FRCP1	0.17	597	< 0.010	0.019	< 0.000050	< 0.000050	0.042	0.037	65	65	12
Q2	LC_LCDSSLCC	0.22	269	< 0.010	0.018	< 0.000050	< 0.000050	0.016	0.016	25	25	6

% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-1. *C. dubia* reproduction paired with water quality

Quarter	Sample ID	MAJOR CATION SUM-N-meq/l	MANGANESE-D-mg/l	MANGANESE-T-mg/l	MERCURY-D-mg/l	MERCURY-T-mg/l	MOLYBDENUM-D-mg/l	MOLYBDENUM-T-mg/l	NICKEL-D-mg/l	NICKEL-T-mg/l	NITRATE NITROGEN (NO3), AS N-N-mg/l	NITRITE NITROGEN (NO2), AS N-N-mg/l
References												
Q1	Reference (FR_UFR1)	4.0	0.000054	0.00018	< 0.000010	< 0.000010	0.00053	0.00054	< 0.00050	< 0.00050	0.13	< 0.0010
Q1	Reference (FR_UFR1)	4.0	0.000054	0.00018	< 0.000010	< 0.000010	0.00053	0.00054	< 0.00050	< 0.00050	0.13	< 0.0010
Q1	Reference (FR_UFR1)	4.0	0.00017	0.00037	< 0.000010	< 0.000010	0.00056	0.00055	< 0.00050	< 0.00050	0.13	< 0.0010
Q2	Reference (FR_UFR1)	2.6	0.00064	0.0025	< 0.0000050	< 0.0000050	0.00052	0.00062	< 0.00050	< 0.00050	0.066	< 0.0010
Q3	Reference (FR_UFR1)	3.8	0.00062	0.0015	< 0.0000050	< 0.0000050	0.00068	0.00068	< 0.00050	< 0.00050	0.019	< 0.0010
Q4	Reference (FR_UFR1)	3.9	0.0001	0.00031	< 0.0000050	< 0.0000050	0.00065	0.00059	< 0.00050	< 0.00050	0.022	< 0.0010
Q2	Reference (GH_ER2)	3.2	0.0033	0.0059	< 0.0000050	< 0.0000050	0.00092	0.00094	< 0.00050	< 0.00050	0.086	< 0.0010
Q4	Reference (GH_ER2)	3.4	0.0021	0.0027	< 0.0000050	< 0.0000050	0.001	0.0010	< 0.00050	< 0.00050	0.078	< 0.0010
Tests that were not statistically different than reference												
Q1	CM_MC2	9.4	0.0046	0.0064	< 0.000010	< 0.000010	0.001	0.0011	0.0095	0.0097	2.4	0.012
Q3	CM_MC2	9.6	0.0018	0.0032	< 0.0000050	< 0.0000050	0.001	0.0011	0.013	0.013	2.5	0.0088
Q1	EV_HC1	8.3	0.001	0.0015	0.00001	0.00001	0.00063	0.00065	0.0006	0.00064	0.8	0.001
Q2	EV_HC1	6.2	0.00053	0.0016	0.000005	0.000005	0.0005	0.00048	0.00075	0.00083	0.57	0.001
Q3	EV_HC1	7.6	0.0028	0.0051	< 0.0000050	< 0.0000050	0.00092	0.00092	0.00079	0.00079	0.87	0.0011
Q4	EV_HC1	8.7	0.0018	0.002			0.00097	0.00098	0.00066	0.00069	1.2	< 0.0050
Q1	EV_MC2	8.7	0.0024	0.0022	< 0.000010	< 0.000010	0.00079	0.00078	0.0007	0.00052	3.2	0.0013
Q2	EV_MC2	3.3	0.0003	0.01	< 0.0000050	< 0.0000050	0.00059	0.00054	0.00077	0.0014	0.81	< 0.0010
Q3	EV_MC2	7.9	0.00067	0.002	< 0.0000050	< 0.0000050	0.0022	0.0022	0.0047	0.0048	5.7	0.0027
Q4	EV_MC2	8.5	0.0013	0.0018			0.002	0.0021	0.0039	0.0041	5.9	< 0.0050
Q2	FR_FRCP1	6.1	0.0032	0.012	< 0.0000050	< 0.0000050	0.0013	0.0013	0.002	0.0024	7.4	0.0056
Q3	FR_FRCP1	9.5	0.0031	0.0069	< 0.0000050	< 0.0000050	0.0015	0.0015	0.0041	0.0043	8.2	0.0049
Q1	GH_ERC	3.9	0.00035	0.0026	< 0.000010	< 0.000010	0.00092	0.00099	< 0.00050	< 0.00050	0.44	< 0.0010
Q2	GH_ERC	3.6	0.00072	0.0081	< 0.0000050	< 0.0000050	0.00095	0.00097	< 0.00050	< 0.00050	0.31	< 0.0010
Q3	GH_ERC	3.2	0.00058	0.0078	< 0.0000050	< 0.0000050	0.00095	0.001	< 0.00050	< 0.00050	0.17	< 0.0010
Q4	GH_ERC	3.9	0.00063	0.0013	< 0.0000050	< 0.0000050	0.00099	0.0011	< 0.00050	< 0.00050	0.46	< 0.0010
Q1	GH_FR1	9.6	0.0017	0.0021	< 0.000010	< 0.000010	0.00095	0.00098	0.0022	0.0023	13	0.0039
Q2	GH_FR1	6.7	0.0011	0.0044	< 0.0000050	< 0.0000050	0.0011	0.0011	0.0019	0.002	7.5	0.0028
Q3	GH_FR1	7.6	0.00089	0.0023	< 0.0000050	< 0.0000050	0.00099	0.0010	0.0016	0.0017	9.1	0.0046
Q4	GH_FR1	8.8	0.0011	0.0016	< 0.0000050	< 0.0000050	0.0009	0.00099	0.0012	0.0012	10	< 0.0050
Q1	LC_LCDSSLCC	11	0.000074	0.00021	< 0.000010	< 0.000010	0.0017	0.0017	0.0036	0.0036	15	0.003
Q3	LC_LCDSSLCC	7.3	0.0002	0.00054	< 0.0000050	< 0.0000050	0.0014	0.0015	0.0047	0.005	7.2	< 0.0020
Q4	LC_LCDSSLCC	10.3	< 0.00050	< 0.00050	< 0.0000050	< 0.0000050	0.00165	0.00164	0.0065	0.0071	12.8	0.003
Tests with significant results												
Q2	CM_MC2	5.2	0.0035	0.011	< 0.0000050	0.0000084	0.00076	0.00081	0.0062	0.0076	1.2	0.0029
Q4	CM_MC2	11	0.00064	0.0012	< 0.0000050	< 0.0000050	0.00092	0.00096	0.0059	0.006	2.2	< 0.0050
Q1	FR_FRCP1	38	0.0019	0.0027	< 0.000010	< 0.000010	0.0028	0.0029	0.031	0.032	30	< 0.020
Q4	FR_FRCP1	12	0.0076	0.0081	< 0.0000050	< 0.0000050	0.0015	0.0014	0.0068	0.0066	15	< 0.0050
Q2	LC_LCDSSLCC	6	0.0002	0.0005	< 0.0000050	< 0.0000050	0.0011	0.0012	0.0036	0.0036	6	< 0.0050

% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-1. *C. dubia* reproduction paired with water quality

Quarter	Sample ID	NITROGEN, AMMONIA (AS N)-N-mg/l	ORTHO-PHOSPHATE-N-mg/l	OXIDATION-REDUCTION POTENTIAL, LAB-N-mv	pH, LAB-N-ph units	PHOSPHORUS-N-mg/l	POTASSIUM-D-mg/l	POTASSIUM-T-mg/l	SELENIUM-D-ug/l	SELENIUM-T-ug/l	SILICON-D-mg/l	SILICON-T-mg/l
References												
Q1	Reference (FR_UFR1)	< 0.0050	0.0032	344	8.4	0.0042	0.39	0.4	0.69	0.73	1.6	1.6
Q1	Reference (FR_UFR1)	< 0.0050	0.0032	344	8.4	0.0042	0.39	0.4	0.69	0.73	1.6	1.6
Q1	Reference (FR_UFR1)	< 0.0050	0.0027	371	8.3	0.0035	0.39	0.42	0.76	0.73	1.6	1.7
Q2	Reference (FR_UFR1)	< 0.0050	0.0042	470	8.4	0.01	0.33	0.37	0.48	0.49	1.7	1.9
Q3	Reference (FR_UFR1)	< 0.0050	0.0029	325	8.4	0.0054	0.53	0.52	0.47	0.43	2.1	2.1
Q4	Reference (FR_UFR1)	< 0.0050	0.0017	346	8.4	0.0022	0.46	0.42	0.69	0.62	1.5	1.6
Q2	Reference (GH_ER2)	< 0.0050	< 0.0010	312	8.3	0.008	0.36	0.37	0.79	0.87	1.6	1.8
Q4	Reference (GH_ER2)	< 0.0050	0.0015	490	8.3	< 0.0020	0.33	0.35	0.72	0.78	1.7	1.8
Tests that were not statistically different than reference												
Q1	CM_MC2	0.0055	0.001	491	8.4	0.005	1.4	1.4	5.9	6.0	2.1	2.2
Q3	CM_MC2	< 0.0050	< 0.0010	349	8.4	0.003	1.5	1.5	6.2	6.4	2.0	2.1
Q1	EV_HC1	0.005	0.0035	457	7.4	0.0047	0.61	0.62	22	22	1.3	1.3
Q2	EV_HC1	0.0084	0.0031	413	7.5	0.0081	0.53	0.55	19	18	1.1	1.2
Q3	EV_HC1	< 0.0050	0.004	352	8.4	0.0082	0.99	0.99	29	28	2.1	2.0
Q4	EV_HC1	< 0.0050	0.0058	360	8.4	0.0057	0.85	0.9	33	37	2.0	2.1
Q1	EV_MC2	< 0.0050	< 0.0010	302	8.3	0.0047	1.2	1.2	24	22	2.5	2.5
Q2	EV_MC2	< 0.0050	< 0.0010	355	8.1	0.037	0.54	0.67	5.2	5.0	1.7	2.3
Q3	EV_MC2	0.01	0.0027	356	8.1	0.0052	1.5	1.5	23	23	2.5	2.3
Q4	EV_MC2	< 0.0050	0.0035	370	8.2	0.0036	1.3	1.3	24	25	2.5	2.6
Q2	FR_FRCP1	0.0095	0.0014	345	8.4	0.018	1.2	1.2	30	30	1.6	1.6
Q3	FR_FRCP1	< 0.0050	< 0.0010	345	8.4	0.0027	1.9	1.8	57	57	1.9	2.0
Q1	GH_ERC	< 0.0050	< 0.0010	512	8.3	0.0043	0.36	0.37	1.9	1.9	1.8	1.9
Q2	GH_ERC	< 0.0050	< 0.0010	473	8.4	0.016	0.38	0.41	1.7	1.8	1.8	2.0
Q3	GH_ERC	< 0.0050	< 0.0010	320	8.3	0.0077	0.38	0.42	1.1	1.2	1.7	1.9
Q4	GH_ERC	< 0.0050	0.0018	491	8.3	< 0.0020	0.39	0.39	1.5	1.6	1.9	1.9
Q1	GH_FR1	< 0.0050	< 0.0010	305	8.3	0.0036	1.2	1.2	51	52	2.1	2.1
Q2	GH_FR1	< 0.0050	< 0.0010	302	8.4	0.01	1.0	1.1	31	32	1.8	2.0
Q3	GH_FR1	0.0071	< 0.0010	323	8.3	0.0036	1.2	1.2	35	36	2.0	2.1
Q4	GH_FR1	< 0.0050	< 0.0010	288	8.4	< 0.0020	1.2	1.2	40	39	2.1	2.2
Q1	LC_LCDSSLCC	< 0.0050	< 0.0010	294	8.3	0.0029	1.2	1.2	72	71	2.1	2.1
Q3	LC_LCDSSLCC	< 0.0050	0.0018	354	8.4	0.0029	1.0	1.1	37	40	2.2	2.3
Q4	LC_LCDSSLCC	< 0.0050	< 0.0010	364	8.25	< 0.0050	1.33	1.38	52.3	53.5	2.17	2.29
Tests with significant results												
Q2	CM_MC2	< 0.0050	< 0.0010	359	8.4	0.017	0.9	0.98	4.3	4.3	1.8	2.4
Q4	CM_MC2	< 0.0050	< 0.0010	275	8.3	< 0.0020	1.5	1.5	6.0	5.8	2.2	2.1
Q1	FR_FRCP1	< 0.0050	< 0.0010	354	8.3	0.0021	3.8	4.0	490	497	2.3	2.3
Q4	FR_FRCP1	< 0.0050	< 0.0010	354	8.3	< 0.0020	1.9	1.9	78	76	1.7	1.8
Q2	LC_LCDSSLCC	< 0.0050	< 0.0010	493	8.4	< 0.0020	0.8	0.8	25	25	1.8	1.9

% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-1. *C. dubia* reproduction paired with water quality

Quarter	Sample ID	SILVER-D-mg/l	SILVER-T-mg/l	SODIUM-D-mg/l	SODIUM-T-mg/l	STRONTIUM-D-mg/l	STRONTIUM-T-mg/l	SULFATE (AS SO4)-D-mg/l	THALLIUM-D-mg/l	THALLIUM-T-mg/l	TIN-D-mg/l	TIN-T-mg/l
References												
Q1	Reference (FR_UFR1)	< 0.000010	< 0.000010	0.71	0.77	0.088	0.091	47	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q1	Reference (FR_UFR1)	< 0.000010	< 0.000010	0.71	0.77	0.088	0.091	47	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q1	Reference (FR_UFR1)	< 0.000010	< 0.000010	0.71	0.72	0.089	0.092	46	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q2	Reference (FR_UFR1)	< 0.000010	< 0.000010	0.55	0.56	0.061	0.066	15	< 0.000010	0.00001	< 0.00010	< 0.00010
Q3	Reference (FR_UFR1)	< 0.000010	< 0.000010	0.7	0.69	0.093	0.093	32	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q4	Reference (FR_UFR1)	< 0.000010	< 0.000010	0.73	0.69	0.095	0.091	48	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q2	Reference (GH_ER2)	< 0.000010	< 0.000010	0.73	0.73	0.2	0.21	18	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q4	Reference (GH_ER2)	< 0.000010	< 0.000010	0.63	0.67	0.21	0.22	22	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Tests that were not statistically different than reference												
Q1	CM_MC2	< 0.000010	< 0.000010	10	10	0.29	0.3	249	0.000014	< 0.000010	< 0.00010	< 0.00010
Q3	CM_MC2	< 0.000010	< 0.000010	8.7	8.7	0.27	0.29	249	0.000014	0.000019	< 0.00010	< 0.00010
Q1	EV_HC1	0.00001	0.00001	1.1	1.2	0.085	0.087	130	0.00001	0.00001	0.0001	0.0001
Q2	EV_HC1	0.00001	0.00001	0.81	0.82	0.062	0.061	79	0.00001	0.00001	0.0001	0.0001
Q3	EV_HC1	< 0.000010	< 0.000010	1.5	1.5	0.11	0.11	165	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q4	EV_HC1	< 0.000010	< 0.000010	1.6	1.7	0.13	0.13	218	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q1	EV_MC2	< 0.000010	< 0.000010	24	5.7	0.19	0.2	147	< 0.000010	< 0.000010	0.00018	< 0.00010
Q2	EV_MC2	< 0.000010	0.000017	2.1	2.1	0.1	0.093	41	0.000011	0.000025	< 0.00010	< 0.00010
Q3	EV_MC2	< 0.000010	< 0.000010	4.7	4.6	0.21	0.21	169	0.000013	0.000014	< 0.00010	< 0.00010
Q4	EV_MC2	< 0.000010	< 0.000010	4.9	4.8	0.23	0.23	183	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q2	FR_FRCP1	< 0.000010	< 0.000010	1.2	1.2	0.11	0.11	126	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q3	FR_FRCP1	< 0.000010	< 0.000010	1.6	1.6	0.13	0.13	234	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q1	GH_ERC	< 0.000010	< 0.000010	0.94	0.95	0.2	0.21	30	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q2	GH_ERC	< 0.000010	< 0.000010	0.98	0.97	0.21	0.21	25	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q3	GH_ERC	< 0.000010	< 0.000010	0.7	0.74	0.19	0.2	20	< 0.000010	< 0.000010	< 0.00010	0.00016
Q4	GH_ERC	< 0.000010	< 0.000010	0.89	0.94	0.22	0.23	37	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q1	GH_FR1	< 0.000010	< 0.000010	2.3	2.4	0.16	0.16	233	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q2	GH_FR1	< 0.000010	< 0.000010	1.6	1.7	0.12	0.12	136	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q3	GH_FR1	< 0.000010	< 0.000010	1.8	1.8	0.13	0.13	154	< 0.000010	< 0.000010	< 0.00010	0.00015
Q4	GH_FR1	< 0.000010	< 0.000010	2.1	2.2	0.14	0.15	189	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q1	LC_LCDSSLCC	< 0.000010	< 0.000010	5.9	5.9	0.23	0.23	283	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q3	LC_LCDSSLCC	< 0.000010	< 0.000010	3.8	3.9	0.16	0.17	157	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q4	LC_LCDSSLCC	< 0.000050	< 0.000050	5.82	6.18	0.212	0.222	237	< 0.000050	< 0.000050	< 0.00050	< 0.00050
Tests with significant results												
Q2	CM_MC2	< 0.000010	< 0.000010	4.4	4.5	0.16	0.17	110	0.000011	0.000018	< 0.00010	< 0.00010
Q4	CM_MC2	< 0.000010	< 0.000010	10	10.7	0.3	0.3	277	0.000011	< 0.000010	< 0.00010	< 0.00010
Q1	FR_FRCP1	< 0.000020	< 0.000020	2.0	2.1	0.22	0.23	1460	0.00003	0.000032	< 0.00020	< 0.00020
Q4	FR_FRCP1	< 0.000010	< 0.000010	2.1	2.0	0.16	0.16	327	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q2	LC_LCDSSLCC	< 0.000010	< 0.000010	2.9	2.9	0.13	0.13	107	< 0.000010	< 0.000010	< 0.00010	< 0.00010

% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-1. *C. dubia* reproduction paired with water quality

Quarter	Sample ID	TITANIUM-D-mg/l	TITANIUM-T-mg/l	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)-N-mg/l	TOTAL KJELDAHL NITROGEN-N-mg/l	TOTAL ORGANIC CARBON-T-mg/l	TOTAL SUSPENDED SOLIDS, LAB-N-mg/l	TURBIDITY, LAB-N-ntu	URANIUM-D-mg/l	URANIUM-T-mg/l	VANADIUM-D-mg/l	VANADIUM-T-mg/l
References												
Q1	Reference (FR_UFR1)	< 0.010	< 0.010	229	< 0.050	0.69	< 1.0	0.13	0.00047	0.00047	< 0.0010	< 0.0010
Q1	Reference (FR_UFR1)	< 0.010	< 0.010	229	< 0.050	0.69	< 1.0	0.13	0.00047	0.00047	< 0.0010	< 0.0010
Q1	Reference (FR_UFR1)	< 0.010	< 0.010	222	< 0.050	< 0.50	< 1.0	0.33	0.00047	0.00047	< 0.0010	< 0.0010
Q2	Reference (FR_UFR1)	< 0.010	< 0.010	147	0.1	2.1	2.4	1.5	0.00031	0.00033	< 0.00050	< 0.00050
Q3	Reference (FR_UFR1)	< 0.010	< 0.010	211	0.08	1.0	1.1	0.2	0.00042	0.00042	< 0.00050	< 0.00050
Q4	Reference (FR_UFR1)	< 0.010	< 0.010	215	0.095	0.6	< 1.0	0.26	0.00047	0.00044	< 0.00050	< 0.00050
Q2	Reference (GH_ER2)	< 0.010	< 0.010	191	0.067	1.8	4.4	3.9	0.00079	0.00078	< 0.00050	0.00051
Q4	Reference (GH_ER2)	< 0.010	< 0.010	171	< 0.050	< 0.50	< 1.0	0.26	0.00071	0.00072	< 0.00050	< 0.00050
Tests that were not statistically different than reference												
Q1	CM_MC2	< 0.010	< 0.010	551	< 0.050	0.82	1.7	0.53	0.0022	0.0023	< 0.0010	< 0.0010
Q3	CM_MC2	< 0.010	< 0.010	626	0.1	0.75	1.2	0.61	0.0024	0.0025	< 0.00050	< 0.00050
Q1	EV_HC1	0.011	0.011	325	0.05	0.84	1.0	0.24	0.0017	0.0017	0.001	0.001
Q2	EV_HC1	0.01	0.01	233	0.13	1.4	2.6	1.2	0.0012	0.0012	0.0005	0.0005
Q3	EV_HC1	< 0.010	< 0.010	479	0.073	1.6	2.3	0.77	0.0023	0.0023	< 0.00050	< 0.00050
Q4	EV_HC1	< 0.010	< 0.010	529	0.096	0.74	< 1.0	0.29	0.0026	0.0027	< 0.00050	< 0.00050
Q1	EV_MC2	0.014	0.013	438	0.13	1.2	1.2	0.31	0.0013	0.0012	< 0.0010	< 0.0010
Q2	EV_MC2	< 0.010	< 0.010	195	0.28	2.5	23	4.7	0.00051	0.00048	< 0.00050	0.0016
Q3	EV_MC2	< 0.010	< 0.010	477	0.16	0.83	1.2	0.34	0.0019	0.0019	< 0.00050	< 0.00050
Q4	EV_MC2	< 0.010	< 0.010	492	0.14	0.7	1.0	0.36	0.0019	0.0019	< 0.00050	< 0.00050
Q2	FR_FRCP1	< 0.010	< 0.010	372	< 0.050	2.2	7.7	2.0	0.0015	0.0016	< 0.00050	0.00054
Q3	FR_FRCP1	< 0.010	< 0.010	566	0.14	0.93	2.6	0.47	0.0027	0.0028	< 0.00050	< 0.00050
Q1	GH_ERC	< 0.010	< 0.010	203	< 0.050	0.5	2.6	0.41	0.00081	0.00084	< 0.0010	< 0.0010
Q2	GH_ERC	< 0.010	< 0.010	203	0.12	1.3	7.0	1.6	0.00083	0.00084	< 0.00050	0.0007
Q3	GH_ERC	< 0.010	< 0.010	179	< 0.050	0.79	5.1	1.3	0.00065	0.00071	< 0.00050	0.00058
Q4	GH_ERC	< 0.010	< 0.010	214	< 0.050	0.52	< 1.0	0.26	0.00077	0.00081	< 0.00050	< 0.00050
Q1	GH_FR1	0.011	0.011	621	< 0.050	1.1	< 1.0	0.18	0.0022	0.0022	< 0.0010	< 0.0010
Q2	GH_FR1	< 0.010	< 0.010	398	< 0.050	1.6	3.6	2.2	0.0016	0.0016	< 0.00050	< 0.00050
Q3	GH_FR1	< 0.010	< 0.010	473	< 0.050	0.86	1.2	0.33	0.0018	0.0018	< 0.00050	< 0.00050
Q4	GH_FR1	< 0.010	< 0.010	520	0.091	0.57	< 1.0	0.3	0.0019	0.0019	< 0.00050	< 0.00050
Q1	LC_LCDSSLCC	0.014	0.013	690	< 0.050	0.9	< 1.0	0.29	0.0039	0.004	< 0.0010	< 0.0010
Q3	LC_LCDSSLCC	< 0.010	< 0.010	447	0.12	0.64	1.4	0.35	0.0026	0.0028	< 0.00050	< 0.00050
Q4	LC_LCDSSLCC	< 0.010	< 0.010	565	< 0.050	0.99	< 1.0	0.29	0.00375	0.00395	< 0.0025	< 0.0025
Tests with significant results												
Q2	CM_MC2	< 0.010	0.011	314	0.12	1.8	9.6	5.8	0.0011	0.0011	< 0.00050	0.00088
Q4	CM_MC2	< 0.010	< 0.010	627	0.11	0.83	6.6	0.99	0.0022	0.0022	< 0.00050	< 0.00050
Q1	FR_FRCP1	0.017	0.017	2580	< 0.050	1.5	< 1.0	0.12	0.015	0.016	< 0.0020	< 0.0020
Q4	FR_FRCP1	< 0.010	< 0.010	765	< 0.050	0.81	< 1.0	0.29	0.0038	0.0037	< 0.00050	< 0.00050
Q2	LC_LCDSSLCC	< 0.010	< 0.010	337	< 0.050	1.52	< 1.0	0.48	0.002	0.002	< 0.00050	< 0.00050

% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-1. *C. dubia* reproduction paired with water quality

Quarter	Sample ID	ZINC-D-mg/l	ZINC-T-mg/l
References			
Q1	Reference (FR_UFR1)	< 0.0030	< 0.0030
Q1	Reference (FR_UFR1)	< 0.0030	< 0.0030
Q1	Reference (FR_UFR1)	< 0.0030	< 0.0030
Q2	Reference (FR_UFR1)	< 0.0030	< 0.0030
Q3	Reference (FR_UFR1)	< 0.0030	< 0.0030
Q4	Reference (FR_UFR1)	< 0.0030	< 0.0030
Q2	Reference (GH_ER2)	< 0.0030	< 0.0030
Q4	Reference (GH_ER2)	< 0.0030	< 0.0030
Tests that were not statistically different than reference			
Q1	CM_MC2	< 0.0030	0.0032
Q3	CM_MC2	< 0.0030	< 0.0030
Q1	EV_HC1	0.003	0.003
Q2	EV_HC1	0.003	0.003
Q3	EV_HC1	< 0.0030	< 0.0030
Q4	EV_HC1	< 0.0030	< 0.0030
Q1	EV_MC2	0.0041	< 0.0030
Q2	EV_MC2	< 0.0030	0.0041
Q3	EV_MC2	< 0.0030	0.0031
Q4	EV_MC2	< 0.0030	< 0.0030
Q2	FR_FRCP1	< 0.0030	< 0.0030
Q3	FR_FRCP1	< 0.0030	< 0.0030
Q1	GH_ERC	< 0.0030	0.0041
Q2	GH_ERC	< 0.0030	< 0.0030
Q3	GH_ERC	< 0.0030	< 0.0030
Q4	GH_ERC	< 0.0030	< 0.0030
Q1	GH_FR1	< 0.0030	< 0.0030
Q2	GH_FR1	< 0.0030	< 0.0030
Q3	GH_FR1	< 0.0030	< 0.0030
Q4	GH_FR1	< 0.0030	< 0.0030
Q1	LC_LCDSSLCC	0.0038	0.0039
Q3	LC_LCDSSLCC	0.0092	0.011
Q4	LC_LCDSSLCC	0.0081	< 0.015
Tests with significant results			
Q2	CM_MC2	0.0031	0.0059
Q4	CM_MC2	< 0.0030	< 0.0030
Q1	FR_FRCP1	< 0.0030	< 0.0060
Q4	FR_FRCP1	< 0.0030	< 0.0030
Q2	LC_LCDSSLCC	< 0.0030	< 0.0030

% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-2. *P. subcapitata* cell yield paired with water quality

Quarter	Sample ID	Mean Cell Yield (x 10^4 cells/mL) (Mean)	ACIDITY TO pH 8.3 (As CaCO3)-N-mg/l	ALKALINITY, BICARBONATE (As CaCO3), lab measured.-N-mg/l	ALKALINITY, CARBONATE (As CaCO3), lab measured.-N-mg/l	ALKALINITY, HYDROXIDE (As CaCO3), lab measured.-N-mg/l	ALKALINITY, TOTAL (As CaCO3), lab measured.-N-mg/l	ALUMINUM-D-mg/l	ALUMINUM-T-mg/l	ANTIMONY-D-mg/l	ANTIMONY-T-mg/l	ARSENIC-D-mg/l	ARSENIC-T-mg/l
References													
Q1	Reference (FR_UFR1)	108	< 1.0	147	2.3	< 1.0	149	< 0.0030	0.0032	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Q1	Reference (FR_UFR1)	111	< 1.0	147	2.3	< 1.0	149	< 0.0030	0.0032	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Q1	Reference (FR_UFR1)	106	< 1.0	144	1.3	< 1.0	145	< 0.0030	0.0059	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Q2	Reference (FR_UFR1)	122	< 1.0	116	2.8	< 1.0	119	0.0092	0.083	< 0.00010	< 0.00010	0.00012	0.00014
Q3	Reference (FR_UFR1)	126	< 1.0	152	7.4	< 1.0	159	< 0.0030	0.0078	< 0.00010	< 0.00010	0.00011	0.00012
Q4	Reference (FR_UFR1)	122	< 1.0	138	7.6	< 1.0	146	< 0.0030	0.0046	< 0.00010	< 0.00010	< 0.00010	0.0001
Q2	Reference (GH_ER2)	102	< 1.0	151	6.2	< 1.0	157	< 0.0030	0.076	< 0.00010	< 0.00010	0.00011	0.00016
Q4	Reference (GH_ER2)	132	< 1.0	147	< 1.0	< 1.0	147	< 0.0030	0.0046	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Tests that were not statistically different than reference													
Q1	CM_MC2	101	1.8	205	8.4	< 1.0	213	0.0097	0.032	0.00017	0.00019	0.00017	0.00022
Q2	EV_HC1	140	1.3	103	6.7	1.0	110	0.0032	0.05	0.0001	0.0001	0.00013	0.00016
Q3	EV_HC1	134	< 1.0	182	9.8	< 1.0	192	0.0049	0.034	< 0.00010	0.00011	0.00017	0.00024
Q4	EV_HC1	129	< 1.0	187	8.0	< 1.0	195	< 0.0030	0.0058	< 0.00010	0.00012	0.00014	0.00015
Q1	EV_MC2	141	3.4	193	< 1.0	< 1.0	193	0.0037	0.019	< 0.00010	< 0.00010	0.00015	0.00018
Q4	EV_MC2	136	3.0	193	< 1.0	< 1.0	193	< 0.0030	0.0056	0.00035	0.00038	0.00014	0.00019
Q2	FR_FRCP1	140	< 1.0	142	5.0	< 1.0	147	< 0.0030	0.073	0.00022	0.00022	< 0.00010	0.00015
Q3	FR_FRCP1	127	< 1.0	187	11	< 1.0	198	< 0.0030	0.022	0.00027	0.00033	0.0001	0.00019
Q1	GH_ERC	108	2.6	155	< 1.0	< 1.0	155	< 0.0030	0.028	< 0.00010	0.00012	< 0.00010	0.00015
Q2	GH_ERC	131	< 1.0	157	4.8	< 1.0	161	< 0.0030	0.13	< 0.00010	< 0.00010	< 0.00010	0.00017
Q3	GH_ERC	129	< 1.0	142	< 1.0	< 1.0	142	< 0.0030	0.083	< 0.00010	< 0.00010	< 0.00010	0.00017
Q4	GH_ERC	147	< 1.0	151	< 1.0	< 1.0	151	< 0.0030	0.007	< 0.00010	< 0.00010	< 0.00010	< 0.00010
Q1	GH_FR1	97	1.7	202	< 1.0	< 1.0	202	< 0.0030	0.0048	0.00014	0.00014	< 0.00010	0.00014
Q2	GH_FR1	125	< 1.0	159	8.0	< 1.0	167	< 0.0030	0.053	0.00017	0.00017	0.0001	0.00014
Q4	GH_FR1	153	< 1.0	183	4.8	< 1.0	188	< 0.0030	0.004	0.00011	0.00015	< 0.00010	0.00014
Q1	LC_LCDSSLCC	117	< 1.0	193	2.7	< 1.0	195	< 0.0030	0.0052	0.00022	0.00022	0.00011	0.00013
Tests with significant results													
Q2	CM_MC2	108	< 1.0	143	4.9	< 1.0	148	0.0044	0.31	0.00012	0.00013	0.00017	0.00031
Q3	CM_MC2	109	< 1.0	188	11	< 1.0	198	< 0.0030	0.016	0.00018	0.00021	0.00019	0.00021
Q4	CM_MC2	115	< 1.0	209	6.4	< 1.0	215	< 0.0030	0.0054	0.00013	0.00013	0.00018	0.00022
Q1	EV_HC1	27	1.0	131	4.3	1.0	135	0.003	0.009	0.0001	0.0001	0.00013	0.00014
Q2	EV_MC2	102	1.6	112	3.7	< 1.0	116	< 0.0070	0.36	< 0.00010	0.00011	0.00018	0.00033
Q3	EV_MC2	110	3.2	194	< 1.0	< 1.0	194	0.003	0.0085	0.00041	0.00044	0.00016	0.00023
Q1	FR_FRCP1	64	5.1	337	< 1.0	< 1.0	337	< 0.0030	< 0.0060	0.00048	0.00051	< 0.00020	0.00022
Q4	FR_FRCP1	96	< 1.0	211	< 1.0	< 1.0	211	< 0.0030	0.0035	0.00025	0.00026	< 0.00010	< 0.00010
Q3	GH_FR1	107	< 1.0	174	8.2	< 1.0	182	< 0.0030	0.013	0.00022	0.00025	0.00014	0.0002
Q2	LC_LCDSSLCC	69.2	< 1.0	144	5.5	< 1.0	150	< 0.0030	0.0163	0.00015	0.00017	0.00011	0.00014
Q3	LC_LCDSSLCC	101	< 1.0	171	10	< 1.0	181	< 0.0030	0.013	0.00019	0.00026	< 0.00010	0.00011
Q4	LC_LCDSSLCC	112	< 1.0	197	< 1.0	< 1.0	197	< 0.0050	< 0.015	< 0.00050	< 0.00050	< 0.00050	< 0.00050

Abbreviations

% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre
x 104 cells/mL = times 104 cells per millilitre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-2. *P. subcapitata* cell yield paired with water quality

Quarter	Sample ID	BARIUM-D-mg/l	BARIUM-T-mg/l	BERYLLIUM-D-mg/l	BERYLLIUM-T-mg/l	BISMUTH-D-mg/l	BISMUTH-T-mg/l	BORON-D-mg/l	BORON-T-mg/l	BROMIDE-D-mg/l	CADMIUM-D-mg/l	CADMIUM-T-mg/l
References												
Q1	Reference (FR_UFR1)	0.077	0.077	< 0.00010	< 0.00010	< 0.00050	< 0.00050	< 0.010	< 0.010	< 0.050	< 0.000010	0.000011
Q1	Reference (FR_UFR1)	0.077	0.077	< 0.00010	< 0.00010	< 0.00050	< 0.00050	< 0.010	< 0.010	< 0.050	< 0.000010	0.000011
Q1	Reference (FR_UFR1)	0.075	0.078	< 0.00010	< 0.00010	< 0.00050	< 0.00050	< 0.010	< 0.010	< 0.050	0.000011	< 0.000010
Q2	Reference (FR_UFR1)	0.042	0.043	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000074	0.000013
Q3	Reference (FR_UFR1)	0.076	0.076	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000057	0.0000083
Q4	Reference (FR_UFR1)	0.074	0.075	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050	0.0000083
Q2	Reference (GH_ER2)	0.046	0.048	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050	0.000016
Q4	Reference (GH_ER2)	0.047	0.049	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000053	0.0000069
Tests that were not statistically different than reference												
Q1	CM_MC2	0.072	0.072	< 0.00010	< 0.00010	< 0.00050	< 0.00050	0.024	0.025	< 0.10	0.000022	0.000023
Q2	EV_HC1	0.025	0.025	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.05	0.000013	0.000021
Q3	EV_HC1	0.058	0.059	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	0.011	< 0.050	0.000017	0.000025
Q4	EV_HC1	0.06	0.063	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	0.01	< 0.25	0.000013	0.000018
Q1	EV_MC2	0.11	0.11	< 0.00010	< 0.00010	< 0.00050	< 0.00050	0.014	0.016	< 0.050	0.000055	0.000044
Q4	EV_MC2	0.11	0.11	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.016	0.016	< 0.25	0.000037	0.000047
Q2	FR_FRCP1	0.064	0.065	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.00003	0.00005
Q3	FR_FRCP1	0.076	0.076	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.013	0.014	< 0.10	0.000038	0.000047
Q1	GH_ERC	0.055	0.056	< 0.00010	< 0.00010	< 0.00050	< 0.00050	< 0.010	< 0.010	< 0.050	< 0.000010	< 0.000010
Q2	GH_ERC	0.05	0.051	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.000007	0.000022
Q3	GH_ERC	0.046	0.049	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000059	0.000016
Q4	GH_ERC	0.058	0.06	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050	0.0000073
Q1	GH_FR1	0.12	0.13	< 0.00010	< 0.00010	< 0.00050	< 0.00050	0.012	< 0.010	< 0.10	0.000021	0.000024
Q2	GH_FR1	0.085	0.087	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.000021	0.000035
Q4	GH_FR1	0.12	0.12	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	0.011	< 0.25	0.000015	0.000024
Q1	LC_LCDSSLCC	0.096	0.093	< 0.00010	< 0.00010	< 0.00050	< 0.00050	0.013	0.014	< 0.10	0.000086	0.00011
Tests with significant results												
Q2	CM_MC2	0.044	0.046	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.014	0.015	< 0.050	0.000036	0.00006
Q3	CM_MC2	0.069	0.069	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.027	0.029	< 0.10	0.0000099	0.000018
Q4	CM_MC2	0.09	0.092	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.026	0.027	< 0.25	0.0000075	0.0000093
Q1	EV_HC1	0.041	0.042	0.0001	0.0001	0.0005	0.0005	0.01	0.01	0.05	0.000017	0.000016
Q2	EV_MC2	0.062	0.067	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.000018	0.000064
Q3	EV_MC2	0.1	0.1	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.016	0.018	< 0.10	0.000049	0.000056
Q1	FR_FRCP1	0.036	0.037	< 0.00020	< 0.00020	< 0.0010	< 0.0010	< 0.020	< 0.020	< 1.0	< 0.000020	0.000053
Q4	FR_FRCP1	0.08	0.078	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.011	0.016	< 0.25	0.00004	0.000055
Q3	GH_FR1	0.098	0.10	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.01	0.011	< 0.050	0.000019	0.000021
Q2	LC_LCDSSLCC	0.041	0.042	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.000135	0.00014
Q3	LC_LCDSSLCC	0.06	0.063	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.012	0.013	< 0.10	0.00025	0.00026
Q4	LC_LCDSSLCC	0.0845	0.0912	< 0.00050	< 0.00050	< 0.00025	< 0.00025	< 0.050	< 0.050	< 0.050	0.000243	0.000261

Abbreviations

% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre
x 104 cells/mL = times 104 cells per millilitre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-2. *P. subcapitata* cell yield paired with water quality

Quarter	Sample ID	CALCIUM-D-mg/l	CALCIUM-T-mg/l	CARBON, DISSOLVED ORGANIC-D-mg/l	CHLORIDE-D-mg/l	CHROMIUM-D-mg/l	CHROMIUM-T-mg/l	COBALT-D-mg/l	COBALT-T-mg/l	CONDUCTIVITY, LAB-N-us/cm	COPPER-D-mg/l	COPPER-T-mg/l
References												
Q1	Reference (FR_UFR1)	56	56	0.84	< 1.0	0.00017	0.00017	< 0.00010	< 0.00010	367	< 0.00050	< 0.00050
Q1	Reference (FR_UFR1)	56	56	0.84	< 1.0	0.00017	0.00017	< 0.00010	< 0.00010	367	< 0.00050	< 0.00050
Q1	Reference (FR_UFR1)	56	57	< 0.50	< 1.0	0.00013	0.00015	< 0.00010	< 0.00010	353	< 0.00050	< 0.00050
Q2	Reference (FR_UFR1)	37	38	1.8	< 1.0	0.00014	0.00046	< 0.00010	< 0.00010	245	< 0.00050	< 0.00050
Q3	Reference (FR_UFR1)	54	55	0.75	1.0	0.00013	0.00013	< 0.00010	< 0.00010	342	< 0.00050	< 0.00050
Q4	Reference (FR_UFR1)	54	56	0.6	< 1.0	0.00011	0.00036	< 0.00010	< 0.00010	354	< 0.00050	< 0.00050
Q2	Reference (GH_ER2)	47	48	0.84	1.0	0.00022	0.00037	< 0.00010	< 0.00010	303	< 0.00050	< 0.00050
Q4	Reference (GH_ER2)	50	51	0.61	1.2	0.00022	0.00034	< 0.00010	< 0.00010	314	< 0.00050	< 0.00050
Tests that were not statistically different than reference												
Q1	CM_MC2	105	106	0.93	3.4	0.00019	0.00024	0.00074	0.00079	826	< 0.00050	< 0.00050
Q2	EV_HC1	48	47	1.1	1.3	0.00013	0.00021	0.0001	0.0001	350	0.0005	0.0005
Q3	EV_HC1	82	75	1.1	1.4	0.00015	0.00024	< 0.00010	< 0.00010	625	< 0.00050	< 0.00050
Q4	EV_HC1	92	93	0.63	1.8	0.00013	0.00022	< 0.00010	< 0.00010	732	< 0.00050	< 0.00050
Q1	EV_MC2	95	91	1.7	11	0.00012	< 0.00020	< 0.00010	< 0.00010	665	0.0012	0.00076
Q4	EV_MC2	102	102	0.6	8.7	0.00012	0.00015	< 0.00010	< 0.00010	733	< 0.00050	< 0.00050
Q2	FR_FRCP1	73	73	1.6	1.2	< 0.00010	0.00028	< 0.00010	0.00012	573	< 0.00050	< 0.00050
Q3	FR_FRCP1	107	109	0.93	1.5	0.0001	0.00017	< 0.00010	< 0.00010	815	< 0.00050	< 0.00050
Q1	GH_ERC	55	55	0.64	< 1.0	0.00029	0.00034	< 0.00010	< 0.00010	345	< 0.00050	< 0.00050
Q2	GH_ERC	52	53	0.96	< 1.0	0.00017	0.00054	< 0.00010	< 0.00010	338	< 0.00050	< 0.00050
Q3	GH_ERC	47	49	0.75	< 1.0	0.00019	0.00037	< 0.00010	< 0.00010	284	< 0.00050	< 0.00050
Q4	GH_ERC	56	58	< 0.50	1.2	0.00022	0.00026	< 0.00010	< 0.00010	355	< 0.00050	< 0.00050
Q1	GH_FR1	112	114	1.1	2.6	0.00021	0.00015	< 0.00010	< 0.00010	851	< 0.00050	< 0.00050
Q2	GH_FR1	79	81	1.4	1.4	< 0.00010	0.0002	< 0.00010	< 0.00010	614	< 0.00050	< 0.00050
Q4	GH_FR1	105	106	< 0.50	1.7	0.00012	0.00013	< 0.00010	< 0.00010	760	< 0.00050	< 0.00050
Q1	LC_LCDSSLCC	126	123	1.1	2.7	0.00016	0.00021	< 0.00010	< 0.00010	940	< 0.00050	< 0.00050
Tests with significant results												
Q2	CM_MC2	61	60	1.5	1.2	0.0002	0.00058	0.00037	0.00061	484	< 0.00050	0.00053
Q3	CM_MC2	102	104	0.86	2.1	0.00019	0.00023	0.00026	0.00034	802	< 0.00050	< 0.00050
Q4	CM_MC2	118	115	0.56	3.2	0.00019	0.0002	< 0.00010	< 0.00010	876	< 0.00050	< 0.00050
Q1	EV_HC1	60	60	0.82	1.5	0.00014	0.00018	0.0001	0.0001	453	0.0005	0.0005
Q2	EV_MC2	43	44	1.9	2.9	0.0002	0.0007	< 0.00010	0.00022	299	< 0.00050	0.00073
Q3	EV_MC2	95	87	1.0	9.6	0.00013	0.00019	< 0.00010	< 0.00010	686	< 0.00050	< 0.00050
Q1	FR_FRCP1	331	337	1.4	2.6	< 0.00020	< 0.00020	< 0.00020	< 0.00020	2680	< 0.00050	< 0.0010
Q4	FR_FRCP1	131	130	0.65	2.2	< 0.00010	0.00027	< 0.00010	< 0.00010	1030	< 0.00050	< 0.00050
Q3	GH_FR1	89	90	0.87	1.6	0.00012	0.00015	< 0.00010	< 0.00010	657	< 0.00050	< 0.00050
Q2	LC_LCDSSLCC	67	68	1.2	1.4	0.00014	0.00019	< 0.00010	< 0.00010	535	< 0.00050	< 0.00050
Q3	LC_LCDSSLCC	88	92	0.83	2.0	0.00011	0.0002	< 0.00010	< 0.00010	660	< 0.00050	< 0.00050
Q4	LC_LCDSSLCC	116	117	0.74	2.22	< 0.00050	< 0.00050	< 0.00050	< 0.00050	770	< 0.0010	< 0.0025

Abbreviations

% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre
x 104 cells/mL = times 104 cells per millilitre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-2. *P. subcapitata* cell yield paired with water quality

Quarter	Sample ID	FLUORIDE-D-mg/l	Hardness, Total or Dissolved CaCO3-N-mg/l	IRON-D-mg/l	IRON-T-mg/l	LEAD-D-mg/l	LEAD-T-mg/l	LITHIUM-D-mg/l	LITHIUM-T-mg/l	MAGNESIUM-D-mg/l	MAGNESIUM-T-mg/l	MAJOR ANION SUM-N-meq/l
References												
Q1	Reference (FR_UFR1)	0.14	197	< 0.010	< 0.010	< 0.000050	< 0.000050	0.0019	0.0016	14	15	4.0
Q1	Reference (FR_UFR1)	0.14	197	< 0.010	< 0.010	< 0.000050	< 0.000050	0.0019	0.0016	14	15	4.0
Q1	Reference (FR_UFR1)	0.14	197	< 0.010	< 0.010	< 0.000050	< 0.000050	0.0015	0.0017	14	14	3.9
Q2	Reference (FR_UFR1)	0.15	129	< 0.010	0.052	< 0.000050	< 0.000050	< 0.0010	0.0012	9.0	9.2	2.7
Q3	Reference (FR_UFR1)	0.15	188	< 0.010	< 0.010	0.000055	< 0.000050	0.002	0.002	13	13	3.9
Q4	Reference (FR_UFR1)	0.16	190	< 0.010	< 0.010	< 0.000050	< 0.000050	0.0015	0.0015	14	14	3.9
Q2	Reference (GH_ER2)	0.15	160	< 0.010	0.066	< 0.000050	< 0.000050	0.0017	0.0016	10	11	3.6
Q4	Reference (GH_ER2)	0.16	170	< 0.010	< 0.010	< 0.000050	< 0.000050	0.0016	0.0018	11	11	3.4
Tests that were not statistically different than reference												
Q1	CM_MC2	0.14	445	< 0.010	0.031	< 0.000050	< 0.000050	0.011	0.011	44	46	9.7
Q2	EV_HC1	0.13	205	0.01	0.051	0.00005	0.000056	0.0044	0.0042	21	21	5.8
Q3	EV_HC1	0.21	373	< 0.010	0.027	< 0.000050	< 0.000050	0.0069	0.0068	41	41	7.4
Q4	EV_HC1	0.2	431	< 0.010	< 0.010	< 0.000050	< 0.000050	0.0069	0.0067	49	50	8.6
Q1	EV_MC2	0.15	381	< 0.010	0.024	< 0.000050	< 0.000050	0.015	0.015	35	33	7.5
Q4	EV_MC2	0.16	415	< 0.010	0.014	< 0.000050	< 0.000050	0.023	0.022	39	39	8.3
Q2	FR_FRCP1	0.2	302	< 0.010	0.11	< 0.000050	0.00014	0.019	0.018	29	29	6.1
Q3	FR_FRCP1	0.2	471	< 0.010	0.033	< 0.000050	< 0.000050	0.03	0.031	50	51	9.5
Q1	GH_ERC	0.15	191	< 0.010	0.036	< 0.000050	0.0002	0.0019	0.002	13	13	3.8
Q2	GH_ERC	0.15	179	< 0.010	0.15	< 0.000050	0.00011	0.0022	0.0023	12	12	3.8
Q3	GH_ERC	0.16	160	< 0.010	0.088	< 0.000050	0.00007	0.0017	0.002	10	11	3.3
Q4	GH_ERC	0.16	190	< 0.010	< 0.010	< 0.000050	< 0.000050	0.002	0.0021	12	13	3.9
Q1	GH_FR1	0.18	475	< 0.010	< 0.010	< 0.000050	< 0.000050	0.016	0.015	48	49	9.9
Q2	GH_FR1	0.17	332	< 0.010	0.07	< 0.000050	0.000063	0.014	0.014	33	34	6.7
Q4	GH_FR1	0.16	436	< 0.010	< 0.010	< 0.000050	< 0.000050	0.017	0.017	42	43	8.5
Q1	LC_LCDSSLCC	0.24	536	< 0.010	< 0.010	< 0.000050	< 0.000050	0.031	0.031	54	53	11
Tests with significant results												
Q2	CM_MC2	0.1	248	< 0.010	0.3	< 0.000050	0.00017	0.0064	0.0067	23	23	5.4
Q3	CM_MC2	0.12	458	< 0.010	0.022	< 0.000050	< 0.000050	0.013	0.014	49	51	9.4
Q4	CM_MC2	0.11	505	< 0.010	< 0.010	< 0.000050	< 0.000050	0.011	0.012	51	51	10
Q1	EV_HC1	0.15	274	0.01	0.013	0.00005	0.00005	0.0047	0.0047	30	31	8.2
Q2	EV_MC2	0.12	159	< 0.010	0.39	< 0.000050	0.00028	0.0054	0.0052	12	13	3.3
Q3	EV_MC2	0.18	384	< 0.010	0.018	< 0.000050	< 0.000050	0.022	0.021	36	35	8.1
Q1	FR_FRCP1	0.45	1880	< 0.020	< 0.020	< 0.00010	< 0.00010	0.054	0.056	257	261	40
Q4	FR_FRCP1	0.17	597	< 0.010	0.019	< 0.000050	< 0.000050	0.042	0.037	65	65	12
Q3	GH_FR1	0.18	374	< 0.010	0.016	< 0.000050	< 0.000050	0.015	0.015	37	37	7.6
Q2	LC_LCDSSLCC	0.22	269	< 0.010	0.018	< 0.000050	< 0.000050	0.016	0.016	25	25	6
Q3	LC_LCDSSLCC	0.24	355	< 0.010	< 0.010	< 0.000050	< 0.000050	0.021	0.023	33	34	7.5
Q4	LC_LCDSSLCC	0.184	499	< 0.050	< 0.050	< 0.00025	< 0.00025	0.0361	0.0361	50.8	54.3	9.85

Abbreviations

% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre
x 104 cells/mL = times 104 cells per millilitre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-2. *P. subcapitata* cell yield paired with water quality

Quarter	Sample ID	MAJOR CATION SUM-N-meq/l	MANGANESE-D-mg/l	MANGANESE-T-mg/l	MERCURY-D-mg/l	MERCURY-T-mg/l	MOLYBDENUM-D-mg/l	MOLYBDENUM-T-mg/l	NICKEL-D-mg/l	NICKEL-T-mg/l	NITRATE NITROGEN (NO3), AS N-N-mg/l	NITRITE NITROGEN (NO2), AS N-N-mg/l
References												
Q1	Reference (FR_UFR1)	4.0	0.000054	0.00018	< 0.000010	< 0.000010	0.00053	0.00054	< 0.00050	< 0.00050	0.13	< 0.0010
Q1	Reference (FR_UFR1)	4.0	0.000054	0.00018	< 0.000010	< 0.000010	0.00053	0.00054	< 0.00050	< 0.00050	0.13	< 0.0010
Q1	Reference (FR_UFR1)	4.0	0.00017	0.00037	< 0.000010	< 0.000010	0.00056	0.00055	< 0.00050	< 0.00050	0.13	< 0.0010
Q2	Reference (FR_UFR1)	2.6	0.00064	0.0025	< 0.0000050	< 0.0000050	0.00052	0.00062	< 0.00050	< 0.00050	0.066	< 0.0010
Q3	Reference (FR_UFR1)	3.8	0.00062	0.0015	< 0.0000050	< 0.0000050	0.00068	0.00068	< 0.00050	< 0.00050	0.019	< 0.0010
Q4	Reference (FR_UFR1)	3.9	0.0001	0.00031	< 0.0000050	< 0.0000050	0.00065	0.00059	< 0.00050	< 0.00050	0.022	< 0.0010
Q2	Reference (GH_ER2)	3.2	0.0033	0.0059	< 0.0000050	< 0.0000050	0.00092	0.00094	< 0.00050	< 0.00050	0.086	< 0.0010
Q4	Reference (GH_ER2)	3.4	0.0021	0.0027	< 0.0000050	< 0.0000050	0.001	0.0010	< 0.00050	< 0.00050	0.078	< 0.0010
Tests that were not statistically different than reference												
Q1	CM_MC2	9.4	0.0046	0.0064	< 0.000010	< 0.000010	0.001	0.0011	0.0095	0.0097	2.4	0.012
Q2	EV_HC1	6.2	0.00053	0.0016	0.000005	0.000005	0.0005	0.00048	0.00075	0.00083	0.57	0.001
Q3	EV_HC1	7.6	0.0028	0.0051	< 0.0000050	< 0.0000050	0.00092	0.00092	0.00079	0.00079	0.87	0.0011
Q4	EV_HC1	8.7	0.0018	0.002			0.00097	0.00098	0.00066	0.00069	1.2	< 0.0050
Q1	EV_MC2	8.7	0.0024	0.0022	< 0.000010	< 0.000010	0.00079	0.00078	0.0007	0.00052	3.2	0.0013
Q4	EV_MC2	8.5	0.0013	0.0018			0.002	0.0021	0.0039	0.0041	5.9	< 0.0050
Q2	FR_FRCP1	6.1	0.0032	0.012	< 0.0000050	< 0.0000050	0.0013	0.0013	0.002	0.0024	7.4	0.0056
Q3	FR_FRCP1	9.5	0.0031	0.0069	< 0.0000050	< 0.0000050	0.0015	0.0015	0.0041	0.0043	8.2	0.0049
Q1	GH_ERC	3.9	0.00035	0.0026	< 0.000010	< 0.000010	0.00092	0.00099	< 0.00050	< 0.00050	0.44	< 0.0010
Q2	GH_ERC	3.6	0.00072	0.0081	< 0.0000050	< 0.0000050	0.00095	0.00097	< 0.00050	< 0.00050	0.31	< 0.0010
Q3	GH_ERC	3.2	0.00058	0.0078	< 0.0000050	< 0.0000050	0.00095	0.001	< 0.00050	< 0.00050	0.17	< 0.0010
Q4	GH_ERC	3.9	0.00063	0.0013	< 0.0000050	< 0.0000050	0.00099	0.0011	< 0.00050	< 0.00050	0.46	< 0.0010
Q1	GH_FR1	9.6	0.0017	0.0021	< 0.000010	< 0.000010	0.00095	0.00098	0.0022	0.0023	13	0.0039
Q2	GH_FR1	6.7	0.0011	0.0044	< 0.0000050	< 0.0000050	0.0011	0.0011	0.0019	0.002	7.5	0.0028
Q4	GH_FR1	8.8	0.0011	0.0016	< 0.0000050	< 0.0000050	0.0009	0.00099	0.0012	0.0012	10	< 0.0050
Q1	LC_LCDSSLCC	11	0.000074	0.00021	< 0.000010	< 0.000010	0.0017	0.0017	0.0036	0.0036	15	0.003
Tests with significant results												
Q2	CM_MC2	5.2	0.0035	0.011	< 0.0000050	0.0000084	0.00076	0.00081	0.0062	0.0076	1.2	0.0029
Q3	CM_MC2	9.6	0.0018	0.0032	< 0.0000050	< 0.0000050	0.001	0.0011	0.013	0.013	2.5	0.0088
Q4	CM_MC2	11	0.00064	0.0012	< 0.0000050	< 0.0000050	0.00092	0.00096	0.0059	0.006	2.2	< 0.0050
Q1	EV_HC1	8.3	0.001	0.0015	0.00001	0.00001	0.00063	0.00065	0.0006	0.00064	0.8	0.001
Q2	EV_MC2	3.3	0.0003	0.01	< 0.0000050	< 0.0000050	0.00059	0.00054	0.00077	0.0014	0.81	< 0.0010
Q3	EV_MC2	7.9	0.00067	0.002	< 0.0000050	< 0.0000050	0.0022	0.0022	0.0047	0.0048	5.7	0.0027
Q1	FR_FRCP1	38	0.0019	0.0027	< 0.000010	< 0.000010	0.0028	0.0029	0.031	0.032	30	< 0.020
Q4	FR_FRCP1	12	0.0076	0.0081	< 0.0000050	< 0.0000050	0.0015	0.0014	0.0068	0.0066	15	< 0.0050
Q3	GH_FR1	7.6	0.00089	0.0023	< 0.0000050	< 0.0000050	0.00099	0.0010	0.0016	0.0017	9.1	0.0046
Q2	LC_LCDSSLCC	6	0.00016	0.00051	< 0.0000050	< 0.0000050	0.0011	0.0012	0.0036	0.0036	6	0.0014
Q3	LC_LCDSSLCC	7.3	0.0002	0.00054	< 0.0000050	< 0.0000050	0.0014	0.0015	0.0047	0.005	7.2	< 0.0020
Q4	LC_LCDSSLCC	10.3	< 0.00050	< 0.00050	< 0.0000050	< 0.0000050	0.00165	0.00164	0.0065	0.0071	12.8	0.003

Abbreviations

% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre
x 104 cells/mL = times 104 cells per millilitre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-2. *P. subcapitata* cell yield paired with water quality

Quarter	Sample ID	NITROGEN, AMMONIA (AS N)-N-mg/l	ORTHO-PHOSPHATE-N-mg/l	OXIDATION-REDUCTION POTENTIAL, LAB-N-mv	pH, LAB-N-ph units	PHOSPHORUS-N-mg/l	POTASSIUM-D-mg/l	POTASSIUM-T-mg/l	SELENIUM-D-ug/l	SELENIUM-T-ug/l	SILICON-D-mg/l	SILICON-T-mg/l
References												
Q1	Reference (FR_UFR1)	< 0.0050	0.0032	344	8.4	0.0042	0.39	0.4	0.69	0.73	1.6	1.6
Q1	Reference (FR_UFR1)	< 0.0050	0.0032	344	8.4	0.0042	0.39	0.4	0.69	0.73	1.6	1.6
Q1	Reference (FR_UFR1)	< 0.0050	0.0027	371	8.3	0.0035	0.39	0.42	0.76	0.73	1.6	1.7
Q2	Reference (FR_UFR1)	< 0.0050	0.0042	470	8.4	0.01	0.33	0.37	0.48	0.49	1.7	1.9
Q3	Reference (FR_UFR1)	< 0.0050	0.0029	325	8.4	0.0054	0.53	0.52	0.47	0.43	2.1	2.1
Q4	Reference (FR_UFR1)	< 0.0050	0.0017	346	8.4	0.0022	0.46	0.42	0.69	0.62	1.5	1.6
Q2	Reference (GH_ER2)	< 0.0050	< 0.0010	312	8.3	0.008	0.36	0.37	0.79	0.87	1.6	1.8
Q4	Reference (GH_ER2)	< 0.0050	0.0015	490	8.3	< 0.0020	0.33	0.35	0.72	0.78	1.7	1.8
Tests that were not statistically different than reference												
Q1	CM_MC2	0.0055	0.001	491	8.4	0.005	1.4	1.4	5.9	6.0	2.1	2.2
Q2	EV_HC1	0.0084	0.0031	413	7.5	0.0081	0.53	0.55	19	18	1.1	1.2
Q3	EV_HC1	< 0.0050	0.004	352	8.4	0.0082	0.99	0.99	29	28	2.1	2.0
Q4	EV_HC1	< 0.0050	0.0058	360	8.4	0.0057	0.85	0.9	33	37	2.0	2.1
Q1	EV_MC2	< 0.0050	< 0.0010	302	8.3	0.0047	1.2	1.2	24	22	2.5	2.5
Q4	EV_MC2	< 0.0050	0.0035	370	8.2	0.0036	1.3	1.3	24	25	2.5	2.6
Q2	FR_FRCP1	0.0095	0.0014	345	8.4	0.018	1.2	1.2	30	30	1.6	1.6
Q3	FR_FRCP1	< 0.0050	< 0.0010	345	8.4	0.0027	1.9	1.8	57	57	1.9	2.0
Q1	GH_ERC	< 0.0050	< 0.0010	512	8.3	0.0043	0.36	0.37	1.9	1.9	1.8	1.9
Q2	GH_ERC	< 0.0050	< 0.0010	473	8.4	0.016	0.38	0.41	1.7	1.8	1.8	2.0
Q3	GH_ERC	< 0.0050	< 0.0010	320	8.3	0.0077	0.38	0.42	1.1	1.2	1.7	1.9
Q4	GH_ERC	< 0.0050	0.0018	491	8.3	< 0.0020	0.39	0.39	1.5	1.6	1.9	1.9
Q1	GH_FR1	< 0.0050	< 0.0010	305	8.3	0.0036	1.2	1.2	51	52	2.1	2.1
Q2	GH_FR1	< 0.0050	< 0.0010	302	8.4	0.01	1.0	1.1	31	32	1.8	2.0
Q4	GH_FR1	< 0.0050	< 0.0010	288	8.4	< 0.0020	1.2	1.2	40	39	2.1	2.2
Q1	LC_LCDSSLCC	< 0.0050	< 0.0010	294	8.3	0.0029	1.2	1.2	72	71	2.1	2.1
Tests with significant results												
Q2	CM_MC2	< 0.0050	< 0.0010	359	8.4	0.017	0.9	0.98	4.3	4.3	1.8	2.4
Q3	CM_MC2	< 0.0050	< 0.0010	349	8.4	0.003	1.5	1.5	6.2	6.4	2.0	2.1
Q4	CM_MC2	< 0.0050	< 0.0010	275	8.3	< 0.0020	1.5	1.5	6.0	5.8	2.2	2.1
Q1	EV_HC1	0.005	0.0035	457	7.4	0.0047	0.61	0.62	22	22	1.3	1.3
Q2	EV_MC2	< 0.0050	< 0.0010	355	8.1	0.037	0.54	0.67	5.2	5.0	1.7	2.3
Q3	EV_MC2	0.01	0.0027	356	8.1	0.0052	1.5	1.5	23	23	2.5	2.3
Q1	FR_FRCP1	< 0.0050	< 0.0010	354	8.3	0.0021	3.8	4.0	490	497	2.3	2.3
Q4	FR_FRCP1	< 0.0050	< 0.0010	354	8.3	< 0.0020	1.9	1.9	78	76	1.7	1.8
Q3	GH_FR1	0.0071	< 0.0010	323	8.3	0.0036	1.2	1.2	35	36	2.0	2.1
Q2	LC_LCDSSLCC	< 0.0050	0.0027	493	8.4	0.0056	0.8	0.8	25	25	1.8	1.9
Q3	LC_LCDSSLCC	< 0.0050	0.0018	354	8.4	0.0029	1.0	1.1	37	40	2.2	2.3
Q4	LC_LCDSSLCC	< 0.0050	< 0.0010	364	8.25	< 0.0050	1.33	1.38	52.3	53.5	2.17	2.29

Abbreviations

% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre
x 104 cells/mL = times 104 cells per millilitre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-2. *P. subcapitata* cell yield paired with water quality

Quarter	Sample ID	SILVER-D-mg/l	SILVER-T-mg/l	SODIUM-D-mg/l	SODIUM-T-mg/l	STRONTIUM-D-mg/l	STRONTIUM-T-mg/l	SULFATE (AS SO4)-D-mg/l	THALLIUM-D-mg/l	THALLIUM-T-mg/l	TIN-D-mg/l	TIN-T-mg/l
References												
Q1	Reference (FR_UFR1)	< 0.000010	< 0.000010	0.71	0.77	0.088	0.091	47	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q1	Reference (FR_UFR1)	< 0.000010	< 0.000010	0.71	0.77	0.088	0.091	47	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q1	Reference (FR_UFR1)	< 0.000010	< 0.000010	0.71	0.72	0.089	0.092	46	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q2	Reference (FR_UFR1)	< 0.000010	< 0.000010	0.55	0.56	0.061	0.066	15	< 0.000010	0.00001	< 0.00010	< 0.00010
Q3	Reference (FR_UFR1)	< 0.000010	< 0.000010	0.7	0.69	0.093	0.093	32	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q4	Reference (FR_UFR1)	< 0.000010	< 0.000010	0.73	0.69	0.095	0.091	48	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q2	Reference (GH_ER2)	< 0.000010	< 0.000010	0.73	0.73	0.2	0.21	18	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q4	Reference (GH_ER2)	< 0.000010	< 0.000010	0.63	0.67	0.21	0.22	22	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Tests that were not statistically different than reference												
Q1	CM_MC2	< 0.000010	< 0.000010	10	10	0.29	0.3	249	0.000014	< 0.000010	< 0.00010	< 0.00010
Q2	EV_HC1	0.00001	0.00001	0.81	0.82	0.062	0.061	79	0.00001	0.00001	0.0001	0.0001
Q3	EV_HC1	< 0.000010	< 0.000010	1.5	1.5	0.11	0.11	165	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q4	EV_HC1	< 0.000010	< 0.000010	1.6	1.7	0.13	0.13	218	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q1	EV_MC2	< 0.000010	< 0.000010	24	5.7	0.19	0.2	147	< 0.000010	< 0.000010	0.00018	< 0.00010
Q4	EV_MC2	< 0.000010	< 0.000010	4.9	4.8	0.23	0.23	183	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q2	FR_FRCP1	< 0.000010	< 0.000010	1.2	1.2	0.11	0.11	126	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q3	FR_FRCP1	< 0.000010	< 0.000010	1.6	1.6	0.13	0.13	234	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q1	GH_ERC	< 0.000010	< 0.000010	0.94	0.95	0.2	0.21	30	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q2	GH_ERC	< 0.000010	< 0.000010	0.98	0.97	0.21	0.21	25	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q3	GH_ERC	< 0.000010	< 0.000010	0.7	0.74	0.19	0.2	20	< 0.000010	< 0.000010	< 0.00010	0.00016
Q4	GH_ERC	< 0.000010	< 0.000010	0.89	0.94	0.22	0.23	37	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q1	GH_FR1	< 0.000010	< 0.000010	2.3	2.4	0.16	0.16	233	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q2	GH_FR1	< 0.000010	< 0.000010	1.6	1.7	0.12	0.12	136	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q4	GH_FR1	< 0.000010	< 0.000010	2.1	2.2	0.14	0.15	189	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q1	LC_LCDSSLCC	< 0.000010	< 0.000010	5.9	5.9	0.23	0.23	283	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Tests with significant results												
Q2	CM_MC2	< 0.000010	< 0.000010	4.4	4.5	0.16	0.17	110	0.000011	0.000018	< 0.00010	< 0.00010
Q3	CM_MC2	< 0.000010	< 0.000010	8.7	8.7	0.27	0.29	249	0.000014	0.000019	< 0.00010	< 0.00010
Q4	CM_MC2	< 0.000010	< 0.000010	10	10.7	0.3	0.3	277	0.000011	< 0.000010	< 0.00010	< 0.00010
Q1	EV_HC1	0.00001	0.00001	1.1	1.2	0.085	0.087	130	0.00001	0.00001	0.0001	0.0001
Q2	EV_MC2	< 0.000010	0.000017	2.1	2.1	0.1	0.093	41	0.000011	0.000025	< 0.00010	< 0.00010
Q3	EV_MC2	< 0.000010	< 0.000010	4.7	4.6	0.21	0.21	169	0.000013	0.000014	< 0.00010	< 0.00010
Q1	FR_FRCP1	< 0.000020	< 0.000020	2.0	2.1	0.22	0.23	1460	0.00003	0.000032	< 0.00020	< 0.00020
Q4	FR_FRCP1	< 0.000010	< 0.000010	2.1	2.0	0.16	0.16	327	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q3	GH_FR1	< 0.000010	< 0.000010	1.8	1.8	0.13	0.13	154	< 0.000010	< 0.000010	< 0.00010	0.00015
Q2	LC_LCDSSLCC	< 0.000010	< 0.000010	2.9	2.9	0.13	0.13	107	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q3	LC_LCDSSLCC	< 0.000010	< 0.000010	3.8	3.9	0.16	0.17	157	< 0.000010	< 0.000010	< 0.00010	< 0.00010
Q4	LC_LCDSSLCC	< 0.000050	< 0.000050	5.82	6.18	0.212	0.222	237	< 0.000050	< 0.000050	< 0.00050	< 0.00050

Abbreviations

% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre
x 104 cells/mL = times 104 cells per millilitre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-2. *P. subcapitata* cell yield paired with water quality

Quarter	Sample ID	TITANIUM-D-mg/l	TITANIUM-T-mg/l	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)-N-mg/l	TOTAL KJELDAHL NITROGEN-N-mg/l	TOTAL ORGANIC CARBON-T-mg/l	TOTAL SUSPENDED SOLIDS, LAB-N-mg/l	TURBIDITY, LAB-N-ntu	URANIUM-D-mg/l	URANIUM-T-mg/l	VANADIUM-D-mg/l	VANADIUM-T-mg/l
References												
Q1	Reference (FR_UFR1)	< 0.010	< 0.010	229	< 0.050	0.69	< 1.0	0.13	0.00047	0.00047	< 0.0010	< 0.0010
Q1	Reference (FR_UFR1)	< 0.010	< 0.010	229	< 0.050	0.69	< 1.0	0.13	0.00047	0.00047	< 0.0010	< 0.0010
Q1	Reference (FR_UFR1)	< 0.010	< 0.010	222	< 0.050	< 0.50	< 1.0	0.33	0.00047	0.00047	< 0.0010	< 0.0010
Q2	Reference (FR_UFR1)	< 0.010	< 0.010	147	0.1	2.1	2.4	1.5	0.00031	0.00033	< 0.00050	< 0.00050
Q3	Reference (FR_UFR1)	< 0.010	< 0.010	211	0.08	1.0	1.1	0.2	0.00042	0.00042	< 0.00050	< 0.00050
Q4	Reference (FR_UFR1)	< 0.010	< 0.010	215	0.095	0.6	< 1.0	0.26	0.00047	0.00044	< 0.00050	< 0.00050
Q2	Reference (GH_ER2)	< 0.010	< 0.010	191	0.067	1.8	4.4	3.9	0.00079	0.00078	< 0.00050	0.00051
Q4	Reference (GH_ER2)	< 0.010	< 0.010	171	< 0.050	< 0.50	< 1.0	0.26	0.00071	0.00072	< 0.00050	< 0.00050
Tests that were not statistically different than reference												
Q1	CM_MC2	< 0.010	< 0.010	551	< 0.050	0.82	1.7	0.53	0.0022	0.0023	< 0.0010	< 0.0010
Q2	EV_HC1	0.01	0.01	233	0.13	1.4	2.6	1.2	0.0012	0.0012	0.0005	0.0005
Q3	EV_HC1	< 0.010	< 0.010	479	0.073	1.6	2.3	0.77	0.0023	0.0023	< 0.00050	< 0.00050
Q4	EV_HC1	< 0.010	< 0.010	529	0.096	0.74	< 1.0	0.29	0.0026	0.0027	< 0.00050	< 0.00050
Q1	EV_MC2	0.014	0.013	438	0.13	1.2	1.2	0.31	0.0013	0.0012	< 0.0010	< 0.0010
Q4	EV_MC2	< 0.010	< 0.010	492	0.14	0.7	1.0	0.36	0.0019	0.0019	< 0.00050	< 0.00050
Q2	FR_FRCP1	< 0.010	< 0.010	372	< 0.050	2.2	7.7	2.0	0.0015	0.0016	< 0.00050	0.00054
Q3	FR_FRCP1	< 0.010	< 0.010	566	0.14	0.93	2.6	0.47	0.0027	0.0028	< 0.00050	< 0.00050
Q1	GH_ERC	< 0.010	< 0.010	203	< 0.050	0.5	2.6	0.41	0.00081	0.00084	< 0.0010	< 0.0010
Q2	GH_ERC	< 0.010	< 0.010	203	0.12	1.3	7.0	1.6	0.00083	0.00084	< 0.00050	0.0007
Q3	GH_ERC	< 0.010	< 0.010	179	< 0.050	0.79	5.1	1.3	0.00065	0.00071	< 0.00050	0.00058
Q4	GH_ERC	< 0.010	< 0.010	214	< 0.050	0.52	< 1.0	0.26	0.00077	0.00081	< 0.00050	< 0.00050
Q1	GH_FR1	0.011	0.011	621	< 0.050	1.1	< 1.0	0.18	0.0022	0.0022	< 0.0010	< 0.0010
Q2	GH_FR1	< 0.010	< 0.010	398	< 0.050	1.6	3.6	2.2	0.0016	0.0016	< 0.00050	< 0.00050
Q4	GH_FR1	< 0.010	< 0.010	520	0.091	0.57	< 1.0	0.3	0.0019	0.0019	< 0.00050	< 0.00050
Q1	LC_LCDSSLCC	0.014	0.013	690	< 0.050	0.9	< 1.0	0.29	0.0039	0.004	< 0.0010	< 0.0010
Tests with significant results												
Q2	CM_MC2	< 0.010	0.011	314	0.12	1.8	9.6	5.8	0.0011	0.0011	< 0.00050	0.00088
Q3	CM_MC2	< 0.010	< 0.010	626	0.1	0.75	1.2	0.61	0.0024	0.0025	< 0.00050	< 0.00050
Q4	CM_MC2	< 0.010	< 0.010	627	0.11	0.83	6.6	0.99	0.0022	0.0022	< 0.00050	< 0.00050
Q1	EV_HC1	0.011	0.011	325	0.05	0.84	1.0	0.24	0.0017	0.0017	0.001	0.001
Q2	EV_MC2	< 0.010	< 0.010	195	0.28	2.5	23	4.7	0.00051	0.00048	< 0.00050	0.0016
Q3	EV_MC2	< 0.010	< 0.010	477	0.16	0.83	1.2	0.34	0.0019	0.0019	< 0.00050	< 0.00050
Q1	FR_FRCP1	0.017	0.017	2580	< 0.050	1.5	< 1.0	0.12	0.015	0.016	< 0.0020	< 0.0020
Q4	FR_FRCP1	< 0.010	< 0.010	765	< 0.050	0.81	< 1.0	0.29	0.0038	0.0037	< 0.00050	< 0.00050
Q3	GH_FR1	< 0.010	< 0.010	473	< 0.050	0.86	1.2	0.33	0.0018	0.0018	< 0.00050	< 0.00050
Q2	LC_LCDSSLCC	< 0.010	< 0.010	337	< 0.050	1.52	1.6	0.48	0.002	0.002	< 0.00050	< 0.00050
Q3	LC_LCDSSLCC	< 0.010	< 0.010	447	0.12	0.64	1.4	0.35	0.0026	0.0028	< 0.00050	< 0.00050
Q4	LC_LCDSSLCC	< 0.010	< 0.010	565	< 0.050	0.99	< 1.0	0.29	0.00375	0.00395	< 0.0025	< 0.0025

Abbreviations

% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre
x 104 cells/mL = times 104 cells per millilitre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-2. *P. subcapitata* cell yield paired with water quality

Quarter	Sample ID	ZINC-D-mg/l	ZINC-T-mg/l
References			
Q1	Reference (FR_UFR1)	< 0.0030	< 0.0030
Q1	Reference (FR_UFR1)	< 0.0030	< 0.0030
Q1	Reference (FR_UFR1)	< 0.0030	< 0.0030
Q2	Reference (FR_UFR1)	< 0.0030	< 0.0030
Q3	Reference (FR_UFR1)	< 0.0030	< 0.0030
Q4	Reference (FR_UFR1)	< 0.0030	< 0.0030
Q2	Reference (GH_ER2)	< 0.0030	< 0.0030
Q4	Reference (GH_ER2)	< 0.0030	< 0.0030
Tests that were not statistically different than reference			
Q1	CM_MC2	< 0.0030	0.0032
Q2	EV_HC1	0.003	0.003
Q3	EV_HC1	< 0.0030	< 0.0030
Q4	EV_HC1	< 0.0030	< 0.0030
Q1	EV_MC2	0.0041	< 0.0030
Q4	EV_MC2	< 0.0030	< 0.0030
Q2	FR_FRCP1	< 0.0030	< 0.0030
Q3	FR_FRCP1	< 0.0030	< 0.0030
Q1	GH_ERC	< 0.0030	0.0041
Q2	GH_ERC	< 0.0030	< 0.0030
Q3	GH_ERC	< 0.0030	< 0.0030
Q4	GH_ERC	< 0.0030	< 0.0030
Q1	GH_FR1	< 0.0030	< 0.0030
Q2	GH_FR1	< 0.0030	< 0.0030
Q4	GH_FR1	< 0.0030	< 0.0030
Q1	LC_LCDSSLCC	0.0038	0.0039
Tests with significant results			
Q2	CM_MC2	0.0031	0.0059
Q3	CM_MC2	< 0.0030	< 0.0030
Q4	CM_MC2	< 0.0030	< 0.0030
Q1	EV_HC1	0.003	0.003
Q2	EV_MC2	< 0.0030	0.0041
Q3	EV_MC2	< 0.0030	0.0031
Q1	FR_FRCP1	< 0.0030	< 0.0060
Q4	FR_FRCP1	< 0.0030	< 0.0030
Q3	GH_FR1	< 0.0030	< 0.0030
Q2	LC_LCDSSLCC	0.0061	0.0066
Q3	LC_LCDSSLCC	0.0092	0.011
Q4	LC_LCDSSLCC	0.0081	< 0.015

Abbreviations

% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre
x 104 cells/mL = times 104 cells per millilitre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-3. *H. azteca* dry weight paired with water quality

Quarter	Sample ID	Mean Dry Weight (mg)	ACIDITY TO pH 8.3 (As CaCO3)-N-mg/l	ALKALINITY, BICARBONATE (As CaCO3), lab measured.-N-mg/l	ALKALINITY, CARBONATE (As CaCO3), lab measured.-N-mg/l	ALKALINITY, HYDROXIDE (As CaCO3), lab measured.-N-mg/l	ALKALINITY, TOTAL (As CaCO3), lab measured.-N-mg/l	ALUMINUM-D-mg/l	ALUMINUM-T-mg/l	ANTIMONY-D-mg/l	ANTIMONY-T-mg/l	ARSENIC-D-mg/l	ARSENIC-T-mg/l
References													
Q1	Reference (FR_UFR1)	0.76	1.0	135	4.3	1.0	139	0.0033	0.024	0.0001	0.0001	0.0001	0.00012
Q2	Reference (FR_UFR1)	0.97	1.0	114	2.8	1.0	116	0.0048	0.049	0.0001	0.0001	0.00011	0.00013
Q3	Reference (FR_UFR1)	0.59	1.0	153	6.8	1.0	160	0.003	0.0086	0.0001	0.00011	0.00011	0.00016
Q4	Reference (FR_UFR1)	0.8	1.0	140	5.2	1.0	146	0.003	0.0056	0.0001	0.0001	0.0001	0.00011
Tests that were not statistically different than reference													
Q1	CM_MC2	0.68	1.0	172	4.1	1.0	176	0.0063	0.2	0.00013	0.00015	0.00016	0.00026
Q2	CM_MC2	0.92	1.1	132	3.7	1.0	136	0.012	0.66	0.00011	0.00013	0.00016	0.00049
Q4	CM_MC2	0.61	1.0	189	6.3	1.0	195	0.0031	0.05	0.00015	0.00017	0.00017	0.00023
Q1	FR_FRCP1	0.76	1.0	217	9.1	1.0	226	0.003	0.024	0.00036	0.00037	0.0001	0.00013
Q3	FR_FRCP1	0.65	1.0	196	11	1.0	207	0.003	0.0082	0.00026	0.00029	0.0001	0.00017
Q4	FR_FRCP1	0.71	1.0	211	2.7	1.0	213	0.0032	0.0046	0.00025	0.00028	0.0001	0.00011
Q1	GH_FR1	0.84	1.0	197	7.5	1.0	204	0.003	0.069	0.0002	0.00021	0.0001	0.00015
Q2	GH_FR1	0.83	1.0	153	4.9	1.0	158	0.003	0.054	0.00015	0.00016	0.0001	0.00016
Q3	GH_FR1	0.51	1.0	177	8.5	1.0	185	0.003	0.032	0.00017	0.00021	0.00011	0.00016
Q4	GH_FR1	0.74	1.0	187	5.8	1.0	193	0.003	0.0037	0.00012	0.00015	0.0001	0.00012
Tests with significant results													
Q3	CM_MC2	0.29	1.1	201	8.6	1.0	210	0.003	0.01	0.0002	0.00021	0.00019	0.00023
Q2	FR_FRCP1	0.76	1.0	137	5.0	1.0	142	0.003	0.045	0.00021	0.00022	0.0001	0.00013

Abbreviations
% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg = milligrams
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre.

Screening
Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-3. *H. azteca* dry weight paired with water quality

Quarter	Sample ID	BARIUM-D-mg/l	BARIUM-T-mg/l	BERYLLIUM-D-mg/l	BERYLLIUM-T-mg/l	BISMUTH-D-mg/l	BISMUTH-T-mg/l	BORON-D-mg/l	BORON-T-mg/l	BROMIDE-D-mg/l	CADMIUM-D-mg/l	CADMIUM-T-mg/l
References												
Q1	Reference (FR_UFR1)	0.07	0.072	0.0001	0.0001	0.00032	0.00032	0.01	0.01	0.05	0.0000097	0.000011
Q2	Reference (FR_UFR1)	0.043	0.043	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.05	0.0000057	0.0000086
Q3	Reference (FR_UFR1)	0.081	0.082	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.05	0.0000081	0.000012
Q4	Reference (FR_UFR1)	0.073	0.074	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.05	0.0000065	0.0000085
Tests that were not statistically different than reference												
Q1	CM_MC2	0.059	0.061	0.0001	0.0001	0.00032	0.00032	0.019	0.021	0.06	0.00002	0.000034
Q2	CM_MC2	0.042	0.048	0.0001	0.00011	0.00005	0.00005	0.014	0.017	0.05	0.000035	0.000088
Q4	CM_MC2	0.074	0.074	0.0001	0.0001	0.00005	0.00005	0.024	0.027	0.25	0.000012	0.000019
Q1	FR_FRCP1	0.087	0.089	0.0001	0.0001	0.00032	0.00032	0.013	0.013	0.27	0.000037	0.000074
Q3	FR_FRCP1	0.078	0.079	0.0001	0.0001	0.00005	0.00005	0.013	0.014	0.25	0.000043	0.000052
Q4	FR_FRCP1	0.08	0.08	0.0001	0.0001	0.00005	0.00005	0.011	0.012	0.25	0.000043	0.000058
Q1	GH_FR1	0.11	0.11	0.0001	0.0001	0.00032	0.00032	0.01	0.01	0.1	0.000021	0.000027
Q2	GH_FR1	0.083	0.084	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.075	0.00002	0.000028
Q3	GH_FR1	0.099	0.1	0.0001	0.0001	0.00005	0.00005	0.01	0.011	0.067	0.000018	0.000023
Q4	GH_FR1	0.11	0.11	0.0001	0.0001	0.00005	0.00005	0.01	0.012	0.25	0.000017	0.000019
Tests with significant results												
Q3	CM_MC2	0.077	0.078	0.0001	0.0001	0.00005	0.00005	0.027	0.027	0.21	0.0000091	0.000017
Q2	FR_FRCP1	0.06	0.061	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.05	0.000025	0.000039

Abbreviations
% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg = milligrams
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre.

Screening
Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-3. *H. azteca* dry weight paired with water quality

Quarter	Sample ID	CALCIUM-D-mg/l	CALCIUM-T-mg/l	CARBON, DISSOLVED ORGANIC-D-mg/l	CHLORIDE-D-mg/l	CHROMIUM-D-mg/l	CHROMIUM-T-mg/l	COBALT-D-mg/l	COBALT-T-mg/l	CONDUCTIVITY, LAB-N-us/cm	COPPER-D-mg/l	COPPER-T-mg/l
References												
Q1	Reference (FR_UFR1)	51	52	1.3	1.0	0.00013	0.00019	0.0001	0.0001	328	0.0005	0.0005
Q2	Reference (FR_UFR1)	37	37	1.8	1.0	0.00011	0.00026	0.0001	0.0001	234	0.0005	0.0005
Q3	Reference (FR_UFR1)	57	58	1.0	1.0	0.0001	0.00014	0.0001	0.0001	348	0.0005	0.0005
Q4	Reference (FR_UFR1)	55	56	0.55	1.0	0.00012	0.00018	0.0001	0.0001	356	0.0005	0.0005
Tests that were not statistically different than reference												
Q1	CM_MC2	80	82	1.6	2.4	0.00015	0.00046	0.00047	0.00072	599	0.0005	0.00062
Q2	CM_MC2	59	60	1.5	1.4	0.00023	0.001	0.0003	0.00083	457	0.0005	0.0013
Q4	CM_MC2	108	107	1.2	3.4	0.00016	0.00026	0.00051	0.0006	821	0.0005	0.00059
Q1	FR_FRCP1	144	148	1.2	2.4	0.00011	0.00017	0.00012	0.00014	1113	0.0005	0.0005
Q3	FR_FRCP1	122	123	0.92	1.6	0.0001	0.00014	0.0001	0.0001	925	0.0005	0.0005
Q4	FR_FRCP1	140	141	0.78	2.4	0.00012	0.00016	0.0001	0.0001	1100	0.0005	0.0005
Q1	GH_FR1	112	113	1.5	2.7	0.00011	0.00022	0.00011	0.00017	823	0.0005	0.00051
Q2	GH_FR1	80	80	1.4	1.6	0.00013	0.00024	0.0001	0.0001	581	0.0005	0.0005
Q3	GH_FR1	92	92	0.89	1.5	0.00011	0.0002	0.0001	0.0001	686	0.0005	0.0005
Q4	GH_FR1	106	107	0.66	2.0	0.00012	0.00017	0.0001	0.0001	783	0.0005	0.0005
Tests with significant results												
Q3	CM_MC2	119	121	0.99	2.8	0.00014	0.00017	0.00018	0.00021	939	0.0005	0.0005
Q2	FR_FRCP1	73	73	1.4	1.1	0.00011	0.00019	0.0001	0.00011	568	0.0005	0.0005

Abbreviations
% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg = milligrams
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-3. *H. azteca* dry weight paired with water quality

Quarter	Sample ID	FLUORIDE-D-mg/l	Hardness, Total or Dissolved CaCO3-N-mg/l	IRON-D-mg/l	IRON-T-mg/l	LEAD-D-mg/l	LEAD-T-mg/l	LITHIUM-D-mg/l	LITHIUM-T-mg/l	MAGNESIUM-D-mg/l	MAGNESIUM-T-mg/l	MAJOR ANION SUM-N-meq/l
References												
Q1	Reference (FR_UFR1)	0.14	180	0.01	0.017	0.00005	0.00005	0.0013	0.0013	13	13	3.6
Q2	Reference (FR_UFR1)	0.15	131	0.01	0.036	0.00005	0.00005	0.0011	0.0012	9.2	9.2	2.6
Q3	Reference (FR_UFR1)	0.15	199	0.01	0.011	0.00005	0.00005	0.0018	0.0021	14	14	3.9
Q4	Reference (FR_UFR1)	0.15	193	0.01	0.01	0.00005	0.00005	0.0014	0.0013	14	14	3.9
Tests that were not statistically different than reference												
Q1	CM_MC2	0.11	333	0.01	0.21	0.00005	0.00014	0.0081	0.0084	32	33	7.0
Q2	CM_MC2	0.099	240	0.015	0.85	0.00005	0.00058	0.0062	0.0069	23	23	5.0
Q4	CM_MC2	0.11	456	0.01	0.053	0.00005	0.000063	0.012	0.012	46	46	9.4
Q1	FR_FRCP1	0.18	679	0.01	0.035	0.00005	0.000053	0.043	0.043	77	78	14
Q3	FR_FRCP1	0.2	541	0.01	0.019	0.00005	0.00005	0.035	0.036	58	59	11
Q4	FR_FRCP1	0.18	650	0.01	0.021	0.00005	0.00005	0.04	0.041	73	74	13
Q1	GH_FR1	0.15	479	0.01	0.065	0.00005	0.000063	0.014	0.014	48	49	9.7
Q2	GH_FR1	0.17	329	0.01	0.077	0.00005	0.000071	0.015	0.015	31	32	6.4
Q3	GH_FR1	0.18	385	0.01	0.052	0.00005	0.000062	0.015	0.015	38	38	7.8
Q4	GH_FR1	0.16	445	0.01	0.011	0.00005	0.00005	0.016	0.016	44	45	8.9
Tests with significant results												
Q3	CM_MC2	0.12	534	0.01	0.012	0.00005	0.00005	0.014	0.015	57	58	11
Q2	FR_FRCP1	0.2	308	0.01	0.064	0.00005	0.000082	0.018	0.019	30	30	5.9

Abbreviations
% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg = milligrams
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre.

Screening
Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-3. *H. azteca* dry weight paired with water quality

Quarter	Sample ID	MAJOR CATION SUM-N-meq/l	MANGANESE-D-mg/l	MANGANESE-T-mg/l	MERCURY-D-mg/l	MERCURY-T-mg/l	MOLYBDENUM-D-mg/l	MOLYBDENUM-T-mg/l	NICKEL-D-mg/l	NICKEL-T-mg/l	NITRATE NITROGEN (NO3), AS N-N-mg/l	NITRITE NITROGEN (NO2), AS N-N-mg/l
References												
Q1	Reference (FR_UFR1)	3.6	0.00062	0.001	0.000009	0.000009	0.00057	0.00057	0.0005	0.0005	0.12	0.001
Q2	Reference (FR_UFR1)	2.7	0.00069	0.0022	0.000005	0.000005	0.00056	0.0006	0.0005	0.0005	0.03	0.001
Q3	Reference (FR_UFR1)	4.0	0.00068	0.0013	0.000005	0.000005	0.00064	0.00065	0.0005	0.0005	0.048	0.001
Q4	Reference (FR_UFR1)	3.9	0.00016	0.00031	0.000005	0.000005	0.00061	0.00059	0.0005	0.0005	0.074	0.001
Tests that were not statistically different than reference												
Q1	CM_MC2	7.0	0.0038	0.011	0.000009	0.000009	0.00092	0.00096	0.0061	0.0067	1.6	0.01
Q2	CM_MC2	5.0	0.0027	0.028	0.000005	0.000007	0.00077	0.00097	0.006	0.0081	1.1	0.0029
Q4	CM_MC2	9.6	0.0039	0.0065	0.000005	0.0000051	0.0011	0.0011	0.0087	0.009	2.4	0.034
Q1	FR_FRCP1	14	0.0069	0.01	0.000009	0.000009	0.002	0.002	0.0073	0.0077	15	0.014
Q3	FR_FRCP1	11	0.0052	0.0071	0.000005	0.000005	0.0015	0.0015	0.0056	0.0058	10	0.0071
Q4	FR_FRCP1	13	0.0076	0.0089	0.000005	0.000005	0.0015	0.0015	0.007	0.0072	16	0.0053
Q1	GH_FR1	9.7	0.0023	0.0043	0.000009	0.000009	0.0012	0.0012	0.0037	0.0039	11	0.0038
Q2	GH_FR1	6.7	0.00099	0.0047	0.000005	0.000005	0.00099	0.00099	0.0016	0.0018	7.8	0.003
Q3	GH_FR1	7.8	0.002	0.0057	0.000005	0.000005	0.00099	0.001	0.0015	0.0016	9.6	0.006
Q4	GH_FR1	9.0	0.0012	0.0016	0.000005	0.000005	0.00094	0.00098	0.0015	0.0015	10	0.005
Tests with significant results												
Q3	CM_MC2	11	0.00076	0.0017	0.000005	0.000005	0.0011	0.0011	0.012	0.013	3.2	0.0068
Q2	FR_FRCP1	6.2	0.0027	0.0079	0.000005	0.000005	0.0012	0.0012	0.0018	0.0021	8.1	0.0046

Abbreviations
% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg = milligrams
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre.

Screening
Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-3. *H. azteca* dry weight paired with water quality

Quarter	Sample ID	NITROGEN, AMMONIA (AS N)-N-mg/l	ORTHO-PHOSPHATE-N-mg/l	OXIDATION-REDUCTION POTENTIAL, LAB-N-mv	pH, LAB-N-ph units	PHOSPHORUS-N-mg/l	POTASSIUM-D-mg/l	POTASSIUM-T-mg/l	SELENIUM-D-ug/l	SELENIUM-T-ug/l	SILICON-D-mg/l	SILICON-T-mg/l
References												
Q1	Reference (FR_UFR1)	0.005	0.003	336	8.3	0.005	0.4	0.42	0.72	0.77	1.7	1.8
Q2	Reference (FR_UFR1)	0.005	0.003	383	8.3	0.007	0.34	0.36	0.45	0.5	1.7	1.8
Q3	Reference (FR_UFR1)	0.005	0.0036	362	8.4	0.0033	0.52	0.54	0.49	0.49	2.1	2.2
Q4	Reference (FR_UFR1)	0.005	0.0015	377	8.4	0.0024	0.39	0.39	0.65	0.67	1.5	1.6
Tests that were not statistically different than reference												
Q1	CM_MC2	0.0079	0.0015	359	8.3	0.014	1.1	1.2	4.3	4.3	2.0	2.5
Q2	CM_MC2	0.0068	0.0017	363	8.4	0.062	0.83	1.1	3.9	3.9	1.9	3.1
Q4	CM_MC2	0.016	0.0012	373	8.4	0.0081	1.4	1.4	5.2	5.2	2.1	2.2
Q1	FR_FRCP1	0.019	0.001	305	8.4	0.004	2.1	2.2	112	113	1.9	2.0
Q3	FR_FRCP1	0.0064	0.001	364	8.4	0.0022	1.9	1.9	72	73	2.0	2.1
Q4	FR_FRCP1	0.005	0.001	379	8.3	0.002	1.9	2.0	91	91	1.8	1.8
Q1	GH_FR1	0.005	0.0014	343	8.3	0.0061	1.3	1.3	50	49	2.3	2.4
Q2	GH_FR1	0.0054	0.001	444	8.4	0.009	1.0	1.1	30	30	1.7	1.8
Q3	GH_FR1	0.0062	0.001	393	8.3	0.0031	1.2	1.2	37	37	2.0	2.1
Q4	GH_FR1	0.005	0.0011	354	8.4	0.0022	1.2	1.2	42	42	2.2	2.2
Tests with significant results												
Q3	CM_MC2	0.0062	0.001	404	8.3	0.0029	1.7	1.8	7.9	8.1	1.9	1.9
Q2	FR_FRCP1	0.011	0.0012	397	8.4	0.01	1.2	1.2	30	30	1.5	1.6

Abbreviations
% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg = milligrams
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre.

Screening
Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-3. *H. azteca* dry weight paired with water quality

Quarter	Sample ID	SILVER-D-mg/l	SILVER-T-mg/l	SODIUM-D-mg/l	SODIUM-T-mg/l	STRONTIUM-D-mg/l	STRONTIUM-T-mg/l	SULFATE (AS SO4)-D-mg/l	THALLIUM-D-mg/l	THALLIUM-T-mg/l	TIN-D-mg/l	TIN-T-mg/l
References												
Q1	Reference (FR_UFR1)	0.00001	0.00001	0.71	0.71	0.084	0.085	38	0.00001	0.00001	0.0001	0.0001
Q2	Reference (FR_UFR1)	0.00001	0.00001	0.57	0.58	0.063	0.066	14	0.00001	0.00001	0.0001	0.0001
Q3	Reference (FR_UFR1)	0.00001	0.00001	0.72	0.74	0.095	0.097	36	0.00001	0.000016	0.0001	0.0001
Q4	Reference (FR_UFR1)	0.00001	0.00001	0.68	0.68	0.092	0.091	47	0.00001	0.00001	0.0001	0.0001
Tests that were not statistically different than reference												
Q1	CM_MC2	0.00001	0.00001	6.9	6.9	0.22	0.23	159	0.00001	0.000017	0.0001	0.0001
Q2	CM_MC2	0.00001	0.000013	3.8	3.9	0.15	0.16	103	0.00001	0.000034	0.0001	0.0001
Q4	CM_MC2	0.00001	0.00001	9.5	9.5	0.29	0.29	252	0.000011	0.000012	0.0001	0.0001
Q1	FR_FRCP1	0.00001	0.00001	2.4	2.5	0.17	0.17	407	0.000013	0.000013	0.0001	0.0001
Q3	FR_FRCP1	0.00001	0.00001	1.7	1.8	0.15	0.15	291	0.000011	0.00001	0.0001	0.0001
Q4	FR_FRCP1	0.00001	0.00001	2.0	2.1	0.17	0.17	364	0.00001	0.00001	0.0001	0.0001
Q1	GH_FR1	0.00001	0.00001	2.3	2.4	0.15	0.15	230	0.00001	0.00001	0.0001	0.0001
Q2	GH_FR1	0.00001	0.00001	1.6	1.6	0.11	0.11	129	0.00001	0.00001	0.0001	0.0001
Q3	GH_FR1	0.00001	0.00001	1.8	1.9	0.13	0.13	160	0.00001	0.00001	0.0001	0.00012
Q4	GH_FR1	0.00001	0.00001	2.0	2.1	0.15	0.15	202	0.00001	0.00001	0.0001	0.0001
Tests with significant results												
Q3	CM_MC2	0.00001	0.00001	10	10	0.31	0.32	325	0.000019	0.000018	0.0001	0.0001
Q2	FR_FRCP1	0.00001	0.00001	1.2	1.2	0.10	0.1	119	0.00001	0.00001	0.0001	0.0001

Abbreviations

% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg = milligrams
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-3. *H. azteca* dry weight paired with water quality

Quarter	Sample ID	TITANIUM-D-mg/l	TITANIUM-T-mg/l	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)-N-mg/l	TOTAL KJELDAHL NITROGEN-N-mg/l	TOTAL ORGANIC CARBON-T-mg/l	TOTAL SUSPENDED SOLIDS, LAB-N-mg/l	TURBIDITY, LAB-N-ntu	URANIUM-D-mg/l	URANIUM-T-mg/l	VANADIUM-D-mg/l	VANADIUM-T-mg/l
References												
Q1	Reference (FR_UFR1)	0.01	0.01	203	0.075	1.1	1.1	0.69	0.00044	0.00044	0.0008	0.0008
Q2	Reference (FR_UFR1)	0.01	0.01	141	0.094	2.0	2.0	1.4	0.00031	0.00031	0.0005	0.0005
Q3	Reference (FR_UFR1)	0.01	0.01	221	0.06	0.84	1.0	0.24	0.00043	0.00044	0.0005	0.00053
Q4	Reference (FR_UFR1)	0.01	0.01	217	0.065	0.6	1.0	0.22	0.00045	0.00045	0.0005	0.0005
Tests that were not statistically different than reference												
Q1	CM_MC2	0.01	0.014	408	0.12	1.9	10	6.1	0.0015	0.0015	0.0008	0.00092
Q2	CM_MC2	0.01	0.018	308	0.18	2.2	32	16	0.0011	0.0011	0.0005	0.0016
Q4	CM_MC2	0.011	0.012	571	0.14	1.4	4.1	2.0	0.0024	0.0023	0.0005	0.00053
Q1	FR_FRCP1	0.013	0.014	866	0.05	1.3	1.9	1.3	0.0041	0.0042	0.0008	0.0008
Q3	FR_FRCP1	0.01	0.01	703	0.13	0.96	1.0	0.23	0.0032	0.0033	0.0005	0.0005
Q4	FR_FRCP1	0.011	0.011	836	0.1	0.88	1.1	0.37	0.0042	0.0043	0.0005	0.0005
Q1	GH_FR1	0.012	0.014	574	0.12	1.9	2.5	3.6	0.0022	0.0023	0.0008	0.00083
Q2	GH_FR1	0.01	0.01	386	0.073	1.6	4.4	1.8	0.0015	0.0015	0.0005	0.00056
Q3	GH_FR1	0.01	0.01	508	0.12	0.89	8.3	1.9	0.0018	0.0019	0.0005	0.00051
Q4	GH_FR1	0.01	0.011	545	0.11	0.7	1.0	0.27	0.002	0.0021	0.0005	0.0005
Tests with significant results												
Q3	CM_MC2	0.01	0.01	725	0.14	1.1	1.3	0.48	0.0029	0.003	0.0005	0.0005
Q2	FR_FRCP1	0.01	0.01	374	0.05	1.7	5.4	1.4	0.0016	0.0016	0.0005	0.00051

Abbreviations
% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg = milligrams
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre.

Screening
Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-3. *H. azteca* dry weight paired with water quality

Quarter	Sample ID	ZINC-D-mg/l	ZINC-T-mg/l
References			
Q1	Reference (FR_UFR1)	0.003	0.0032
Q2	Reference (FR_UFR1)	0.003	0.003
Q3	Reference (FR_UFR1)	0.003	0.003
Q4	Reference (FR_UFR1)	0.003	0.003
Tests that were not statistically different than reference			
Q1	CM_MC2	0.003	0.0036
Q2	CM_MC2	0.0035	0.0091
Q4	CM_MC2	0.003	0.003
Q1	FR_FRCP1	0.003	0.0031
Q3	FR_FRCP1	0.003	0.003
Q4	FR_FRCP1	0.003	0.003
Q1	GH_FR1	0.003	0.003
Q2	GH_FR1	0.003	0.003
Q3	GH_FR1	0.003	0.003
Q4	GH_FR1	0.003	0.003
Tests with significant results			
Q3	CM_MC2	0.003	0.003
Q2	FR_FRCP1	0.003	0.003

Abbreviations
% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg = milligrams
mg/l = milligrams per litre
"-T-" = total concentration
ug/l = micrograms per litre.

Screening
Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference

Table D-4. *O. mykiss* endpoints paired with water quality

Quarter	Sample ID	Mean Survival (%)	Mean Viability (%)	Mean Length (mm)	Mean Wet Weight (mg)	ACIDITY TO pH 8.3 (As CaCO3)-N-mg/l	ALKALINITY, BICARBONATE (As CaCO3), lab measured.-N-mg/l	ALKALINITY, CARBONATE (As CaCO3), lab measured.-N-mg/l	ALKALINITY, HYDROXIDE (As CaCO3), lab measured.-N-mg/l	ALKALINITY, TOTAL (As CaCO3), lab measured.-N-mg/l	ALUMINUM-D-mg/l	ALUMINUM-T-mg/l	ANTIMONY-D-mg/l	ANTIMONY-T-mg/l
References														
Q2	Reference (FR_UFR1)	77.6	72.6	18.7	97.7	1.00	114	3.62	1.00	118	0.0075	0.0594	0.00010	0.00010
Q4	Reference (FR_UFR1)	83.2	83.2	19.0	81.3	1.00	140	5.20	1.00	146	0.0030	0.00556	0.00010	0.00010
Q2	Reference (GH_ER2)	53.6	53.6	18.0	91.3	1.12	146	4.18	1.00	150	0.0030	0.0824	0.00010	0.00010
Q4	Reference (GH_ER2)	86.8	86.8	18.4	78.8	1.00	146	1.70	1.00	147	0.0030	0.0139	0.00010	0.00010
Tests that were not statistically different than reference														
Q2	CM_MC2	68.8	68.8	20.4	99.0	1.06	132	3.68	1.00	138	0.0122	0.578	0.000188	0.000156
Q2	EV_MC2	86.5	84.8	20.3	101	1.18	100	3.46	1.00	104	0.00652	0.662	0.000136	0.000166
Q4	EV_MC2	80.8	79.2	18.7	78.0	1.50	166	1.55	1.00	167	0.00683	0.0807	0.00026	0.00029
Q2	FR_FRCP1	73.9	72.3	20.0	106	1.00	139	5.88	1.00	145	0.0030	0.0471	0.000216	0.000224
Q2	GH_ERC	58.0	56.3	17.5	91.0	1.00	148	4.54	1.00	153	0.00322	0.209	0.00010	0.00010
Q2	GH_FR1	75.5	75.5	18.8	94.7	1.00	150	5.70	1.00	156	0.0030	0.0505	0.000162	0.000172
Q2	LC_LCDSSLCC	78.3	75.0	19.8	99.7	1.14	116	4.69	1.00	121	0.0030	0.041	0.000142	0.000155
Q4	LC_LCDSSLCC	81.6	80.8	18.6	82.2	1.00	199	1.00	1.00	199	0.0030	0.0052	0.00028	0.00032
Tests with significant results for survival and viability														
Q4	CM_MC2	75.9	75.1	19.0	82.1	1.00	189	6.32	1.00	195	0.00306	0.0502	0.000154	0.000168
Q4	EV_HC1	76.2	74.5	18.7	80.1	1.00	188	8.30	1.00	197	0.0032	0.0226	0.00010	0.000108
Q4	FR_FRCP1	67.5	66.7	18.3	79.8	1.00	211	2.72	1.00	213	0.00316	0.00462	0.00025	0.000282
Q4	GH_ERC	71.3	68.8	18.4	76.1	1.00	151	1.70	1.00	152	0.0031	0.00893	0.00010	0.00010
Q4	GH_FR1	74.2	73.3	17.9	78.2	1.00	187	5.80	1.00	193	0.0030	0.00366	0.00012	0.00015
Tests with significant results for length														
Q4	FR_FRCP1	67.5	66.7	18.3	79.8	1.00	211	2.72	1.00	213	0.00316	0.00462	0.00025	0.000282
Q4	GH_ERC	71.3	68.8	18.4	76.1	1.00	151	1.70	1.00	152	0.0031	0.00893	0.00010	0.00010
Q4	GH_FR1	74.2	73.3	17.9	78.2	1.00	187	5.80	1.00	193	0.0030	0.00366	0.00012	0.00015
Tests with significant results for weight														
Q2	EV_HC1	69.4	68.6	18.0	88.2	1.22	107	6.36	1.00	113	0.00308	0.0545	0.00010	0.000103
Q4	GH_ERC	71.3	68.8	18.4	76.1	1.00	151	1.70	1.00	152	0.0031	0.00893	0.00010	0.00010

Abbreviations
% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg = milligrams
mg/l = milligrams per litre
mm = millimetres
n/a = not applicable
"-T-" = total concentration
ug/l = micrograms per litre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference for that endpoint.

Table D-4. *O. mykiss* endpoints paired with water quality

Quarter	Sample ID	ARSENIC-D-mg/l	ARSENIC-T-mg/l	BARIUM-D-mg/l	BARIUM-T-mg/l	BERYLLIUM-D-mg/l	BERYLLIUM-T-mg/l	BISMUTH-D-mg/l	BISMUTH-T-mg/l	BORON-D-mg/l	BORON-T-mg/l	BROMIDE-D-mg/l
References												
Q2	Reference (FR_UFR1)	0.000104	0.000128	0.0431	0.0434	0.00010	0.00010	0.000050	0.000050	0.010	0.010	0.050
Q4	Reference (FR_UFR1)	0.00010	0.000108	0.0732	0.0741	0.00010	0.00010	0.000050	0.000050	0.010	0.010	0.050
Q2	Reference (GH_ER2)	0.00011	0.000162	0.0444	0.0457	0.00010	0.00010	0.000050	0.000050	0.010	0.010	0.050
Q4	Reference (GH_ER2)	0.00010	0.000115	0.0474	0.0484	0.00010	0.00010	0.000050	0.000050	0.010	0.010	0.050
Tests that were not statistically different than reference												
Q2	CM_MC2	0.000228	0.000492	0.0426	0.049	0.00018	0.000138	0.00054	0.00054	0.0212	0.0182	0.050
Q2	EV_MC2	0.000176	0.000544	0.0635	0.0765	0.00010	0.000118	0.000050	0.000050	0.010	0.0102	0.050
Q4	EV_MC2	0.000158	0.000215	0.11	0.111	0.00010	0.00010	0.000050	0.000050	0.0125	0.0133	0.100
Q2	FR_FRCP1	0.00010	0.000132	0.063	0.064	0.00010	0.00010	0.000050	0.000050	0.010	0.010	0.050
Q2	GH_ERC	0.000104	0.000242	0.0491	0.051	0.00010	0.00010	0.000050	0.000050	0.010	0.010	0.050
Q2	GH_FR1	0.000102	0.000154	0.0852	0.0861	0.00010	0.00010	0.000050	0.000050	0.010	0.010	0.070
Q2	LC_LCDSSLCC	0.000116	0.000159	0.0348	0.0354	0.00010	0.00010	0.000050	0.000050	0.010	0.0102	0.060
Q4	LC_LCDSSLCC	0.00010	0.00013	0.0831	0.0865	0.00010	0.00010	0.000050	0.000050	0.015	0.016	0.25
Tests with significant results for survival and viability												
Q4	CM_MC2	0.00017	0.000228	0.0741	0.0743	0.00010	0.00010	0.000050	0.000050	0.0244	0.0274	0.25
Q4	EV_HC1	0.000148	0.000183	0.0632	0.0643	0.00010	0.00010	0.000050	0.000050	0.010	0.0103	0.20
Q4	FR_FRCP1	0.00010	0.000114	0.0796	0.0802	0.00010	0.00010	0.000050	0.000050	0.0114	0.0124	0.25
Q4	GH_ERC	0.00010	0.000118	0.060	0.060	0.00010	0.00010	0.000050	0.000050	0.010	0.010	0.050
Q4	GH_FR1	0.000102	0.00012	0.114	0.112	0.00010	0.00010	0.000050	0.000050	0.0104	0.0122	0.25
Tests with significant results for length												
Q4	FR_FRCP1	0.00010	0.000114	0.0796	0.0802	0.00010	0.00010	0.000050	0.000050	0.0114	0.0124	0.25
Q4	GH_ERC	0.00010	0.000118	0.060	0.060	0.00010	0.00010	0.000050	0.000050	0.010	0.010	0.050
Q4	GH_FR1	0.000102	0.00012	0.114	0.112	0.00010	0.00010	0.000050	0.000050	0.0104	0.0122	0.25
Tests with significant results for weight												
Q2	EV_HC1	0.00013	0.000167	0.0268	0.0277	0.00010	0.00010	0.000050	0.000050	0.010	0.0101	0.0567
Q4	GH_ERC	0.00010	0.000118	0.060	0.060	0.00010	0.00010	0.000050	0.000050	0.010	0.010	0.050

Abbreviations
% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg = milligrams
mg/l = milligrams per litre
mm = millimetres
n/a = not applicable
"-T-" = total concentration
ug/l = micrograms per litre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference for that endpoint.

Table D-4. *O. mykiss* endpoints paired with water quality

Quarter	Sample ID	CADMIUM-D-mg/l	CADMIUM-T-mg/l	CALCIUM-D-mg/l	CALCIUM-T-mg/l	CARBON, DISSOLVED ORGANIC-D-mg/l	CHLORIDE-D-mg/l	CHROMIUM-D-mg/l	CHROMIUM-T-mg/l	COBALT-D-mg/l	COBALT-T-mg/l	CONDUCTIVITY, LAB-N-us/cm
References												
Q2	Reference (FR_UFR1)	0.0000066	0.00000986	37.7	37.7	1.89	1.00	0.000118	0.00026	0.00010	0.00010	239
Q4	Reference (FR_UFR1)	0.00000652	0.00000854	54.7	56.0	0.546	1.02	0.00012	0.000184	0.00010	0.00010	356
Q2	Reference (GH_ER2)	0.00000564	0.0000167	47.6	49.1	1.12	1.16	0.00020	0.000754	0.00010	0.00010	297
Q4	Reference (GH_ER2)	0.00000508	0.00000735	50.8	51.9	0.675	1.10	0.000218	0.000303	0.00010	0.00010	314
Tests that were not statistically different than reference												
Q2	CM_MC2	0.0000379	0.0000814	59.7	60.4	1.33	1.40	0.000282	0.000912	0.00034	0.00082	466
Q2	EV_MC2	0.0000236	0.000125	45.1	46.0	2.00	3.24	0.000182	0.0012	0.00010	0.000476	321
Q4	EV_MC2	0.000029	0.0000448	80.5	80.8	1.49	5.58	0.00014	0.000273	0.00010	0.000105	588
Q2	FR_FRCP1	0.0000285	0.0000421	74.9	75.4	1.46	1.14	0.000104	0.000184	0.00010	0.000104	580
Q2	GH_ERC	0.00000726	0.0000334	51.5	52.7	1.12	1.32	0.000242	0.000692	0.00010	0.000144	323
Q2	GH_FR1	0.0000214	0.0000281	81.3	81.4	1.38	1.62	0.00012	0.000238	0.00010	0.00010	595
Q2	LC_LCDSSLCC	0.000108	0.000132	57.3	57.9	1.25	1.46	0.000123	0.000319	0.00010	0.00012	436
Q4	LC_LCDSSLCC	0.000199	0.000235	119	125	0.67	3.80	0.00014	0.00017	0.00010	0.00010	901
Tests with significant results for survival and viability												
Q4	CM_MC2	0.0000118	0.0000191	108	107	1.17	3.42	0.000158	0.00026	0.000506	0.000602	821
Q4	EV_HC1	0.0000154	0.0000218	92.9	93.0	1.28	1.88	0.00014	0.000275	0.00010	0.00010	750
Q4	FR_FRCP1	0.0000432	0.0000581	140	141	0.782	2.36	0.000124	0.000162	0.000102	0.000102	1100
Q4	GH_ERC	0.00000563	0.00000633	57.0	57.9	0.58	1.20	0.000228	0.000303	0.00010	0.00010	357
Q4	GH_FR1	0.0000167	0.0000187	106	107	0.656	2.00	0.000122	0.000174	0.00010	0.00010	783
Tests with significant results for length												
Q4	FR_FRCP1	0.0000432	0.0000581	140	141	0.782	2.36	0.000124	0.000162	0.000102	0.000102	1100
Q4	GH_ERC	0.00000563	0.00000633	57.0	57.9	0.58	1.20	0.000228	0.000303	0.00010	0.00010	357
Q4	GH_FR1	0.0000167	0.0000187	106	107	0.656	2.00	0.000122	0.000174	0.00010	0.00010	783
Tests with significant results for weight												
Q2	EV_HC1	0.0000136	0.0000201	46.7	46.9	1.07	1.32	0.000137	0.000227	0.00010	0.000105	364
Q4	GH_ERC	0.00000563	0.00000633	57.0	57.9	0.58	1.20	0.000228	0.000303	0.00010	0.00010	357

Abbreviations
% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg = milligrams
mg/l = milligrams per litre
mm = millimetres
n/a = not applicable
"-T-" = total concentration
ug/l = micrograms per litre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference for that endpoint.

Table D-4. *O. mykiss* endpoints paired with water quality

Quarter	Sample ID	COPPER-D-mg/l	COPPER-T-mg/l	FLUORIDE-D-mg/l	Hardness, Total or Dissolved CaCO3-N-mg/l	IRON-D-mg/l	IRON-T-mg/l	LEAD-D-mg/l	LEAD-T-mg/l	LITHIUM-D-mg/l	LITHIUM-T-mg/l	MAGNESIUM-D-mg/l
References												
Q2	Reference (FR_UFR1)	0.00050	0.00050	0.146	132	0.010	0.0402	0.000050	0.000050	0.0012	0.00122	9.27
Q4	Reference (FR_UFR1)	0.00050	0.00050	0.154	193	0.010	0.010	0.000050	0.000050	0.00136	0.0013	13.8
Q2	Reference (GH_ER2)	0.00050	0.000518	0.155	162	0.010	0.093	0.000050	0.0000716	0.00162	0.00174	10.5
Q4	Reference (GH_ER2)	0.00050	0.00050	0.163	173	0.010	0.0215	0.000050	0.000050	0.00163	0.00163	11.1
Tests that were not statistically different than reference												
Q2	CM_MC2	0.00050	0.00112	0.0974	245	0.0218	0.737	0.000090	0.00050	0.00632	0.0068	23.4
Q2	EV_MC2	0.000608	0.00145	0.118	170	0.0104	0.822	0.000050	0.000671	0.00662	0.0070	14.0
Q4	EV_MC2	0.00050	0.000555	0.154	320	0.0125	0.0825	0.000050	0.0000773	0.0155	0.0153	29.0
Q2	FR_FRCP1	0.00050	0.00050	0.20	315	0.010	0.066	0.000050	0.0000762	0.0196	0.0198	31.1
Q2	GH_ERC	0.00050	0.00070	0.153	177	0.010	0.261	0.0000508	0.00018	0.0021	0.00232	11.7
Q2	GH_FR1	0.00050	0.00050	0.171	335	0.010	0.071	0.000050	0.0000712	0.0146	0.0145	32.0
Q2	LC_LCDSSLCC	0.00050	0.000558	0.152	232	0.010	0.0484	0.000050	0.0000806	0.014	0.0122	21.6
Q4	LC_LCDSSLCC	0.00050	0.00050	0.22	497	0.010	0.010	0.000050	0.000050	0.0359	0.0361	48.5
Tests with significant results for survival and viability												
Q4	CM_MC2	0.00050	0.000588	0.114	456	0.010	0.0532	0.000050	0.0000634	0.0115	0.012	45.7
Q4	EV_HC1	0.00050	0.000528	0.201	434	0.010	0.0278	0.000050	0.000050	0.00708	0.00723	49.1
Q4	FR_FRCP1	0.00050	0.00050	0.176	650	0.010	0.0208	0.000050	0.000050	0.0404	0.0407	72.9
Q4	GH_ERC	0.00050	0.00052	0.158	195	0.010	0.0145	0.000050	0.000050	0.00193	0.00193	12.7
Q4	GH_FR1	0.00050	0.00050	0.164	445	0.010	0.0108	0.000050	0.000050	0.0156	0.0159	44.0
Tests with significant results for length												
Q4	FR_FRCP1	0.00050	0.00050	0.176	650	0.010	0.0208	0.000050	0.000050	0.0404	0.0407	72.9
Q4	GH_ERC	0.00050	0.00052	0.158	195	0.010	0.0145	0.000050	0.000050	0.00193	0.00193	12.7
Q4	GH_FR1	0.00050	0.00050	0.164	445	0.010	0.0108	0.000050	0.000050	0.0156	0.0159	44.0
Tests with significant results for weight												
Q2	EV_HC1	0.00050	0.000515	0.13	206	0.010	0.0583	0.000050	0.0000699	0.00423	0.00423	21.7
Q4	GH_ERC	0.00050	0.00052	0.158	195	0.010	0.0145	0.000050	0.000050	0.00193	0.00193	12.7

Abbreviations
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ug/l = micrograms per litre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference for that endpoint.

Table D-4. *O. mykiss* endpoints paired with water quality

Quarter	Sample ID	MAGNESIUM-T-mg/l	MAJOR ANION SUM-N-meq/l	MAJOR CATION SUM-N-meq/l	MANGANESE-D-mg/l	MANGANESE-T-mg/l	MERCURY-D-mg/l	MERCURY-T-mg/l	MOLYBDENUM-D-mg/l	MOLYBDENUM-T-mg/l	NICKEL-D-mg/l	NICKEL-T-mg/l
References												
Q2	Reference (FR_UFR1)	9.36	2.66	2.68	0.00067	0.00216	0.0000050	0.0000050	0.000548	0.000588	0.00050	0.00050
Q4	Reference (FR_UFR1)	14.3	3.90	3.91	0.000156	0.000308	0.0000050	0.0000050	0.00061	0.000589	0.00050	0.00050
Q2	Reference (GH_ER2)	10.9	3.41	3.28	0.00295	0.00735	0.00000546	0.0000050	0.000949	0.000961	0.00050	0.00051
Q4	Reference (GH_ER2)	11.5	3.44	3.48	0.00225	0.00352	0.0000050	0.0000050	0.0010	0.00102	0.00050	0.00050
Tests that were not statistically different than reference												
Q2	CM_MC2	23.7	5.11	5.04	0.00287	0.0253	0.0000060	0.00000762	0.000782	0.000948	0.0062	0.00798
Q2	EV_MC2	14.2	3.27	3.52	0.000728	0.0241	0.0000050	0.0000050	0.000782	0.000874	0.0012	0.00292
Q4	EV_MC2	29.1	6.46	6.60	0.00127	0.00302			0.00162	0.00165	0.00294	0.00312
Q2	FR_FRCP1	31.4	6.10	6.38	0.00305	0.00833	0.0000050	0.0000050	0.0013	0.00132	0.0021	0.00235
Q2	GH_ERC	12.0	3.59	3.59	0.000544	0.0144	0.0000050	0.0000050	0.000961	0.000938	0.00050	0.000688
Q2	GH_FR1	32.5	6.53	6.79	0.00104	0.00452	0.0000050	0.0000050	0.00103	0.00104	0.00179	0.00198
Q2	LC_LCDSSLCC	21.8	5.70	5.83	0.000148	0.00226	0.0000050	0.0000050	0.000952	0.000956	0.00288	0.00319
Q4	LC_LCDSSLCC	51.7	10.3	10.3	0.00037	0.00050	0.0000050	0.0000050	0.00181	0.00187	0.0066	0.00686
Tests with significant results for survival and viability												
Q4	CM_MC2	45.8	9.43	9.57	0.00394	0.00647	0.0000050	0.0000051	0.00108	0.00111	0.00867	0.00897
Q4	EV_HC1	49.5	8.59	8.78	0.00187	0.00236			0.00100	0.00105	0.000755	0.000788
Q4	FR_FRCP1	73.8	13.1	13.1	0.0076	0.00889	0.0000050	0.0000050	0.00146	0.00147	0.00704	0.0072
Q4	GH_ERC	13.1	3.90	3.94	0.000568	0.00143	0.0000050	0.0000050	0.000997	0.00104	0.00050	0.00050
Q4	GH_FR1	45.3	8.85	9.01	0.00116	0.00156	0.0000050	0.0000050	0.000941	0.000983	0.00148	0.00147
Tests with significant results for length												
Q4	FR_FRCP1	73.8	13.1	13.1	0.0076	0.00889	0.0000050	0.0000050	0.00146	0.00147	0.00704	0.0072
Q4	GH_ERC	13.1	3.90	3.94	0.000568	0.00143	0.0000050	0.0000050	0.000997	0.00104	0.00050	0.00050
Q4	GH_FR1	45.3	8.85	9.01	0.00116	0.00156	0.0000050	0.0000050	0.000941	0.000983	0.00148	0.00147
Tests with significant results for weight												
Q2	EV_HC1	21.9	6.06	6.24	0.000635	0.00206	0.0000050	0.0000050	0.000512	0.000522	0.000729	0.000854
Q4	GH_ERC	13.1	3.90	3.94	0.000568	0.00143	0.0000050	0.0000050	0.000997	0.00104	0.00050	0.00050

Abbreviations
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mm = millimetres
n/a = not applicable
"-T-" = total concentration
ug/l = micrograms per litre.

Screening

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Table D-4. *O. mykiss* endpoints paired with water quality

Quarter	Sample ID	NITRATE NITROGEN (NO3), AS N-N-mg/l	NITRITE NITROGEN (NO2), AS N-N-mg/l	NITROGEN, AMMONIA (AS N)-N-mg/l	ORTHO-PHOSPHATE-N-mg/l	OXIDATION-REDUCTION POTENTIAL, LAB-N-mv	pH, LAB-N-ph units	PHOSPHORUS-N-mg/l	POTASSIUM-D-mg/l	POTASSIUM-T-mg/l	SELENIUM-D-ug/l	SELENIUM-T-ug/l
References												
Q2	Reference (FR_UFR1)	0.0378	0.0010	0.0050	0.00346	361	8.35	0.00774	0.343	0.362	0.462	0.503
Q4	Reference (FR_UFR1)	0.0743	0.0010	0.0050	0.00152	377	8.40	0.00236	0.387	0.39	0.654	0.668
Q2	Reference (GH_ER2)	0.0823	0.0010	0.0068	0.00108	330	8.34	0.00902	0.351	0.371	0.746	0.793
Q4	Reference (GH_ER2)	0.0812	0.0010	0.0050	0.0012	386	8.32	0.00303	0.346	0.356	0.794	0.845
Tests that were not statistically different than reference												
Q2	CM_MC2	1.13	0.0047	0.00642	0.00158	357	8.34	0.0523	0.846	1.05	3.99	3.97
Q2	EV_MC2	1.13	0.00128	0.00596	0.00288	380	8.29	0.0805	0.627	0.822	6.35	6.34
Q4	EV_MC2	3.75	0.00233	0.0054	0.0052	376	8.24	0.00875	1.06	1.07	15.7	16.2
Q2	FR_FRCP1	7.85	0.00524	0.0124	0.00134	372	8.41	0.00972	1.22	1.22	32.7	31.9
Q2	GH_ERC	0.263	0.0010	0.0052	0.0010	433	8.36	0.0255	0.375	0.445	1.47	1.52
Q2	GH_FR1	7.82	0.00336	0.00532	0.0010	433	8.39	0.00844	1.04	1.07	31.1	31.6
Q2	LC_LCDSSLCC	4.76	0.00148	0.0050	0.00143	414	7.97	0.00884	0.662	0.675	22.3	21.6
Q4	LC_LCDSSLCC	14.5	0.0050	0.0050	0.0010	341	8.34	0.0020	1.44	1.48	50.0	53.6
Tests with significant results for survival and viability												
Q4	CM_MC2	2.39	0.0339	0.0163	0.00124	373	8.35	0.00814	1.40	1.38	5.23	5.22
Q4	EV_HC1	1.17	0.0040	0.0050	0.00573	373	8.38	0.00688	0.947	0.967	36.0	37.2
Q4	FR_FRCP1	16.3	0.00528	0.0050	0.0010	379	8.33	0.0020	1.92	2.01	91.4	91.0
Q4	GH_ERC	0.494	0.0010	0.0050	0.0012	391	8.27	0.00345	0.401	0.399	1.59	1.65
Q4	GH_FR1	10.4	0.0050	0.0050	0.00108	354	8.36	0.00218	1.18	1.22	41.9	42.4
Tests with significant results for length												
Q4	FR_FRCP1	16.3	0.00528	0.0050	0.0010	379	8.33	0.0020	1.92	2.01	91.4	91.0
Q4	GH_ERC	0.494	0.0010	0.0050	0.0012	391	8.27	0.00345	0.401	0.399	1.59	1.65
Q4	GH_FR1	10.4	0.0050	0.0050	0.00108	354	8.36	0.00218	1.18	1.22	41.9	42.4
Tests with significant results for weight												
Q2	EV_HC1	0.56	0.00113	0.00639	0.00296	423	7.69	0.0082	0.536	0.561	18.7	19.0
Q4	GH_ERC	0.494	0.0010	0.0050	0.0012	391	8.27	0.00345	0.401	0.399	1.59	1.65

Abbreviations
% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg = milligrams
mg/l = milligrams per litre
mm = millimetres
n/a = not applicable
"-T-" = total concentration
ug/l = micrograms per litre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference for that endpoint.

Table D-4. *O. mykiss* endpoints paired with water quality

Quarter	Sample ID	SILICON-D-mg/l	SILICON-T-mg/l	SILVER-D-mg/l	SILVER-T-mg/l	SODIUM-D-mg/l	SODIUM-T-mg/l	STRONTIUM-D-mg/l	STRONTIUM-T-mg/l	SULFATE (AS SO4)-D-mg/l	THALLIUM-D-mg/l	THALLIUM-T-mg/l
References												
Q2	Reference (FR_UFR1)	1.72	1.83	0.000010	0.000010	0.576	0.583	0.0637	0.0658	14.4	0.000010	0.000010
Q4	Reference (FR_UFR1)	1.50	1.55	0.000010	0.000010	0.681	0.681	0.0916	0.0907	46.8	0.000010	0.000010
Q2	Reference (GH_ER2)	1.67	1.89	0.000010	0.000010	0.741	0.738	0.203	0.212	17.0	0.000010	0.0000104
Q4	Reference (GH_ER2)	1.74	1.82	0.000010	0.000010	0.651	0.672	0.211	0.218	22.0	0.000010	0.000010
Tests that were not statistically different than reference												
Q2	CM_MC2	1.86	2.84	0.000018	0.000020	4.05	4.12	0.161	0.166	107	0.0000182	0.0000374
Q2	EV_MC2	1.69	2.79	0.000010	0.0000246	2.34	2.21	0.103	0.105	49.1	0.0000114	0.0000356
Q4	EV_MC2	2.37	2.52	0.000010	0.000010	3.91	3.89	0.188	0.187	129	0.000010	0.0000108
Q2	FR_FRCP1	1.53	1.62	0.000010	0.000010	1.20	1.21	0.103	0.106	125	0.000010	0.000010
Q2	GH_ERC	1.73	2.09	0.000010	0.0000114	0.949	0.941	0.203	0.201	22.8	0.000010	0.0000138
Q2	GH_FR1	1.79	1.88	0.000010	0.000010	1.62	1.64	0.114	0.115	134	0.000010	0.000010
Q2	LC_LCDSSLCC	1.49	1.56	0.000010	0.000010	2.40	2.40	0.108	0.109	89.6	0.0000105	0.0000115
Q4	LC_LCDSSLCC	2.15	2.29	0.000010	0.000010	7.03	7.22	0.215	0.22	248	0.000010	0.000010
Tests with significant results for survival and viability												
Q4	CM_MC2	2.15	2.24	0.000010	0.000010	9.50	9.49	0.288	0.295	252	0.0000108	0.000012
Q4	EV_HC1	2.09	2.16	0.000010	0.000010	1.87	1.89	0.133	0.136	217	0.000010	0.000010
Q4	FR_FRCP1	1.75	1.78	0.000010	0.000010	2.00	2.06	0.165	0.167	364	0.0000102	0.0000104
Q4	GH_ERC	1.85	1.92	0.000010	0.000010	0.924	0.93	0.222	0.227	38.9	0.000010	0.000010
Q4	GH_FR1	2.18	2.24	0.000010	0.000010	2.04	2.11	0.147	0.151	202	0.000010	0.000010
Tests with significant results for length												
Q4	FR_FRCP1	1.75	1.78	0.000010	0.000010	2.00	2.06	0.165	0.167	364	0.0000102	0.0000104
Q4	GH_ERC	1.85	1.92	0.000010	0.000010	0.924	0.93	0.222	0.227	38.9	0.000010	0.000010
Q4	GH_FR1	2.18	2.24	0.000010	0.000010	2.04	2.11	0.147	0.151	202	0.000010	0.000010
Tests with significant results for weight												
Q2	EV_HC1	1.19	1.28	0.000010	0.000010	0.844	0.857	0.0636	0.0643	82.3	0.000010	0.0000116
Q4	GH_ERC	1.85	1.92	0.000010	0.000010	0.924	0.93	0.222	0.227	38.9	0.000010	0.000010

Abbreviations
% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg = milligrams
mg/l = milligrams per litre
mm = millimetres
n/a = not applicable
"-T-" = total concentration
ug/l = micrograms per litre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference for that endpoint.

Table D-4. *O. mykiss* endpoints paired with water quality

Quarter	Sample ID	TIN-D-mg/l	TIN-T-mg/l	TITANIUM-D-mg/l	TITANIUM-T-mg/l	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)-N-mg/l	TOTAL KJELDAHL NITROGEN-N-mg/l	TOTAL ORGANIC CARBON-T-mg/l	TOTAL SUSPENDED SOLIDS, LAB-N-mg/l	TURBIDITY, LAB-N-ntu	URANIUM-D-mg/l	URANIUM-T-mg/l
References												
Q2	Reference (FR_UFR1)	0.00010	0.00010	0.010	0.010	143	0.092	2.03	1.94	1.43	0.000314	0.000318
Q4	Reference (FR_UFR1)	0.00010	0.00010	0.010	0.010	217	0.0652	0.604	1.00	0.22	0.000448	0.000454
Q2	Reference (GH_ER2)	0.00010	0.00010	0.010	0.010	181	0.0864	1.39	5.94	4.05	0.000772	0.00079
Q4	Reference (GH_ER2)	0.00010	0.00010	0.010	0.010	176	0.050	0.615	1.28	0.365	0.000743	0.000754
Tests that were not statistically different than reference												
Q2	CM_MC2	0.00010	0.00013	0.010	0.0162	316	0.157	1.94	28.9	14.6	0.0011	0.00114
Q2	EV_MC2	0.00010	0.00010	0.010	0.0168	208	0.287	3.61	57.1	15.0	0.000621	0.000668
Q4	EV_MC2	0.00010	0.00010	0.010	0.0103	387	0.172	1.61	3.08	2.55	0.0014	0.00142
Q2	FR_FRCP1	0.00010	0.00010	0.010	0.010	382	0.050	1.83	5.22	1.37	0.00162	0.00168
Q2	GH_ERC	0.00010	0.00010	0.010	0.0104	192	0.122	1.70	17.2	6.88	0.000802	0.000811
Q2	GH_FR1	0.00010	0.00010	0.010	0.010	399	0.0682	1.57	4.14	1.80	0.00158	0.00159
Q2	LC_LCDSSLCC	0.00010	0.00010	0.010	0.010	280	0.0748	1.26	5.29	1.73	0.00163	0.00166
Q4	LC_LCDSSLCC	0.00010	0.00010	0.010	0.010	651	0.133	0.77	1.00	0.45	0.00402	0.00417
Tests with significant results for survival and viability												
Q4	CM_MC2	0.00010	0.00010	0.0108	0.0116	571	0.138	1.40	4.08	2.00	0.00235	0.00233
Q4	EV_HC1	0.00010	0.00010	0.0103	0.0105	519	0.10	1.23	1.05	0.693	0.00272	0.00276
Q4	FR_FRCP1	0.00010	0.00010	0.0106	0.0106	836	0.101	0.878	1.06	0.366	0.00423	0.00425
Q4	GH_ERC	0.00010	0.00010	0.010	0.010	211	0.051	0.58	3.18	0.498	0.000819	0.000835
Q4	GH_FR1	0.00010	0.00010	0.0104	0.0106	545	0.108	0.704	1.00	0.27	0.00202	0.00213
Tests with significant results for length												
Q4	FR_FRCP1	0.00010	0.00010	0.0106	0.0106	836	0.101	0.878	1.06	0.366	0.00423	0.00425
Q4	GH_ERC	0.00010	0.00010	0.010	0.010	211	0.051	0.58	3.18	0.498	0.000819	0.000835
Q4	GH_FR1	0.00010	0.00010	0.0104	0.0106	545	0.108	0.704	1.00	0.27	0.00202	0.00213
Tests with significant results for weight												
Q2	EV_HC1	0.00010	0.00010	0.010	0.010	241	0.106	1.32	2.22	1.31	0.00127	0.00129
Q4	GH_ERC	0.00010	0.00010	0.010	0.010	211	0.051	0.58	3.18	0.498	0.000819	0.000835

Abbreviations
% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg = milligrams
mg/l = milligrams per litre
mm = millimetres
n/a = not applicable
"-T-" = total concentration
ug/l = micrograms per litre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference for that endpoint.

Table D-4. *O. mykiss* endpoints paired with water quality

Quarter	Sample ID	VANADIUM-D-mg/l	VANADIUM-T-mg/l	ZINC-D-mg/l	ZINC-T-mg/l
References					
Q2	Reference (FR_UFR1)	0.00050	0.00050	0.0030	0.0030
Q4	Reference (FR_UFR1)	0.00050	0.00050	0.0030	0.0030
Q2	Reference (GH_ER2)	0.00050	0.000614	0.0030	0.0030
Q4	Reference (GH_ER2)	0.00050	0.00050	0.0030	0.0030
Tests that were not statistically different than reference					
Q2	CM_MC2	0.0014	0.00231	0.00582	0.0103
Q2	EV_MC2	0.00050	0.00294	0.0030	0.00872
Q4	EV_MC2	0.00050	0.00071	0.0030	0.0030
Q2	FR_FRCP1	0.00050	0.000508	0.0030	0.00304
Q2	GH_ERC	0.00050	0.00107	0.0030	0.00382
Q2	GH_FR1	0.00050	0.000544	0.0030	0.0030
Q2	LC_LCDSSLCC	0.00050	0.000561	0.00517	0.00702
Q4	LC_LCDSSLCC	0.00050	0.00050	0.0085	0.0092
Tests with significant results for survival and viability					
Q4	CM_MC2	0.00050	0.000528	0.0030	0.0030
Q4	EV_HC1	0.00050	0.000518	0.0030	0.0030
Q4	FR_FRCP1	0.00050	0.000504	0.0030	0.0030
Q4	GH_ERC	0.00050	0.00050	0.0030	0.0030
Q4	GH_FR1	0.00050	0.00050	0.0030	0.0030
Tests with significant results for length					
Q4	FR_FRCP1	0.00050	0.000504	0.0030	0.0030
Q4	GH_ERC	0.00050	0.00050	0.0030	0.0030
Q4	GH_FR1	0.00050	0.00050	0.0030	0.0030
Tests with significant results for weight					
Q2	EV_HC1	0.00050	0.000581	0.0030	0.00307
Q4	GH_ERC	0.00050	0.00050	0.0030	0.0030

Abbreviations
% = percent
CaCO3 = calcium carbonate
"-D-" = dissolved concentration
mg = milligrams
mg/l = milligrams per litre
mm = millimetres
n/a = not applicable
"-T-" = total concentration
ug/l = micrograms per litre.

Screening

Concentrations of parameters in tests with significant results are shaded if the concentration is greater than the maximum concentration measured in references or tests that are not statistically different than reference for that endpoint.

Parameter	Rs[1]	Is parameter greater than the chronic BC WQG in at least one test with significant adverse effects?[2]	Retain Parameter for Concentration-Response Analysis?[3]
ACIDITY TO pH 8.3 (As CaCO3)-N-mg/l	-0.009	-	-
ALKALINITY, BICARBONATE (As CaCO3), lab measured.-N-mg/l	-0.181	-	-
ALKALINITY, CARBONATE (As CaCO3), lab measured.-N-mg/l	0.070	-	-
ALKALINITY, HYDROXIDE (As CaCO3), lab measured.-N-mg/l	NC	-	-
ALKALINITY, TOTAL (As CaCO3), lab measured.-N-mg/l	-0.207	-	-
ALUMINUM-D-mg/l	-0.021	-	-
ANTIMONY-T-mg/l	-0.187	-	-
ARSENIC-T-mg/l	-0.164	-	-
BARIUM-T-mg/l	0.268	-	-
BERYLLIUM-T-mg/l	-0.349	Yes[4]	No - low detection frequency[5]
BISMUTH-T-mg/l	0.326	-	-
BORON-T-mg/l	-0.358	No	No
BROMIDE-D-mg/l	-0.179	-	-
CADMIUM-D-mg/l	-0.006	-	Yes
CALCIUM-T-mg/l	-0.134	-	-
CARBON, DISSOLVED ORGANIC-D-mg/l	0.056	-	-
CHLORIDE-D-mg/l	-0.153	-	-
CHROMIUM-T-mg/l	-0.359	No	No
COBALT-T-mg/l	-0.296	No	No
CONDUCTIVITY, LAB-N-us/cm	-0.113	-	-
COPPER-T-mg/l	-0.277	-	-
FLUORIDE-D-mg/l	-0.010	-	-
Hardness, Total or Dissolved CaCO3-N-mg/l	-0.090	-	-
IRON-D-mg/l	-0.349	No	No
IRON-T-mg/l	-0.245	-	-
LEAD-T-mg/l	-0.287	No	No
LITHIUM-T-mg/l	-0.203	-	-
MAGNESIUM-T-mg/l	-0.108	-	-
MAJOR ANION SUM-N-meq/l	-0.084	-	-
MAJOR CATION SUM-N-meq/l	-0.058	-	-
MANGANESE-T-mg/l	-0.289	No	No
MERCURY-T-mg/l	0.357	-	-
MOLYBDENUM-T-mg/l	-0.377	No	No
NICKEL-T-mg/l	-0.440	No	No
NITRATE NITROGEN (NO3), AS N-N-mg/l	-0.098	-	Yes
NITRITE NITROGEN (NO2), AS N-N-mg/l	-0.310	No	No
NITROGEN, AMMONIA (AS N)-N-mg/l	0.057	-	-
ORTHO-PHOSPHATE-N-mg/l	0.304	-	-
OXIDATION-REDUCTION POTENTIAL, LAB-N-mv	-0.228	-	-
pH, LAB-N-ph units	0.012	-	-
PHOSPHORUS-N-mg/l	0.055	-	-
POTASSIUM-T-mg/l	-0.230	-	-
SELENIUM-T-ug/l	-0.035	-	Yes
SILICON-T-mg/l	-0.289	No WQG	Yes
SILVER-T-mg/l	-0.348	No	No
SODIUM-D-mg/l	-0.239	-	-
SODIUM-T-mg/l	-0.257	-	-
STRONTIUM-T-mg/l	-0.487	No WQG	Yes
SULFATE (AS SO4)-D-mg/l	-0.142	-	Yes
THALLIUM-T-mg/l	-0.411	No	No
TIN-T-mg/l	-0.328	No WQG	No - low detection frequency[5]
TITANIUM-T-mg/l	0.097	-	-
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)-N-mg/l	-0.102	-	-
TOTAL KJELDAHL NITROGEN-N-mg/l	-0.004	-	-
TOTAL ORGANIC CARBON-T-mg/l	-0.099	-	-
TOTAL SUSPENDED SOLIDS, LAB-N-mg/l	-0.178	-	-
TURBIDITY, LAB-N-ntu	-0.191	-	-
URANIUM-T-mg/l	-0.203	-	-
VANADIUM-T-mg/l	0.101	-	-
ZINC-T-mg/l	-0.297	No	No

Notes:

1 Statistical significance is based on one-tailed comparisons. Significant negative correlations ($\alpha < 0.05$; $rs < -0.279$) are highlighted. NC = rs could not be calculated because parameter concentration was the same in all tests.

2 Concentrations of parameters with significant rank order correlations were screeened against chronic BC WQGs in Table D-9.

3 Parameters were retained for graphical analysis if they met one of the following conditions: 1) order constituent, 2) significant negative correlation and concentration was greater than the chronic BC WQG, or 3) significant negative correlation and there is no chronic BC WQG.

4 Elevated detection limit in one sample was greater than the chronic BC WQG.

5 Of 36 samples, two had detected concentrations of total beryllium and four had detected concentrations of total tin (Table D-1).

Abbreviations

% = percent; $CaCO_3$ = calcium carbonate; "-D-" = dissolved concentration; mg/l = milligrams per litre; "-T-" = total concentration; ug/l = micrograms per litre.

Table D-6. Spearman Rank Order Correlation for *P. subcapitata* Cell Yield

Parameter	Rs[1]	Is parameter greater than the chronic BC WQG in at least one test with significant adverse effects?[2]	Retain Parameter for Concentration-Response Analysis?[3]
ACIDITY TO pH 8.3 (As CaCO3)-N-mg/l	-0.120	-	-
ALKALINITY, BICARBONATE (As CaCO3), lab measured.-N-mg/l	-0.117	-	-
ALKALINITY, CARBONATE (As CaCO3), lab measured.-N-mg/l	0.002	-	-
ALKALINITY, HYDROXIDE (As CaCO3), lab measured.-N-mg/l	NC	-	-
ALKALINITY, TOTAL (As CaCO3), lab measured.-N-mg/l	-0.139	-	-
ALUMINUM-D-mg/l	-0.041	-	-
ANTIMONY-T-mg/l	-0.250	-	-
ARSENIC-T-mg/l	-0.033	-	-
BARIUM-T-mg/l	0.134	-	-
BERYLLIUM-T-mg/l	-0.193	-	-
BISMUTH-T-mg/l	-0.393	No WQG	Yes
BORON-T-mg/l	-0.116	-	-
BROMIDE-D-mg/l	-0.147	-	-
CADMIUM-D-mg/l	-0.245	-	Yes
CALCIUM-T-mg/l	-0.175	-	-
CARBON, DISSOLVED ORGANIC-D-mg/l	-0.140	-	-
CHLORIDE-D-mg/l	-0.144	-	-
CHROMIUM-T-mg/l	0.053	-	-
COBALT-T-mg/l	-0.253	-	-
CONDUCTIVITY, LAB-N-us/cm	-0.183	-	-
COPPER-T-mg/l	-0.137	-	-
FLUORIDE-D-mg/l	0.023	-	-
Hardness, Total or Dissolved CaCO3-N-mg/l	-0.166	-	-
IRON-D-mg/l	-0.193	-	-
IRON-T-mg/l	0.025	-	-
LEAD-T-mg/l	0.018	-	-
LITHIUM-T-mg/l	-0.112	-	-
MAGNESIUM-T-mg/l	-0.183	-	-
MAJOR ANION SUM-N-meq/l	-0.207	-	-
MAJOR CATION SUM-N-meq/l	-0.179	-	-
MANGANESE-T-mg/l	0.037	-	-
MERCURY-T-mg/l	-0.402	No	No
MOLYBDENUM-T-mg/l	-0.054	-	-
NICKEL-T-mg/l	-0.339	No	No
NITRATE NITROGEN (NO3), AS N-N-mg/l	-0.170	-	Yes
NITRITE NITROGEN (NO2), AS N-N-mg/l	-0.092	-	-
NITROGEN, AMMONIA (AS N)-N-mg/l	0.060	-	-
ORTHO-PHOSPHATE-N-mg/l	0.173	-	-
OXIDATION-REDUCTION POTENTIAL, LAB-N-mv	-0.143	-	-
pH, LAB-N-ph units	0.130	-	-
PHOSPHORUS-N-mg/l	0.067	-	-
POTASSIUM-T-mg/l	-0.158	-	-
SELENIUM-T-ug/l	-0.141	-	Yes
SILICON-T-mg/l	-0.054	-	-
SILVER-T-mg/l	-0.260	-	-
SODIUM-T-mg/l	-0.202	-	-
STRONTIUM-T-mg/l	-0.012	-	-
SULFATE (AS SO4)-D-mg/l	-0.197	-	Yes
THALLIUM-T-mg/l	-0.288	No	No
TIN-T-mg/l	-0.137	-	-
TITANIUM-T-mg/l	-0.245	-	-
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)-N-mg/l	-0.181	-	-
TOTAL KJELDAHL NITROGEN-N-mg/l	0.251	-	-
TOTAL ORGANIC CARBON-T-mg/l	-0.080	-	-
TOTAL SUSPENDED SOLIDS, LAB-N-mg/l	0.070	-	-
TURBIDITY, LAB-N-ntu	0.131	-	-
URANIUM-T-mg/l	-0.207	-	-
VANADIUM-T-mg/l	-0.384	No WQG	Yes
ZINC-T-mg/l	-0.495	No	No

Notes:

1 Statistical significance is based on one-tailed comparisons. Significant negative correlations ($\alpha < 0.05$; $rs < -0.279$) are highlighted. NC = rs could not be calculated because parameter concentration was the same in all tests.

2 Concentrations of parameters with significant rank order correlations were screeened against chronic BC WQGs in Table D-9.

3 Parameters were retained for graphical analysis if they met one of the following conditions: 1) order constituent, 2) significant negative correlation and concentration was greater than the chronic BC WQG, or 3) significant negative correlation and there is no chronic BC WQG.

Abbreviations

% = percent; $CaCO_3$ = calcium carbonate; "-D-" = dissolved concentration; mg/l = milligrams per litre; "-T-" = total concentration; TDS = total dissolved solids; ug/l = micrograms per litre; WQG = water quality guideline.

Table D-7. Spearman Rank Order Correlation for *H. azteca* Growth

Parameter	Rs[1]	Is parameter greater than the chronic BC WQG in at least one test with significant adverse effects?[2]	Retain Parameter for Concentration-Response Analysis?[3]
ACIDITY TO pH 8.3 (As CaCO3)-N-mg/l	-0.041	-	-
ALKALINITY, BICARBONATE (As CaCO3), lab measured.-N-mg/l	-0.472	No WQG	No - parameter included in TDS
ALKALINITY, CARBONATE (As CaCO3), lab measured.-N-mg/l	-0.504	No WQG	No - parameter included in TDS
ALKALINITY, HYDROXIDE (As CaCO3), lab measured.-N-mg/l	NC	-	-
ALKALINITY, TOTAL (As CaCO3), lab measured.-N-mg/l	-0.528	No WQG	No - parameter included in TDS
ALUMINUM-D-mg/l	0.182	-	-
ANTIMONY-T-mg/l	-0.333	-	-
ARSENIC-T-mg/l	-0.294	-	-
BARIUM-T-mg/l	-0.263	-	-
BERYLLIUM-T-mg/l	0.365	-	-
BISMUTH-T-mg/l	0.188	-	-
BORON-T-mg/l	-0.490	No	No
BROMIDE-D-mg/l	-0.351	-	-
CADMIUM-D-mg/l	0.062	-	Yes
CALCIUM-T-mg/l	-0.401	-	-
CARBON, DISSOLVED ORGANIC-D-mg/l	0.514	-	-
CHLORIDE-D-mg/l	-0.345	-	-
CHROMIUM-T-mg/l	0.463	-	-
COBALT-T-mg/l	0.003	-	-
CONDUCTIVITY, LAB-N-us/cm	-0.398	-	-
COPPER-T-mg/l	0.165	-	-
FLUORIDE-D-mg/l	-0.103	-	-
Hardness, Total or Dissolved CaCO3-N-mg/l	-0.413	-	-
IRON-D-mg/l	0.365	-	-
IRON-T-mg/l	0.342	-	-
LEAD-T-mg/l	0.249	-	-
LITHIUM-T-mg/l	-0.327	-	-
MAGNESIUM-T-mg/l	-0.386	-	-
MAJOR ANION SUM-N-meq/l	-0.412	-	-
MAJOR CATION SUM-N-meq/l	-0.425	-	-
MANGANESE-T-mg/l	0.041	-	-
MERCURY-T-mg/l	0.245	-	-
MOLYBDENUM-T-mg/l	-0.229	-	-
NICKEL-T-mg/l	-0.263	-	-
NITRATE NITROGEN (NO3), AS N-N-mg/l	-0.156	-	Yes
NITRITE NITROGEN (NO2), AS N-N-mg/l	-0.545	No	No
NITROGEN, AMMONIA (AS N)-N-mg/l	-0.216	-	-
ORTHO-PHOSPHATE-N-mg/l	0.335	-	-
OXIDATION-REDUCTION POTENTIAL, LAB-N-mv	-0.133	-	-
PHOSPHORUS-N-mg/l	0.421	-	-
POTASSIUM-T-mg/l	-0.443	No WQG	No - parameter included in TDS
SELENIUM-T-ug/l	-0.127	-	Yes
SILICON-T-mg/l	-0.166	-	-
SILVER-T-mg/l	0.365	-	-
SODIUM-T-mg/l	-0.365	-	-
STRONTIUM-T-mg/l	-0.410	-	-
SULFATE (AS SO4)-D-mg/l	-0.407	-	Yes
THALLIUM-T-mg/l	-0.306	-	-
TIN-T-mg/l	-0.365	-	-
TITANIUM-T-mg/l	0.227	-	-
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)-N-mg/l	-0.425	-	Yes
TOTAL KJELDAHL NITROGEN-N-mg/l	-0.277	-	-
TOTAL ORGANIC CARBON-T-mg/l	0.516	-	-
TOTAL SUSPENDED SOLIDS, LAB-N-mg/l	0.189	-	-
TURBIDITY, LAB-N-ntu	0.266	-	-
URANIUM-T-mg/l	-0.381	-	-
VANADIUM-T-mg/l	0.276	-	-
ZINC-T-mg/l	0.093	-	-

Notes:

1 Statistical significance is based on one-tailed comparisons. Significant negative correlations ($\alpha < 0.05$; $rs < -0.429$) are highlighted. NC = rs could not be calculated because parameter concentration was the same in all tests.

2 Concentrations of parameters with significant rank order correlations were screeened against chronic BC WQGs in Table D-9.

3 Parameters were retained for graphical analysis if they met one of the following conditions: 1) order constituent, 2) significant negative correlation and concentration was greater than the chronic BC WQG, or 3) significant negative correlation and there is no chronic BC WQG.

Abbreviations

% = percent; $CaCO_3$ = calcium carbonate; "-D-" = dissolved concentration; mg/l = milligrams per litre; "-T-" = total concentration; TDS = total dissolved solids; ug/l = micrograms per litre; WQG = water quality guideline.

Table D-8. Spearman Rank Order Correlation for *O. mykiss* Endpoints

Parameter	Rs[1]				Is parameter greater than the chronic BC WQG in at least one test with significant adverse effects?[2]	Retain Parameter for Concentration-Response Analysis?[3]			
	Survival	Viability	Length	Wet Weight		Survival	Viability	Length	Wet Weight
ACIDITY TO pH 8.3 (As CaCO3)-N-mg/l	-0.100	-0.161	0.195	0.483	-	-			
ALKALINITY, BICARBONATE (As CaCO3), lab measured.-N-mg/l	-0.221	-0.096	-0.419	-0.650	No WQG	-	-	No - parameter included in TDS	
ALKALINITY, CARBONATE (As CaCO3), lab measured.-N-mg/l	-0.197	-0.141	0.028	0.209	-	-			
ALKALINITY, HYDROXIDE (As CaCO3), lab measured.-N-mg/l	NC	NC	NC	NC	-	-			
ALKALINITY, TOTAL (As CaCO3), lab measured.-N-mg/l	-0.224	-0.087	-0.424	-0.597	No WQG	-	-	No - parameter included in TDS	
ALUMINUM-D-mg/l	-0.280	-0.338	0.114	0.182	-	-			
ANTIMONY-T-mg/l	0.057	0.168	0.383	0.266	-	-			
ARSENIC-T-mg/l	-0.238	-0.193	0.256	0.626	-	-			
BARIUM-T-mg/l	0.168	0.344	0.019	-0.285	-	-			
BERYLLIUM-T-mg/l	0.054	0.119	0.576	0.445	-	-			
BISMUTH-T-mg/l	-0.252	-0.168	0.421	0.252	-	-			
BORON-T-mg/l	0.025	0.086	0.235	-0.039	-	-			
BROMIDE-D-mg/l	0.023	0.098	-0.193	-0.309	-	-			
CADMIUM-D-mg/l	0.003	0.037	0.388	0.444	-	Yes			
CALCIUM-T-mg/l	-0.118	0.029	0.021	-0.291	-	-			
CARBON, DISSOLVED ORGANIC-D-mg/l	0.015	0.000	0.535	0.876	-	-			
CHLORIDE-D-mg/l	0.035	0.152	0.078	-0.035	-	-			
CHROMIUM-T-mg/l	-0.065	-0.082	0.253	0.420	-	-			
COBALT-T-mg/l	-0.185	-0.166	0.414	0.473	-	-			
CONDUCTIVITY, LAB-N-us/cm	-0.115	0.019	0.074	-0.194	-	-			
COPPER-T-mg/l	-0.215	-0.211	0.247	0.327	-	-			
FLUORIDE-D-mg/l	-0.003	0.052	-0.312	-0.291	-	-			
Hardness, Total or Dissolved CaCO3-N-mg/l	-0.112	0.022	0.049	-0.229	-	-			
IRON-D-mg/l	0.054	0.119	0.576	0.445	-	-			
IRON-T-mg/l	-0.346	-0.283	0.260	0.703	-	-			
LEAD-T-mg/l	-0.239	-0.192	0.403	0.783	-	-			
LITHIUM-T-mg/l	-0.106	0.001	0.105	0.100	-	-			
MAGNESIUM-T-mg/l	-0.047	0.093	0.127	-0.141	-	-			
MAJOR ANION SUM-N-meq/l	-0.147	-0.028	-0.059	-0.274	-	-			
MAJOR CATION SUM-N-meq/l	-0.109	0.010	0.000	-0.224	-	-			
MANGANESE-T-mg/l	-0.385	-0.308	0.251	0.529	-	-			
MERCURY-T-mg/l	-0.138	-0.035	0.442	0.100	-	-			
MOLYBDENUM-T-mg/l	-0.050	0.059	-0.001	-0.274	-	-			
NICKEL-T-mg/l	-0.093	0.007	0.418	0.304	-	-			
NITRATE NITROGEN (NO3), AS N-N-mg/l	-0.091	0.018	0.085	0.035	-	Yes			
NITRITE NITROGEN (NO2), AS N-N-mg/l	-0.056	0.058	0.286	0.095	-	-			
NITROGEN, AMMONIA (AS N)-N-mg/l	-0.372	-0.268	0.276	0.493	-	-			
ORTHO-PHOSPHATE-N-mg/l	0.294	0.154	0.508	0.405	-	-			
OXIDATION-REDUCTION POTENTIAL, LAB-N-mv	0.034	0.038	-0.094	-0.003	-	-			
pH, LAB-N-ph units	-0.085	0.034	0.062	0.109	-	-			
PHOSPHORUS-N-mg/l	-0.238	-0.214	0.397	0.779	-	-			
POTASSIUM-T-mg/l	-0.124	0.001	0.189	0.056	-	-			
SELENIUM-T-ug/l	-0.074	0.016	0.010	0.012	-	Yes			
SILICON-T-mg/l	-0.032	0.085	0.137	0.029	-	-			
SILVER-T-mg/l	-0.099	-0.047	0.285	0.423	-	-			
SODIUM-T-mg/l	0.029	0.141	0.380	0.176	-	-			
STRONTIUM-T-mg/l	-0.156	-0.062	-0.239	-0.494	No WQG	-	-	-	Yes
SULFATE (AS SO4)-D-mg/l	-0.032	0.107	0.175	-0.097	-	Yes			
THALLIUM-T-mg/l	-0.318	-0.301	0.183	0.379	-	-			
TIN-T-mg/l	-0.252	-0.168	0.421	0.252	-	-			
TITANIUM-T-mg/l	-0.134	-0.033	0.182	0.052	-	-			
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)-N-mg/l	-0.097	0.038	0.121	-0.144	-	-	-	Yes	Yes
TOTAL KJELDAHL NITROGEN-N-mg/l	-0.110	-0.066	0.070	0.166	-	-			
TOTAL ORGANIC CARBON-T-mg/l	-0.150	-0.149	0.411	0.829	-	-			
TOTAL SUSPENDED SOLIDS, LAB-N-mg/l	-0.304	-0.273	0.364	0.702	-	-			
TURBIDITY, LAB-N-ntu	-0.279	-0.243	0.333	0.691	-	-			
URANIUM-T-mg/l	-0.232	-0.140	-0.078	-0.162	-	-			
VANADIUM-T-mg/l	-0.387	-0.330	0.216	0.634	-	-			
ZINC-T-mg/l	0.026	0.008	0.380	0.567	-	-			

Notes:

1 Statistical significance is based on one-tailed comparisons. Significant negative correlations ($\alpha < 0.05$; $rs < -0.401$) are highlighted. NC = rs could not be calculated because parameter concentration was the same in all tests.
2 Concentrations of parameters with significant rank order correlations were screeened against chronic BC WQGs in Table D-9.
3 Parameters were retained for graphical analysis if they met one of the following conditions: 1) order constituent, 2) significant negative correlation and concentration was greater than the chronic BC WQG, or 3) significant negative correlation and there is no chronic BC WQG.

Abbreviations
% = percent; $CaCO_3$ = calcium carbonate; "-D-" = dissolved concentration; mg/l = milligrams per litre; "-T-" = total concentration; TDS = total dissolved solids; ug/l = micrograms per litre; WQG = water quality guideline.

Table D-9. Screening of Parameters with Significant Rank Order Correlations Against Chronic BC WQGs

Quarter	Chronic BC WQG - Freshwater Aquatic Life	Notes	Q2	Q4	Q1	Q4	Q2	Q3	Q2	Q4	Q2	Q4	Q4	Q4	Q4	Q2	Q3	Q4	Q1	Q2	Q3	Q1	Q4	Q3	Q2	Q3
Test Species			C. dubia	C. dubia	C. dubia	C. dubia	C. dubia	H. azteca	H. azteca	O. mykiss	O. mykiss	O. mykiss	O. mykiss	O. mykiss	O. mykiss	P. subcapitata	P. subcapitata	P. subcapitata	P. subcapitata	P. subcapitata	P. subcapitata	P. subcapitata	P. subcapitata	P. subcapitata	P. subcapitata	P. subcapitata
Sample ID			CM_MC2	CM_MC2	FR_FRCP1	FR_FRCP1	LC_LCDSSLCC	CM_MC2	FR_FRCP1	CM_MC2	EV_HC1	EV_HC1	FR_FRCP1	GH_ERC	GH_FR1	CM_MC2	CM_MC2	CM_MC2	EV_HC1	EV_MC2	EV_MC2	FR_FRCP1	FR_FRCP1	GH_FR1	LC_LCDSSLCC	LC_LCDSSLCC
ALKALINITY, BICARBONATE (As CaCO3), lab measured.-N-mg/l	No WQG		143	209	337	211	144	201	137	189	107	188	211	151	187	143	188	209	131	112	194	337	211	174	144	171
ALKALINITY, CARBONATE (As CaCO3), lab measured.-N-mg/l	No WQG		4.9	6.4	< 1.0	< 1.0	5.5	8.6	5.0	6.3	6.4	8.3	2.7	1.7	5.8	4.9	11	6.4	4.3	3.7	< 1.0	< 1.0	< 1.0	8.2	5.5	10
ALKALINITY, TOTAL (As CaCO3), lab measured.-N-mg/l	No WQG		148	215	337	211	150	210	142	195	113	197	213	152	193	148	198	215	135	116	194	337	211	182	150	181
ANTIMONY-T-mg/l	0.009	1	0.00013	0.00013	0.00051	0.00026	0.00017	0.00021	0.00022	0.00017	0.0001	0.00011	0.00028	0.0001	0.00015	0.00013	0.00021	0.00013	0.0001	0.00011	0.00044	0.00051	0.00026	0.00025	0.00017	0.00026
ARSENIC-T-mg/l	0.005	2	0.00031	0.00022	0.00022	< 0.00010	0.00014	0.00023	0.00013	0.00023	0.00017	0.00018	0.00011	0.00012	0.00012	0.00031	0.00021	0.00022	0.00014	0.00033	0.00023	0.00022	< 0.00010	0.0002	0.00014	0.00011
BERYLLIUM-T-mg/l	0.00013	1	< 0.00010	< 0.00010	*< 0.00020*	< 0.00010	< 0.00010	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	< 0.00010	< 0.00010	< 0.00010	0.0001	< 0.00010	< 0.00010	*< 0.00020*	< 0.00010	< 0.00010	< 0.00010	< 0.00010
BORON-T-mg/l	1.2		0.015	0.027	< 0.020	0.016	< 0.010	0.027	0.01	0.027	0.01	0.01	0.012	0.01	0.012	0.015	0.029	0.027	0.01	< 0.010	0.018	< 0.020	0.016	0.011	< 0.010	0.013
BROMIDE-D-mg/l	No WQG		< 0.050	< 0.25	< 1.0	< 0.25	< 0.050	0.21	0.05	0.25	0.057	0.2	0.25	0.05	0.25	< 0.050	< 0.10	< 0.25	0.05	< 0.050	< 0.10	< 1.0	< 0.25	< 0.050	< 0.050	< 0.10
CADMIUM-D-mg/l	0.0003	3	0.000036	0.0000075	< 0.000020	0.00004	0.00014	0.0000091	0.000025	0.000012	0.000014	0.000015	0.000043	0.0000056	0.000017	0.000036	0.0000099	0.0000075	0.000017	0.000018	0.000049	< 0.000020	0.00004	0.000019	0.00014	0.00025
CALCIUM-T-mg/l	No WQG		60	115	337	130	68	121	73	107	47	93	141	58	107	60	104	115	60	44	87	337	130	90	68	92
CHLORIDE-D-mg/l	150		1.2	3.2	2.6	2.2	1.4	2.8	1.1	3.4	1.3	1.9	2.4	1.2	2.0	1.2	2.1	3.2	1.5	2.9	9.6	2.6	2.2	1.6	1.4	2.0
CHROMIUM-T-mg/l	0.001	1, 4	0.00058	0.0002	< 0.00020	0.00027	0.00019	0.00017	0.00019	0.00026	0.00023	0.00028	0.00016	0.0003	0.00017	0.00058	0.00023	0.0002	0.00018	0.0007	0.00019	< 0.00020	0.00027	0.00015	0.00019	0.0002
COBALT-T-mg/l	0.004		0.00061	< 0.00010	< 0.00020	< 0.00010	< 0.00010	0.00021	0.00011	0.0006	0.0001	0.0001	0.0001	0.0001	0.0001	0.00061	0.00034	< 0.00010	0.0001	0.00022	< 0.00010	< 0.00020	< 0.00010	< 0.00010	< 0.00010	< 0.00010
CONDUCTIVITY, LAB-N-us/cm	No WQG		494	876	2680	1030	535	939	568	821	364	750	1100	357	783	484	802	876	453	299	686	2680	1030	657	535	660
FLUORIDE-D-mg/l	1.5	5	0.1	0.11	0.45	0.17	0.22	0.12	0.2	0.11	0.13	0.2	0.18	0.16	0.16	0.1	0.12	0.11	0.15	0.12	0.18	0.45	0.17	0.18	0.22	0.24
Hardness, Total or Dissolved CaCO3-N-mg/l	No WQG		248	505	1880	597	269	534	308	456	206	434	650	195	445	248	458	505	274	159	384	1880	597	374	269	355
IRON-D-mg/l	0.35	5	< 0.010	< 0.010	< 0.020	< 0.010	< 0.010	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	< 0.010	< 0.010	< 0.010	0.01	< 0.010	< 0.010	< 0.020	< 0.010	< 0.010	< 0.010	< 0.010
IRON-T-mg/l	1	5	< 0.010	< 0.010	< 0.020	< 0.010	0.018	0.012	0.064	0.053	0.058	0.028	0.021	0.015	0.011	< 0.010	< 0.010	< 0.010	0.013	< 0.010	< 0.010	< 0.020	< 0.010	< 0.010	0.018	< 0.010
LEAD-T-mg/l	0.0091	15	0.00017	< 0.000050	< 0.00010	< 0.000050	< 0.000050	0.00005	0.000082	0.000063	0.00007	0.00005	0.00005	0.00005	0.00005	0.00017	< 0.000050	< 0.000050	0.00005	0.00028	< 0.000050	< 0.00010	< 0.000050	< 0.000050	< 0.000050	< 0.000050
LITHIUM-T-mg/l	No WQG		0.0067	0.012	0.056	0.037	0.016	0.015	0.019	0.012	0.0042	0.0072	0.041	0.0019	0.016	0.0067	0.014	0.012	0.0047	0.0052	0.021	0.056	0.037	0.015	0.016	0.023
MAGNESIUM-T-mg/l	No WQG		23	51	261	65	25	58	30	46	22	49	74	13	45	23	51	51	31	13	35	261	65	37	25	34
MAJOR ANION SUM-N-meq/l	No WQG		5.4	10	40	12	5.7	11	5.9	9.4	6.1	8.6	13	3.9	8.9	5.4	9.4	10	8.2	3.3	8.1	40	12	7.6	5.7	7.5
MAJOR CATION SUM-N-meq/l	No WQG		5.2	11	38	12	5.5	11	6.2	9.6	6.2	8.8	13	3.9	9.0	5.2	9.6	11	8.3	3.3	7.9	38	12	7.6	5.6	7.3
MANGANESE-T-mg/l	1.3	6	0.011	0.0012	0.0027	0.0081	0.00051	0.0017	0.0079	0.0065	0.0021	0.0024	0.0089	0.0014	0.0016	0.011	0.0032	0.0012	0.0015	0.001	0.002	0.0027	0.0081	0.0023	0.00051	0.00054
MERCURY-T-mg/l	0.00002	16	0.0000084	< 0.0000050	< 0.000010	< 0.0000050	< 0.0000050	0.000005	0.000005	0.0000051	0.000005	0.0000061	0.000005	0.000005	0.000005	0.0000084	< 0.0000050	< 0.0000050	0.000010	< 0.0000050	< 0.0000050	< 0.0000050	< 0.0000050	0.000005	< 0.0000050	< 0.0000050
MOLYBDENUM-T-mg/l	1		0.00081	0.00096	0.0029	0.0014	0.0012	0.0011	0.0012	0.0011	0.00052	0.001	0.0015	0.001	0.00098	0.00081	0.0011	0.00096	0.00065	0.00054	0.0022	0.0029	0.0014	0.0010	0.0012	0.0015
NICKEL-T-mg/l	0.14	1, 7	0.0076	0.006	0.032	0.0066	0.0036	0.013	0.0021	0.009	0.00085	0.00079	0.0072	0.0005	0.0015	0.0076	0.013	0.006	0.00064	0.0014	0.0048	0.032	0.0066	0.0017	0.0036	0.005
NITROGEN, AMMONIA (AS N)-N-mg/l	0.102	14	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050	0.0062	0.011	0.016	0.0064	0.005	0.005	0.005	0.005	< 0.0050	< 0.0050	< 0.0050	0.005	< 0.0050	0.01	< 0.0050	< 0.0050	0.0071	< 0.0050	< 0.0050
NITRATE NITROGEN (NO3), AS N-N-mg/l	3		1.2	2.2	30	15	5.8	3.2	8.1	2.4	0.56	1.2	16	0.49	10	1.2	2.5	2.2	0.8	0.81	5.7	30	15	9.1	5.8	7.2
NITRITE NITROGEN (NO2), AS N-N-mg/l	0.02 - 0.1	8	0.0029	< 0.0050	< 0.020	< 0.0050	0.0014	0.0068	0.0046	0.034	0.0011	0.004	0.0053	0.001	0.005	0.0029	0.0088	< 0.0050	0.001	< 0.0010	0.0027	< 0.020	< 0.0050	0.0046	0.0014	< 0.0020
POTASSIUM-T-mg/l	No WQG		0.98	1.5	4.0	1.9	0.82	1.8	1.2	1.4	0.56	0.97	2.0	0.4	1.2	0.98	1.5	1.5	0.62	0.67	1.5	4.0	1.9	1.2	0.82	1.1
SELENIUM-T-ug/l	2		4.3	5.8	497	76	25	8.1	30	5.2	19	37	91	1.6	42	4.3	6.4	5.8	22	5.0	23	497	76	36	25	40
SILICON-T-mg/l	No WQG		2.4	2.1	2.3	1.8	1.9	1.9	1.6	2.2	1.3	2.2	1.8	1.9	2.2	2.4	2.1	2.1	1.3	2.3	2.3	2.3	1.8	2.1	1.9	2.3
SILVER-T-mg/l	0.0015	9	< 0.000010	< 0.000010	< 0.000020	< 0.000010	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	0.00001	< 0.000010	< 0.000010	< 0.000010	0.00001	0.000017	< 0.000010	< 0.000020	< 0.000010	< 0.000010	< 0.000010	< 0.000010
SODIUM-T-mg/l	No WQG		4.5	11	2.1	2.0	2.9	10	1.2	9.5	0.86	1.9	2.1	0.93	2.1	4.5	8.7	11	1.2	2.1	4.6	2.1	2.0	1.8	2.9	3.9
STRONTIUM-T-mg/l	No WQG		0.17	0.3	0.23	0.16	0.13	0.32	0.1	0.29	0.064	0.14	0.17	0.23	0.15	0.17	0.29	0.3	0.087	0.093	0.21	0.23	0.16	0.13	0.13	0.17
SULFATE (AS SO4)-D-mg/l	309	10	110	277	1460	327	107	325	119	252	82	217	364	39	202	110	249	277	130	41	169	1460	327	154	107	157
THALLIUM-T-mg/l	0.0008	1, 11	0.000018	< 0.000010	0.000032	< 0.000010	< 0.000010	0.000018	0.00001	0.000012	0.000012	0.00001	0.00001	0.00001	0.00001	0.000018	0.000019	< 0.000010	0.00001	0.000025	0.000014	0.000032	< 0.000010	< 0.000010	< 0.000010	< 0.000010
TIN-T-mg/l	No WQG		< 0.00010	< 0.00010	< 0.00020	< 0.00010	< 0.00010	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	< 0.00010	< 0.00010	< 0.00010	0.0001	< 0.00010	< 0.00010	< 0.00010	< 0.00020	< 0.00010	0.00015	< 0.00010	< 0.00010
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)-N-mg/l	No WQG		314	627	2580	765	337	725	374	571	241	519	836	211	545	314	626	627	325	195	477	2580	765	473	337	447
URANIUM-T-mg/l	0.0085	1, 2	0.0011	0.0022	0.016	0.0037	0.002	0.003	0.0016	0.0023	0.0013	0.0028	0.0043	0.00084	0.0021	0.0011	0.0025	0.0022	0.0017	0.00048	0.0019	0.016	0.0037	0.0018	0.002	0.0028
ZINC-T-mg/l	0.059	12	0.0059	0.003	0.006	0.003	0.0066	0.003	0.003	0.003	0.0031	0.003	0.003	0.0030	0.003	0.0059	0.003	0.003	0.003	0.0041	0.0031	0.006	0.003	0.003	0.0066	0.0106

Notes:
For hardness-dependent guidelines, the lowest hardness in tests with significant responses was used (159 mg/L CaCO3 Tables D-1 to D-4).
1. Working water quality guideline
2. Guideline was developed by CCME.
3. Hardness-dependent guideline: WQG (mg/L) = (e[0.736 × ln(hardness) – 4.943])/1000.
4. BC WQG for chromium VI (0.001 mg/L) was selected for screening because it's lower than the BC WQG for chromium III (0.0089).
5. Short-term maximum WQG
6. Hardness-dependent guideline: WQG (mg/L) = 0.0044*(hardness)+0.605.
7. Hardness-dependent guideline: 0.025 mg/L for hardness< 60 mg/L, (e[0.76[ln(hardness)]+1.06))/1000 mg/L for hardness 60 - 180 mg/L, 0.15 mg/L for hardness >180 mg/
8. Chloride-dependent guideline: 0.02 mg/L for chloride <2 mg/L, 0.04 mg/L for chloride 2 - 4 mg/L, 0.06 mg/L for chloride 4 - 6 mg/L, 0.08 mg/L for chloride 6 to 8 mg/L, 0.10 mg/L for chloride 8 - 10 mg/L, 0.20 mg/L for chloride >10 mg/L.
9. Hardness-dependent guideline: WQG (mg/L) = 0.00005 mg/L for hardnesss 100 mg/L, 0.0015 mg/L for hardness >100 mg/L.
10. Hardness dependent guideline: BC 30-d WQG (mg/L) = 128 at hardness <30 mg/L, at hardness 31-75 mg/L = 218, at hardness 76-180 mg/L = 309, at hardness 181-250 mg/L = 429, at hardness >250 mg/L determine base on site water
11. Site-specific objective for the lower Columbia River, British Columbia.
12. Hardness-dependent guideline: WQG (mg/L) = [-51.73 + 92.57 log10 (hardness*)] × 0.01
13. WQG = (7.5 + 0.75 (hardness* - 90))/100
14. pH and temperature dependent guidelineConservatively assumed pH= 9 and temperature= 20˚C.
15. Hardness-dependent guideline: WQG (mg/L) = (3.31 + e[1.273 ln (hardness*) - 4.704])/1000 for hardness 8 mg/L.
16. Assumes 0.5% methylmercury.
Abbreviations:
% = percent; CaCO3 = calcium carbonate; "-D-" = dissolved concentration; mg = milligrams; mg/l = milligrams per litre; "-T-" = total concentration; ug/l = micrograms per litre.

APPENDIX E

Site Performance Objectives Mixture Toxicity Testing

Nautilus Environmental

Sublethal Toxicity Study - Testing of Site Waters at Permit 107517 Site Performance Objective Levels with *Ceriodaphnia dubia*, *Pseudokirchneriella subcapitata*, *Hyalella azteca*, *Pimephales promelas* and *Oncorhynchus mykiss*

Final Report

Report date:
March 29, 2016

Submitted to:

Teck Coal Ltd.
Sparwood, BC

8664 Commerce Court
Burnaby, BC
V5A 4N7

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SIGNATURE PAGE

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This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

1.0 INTRODUCTION

The BC Ministry of Environment (BCMoE) issued Permit 107517 to Teck Coal Ltd. in November 2014, under the provisions of the Environmental Management Act. The permit includes requirements for chronic toxicity testing for receiving environments throughout the Elk Valley.

Section 9.8.2 of Permit 107517 requires that "The Permittee must develop with input from the EMC, and implement a sublethal toxicity study to confirm that surface waters meeting the Site Performance Objectives for the order stations are not toxic to sensitive aquatic receptors". For this study, water was collected from the Fording River (Order station FR4 – EMS 200378) and Elk River (Order station ER2 – EMS 200027), and amended to respective long-term Site Performance Objective (SPOs) concentrations for sulphate, selenium, cadmium and nitrate, and then evaluated for toxicity as described by Golder (2015). Test species included a cladoceran (*Ceriodaphnia dubia*), a unicellular green alga (*Pseudokirchneriella subcapitata*), an amphipod (*Hyalella azteca*), the fathead minnow (*Pimephales promelas*) and rainbow trout (*Oncorhynchus mykiss*).

The *P. promelas* test was conducted at the Nautilus Environmental laboratory in Calgary, AB (formerly HydroQual); the other toxicity tests were conducted at the Burnaby, BC location.

This report describes the methods and results of the toxicity tests. Copies of laboratory data sheets and printouts of statistical analyses are provided in Appendices A to E. Water quality analyses were conducted on amended site water; results of analytical chemistry are provided in Appendix F. The chain-of-custody forms are provided in Appendix G.

2.0 METHODS

2.1 Site water collection and preparation

Water was collected from Stations EV_ER4 (Order station ER2 – EMS 200027) and GH_FR1 (Order station FR4 – EMS 200378) by Teck Coal Ltd. on four occasions (November 30 and December 7, 14 and 21, 2015) at approximately weekly intervals during the study and used for the site water exposures. Water was also collected at the same time from stations GH_ER2 (EMS 0200389) and FR_UFR1 (EMS E216777) and was used as site water controls and for preparing dilutions. The water was collected in 20-L plastic containers, and transported to the laboratory by courier in coolers containing ice packs. Samples were received at temperatures ranging from -1.3 to 9.2°C (refer to Section 4.0 for further details) and were stored in the dark at 4 ± 2°C prior to testing. Fresh samples were collected weekly for the duration of the *H. azteca*, *P. promelas* and *O. mykiss* tests.

Table 1. Summary of sample locations.

EMS ID	Order Stn	Site ID	Site Description
200027	ER2	EV_ER4	Elk River downstream of Fording River – Order Station
200378	FR4	GH_FR1	Fording River downstream of Greenhills Creek – Order Station
0200389		GH_ER2	Elk River upstream of Greenhills Operation – Reference site
E216777		FR_UFR1	Fording River upstream of Henretta Creek – Reference site

Upon receipt each week, subsamples of all four waters were collected and analyzed by ALS Environmental (Burnaby, BC) for concentrations of calcium, magnesium, nitrate, sulphate, selenium and cadmium, and the water from EV_ER4 and GH_FR1 was then amended using $NaNO_3$, $CaSO_4.2H_2O$, $MgSO_4.7H_2O$, Na_2SeO_4 and $CdCl_2$ in order to increase the concentrations to the long-term ER2 (EV_ER4) SPO levels of 3 mg/L NO_3-N, 429 mg/L SO_4, 19 µg/L Se, and 0.64 µg/L Cd, and the long-term FR4 (GH_FR1) SPO levels of 20 mg/L NO_3-N, 429 mg/L SO_4, 57 µg/L Se, and 0.64 µg/L Cd. The two sulphate salts were added in manner that maintained a Ca:Mg ratio (on a mass basis) of 2.6:1, which is the approximate ratio of these cations in the Elk Valley. In the case of NO_3-N (for FR4 only) and Cd (for both FR4 and ER2), the target concentrations were calculated using the hardness-based equations provided in Permit 107517, after taking into account the hardness of the mixture following addition of calcium and magnesium sulphate salts (approximately 650 mg/L as $CaCO_3$). The amended waters were

measured for the same analytes after addition of these constituents to confirm that the SPO concentrations were achieved.

Amended samples of EV_ER4 and GH_FR1 were tested at full strength and after dilution to 67, 44 and 30% of full strength using un-amended site water from GH_ER2 and FR_UFR1, respectively, as dilution water. Twice the standard number of test replicates were used for the 100% amended EV_ER4 and GH_FR1 treatments, with the exception of the *O. mykiss* test, which used the standard number of replicates for all treatments. Laboratory control water and un-amended GH_ER2 and FR_UFR1 site water were tested as laboratory and site water controls for the exposures.

2.2 Toxicity test methods

Methods for the toxicity tests using *C. dubia*, *P. subcapitata*, *H. azteca, P. promelas* and *O. mykiss* are summarized in Tables 2 through 6. Laboratory control water was 20% Perrier water prepared with deionized water for *C. dubia*; moderately hard water prepared by addition of reagent grade salts to dechlorinated municipal tap water for *P. promelas* according to a recipe provided by ASTM (1980); moderately hard water prepared by addition of reagent grade salts to dechlorinated municipal tap water for *H. azteca* according to a recipe provided in Environment Canada (2013); and dechlorinated municipal tap water for *O. mykiss*.

For the *H. azteca* tests, the site control and amended site waters were supplemented with 25 mg/L chloride and 0.02 mg/L bromide using NaCl and NaBr, respectively, according to recommendations of the *Hyalella* Advisory Group (chaired by Chris Ingersoll, USGS) (Norberg-King et al., 2014), since low concentrations of these halides are known to impair growth of this species. The laboratory control water contained approximately 75 mg/L chloride and 0.8 mg/L bromide, respectively.

Fathead minnows are known to be susceptible to adverse effects caused by fungi and microbes (Grothe and Johnson, 1996; Ksoz et al., 2997; Downey et al. 2000). These effects have been termed "sporadic mortality phenomenon", and are associated with mortalities that generally occur beginning on day 4 of the 7-day test with this species (Downey et al. 2000). Samples from the Elk Valley have exhibited effects in the laboratory consistent with sporadic mortality phenomenon in previous tests. Consequently, the site water controls and amended mixtures were supplemented with a low dose of copper (20 µg/L) in the *P. promelas* tests prior to preparing the dilutions in order to inhibit microbial growth in these samples from causing

adverse effects on the fish and confounding the results. This concentration of copper was present in all test concentrations of site waters since both the SPO mixtures and the site water controls that were used for preparing dilutions were amended with copper.

Statistical analyses were performed using CETIS (Tidepool Scientific Software, 2013). Statistical endpoints were calculated based on comparison of the results to the un-amended site water controls (GH_ER2 and FR_UFR1).

Table 2. Summary of test conditions: *Ceriodaphnia dubia* survival and reproduction test.

Test organism	*Ceriodaphnia dubia*
Test organism source	In-house culture
Test organism age	<24 h old neonates produced within 12 h
Test type	Static-renewal
Test duration	7 ± 1 day
Test vessel	20 mL test tube
Test volume	15 mL
Test concentrations	100, 67, 44, 30% (v/v), site/dilution water control, laboratory control
Test replicates	10 test replicates per treatment, except 100% (v/v) 20 replicates per treatment
Number of organisms	1 per replicate
Control water	20% Perrier water
Test solution renewal	Daily
Test temperature	25 ± 1°C
Feeding	*Pseudokirchneriella subcapitata* and YCT
Light intensity	100 to 600 lux at water surface
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test protocol	Environment Canada (2007a)
Statistical software	CETIS
Test endpoint	Survival and reproduction
Test acceptability criteria for controls	≥80% survival; ≥15 young per surviving control producing three broods; ≥60% of controls producing three or more broods
Reference toxicant	Sodium chloride

Table 3. Summary of test conditions: *Pseudokirchneriella subcapitata* growth inhibition test.

Test organism	*Pseudokirchneriella subcapitata*, strain CPCC #37
Test organism source	In-house axenic culture, obtained from Canadian Phycological Culture Centre, and originally isolated from Nitelva River, Norway.
Test organism age	3-to 7-day old culture in logarithmic growth phase
Test type	Static
Test duration	72 hours
Test vessel	Microplate
Test volume	220 µL
Test concentrations	95.2, 63.8, 42.7, 28.6% (v/v), site/dilution water control, laboratory control
Test replicates	4 replicates per treatment, except 95.2% (v/v) 8 replicates per treatment; 8 replicates for laboratory and site control
Number of organisms	10, 000 cells/mL
Control water	Deionized water with nutrients added
Test solution renewal	None
Test temperature	24 ± 2°C
Feeding	None
Light intensity	3600 to 4400 lux
Photoperiod	24 hours light
Sample filtration	Through a preconditioned membrane filter of 0.45 µm using a vacuum pump
Aeration	None
pH adjustment	None
Test protocol	Environment Canada (2007b)
Statistical software	CETIS
Test endpoint	Algal cell growth inhibition
Test acceptability criteria for controls	>16-fold increase in number of algal cells; CV ≤20%; no trend when analyzed using Mann-Kendall test
Reference toxicant	Zinc

Table 4. Summary of test conditions: *Hyalella azteca* survival and growth test.

Test organism	*Hyalella azteca*
Test organism source	Aquatic Research Organisms, NH
Test organism age	7-8 days old
Test type	Static-renewal
Test duration	28 days
Test vessel	375 mL glass container
Test volume	300 mL of water
Test concentrations	100, 67, 44, 30% (v/v), site/dilution water control, laboratory control
Test replicates	5 test replicates per treatment, except 100% (v/v) 10 replicates per treatment
Number of organisms	10 per replicate
Control water	Moderately-hard water (hardness 80-100 mg/L $CaCO_3$) containing ~75 mg/L Cl and supplemented with 0.8 mg/L Br. Samples also supplemented with 25 mg/L Cl and 0.02 mg/L Br.
Test solution renewal	Twice daily
Test temperature	23 ± 1°C
Feeding	1 mL of YCT daily to each container. Tetramin daily, with amounts increasing weekly: Week 1: 0.5 mg, Week 2: 0.75 mg, Week 3: 1 mg, Week 4: 1.5 mg in each test container.
Light intensity	500 to 1000 lux at water surface
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test protocol	Modified from US EPA (2000), as described in Norberg-King et al. (2014)
Statistical software	CETIS
Test endpoint	Survival and dry weight
Test acceptability criteria for controls	Mean control survival of ≥80% survival
Reference toxicant	Sodium chloride

Table 5. Summary of test conditions: *Pimephales promelas* survival and growth test.

Test organism	*Pimephales promelas*
Test organism source	Aquatox, Hot Springs, AR
Test organism age	<24 hours
Test type	Static renewal
Test duration	28 days post hatch
Test vessel	1-L plastic container
Test volume	1 L
Test concentrations	100, 67, 44, 30% (v/v), site/dilution water control, laboratory control
Test replicates	4 test replicates per treatment except 100% (v/v) 8 replicates per treatment
Number of organisms	10 per replicate
Control water	Moderately-hard water (hardness 80-100 mg/L $CaCO_3$)
Test solution renewal	Daily
Test temperature	25 ± 1°C
Feeding	Twice a day, after hatch, with newly hatched brine shrimp *(Artemia nauplii)*
Light intensity	100 – 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	Provided post hatch (<100 bubbles/min)
Test protocol	US EPA (1996) and ASTM (2013)
Statistical software	CETIS
Test endpoint	Hatch, survival, length, biomass, normal development (which assesses incidence of deformities)
Test acceptability criteria for controls	>66% hatch; ≥70% post-hatch survival
Reference toxicant	Sodium chloride

Table 6. Summary of test conditions: *Oncorhynchus mykiss* embryo-alevin test.

Test organism	*Oncorhynchus mykiss*
Test organism source	Vancouver Island Trout Hatchery, Duncan, BC
Gamete quality	Small amount of water added to milt on a dry glass slide; verification of vigorous sperm motility using a compound microscope (100 X magnification)
Test organism age	<30 minutes post fertilization, <24 hour old gametes
Test type	Static renewal
Test duration	30 days
Test vessel	2-L plastic containers
Test volume	2 L
Test solution depth	17 cm
Test concentrations	100, 67, 44, 30% (v/v), site/dilution water control, laboratory control
Test replicates	4 test replicates per treatment
No. of organisms	30 eggs per replicate
Control water	City of Burnaby dechlorinated municipal tap water (hardness 12 mg/L $CaCO_3$)
Test solution renewal	Daily (80% renewal)
Test temperature	14 ± 1°C
Feeding	None
Light intensity	Dark
Photoperiod	24 hours dark; low intensity light used during solution renewals
Aeration	6.5 ± 1 mL/min/L
Test protocol	Environment Canada (1998)
Statistical software	CETIS
Test endpoint	Survival, viability (which assesses incidence of deformities), length, wet weight
Test acceptability criteria for controls	≥65% normal hatched fish
Reference toxicant	Sodium dodecyl sulphate

3.0 RESULTS

Results of the toxicity tests using *C. dubia* are provided in Tables 7 and 8. The site water and laboratory water controls performed similarly for this species, indicating that there were no adverse effects associated with the site water controls. No adverse effects were observed on survival or reproduction of *C. dubia* in the EV_ER4 and GH_FR1 SPO mixtures; the LC50, IC25 and IC50 values were all >100%.

Results of the toxicity tests using *P. subcapitata* are provided in Tables 9 and 10. In these tests, the site water controls produced 2.9-to 3.1-fold greater growth than the laboratory water controls. This finding is not unusual, since the higher ionic strength associated with the site water control would be expected to stimulate cell growth of this species relative to the very low ionic strength associated with the laboratory control water. A slight stimulatory effect on cell growth was observed in the EV_ER4 and GH_FR1 SPO mixtures; therefore the IC25 and IC50 values were >95.2%, which was the highest concentration tested.

Results of the toxicity tests using *H. azteca* are provided in Tables 11 and 12. Survival and dry weight were similar in the site water and laboratory water controls for this species, indicating that there were no adverse effects associated with the site water controls. Although the LC50 for *H. azteca* survival in EV_ER4 was >100%, survival was reduced by 40% in the undiluted EV_ER4 mixture. The effect observed in this treatment was highly variable, with four replicates producing between 0 and 10% survival, and the remaining six replicates producing between 90 and 100% survival. The high degree of variation associated with this result suggests that a testing artifact might have contributed to the adverse effect that was observed on survival in those four replicates. However, *H. azteca* dry weight was also reduced in the undiluted EV_ER4 mixture (24.5% reduction); the IC25 was 99.5% and the IC50 was >100%. There was no adverse effect on *H. azteca* survival in the GH_FR1 mixture; the LC50 was >100%. Dry weight was reduced by 12.6% in the full strength GH_FR1 mixture; therefore the IC25 and IC50 values were >100%.

Results of the toxicity tests using *P. promelas* are provided in Tables 13 and 14. Hatch, survival, biomass, length and normal development were similar in the site water and laboratory water controls for this species, indicating that there was no adverse or stimulatory effects associated with the site controls. No adverse effects were observed on *P. promelas* hatching, survival, biomass, length or normal development (i.e., incidence of deformities) in the EV_ER4 and GH_FR1 SPO mixtures; the EC25, EC50, IC25 and IC50 values were >100%.

Results of the toxicity tests using *O. mykiss* are provided in Tables 15 and 16. Survival of *O. mykiss* was statistically significantly reduced in the Elk River site water control (16% reduction) compared to the laboratory control; there were no statistically significant differences in viability, length and wet weight. Survival, viability, length and wet weight of *O. mykiss* were similar in the Fording River site water and laboratory controls, indicating that there were no adverse or stimulatory effects associated with Fording River site water control. No adverse effects were observed on *O. mykiss* survival, viability, length or wet weight in the EV_ER4 and GH_FR1 SPO mixtures; the EC25, EC50, IC25 and IC50 values were >100%.

There were no observations of unusual behaviour of *O. mykiss* in any of the test solutions, and the survival and viability endpoints were similar, indicating a low rate of deformities. A hatch rate was not calculated in these tests; however, the survival endpoint provides an appropriate measure of successful hatch, since the test is terminated shortly following hatch.

A summary of the analytical chemistry measurements on the SPO mixtures is provided in Table 17.

Table 7. Results: *Ceriodaphnia dubia* survival and reproduction test with EV_ER4 mixture.

Concentration (% v/v)	Survival (%)	Reproduction (Mean ± SD)
Laboratory Control	100	17.7 ± 3.2
Site Control (GH_ER2)	100	22.1 ± 2.8
30	100	21.4 ± 3.6
44	100	19.7 ± 5.1
67	100	19.2 ± 4.6
100	90	18.6 ± 6.5
Test endpoint (% v/v)		
LC50	>100	--
IC25	--	>100
IC50	--	>100

SD = Standard Deviation, LC = Lethal Concentration, IC = Inhibition Concentration

Table 8. Results: *Ceriodaphnia dubia* survival and reproduction test with GH_FR1 mixture.

Concentration (% v/v)	Survival (%)	Reproduction (Mean ± SD)
Laboratory Control	100	17.0 ± 3.3
Site Control (FR_UFR1)	100	22.4 ± 3.9
30	100	25.0 ± 1.9
44	100	22.8 ± 3.8
67	100	23.4 ± 3.2
100	100	19.9 ± 4.1
Test endpoint (% v/v)		
LC50	>100	--
IC25	--	>100
IC50	--	>100

SD = Standard Deviation, LC = Lethal Concentration, IC = Inhibition Concentration

Table 9. Results: *Pseudokirchneriella subcapitata* growth inhibition test with EV_ER4 mixture.

Concentration (% v/v)	Cell Density (x 10^4 cells/mL) (Mean ± SD)	Stimulation relative to GH_ER2 (%)
Laboratory Control	28.6 ± 2.5	--
Site Control (GH_ER2)	89.8 ± 7.6	--
28.6	88.8 ± 6.7	--
42.7	95.0 ± 7.5	5.8
63.8	114.5 ± 6.8*	27.6
95.2	94.9 ± 12.5	5.7
Test endpoint (% v/v)		
IC25	>95.2	--
IC50	>95.2	--

SD = Standard Deviation, IC = Inhibition Concentration
* Cell density was significantly greater than the site control GH_ER2

Table 10. Results: *Pseudokirchneriella subcapitata* growth inhibition test with GH_FR1 mixture.

Concentration (% v/v)	Cell Density (x 10^4 cells/mL) (Mean ± SD)	Stimulation relative to FR_UFR1 (%)
Laboratory Control	28.6 ± 2.5	--
Site Control (FR_UFR1)	82.1 ± 6.0	--
28.6	88.5 ± 10.2	7.8
42.7	85.8 ± 7.9	4.4
63.8	122.8 ± 16.2*	49.5
95.2	110.9 ± 14.6*	35.0
Test endpoint (% v/v)		
IC25	>95.2	--
IC50	>95.2	--

SD = Standard Deviation, IC = Inhibition Concentration
*Cell density was significantly greater than the site control FR_UFR1

Table 11. Results: *Hyalella azteca* survival and growth test with EV_ER4 mixture.

Concentration (% v/v)	Survival (%) (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Laboratory Control	98.0 ± 4.5	0.85 ± 0.12
Site Control (GH_ER2)	100 ± 0.0	0.84 ± 0.12
30	98.0 ± 4.5	0.85 ± 0.11
44	96.0 ± 8.9	0.75 ± 0.31
67	100 ± 0.0	0.79 ± 0.31
100	60.0 ± 47.6	0.63 ± 0.18
Test endpoint (% v/v)		
LC50	>100	--
IC25 (95% CL)	--	99.5 (12.3 – N/C)
IC50	--	>100

SD = Standard Deviation, LC = Lethal Concentration, IC = Inhibition Concentration, CL = Confidence Limits, N/C = Not Calculable

Table 12. Results: *Hyalella azteca* survival and growth test with GH_FR1 mixture.

Concentration (% v/v)	Survival (%) (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Laboratory Control	100 ± 0.0	0.92 ± 0.03
Site Control (FR_UFR1)	94.0 ± 5.5	0.87 ± 0.07
30	98.0 ± 4.5	0.86 ± 0.13
44	98.0 ± 4.5	0.85 ± 0.16
67	100 ± 0.0	0.77 ± 0.13
100	96.0 ± 7.0	0.76 ± 0.10
Test endpoint (% v/v)		
LC50	>100	--
IC25	--	>100
IC50	--	>100

SD = Standard Deviation, LC = Lethal Concentration, IC = Inhibition Concentration

Table 13. Results: *Pimephales promelas* survival and growth test with EV_ER4 mixture.

Sample ID	Hatch (%) (Mean ± SD)	Survival (%) (Mean ± SD)	Biomass (mg) (Mean ± SD)	Length (mm) (Mean ± SD)	Normal development (%) (Mean ± SD)
Laboratory Control	96.7 ± 3.8	88.3 ± 3.3	0.9 ± 0.0	8.1 ± 0.4	100.0 ± 0.0
Copper Control	98.3 ± 3.3	73.3 ± 18.9	1.0 ± 0.2	8.9 ± 0.2	98.1 ± 3.8
Site Control (GH_ER2)	96.7 ± 6.7	78.3 ± 10.0	1.1 ± 0.1	8.7 ± 0.4	96.2 ± 7.7
30	98.3 ± 3.3	81.7 ± 16.7	1.0 ± 0.2	9.4 ± 0.4	100.0 ± 0.0
44	98.3 ± 3.3	90.0 ± 3.8	1.0 ± 0.1	8.3 ± 0.2	100.0 ± 0.0
67	100.0 ± 0.0	93.3 ± 7.7	1.1 ± 0.0	8.7 ± 0.2	100.0 ± 0.0
100	99.2 ± 2.4	87.5 ± 13.5	1.1 ± 0.1	8.9 ± 0.4	100.0 ± 0.0
Test endpoint (%v/v)					
EC25	>100	>100	--	--	>100
EC50	>100	>100	--	--	>100
IC25	--	--	>100	>100	--
IC50	--	--	>100	>100	--

SD = Standard Deviation, IC = Inhibition Concentration, EC = Effective Concentration

Table 14. Results: *Pimephales promelas* survival and growth test with GH_FR1 mixture.

Sample ID	Hatch (%) (Mean ± SD)	Survival (%) (Mean ± SD)	Biomass (mg) (Mean ± SD)	Length (mm) (Mean ± SD)	Normal development (%) (Mean ± SD)
Laboratory Control	96.7 ± 3.8	88.3 ± 3.3	0.9 ± 0.0	8.1 ± 0.4	100.0 ± 0.0
Copper Control	98.3 ± 3.3	73.3 ± 18.9	1.0 ± 0.2	8.8 ± 0.3	98.1 ± 3.8
Site Control (FR_UFR1)	98.3 ± 3.3	86.7 ± 7.7	1.0 ± 0.1	8.7 ± 0.2	100.0 ± 0.0
30	98.3 ± 3.3	80.0 ± 16.3	1.1 ± 0.0	9.5 ± 0.5	100.0 ± 0.0
44	100.0 ± 0.0	90.0 ± 8.6	1.2 ± 0.2	8.8 ± 0.2	100.0 ± 0.0
67	100.0 ± 0.0	85.0 ± 6.4	1.1 ± 0.1	9.5 ± 0.3	100.0 ± 0.0
100	100.0 ± 0.0	86.7 ± 10.7	1.1 ± 0.2	9.5 ± 0.3	100.0 ± 0.0
Test endpoint (%v/v)					
EC25	>100	>100	--	--	>100
EC50	>100	>100	--	--	>100
IC25	--	--	>100	>100	--
IC50	--	--	>100	>100	--

SD = Standard Deviation, IC = Inhibition Concentration, EC = Effective Concentration

Table 15. Results: *Oncorhynchus mykiss* embryo-alevin test with EV_ER4 mixture.

Sample ID	Survival (%) (Mean ± SD)	Viability (%) (Mean ± SD)	Length (mm) (Mean ± SD)	Wet Weight (mg) (Mean ± SD)
Laboratory Control	83.5 ± 2.7	79.3 ± 3.3	18.2 ± 0.4	87.3 ± 9.0
Site Control (GH_ER2)	70.5 ± 17.4 *	69.6 ± 18.2	18.1 ± 0.3	81.5 ± 1.2
30	78.2 ± 2.2	73.8 ± 4.0	18.2 ± 0.6	91.6 ± 9.9
44	78.2 ± 8.5	76.6 ± 8.4	19.0 ± 0.3	89.7 ± 8.7
67	83.2 ± 9.4	78.1 ± 8.5	19.1 ± 0.5	97.2 ± 3.3
100	86.6 ± 7.1	83.3 ± 8.4	19.0 ± 0.5	97.0 ± 5.0
Test endpoint (% v/v)				
EC25	>100	>100	--	--
EC50	>100	>100	--	--
IC25	--	--	>100	>100
IC50	--	--	>100	>100

SD = Standard Deviation, EC = Effective Concentration, IC = Inhibition Concentration
* Indicates a statistically significant effect relative to the laboratory control

Table 16. Results: *Oncorhynchus mykiss* embryo-alevin test with GH_FR1 mixture.

Sample ID	Survival (%) (Mean ± SD)	Viability (%) (Mean ± SD)	Length (mm) (Mean ± SD)	Wet Weight (mg) (Mean ± SD)
Laboratory Control	83.1 ± 6.4	79.7 ± 8.6	18.6 ± 0.4	83.3 ± 5.1
Site Control (FR_UFR1)	74.4 ± 8.9	70.2 ± 11.4	18.6 ± 0.4	83.4 ± 3.7
30	79.9 ± 3.7	74.8 ± 1.7	18.0 ± 0.2	80.7 ± 3.2
44	79.0 ± 13.2	77.4 ± 13.6	18.1 ± 0.5	80.6 ± 6.6
67	76.2 ± 11.6	73.0 ± 9.5	16.6 ± 0.9	77.3 ± 4.1
100	70.0 ± 9.6	67.5 ± 8.0	17.1 ± 0.5	74.6 ± 6.5
Test endpoint (% v/v)				
EC25	>100	>100	--	--
EC50	>100	>100	--	--
IC25	--	--	>100	>100
IC50	--	--	>100	>100

SD = Standard Deviation, EC = Effective Concentration, IC = Inhibition Concentration

Table 17. Analytical chemistry summary for SPO mixtures.

Analyte	Target (mg/L)	Burnaby Average (mg/L) (Mean ± SD)	Calgary Average (mg/L) (Mean ± SD)
EV_ER4			
Nitrate (as N)	3.0	3.7 ± 0.3	3.7 ± 0.2
Sulphate (SO_4)	429	466 ± 23	517 ± 65
Cadmium (Cd)	0.00064	0.00060 ± 0.00003	0.00102 ± 0.00003
Selenium (Se)	0.019	0.022 ± 0.003	0.018 ± 0.002
Copper (Cu)	0.020	n/a	0.018 ± 0.001
GH_FR1			
Nitrate (as N)	20	21.6 ± 0.7	21.0 ± 0.3
Sulphate (SO_4)	429	452 ± 23	502 ± 49
Cadmium (Cd)	0.00064	0.00056 ± 0.00004	0.00097 ± 0.00009
Selenium (Se)	0.057	0.057 ± 0.004	0.054 ± 0.002
Copper (Cu)	0.020	n/a	0.017 ± 0.001

Burnaby average applies to *C. dubia, P. subcapitata, H. azteca and O. mykiss* tests
Calgary average applies to *P. promelas* tests

4.0 QA/QC

The health histories of the test organisms used in the exposures were acceptable and met the requirements of the Environment Canada protocols. The tests met all control acceptability criteria and there were no deviations from the test methodologies, other than planned modifications described in Section 2. However, the methods for the rainbow trout test differed from the study plan (Golder, 2015) since the test employed the regular number of replicates for the SPO mixtures (i.e., 4) rather than the planned increased number of replicates (i.e., 8, or twice the number that is required by the method) as a result of technician error.

Water quality parameters remained within ranges specified in the protocols throughout the tests, with the exception of the *P. promelas* test. On day 23 of the *P. promelas* test, the temperature of some test solutions fell to 22 to 23°C, which is below the range of 25 ± 1°C specified by the test method. In addition, the dissolved oxygen of some *P. promelas* test solutions were slightly above the recommended range of 40 to 100% saturation on days 23, 24 and 25. These minor deviations from the specified range would not be expected to affect the outcome of the test.

A number of the samples were partially frozen upon arrival at the laboratory. This was due to sampling locations being frozen and containing ice at the time of collection. Samples were thawed and composited before use in toxicity testing.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 18. Results for these tests fell within the acceptable range for organism performance of mean and two standard deviations, based on historical results obtained by the laboratory with these tests. Thus, the sensitivity of the organisms used in these tests was appropriate. Uncertainty associated with these tests is best described by the standard deviations around the means.

Table 18. Reference toxicant test results.

Test Species	Endpoint	Historical Mean (2 SD Range)	CV (%)	Test Date
C. dubia	Survival (LC50): 2.1 g/L NaCl	2.0 (1.9–2.2)	5	December 3, 2015
	Reproduction (IC50): 1.5 g/L NaCl	1.5 (1.2–2.0)	14	
P. subcapitata	Growth (IC50): 33.6 µg/L Zn	29.1 (16.5–51.1)	33	December 1, 2015
H. azteca	Survival (LC50): 5.6 g/L NaCl	5.3 (4.5–6.2)	9	December 8, 2015
P. promelas	Survival (LC50): 0.8 g/L NaCl	0.8 (0.6–1.2)	12	December 13, 2015
	Biomass (IC25): 0.5 g/L NaCl	0.6 (0.3–1.2)	20	
O. mykiss	Viability (EC50): 7.3 mg/L SDS	4.0 (2.2 - 7.3)	36	December 8, 2015

SD = Standard Deviation, CV = Coefficient of Variation, LC = Lethal Concentration, IC = Inhibition Concentration, EC = Effect Concentration

5.0 REFERENCES

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6.0 END OF REPORT

APPENDIX A – *Ceriodaphnia dubia* Toxicity Test Data

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 1601

Start Date/Time: Dec 8/15 @ 1300h
Set up by: EMM/MLT

Sample Information:

Sample ID: EV_ER24 (commended)
Sample Date: Nov30/15
Date Received: Dec1/15
Sample Volume: 10x2L
GH_ER2 (site dilution water) sampled and received on same dates as EV_ER24

Test Organism Information:

Broodstock No.: 112615A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 29
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: 3→7, 9, 10, 12, 13, 16, 18→20

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd137
Stock Solution ID: 15Na03
Date Initiated: Dec3/15

7-d LC50 (95% CL): 2.1(1.5-3.0) g/L NaCL
7-d IC50 (95% CL): 1.5(1.2-1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0(1.4-2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5(1.2-2.0) g/L NaCL CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: JCH
Date reviewed: Jan-7/16

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: EV_ER4 (ammended)
Work Order #: 16001

Start Date & Time: Dec 8/15 @ 1300h
Stop Date & Time: Dec 15/15 @ 1400h
Test Species: *Ceriodaphnia dubia*

(20% Perrier) lab Control

	Days													
Concentration	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.0	8.0	8.0	7.8	8.0	8.0	8.0	8.1	8.3	8.0	8.1	7.6	8.0	7.5
pH	8.0	7.8	8.0	7.7	8.1	7.7	8.0	7.8	7.8	7.8	7.8	7.8	8.0	7.7
Cond. (µS/cm)	220	221		220		216		224		222		220		223
Initials	EMM	MLT		EMM		EMM		A		A		EMM		MLT

GH_ER2 Site Control

	Days													
Concentration	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.0	7.9	8.1	7.8	8.1	8.0	8.2	7.8	8.1	8.1	8.1	7.6	8.0	7.3
pH	8.2	8.0	8.0	7.8	8.0	7.9	8.1	7.8	8.0	7.9	8.1	7.8	8.0	7.8
Cond. (µS/cm)	314	321		320		329		324		325		329		330
Initials	EMM	MLT		EMM		EMM		A		A		EMM		MLT

	Days													
Concentration	0	1		2		3		4		5		6		7
30% (v/v)	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.2	8.1	8.1	7.8	8.2	8.0	8.2	7.7	8.1	8.0	8.1	7.7	8.1	7.3
pH	8.2	8.0	8.0	7.9	8.0	8.0	8.1	8.0	8.0	8.0	8.1	7.9	8.0	7.9
Cond. (µS/cm)	579	571		580		597		572		595		595		557
Initials	EMM	MLT		EMM		EMM		A		A		MLT		MLT

	Days													
Concentration	0	1		2		3		4		5		6		7
44% (v/v)	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.2	8.1	8.2	7.9	8.2	8.0	8.2	7.7	8.1	7.8	8.2	7.6	8.1	7.3
pH	8.2	8.0	8.0	7.9	8.1	8.0	8.1	8.0	8.0	7.9	8.1	7.9	8.0	7.9
Cond. (µS/cm)	677	683		689		679		675		670		677		680
Initials	EMM	MLT		EMM		EMM		A		A		MLT		MLT

Thermometer: 4 (20% Perrier) **DO meter:** 1 **pH meter:** 2 **Conductivity meter:** 4

	Control	EV_ER4 (ammended)	GH_ER2	
Hardness*	100	710	186	
Alkalinity*	96	174	194	

* mg/L as CaCO3

Analysts: EMM, MLT, KL, AJO
Reviewed by: Jole
Date reviewed: Jan. 7/16

Sample Description: EV_ER4 and GH_ER2 are clear, no particulate or precipitate present, odourless, colourless

Comments: **Broodboard Used:** 112615A

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: EV_ER4 (commanded)
Work Order #: 16001

Start Date & Time: Dec 8/15 @ 1300h
Stop Date & Time: Dec 15/15 @ 1400h
Test Species: *Ceriodaphnia dubia*

MG
Concentration 67 ~~66~~ % (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	25.0	25.0	24.0	25.0	24.0	~~25.0~~	~~24.0~~	~~25.0~~	~~24.0~~	25.0	24.0	25.0
DO (mg/L)	8.2	8.1	8.2	7.7	8.2	8.0	8.3	7.6	8.1	7.9	8.1	7.6	8.1	7.3
pH	8.1	7.9	8.1	7.8	8.1	8.0	8.1	7.9	8.0	7.9	8.1	7.9	8.0	7.8
Cond. (µS/cm)	844	843		849		854		872		860		815		811
Initials	EMM	MG		EMM		EMM		^		^		MG		MG

rep A-FT (1)
Concentration 100% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	25.0	25.0	24.0	25.0	24.0	~~25.0~~	~~24.0~~	~~25.0~~	~~24.0~~	25.0	24.0	25.0
DO (mg/L)	8.2	8.1	8.2	7.8	8.2	8.2	8.3	7.8	8.1	7.8	8.2	7.7	8.1	7.4
pH	8.1	7.9	8.1	7.9	8.1	~~8.0~~ 7.9	8.0	7.9	8.0	7.9	8.0	7.9	8.0	7.9
Cond. (µS/cm)	1077	1077		1077		1082		1077		1071		1036		1030
Initials	EMM	MG		EMM		EMM		^		^		MG		MG

rep H-FT (2)
Concentration 100% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	25.0	25.0	24.0	25.0	24.0	~~25.0~~	~~24.0~~	~~25.0~~	~~24.0~~	25.0	24.0	25.0
DO (mg/L)	8.2	8.2	8.2	7.8	8.2	8.2	8.3	7.6	8.1	7.7	8.2	7.6	8.1	7.4
pH	8.1	7.9	8.1	7.9	8.1	7.9	8.1	7.9	8.0	7.9	8.0	7.9	8.0	7.9
Cond. (µS/cm)	1075	1078		1075		1084		1068		1068		1036		1031
Initials	EMM	MG		EMM		EMM		^		^		MG		MG

	Days													
Concentration	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: 4 (201. Perner (commended)) **DO meter:** 1 **pH meter:** 2 **Conductivity meter:** 4

	Control	EV-ER4	GH_ER2 (site ctrl)	
Hardness*	100	710	186	
Alkalinity*	96	174	194	

* mg/L as CaCO3

Analysts: EMM, MG, AW
Reviewed by: JK
Date reviewed: Jan-7/16

Sample Description: same as page 1 of 2

Comments: **Broodboard Used:** 112615A

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: EV_ER4 (ammended)
Work Order: 16001

Start Date & Time: Dec. 8/15 @ 1300h
Stop Date & Time: Dec 15/15 @ 1400h
Set up by: Emm/MLT

% (v/v)

Days	Concentration: Control										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KC
4	✓	2	3	✓	✓	3	2	3	3	4	A
5	6	✓	✓	5	5	✓	✓	6	✓	7	~
6	10	8	6	✓	7	6	6	✓	8	✓	Emm
7	✓	9	10	8	✓	10	9	11	9	11	MLT
8											
Total	16	19	19	13	12	19	17	20	20	22	MLT

Days	Concentration: Site Control (GH_ER2)										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KC
4	4	4	4	4	4	4	4	3	4	✓	A
5	✓	8	✓	✓	✓	✓	✓	9	✓	✓	~
6	6	✓	8	7	7	9	7	✓	8	9	Emm
7	10	12	11	9	10	11	12	13	13	✓	MLT
8											
Total	20	24	23	20	21	24	23	25	25	16	MLT

Days	Concentration: 30										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KC
4	4	✓	4	4	3	3	4	4	4	4	A
5	✓	6	✓	✓	✓	7	✓	✓	✓	✓	~
6	7	7	8	6	6	✓	8	7	7	8	Emm
7	11	✓	13	10	11	12	14	9	12	11	MLT
8											
Total	22	13	25	20	20	22	26	20	23	23	MLT

Days	Concentration: 44										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KC
4	4	4	4	✓	✓	4	✓	4	✓	4	A
5	✓	✓	✓	5	4	✓	5	8	5	✓	~
6	7	6	7	✓	✓	8	9	✓	✓	8	Emm
7	13	11	11	10	9	14	✓	13	9	11	MLT
8											
Total	24	21	22	15	13	26	14	25	14	23	MLT

Days	Concentration: 66 (MLT) 67										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KC
4	2	2	3	4	4	3	✓	✓	3	4	A
5	✓	✓	✓	4	✓	✓	5	5	✓	✓	~
6	7	6	7	✓	7	8	7	✓	7	8	Emm
7	13	12	13	8	11	13	✓	10	9	11	MLT
8											
Total	22	20	23	12	22	24	12	15	19	23	MLT

Days	Concentration: 100										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KC
4	4	4	4	3	4	4	4	4	✓	4	A
5	5	✓	✓	✓	✓	2	✓	✓	6	✓	~
6	✓	9	7	6	8	8	7	8	✓	7	Emm
7	13 (MLT)	13	13	12	11	9	13	14	10	8	MLT
8											
Total	9	26	24	21	23	14	24	26	16	19	MLT

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: EV_ER4 ammended and diluted w/ Site water GH_ER2, (MLT ~~ER~~) EV_ER4 and GH_ER2 are clear, no particulate, odourless colourless.

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JGH

Date reviewed: Jan. 7/16

CETIS Summary Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Batch ID:	01-9754-3178	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	08 Dec-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	GH_ER2
Ending Date:	15 Dec-15 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 1h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 4h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
11-3530-1045	7d Survival Rate	EC5	81.87	72.6	N/A	1.221	Linear Interpolation (ICPIN)
		EC10	100	78.66	N/A	1	
		EC15	>100	N/A	N/A	<1	
		EC20	>100	N/A	N/A	<1	
		EC25	>100	N/A	N/A	<1	
		EC40	>100	N/A	N/A	<1	
		EC50	>100	N/A	N/A	<1	

7d Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	(1) Dilution Water	10	1	1	1	1	1	0	0	0.0%	0.0%
0	Negative Control	10	1	1	1	1	1	0	0	0.0%	0.0%
30		10	1	1	1	1	1	0	0	0.0%	0.0%
44		10	1	1	1	1	1	0	0	0.0%	0.0%
67		10	1	1	1	1	1	0	0	0.0%	0.0%
100		20	0.9	0.7559	1	0	1	0.06882	0.3078	34.2%	10.0%

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
0	Negative Control	1	1	1	1	1	1	1	1	1	1
30		1	1	1	1	1	1	1	1	1	1
44		1	1	1	1	1	1	1	1	1	1
67		1	1	1	1	1	1	1	1	1	1
100		1	0	1	1	1	1	1	1	0	1
		1	1	1	1	1	1	1	1	1	1

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
30		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
44		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
67		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

(1) Dilution water = GH_ER2 site water
Negative control = lab water

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	11-3530-1045	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 Dec-15 14:31	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	01-9754-3178	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	08 Dec-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	GH_ER2
Ending Date:	15 Dec-15 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 1h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 4h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1059995	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	81.87	72.6	N/A	1.221	NA	1.377
EC10	100	78.66	N/A	1	NA	1.271
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Dilution Water	10	1	1	1	0	0	0.0%	0.0%	10	10
30		10	1	1	1	0	0	0.0%	0.0%	10	10
44		10	1	1	1	0	0	0.0%	0.0%	10	10
67		10	1	1	1	0	0	0.0%	0.0%	10	10
100		20	0.9	0	1	0.06882	0.3078	34.2%	10.0%	18	20

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
30		1	1	1	1	1	1	1	1	1	1
44		1	1	1	1	1	1	1	1	1	1
67		1	1	1	1	1	1	1	1	1	1
100		1	0	1	1	1	1	1	1	0	1
		1	1	1	1	1	1	1	1	1	1

7d Survival Rate Binomials

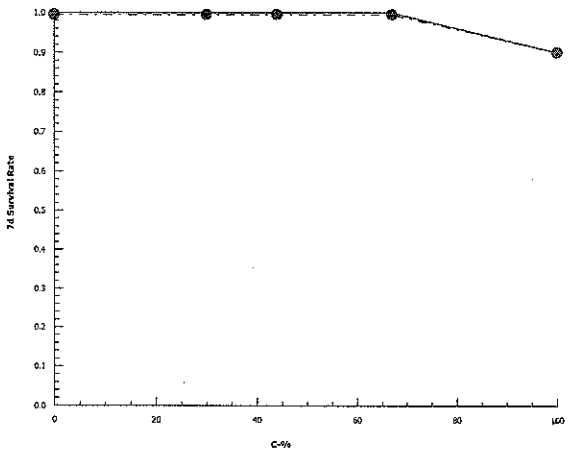
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	(1) Dilution Water	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
30		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
44		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
67		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

(1) Dilution water = GH_ER2 site water
Negative control = lab water

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID:	11-3530-1045	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 Dec-15 14:31	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA: JCH Jan. 7/16

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	19-5776-1524	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 Dec-15 14:30	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	01-9754-3178	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	08 Dec-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	GH_ER2
Ending Date:	15 Dec-15 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 1h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 4h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	Passes 7d survival rate

Fisher Exact Test

	Control	vs	Control	Test Stat	P-Value	P-Type	Decision(α:5%)
(1)	Negative Control		Dilution Water	1	1.0000	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Dilution Water	10	0	10	1	0	0.0%
0	Negative Contr	10	0	10	1	0	0.0%

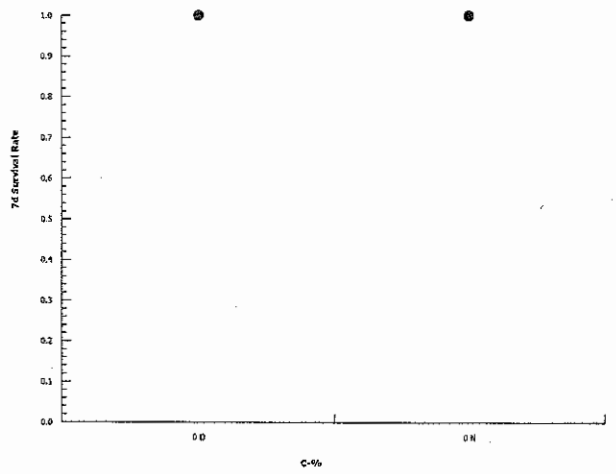
7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
0	Negative Control	1	1	1	1	1	1	1	1	1	1

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



(1) Negative control = lab water
Dilution water = GH_ER2 site water

CETIS Summary Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Batch ID:	01-9754-3178	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	08 Dec-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	GH_ER2
Ending Date:	15 Dec-15 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 1h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 4h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
05-5360-0215	Reproduction	IC5	32.88	2.615	73.07	3.042	Linear Interpolation (ICPIN)
		IC10	42.16	12.07	N/A	2.372	
		IC15	88.4	33.94	N/A	1.131	
		IC20	>100	N/A	N/A	<1	
		IC25	>100	N/A	N/A	<1	
		IC40	>100	N/A	N/A	<1	
		IC50	>100	N/A	N/A	<1	

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0 ①	Dilution Water	10	22.1	20.06	24.14	16	25	0.9	2.846	12.88%	0.0%
0	Negative Control	10	17.7	15.41	19.99	12	22	1.012	3.199	18.07%	19.91%
30		10	21.4	18.83	23.97	13	26	1.137	3.596	16.81%	3.17%
44		10	19.7	16.04	23.36	13	26	1.62	5.122	26.0%	10.86%
67		10	19.2	15.92	22.48	12	24	1.451	4.59	23.91%	13.12%
100		20	18.6	15.55	21.65	7	26	1.459	6.524	35.08%	15.84%

Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	20	24	23	20	21	24	23	25	25	16
0	Negative Control	16	19	19	13	12	19	17	20	20	22
30		22	13	25	20	20	22	26	20	23	23
44		24	21	22	15	13	26	14	25	14	23
67		22	20	23	12	22	24	12	15	19	23
100		22	8	25	24	24	17	7	18	7	18
		9	26	24	21	23	14	24	26	16	19

① Dilution water = GH_ER2 site water
Negative Control = lab water

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	05-5360-0215	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 Dec-15 14:31	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	01-9754-3178	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	08 Dec-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	GH_ER2
Ending Date:	15 Dec-15 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 1h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 4h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1299767	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	32.88	2.615	73.07	3.042	1.369	38.25
IC10	42.16	12.07	N/A	2.372	NA	8.288
IC15	88.4	33.94	N/A	1.131	NA	2.947
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	10	22.1	16	25	0.9	2.846	12.88%	0.0%
30		10	21.4	13	26	1.137	3.596	16.81%	3.17%
44		10	19.7	13	26	1.62	5.122	26.0%	10.86%
67		10	19.2	12	24	1.451	4.59	23.91%	13.12%
100		20	18.6	7	26	1.459	6.524	35.08%	15.84%

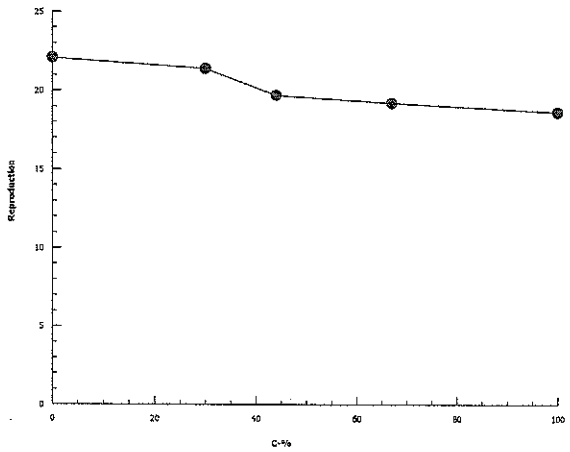
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	20	24	23	20	21	24	23	25	25	16
30		22	13	25	20	20	22	26	20	23	23
44		24	21	22	15	13	26	14	25	14	23
67		22	20	23	12	22	24	12	15	19	23
100		22	8	25	24	24	17	7	18	7	18
		9	26	24	21	23	14	24	26	16	19

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	05-5360-0215	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 Dec-15 14:31	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Report Date: 15 Dec-15 14:32 (p 1 of 1)
Test Code: 16001b | 02-8502-4137

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-0496-5178	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 Dec-15 14:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-9754-3178	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	08 Dec-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	GH_ER2
Ending Date:	15 Dec-15 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 1h	**Source:**	In-House Culture	**Age:**	<24h

Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 4h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	13.3%	Passes reproduction

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control lab control		Dilution Water GHER2	-3.25	1.734	2.348	18	0.9978	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	96.8	96.8	1	10.56	0.0044	Significant Effect
Error	165	9.166667	18			
Total	261.8		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.263	6.541	0.7333	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9083	0.866	0.0591	Normal Distribution

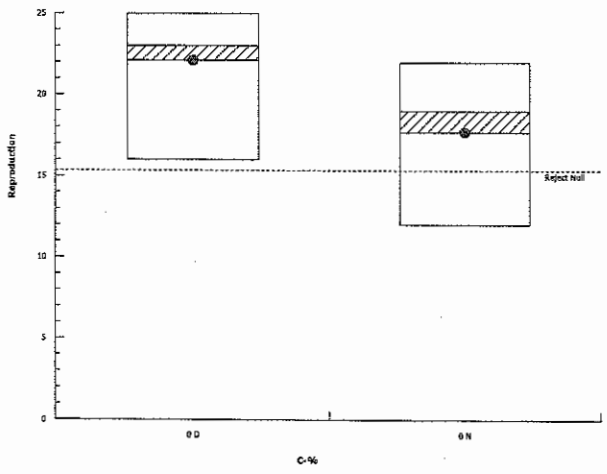
Reproduction Summary

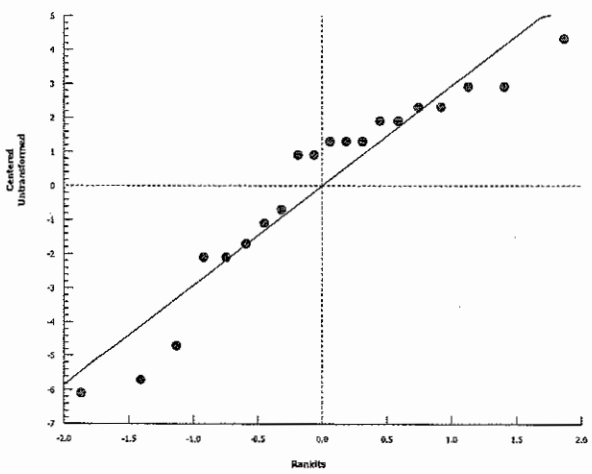
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	10	22.1	20.06	24.14	23	16	25	0.9	12.88%	0.0%
0	Negative Control	10	17.7	15.41	19.99	19	12	22	1.012	18.07%	19.91%

Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	20	24	23	20	21	24	23	25	25	16
0	Negative Control	16	19	19	13	12	19	17	20	20	22

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	15-6201-1184	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Jan-16 13:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	01-9754-3178	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	08 Dec-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	GH_ER2
Ending Date:	15 Dec-15 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 1h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 4h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C < T	NA	NA	13.3%	Fails reproduction

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		Dilution Water	3.25	1.734	2.348	18	0.0022	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend		1.96	0.1447	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	96.8	96.8	1	10.56	0.0044	Significant Effect
Error	165	9.166667	18			
Total	261.8		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.263	6.541	0.7333	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9083	0.866	0.0591	Normal Distribution

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	10	22.1	20.06	24.14	23	16	25	0.9	12.88%	0.0%
0	Negative Control	10	17.7	15.41	19.99	19	12	22	1.012	18.07%	19.91%

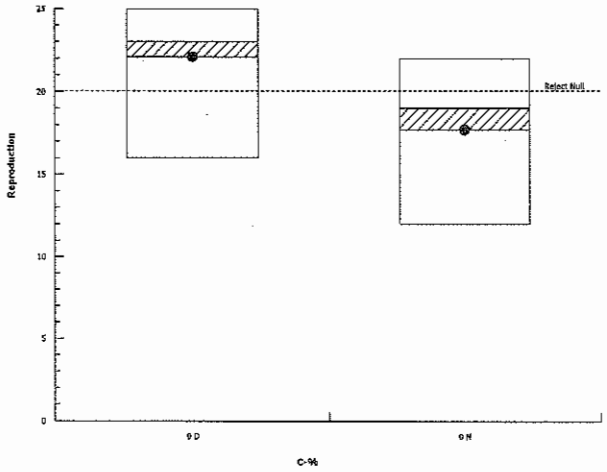
Reproduction Detail

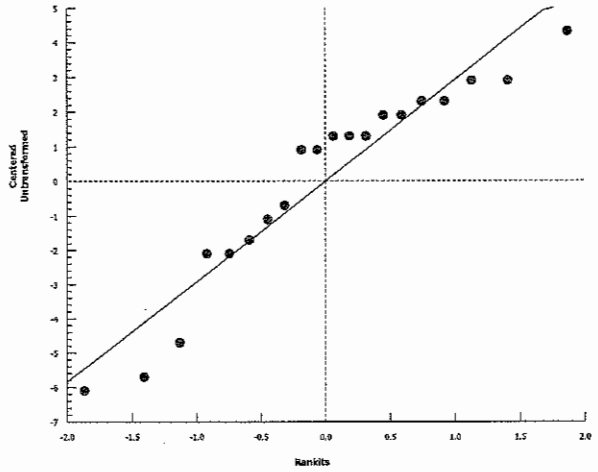
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	20	24	23	20	21	24	23	25	25	16
0	Negative Control	16	19	19	13	12	19	17	20	20	22

Ceriodaphnia 7-d Survival and Reproduction Test | **Nautilus Environmental**

Analysis ID:	15-6201-1184	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Jan-16 13:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Client: Teck Coal

W.O.#: 16001

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
GH_ER2 (site control)	Dec 8/15	50	9.9	10.1	194		50	9.3	186	JS
EV_ER4 (ammended)	↓	50	8.9	9.1	174		100	7.1	710	JS
20% Perrier	Dec 8/15	50	4.9	5.0	96		50	5.0	100	MH

Notes: ① Diluted to 100mL w/ D.I water

Reviewed by: JM

Date Reviewed: Jan. 7/16

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 1602

Start Date/Time: Dec 8/15 @ 1300h
Set up by: FMM/MLT

Sample Information:

Sample ID: GH_FR1 (Commended)
Sample Date: Nov 30/15
Date Received: Dec 1/15
Sample Volume: 11 x 20L
FR_UFR1 (Site dilution water) sampled and recieved on the same dates as GH_FR1

Test Organism Information:

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Broodstock No.: 112615A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 29
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: 3,7,9,10,12,13,16,18,20

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd137
Stock Solution ID: 15Da03
Date Initiated: Dec 3/15

7-d LC50 (95% CL): 2.1 (1.5-3.6) g/L NaCl
7-d IC50 (95% CL): 1.5 (1.2-1.7) g/L NaCl

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.9-2.2) g/L NaCl CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-2.0) g/L NaCl CV (%): 19

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: JGh
Date reviewed: Jan-7/16

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: GH_FR1 (ammended)
Work Order #: 16001

Start Date & Time: Dec 8/15 @ 1300h
Stop Date & Time: Dec 15/15 @ 1600h
Test Species: *Ceriodaphnia dubia*

(20% Perrier) (lab)
Concentration: Control

	Days 0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.6	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.0	7.9	8.0	7.8	8.1	7.8 JS	8.0	8.0	8.3	7.9	8.2	7.5	8.0	7.5
pH	8.0	7.8	8.0	7.7	8.0	7.86	8.0	7.7	7.8	7.9	7.8	7.8	8.0	7.7
Cond. (µS/cm)	220	221		220		216		224		222		220		218
Initials	EMM	EMM		EMM		EMM		^		^		EMM		JS

Concentration: FR_UFR1 Site Control

	Days 0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.5	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.2	8.2	8.1	7.9	8.2	7.9	8.3	7.8	8.1	7.9	8.0	7.5	8.0	7.3
pH	8.1	7.9	8.0	7.9	8.0	7.9	8.1	7.9	8.1	8.0	8.1	7.9	8.1	7.9
Cond. (µS/cm)	354	363		362		371		387		368		378		365
Initials	EMM	MT		EMM		EMM		^		^		EMM		JS

Concentration: 30% (v/v)

	Days 0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.5	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.2	8.2	8.2	8.0	8.2	8.0	8.3	7.8	8.1	8.0	8.1	7.5	8.1	7.3
pH	8.1	8.0	8.0	7.9	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.0
Cond. (µS/cm)	622	638		629		640		655		637		630		602
Initials	EMM	MT		EMM		EMM		^		^		EMM		JS

Concentration: 44% (v/v)

	Days 0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.5	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.2	8.2	8.3	8.0	8.2	8.0	8.2	7.8	8.2	7.9	8.1	7.5	8.0	7.4
pH	8.1	8.0	8.0	7.9	8.1	8.0	8.1	8.0	8.0	8.1	8.1	8.0	8.1	8.0
Cond. (µS/cm)	800	772		778		760		760		759		760		712
Initials	EMM	MT @ 8.2		EMM		EMM		^		^		EMM		JS

Thermometer: 4 **DO meter:** 1 **pH meter:** 2 **Conductivity meter:** 4

	Lab Control	GH_FR1 (ammended)	FR GH_UFR1 (MC)	
Hardness*	100	720	190	
Alkalinity*	96	200	194	

* mg/L as CaCO3

Analysts: EMM, MT, AWD, JS, YL, JW
Reviewed by: JGL
Date reviewed: Jan 7/16

Sample Description: GH_FR1 and FR_UFR1 are clear, no particulate or precipitate, odourless, colourless

Comments: **Broodboard Used:** 112615A ~~B~~ C

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: GH_FR1 (ammended)
Work Order #: 16001

Start Date & Time: Dec 8/15 @ 1300h
Stop Date & Time: Dec 15/15 @ 1500h
Test Species: *Ceriodaphnia dubia*

MLT
Concentration 67 ~~56~~ %(v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.5	25.0	24.0	25.0	24.0	25.0	24.5	25.0	24.5	25.0	24.0	25.0
DO (mg/L)	8.2	8.2	8.2	8.0	8.2	8.0	8.3	7.8	8.1	7.9	8.1	7.5	8.0	7.3
pH	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.0	8.0	8.0	7.8	8.1	7.9
Cond. (µS/cm)	942	931		930		929		902		915		890		850
Initials	EMM	MLT		EMM		EMM		^		^		EMM		JS

rep A>J (1)
Concentration 100%(v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.5	25.0	24.0	25.0	24.0	25.0	24.5	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.2	8.2	8.2	8.0	8.2	8.0	8.3	7.8	8.2	7.9	8.2	7.5	8.0	7.4
pH	8.1	8.0	8.1	8.0	8.1	8.0	8.1	7.9	8.0	7.9	8.0	7.8	8.0	7.9
Cond. (µS/cm)	1181	1180		1176		1196		1169		1163		1170		1095
Initials	EMM	MLT		EMM		EMM		^		^		EMM		JS

rep K>T (2)
Concentration 100%(v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.5	25.0	24.0	25.0	24.0	25.0	24.5	25.0	24.5	25.0	24.0	25.0
DO (mg/L)	8.2	8.2	8.2	8.0	8.2	8.0	8.2	7.6	8.2	7.8	8.2	7.5	8.0	7.5
pH	8.1	8.0	8.1	8.0	8.1	8.0	8.1	7.9	8.0	7.9	8.0	7.8	8.0	7.9
Cond. (µS/cm)	1181	1180.4		1172		1197		1178		1162		1165		1115
Initials	EMM	MLT		EMM		EMM		JW		MML		EMM		JS

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: 4 **DO meter:** 1 **pH meter:** 2 **Conductivity meter:** 4

	lab Control	GH_FR1	FR_UFR1	
Hardness*	100	720	190	
Alkalinity*	96	200	194	

* mg/L as $CaCO_3$

Analysts: EMM, MLT, AWD, JS, ML
Reviewed by: JBL
Date reviewed: Jan. 7/16

Sample Description: Same as page 1 of 2

Comments: **Broodboard Used:** 112615A

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: GH_FR1 (ammended)
Work Order: 16001

Start Date & Time: Dec 8/15 @ 1300h
Stop Date & Time: Dec 15/15 @ 1600h
Set up by: EMM/KLF

% (v/v)

Days	Concentration: 1gh Control										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	~~JS~~
4	2	2	3	3	4	4	2	✓	✓	✓	KC
5	6	✓	✓	✓	7	8	✓	5	4	4	YML
6	✓	8	7	8	✓	✓	6	7	6	✓	MG
7	8	9	8	9	8	9	8	✓	8	7	JS
8											
Total	16	19	18	20	19	21	16	13 12	18	11	MG

Days	Concentration: Site Control (FR_UFR)										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
4	4	4	4	5	2	5	4	5	1	4	KC
5	✓	7	✓	✓	✓	✓	✓	✓	✓	~~4~~	YML
6	7	✓	7	8	8	8	8	9	3	6	MG
7	9	11	13	13	13	12	9	14	10	11	JS
8											
Total	20	22	24	26	23	25	21	28	14	21	MG

Days	Concentration: 30										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	~~JS~~
4	5	4	5	3	5	4	4	4	2	4	KC
5	✓	✓	✓	9	✓	✓	✓	✓	✓	✓	YML
6	7	9	9	✓	6	8	7	9	8	6	MG
7	13	12	13	12	15	13	10	15	14	15	JS
8											
Total	25	25	27	24	26	25	21	28	24	25	MG

Days	Concentration: 44										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	~~JS~~
4	4	3	5	✓	4	4	4	3	3	4	KC
5	✓	✓	✓	5	✓	✓	~~6~~	6	7	7	YML
6	8	6	7	9	7	8	✓	✓	10	✓	MG
7	13	11	13	✓	14	14	14	14	13	13	JS
8											
Total	25	20	25	14	25	26	26	23	20	24	MG

Days	Concentration: ~~66~~ MG 67										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	~~JS~~
4	4	4	4	3	4	4	3	✓	4	3	KC
5	✓	✓	✓	✓	✓	✓	✓	6	✓	✓	YML
6	7	9	9	6	8	7	7	✓	7	8	MG
7	13	12	14	11	13	13	13	10	13	15	JS
8											
Total	24	25	27	20	25	24	23	16	24	26	MG

Days	Concentration: 100										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	~~JS~~
4	✓	4	4	3	4	4	4	4	3	3	KC
5	5	✓	✓	✓	✓	✓	✓	✓	6	✓	YML
6	8	8	7	6	6	6	6	5	✓	6	MG
7	✓	14	14	12	15	13	10	14	12	13	JS
8											
Total	13	26	25	21	25	23	20	23	21	22	MG

Days	Concentration: 100 (GH FR1 ammended)										
	~~AL~~	~~BL~~	~~BM~~	~~BN~~	~~BO~~	~~BP~~	~~BQ~~	~~BR~~	~~BS~~	~~BT~~	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
4	✓	✓	4	3	3	3	✓	✓	✓	4	KC
5	5	5	✓	✓	7	5	4	5	7	✓	YML
6	9	10	8	6	9	✓	12	9	10	4	MG
7	✓	✓	13	8	14	13	✓	✓	✓	13	JS
8											
Total	14	15	25	17	19	21	16	14	17	21	MG

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: GH_FR1 ammended and diluted w/ site water FR_UFR), GH_PR1 and MG FR_UFR1 are clear, no particulate, odourless, colourless
Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count. ~~no precipitate~~ MG.

Reviewed by: JOh

Date reviewed: Jan. 7/16

CETIS Summary Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Batch ID:	01-3629-2905	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	08 Dec-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	FR_UFRI
Ending Date:	15 Dec-15 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 3h	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 13h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
20-5794-5085	7d Survival Rate	EC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC10	>100	N/A	N/A	<1	
		EC15	>100	N/A	N/A	<1	
		EC20	>100	N/A	N/A	<1	
		EC25	>100	N/A	N/A	<1	
		EC40	>100	N/A	N/A	<1	
		EC50	>100	N/A	N/A	<1	

7d Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0 ①	Dilution Water	10	1	1	1	1	1	0	0	0.0%	0.0%
0	Negative Control	10	1	1	1	1	1	0	0	0.0%	0.0%
30		10	1	1	1	1	1	0	0	0.0%	0.0%
44		10	1	1	1	1	1	0	0	0.0%	0.0%
67		10	1	1	1	1	1	0	0	0.0%	0.0%
100		20	1	1	1	1	1	0	0	0.0%	0.0%

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
0	Negative Control	1	1	1	1	1	1	1	1	1	1
30		1	1	1	1	1	1	1	1	1	1
44		1	1	1	1	1	1	1	1	1	1
67		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1
		1	1	1	1	1	1	1	1	1	1

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
30		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
44		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
67		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

① Dilution water = FR_UFRI site water
Negative control = lab ~~control~~ water.

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	20-5794-5085	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 Dec-15 14:09	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	01-3629-2905	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	08 Dec-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	FR_UFRI
Ending Date:	15 Dec-15 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 3h	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 13h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2131282	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Dilution Water	10	1	1	1	0	0	0.0%	0.0%	10	10
30		10	1	1	1	0	0	0.0%	0.0%	10	10
44		10	1	1	1	0	0	0.0%	0.0%	10	10
67		10	1	1	1	0	0	0.0%	0.0%	10	10
100		20	1	1	1	0	0	0.0%	0.0%	20	20

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
30		1	1	1	1	1	1	1	1	1	1
44		1	1	1	1	1	1	1	1	1	1
67		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1
		1	1	1	1	1	1	1	1	1	1

7d Survival Rate Binomials

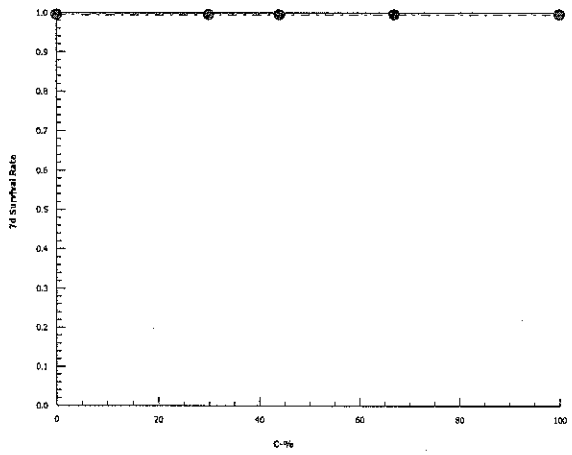
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	(1) Dilution Water	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
30		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
44		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
67		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

(1) Dilution water = FR_UFRI site water
Negative control = lab water

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	20-5794-5085	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 Dec-15 14:09	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA: JOL Jan. 7/16

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	04-0870-3292	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 Dec-15 13:45	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	01-3629-2905	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	08 Dec-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	FR_UFRI
Ending Date:	15 Dec-15 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 3h	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 13h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	Passes 7d survival rate

Fisher Exact Test

	Control	vs	Control	Test Stat	P-Value	P-Type	Decision(α:5%)
①	Negative Control		Dilution Water	1	1.0000	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Dilution Water	10	0	10	1	0	0.0%
0	Negative Contr	10	0	10	1	0	0.0%

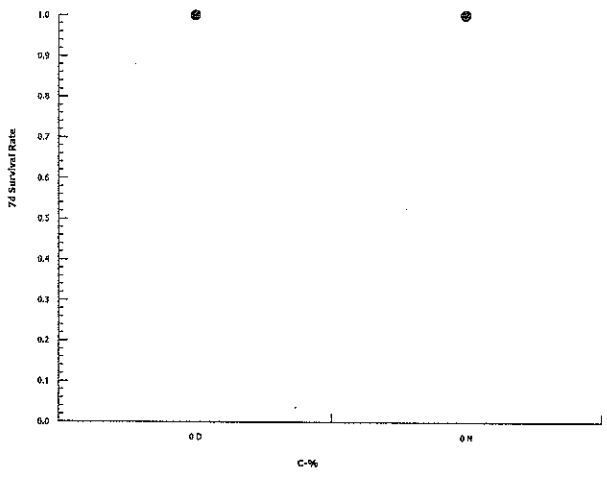
7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1	1	1	1	1	1	1	1	1	1
0	Negative Control	1	1	1	1	1	1	1	1	1	1

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



① Negative control = lab water
Dilution water = FR_UFRI site water

CETIS Summary Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Batch ID:	01-3629-2905	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	08 Dec-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	FR_UFRI
Ending Date:	15 Dec-15 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 3h	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 13h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
10-5111-2913	Reproduction	IC5	72.1	34.81	82.64	1.387	Linear Interpolation (ICPIN)
		IC10	83.63	41.17	N/A	1.196	
		IC15	96.99	76.44	N/A	1.031	
		IC20	>100	N/A	N/A	<1	
		IC25	>100	N/A	N/A	<1	
		IC40	>100	N/A	N/A	<1	
		IC50	>100	N/A	N/A	<1	

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0 ①	Dilution Water	10	22.4	19.64	25.16	14	28	1.222	3.864	17.25%	0.0%
0	Negative Control	10	17	14.64	19.36	11	21	1.043	3.3	19.41%	24.11%
30		10	25	23.65	26.35	21	28	0.5963	1.886	7.54%	-11.61%
44		10	22.8	20.09	25.51	14	26	1.2	3.795	16.64%	-1.79%
67		10	23.4	21.11	25.69	16	27	1.013	3.204	13.69%	-4.46%
100		20	19.9	17.99	21.81	13	26	0.9145	4.09	20.55%	11.16%

Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	20	22	24	26	23	25	21	28	14	21
0	Negative Control	16	19	18	20	19	21	16	12	18	11
30		25	25	27	24	26	25	21	28	24	25
44		25	20	25	14	25	26	26	23	20	24
67		24	25	27	20	25	24	23	16	24	26
100		13	26	25	21	25	23	20	23	21	22
		14	15	25	17	19	21	16	14	17	21

① Dilution water= FR_UFRI site water
Negative control= lab water

Analyst:_____ QA: JGH Jan. 7/16

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	10-5111-2913	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 Dec-15 13:46	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	01-3629-2905	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	08 Dec-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	FR_UFRI
Ending Date:	15 Dec-15 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 3h	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 13h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1382472	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	72.1	34.81	82.64	1.387	1.21	2.873
IC10	83.63	41.17	N/A	1.196	NA	2.429
IC15	96.99	76.44	N/A	1.031	NA	1.308
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	① Dilution Water	10	22.4	14	28	1.222	3.864	17.25%	0.0%
30		10	25	21	28	0.5963	1.886	7.54%	-11.61%
44		10	22.8	14	26	1.2	3.795	16.64%	-1.79%
67		10	23.4	16	27	1.013	3.204	13.69%	-4.46%
100		20	19.9	13	26	0.9145	4.09	20.55%	11.16%

Reproduction Detail

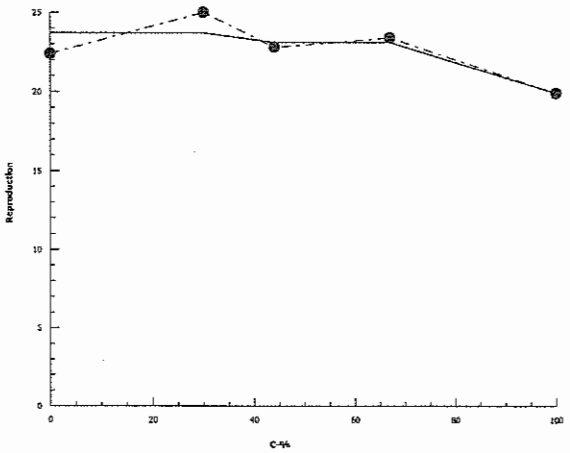
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	20	22	24	26	23	25	21	28	14	21
30		25	25	27	24	26	25	21	28	24	25
44		25	20	25	14	25	26	26	23	20	24
67		24	25	27	20	25	24	23	16	24	26
100		13	26	25	21	25	23	20	23	21	22
		14	15	25	17	19	21	16	14	17	21

① dilution water = FR_UFRI site water.

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	10-5111-2913	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 Dec-15 13:46	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	07-2713-0503	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 Dec-15 13:45	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	01-3629-2905	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	08 Dec-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	FR_UFRI
Ending Date:	15 Dec-15 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 3h	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 13h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	16.4%	Passes reproduction

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
(1) Negative Control		Dilution Water	-3.36	1.734	2.787	18	0.9983	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	145.8	145.8	1	11.29	0.0035	Significant Effect
Error	232.4	12.91111	18			
Total	378.2		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.371	6.541	0.6456	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9491	0.866	0.3534	Normal Distribution

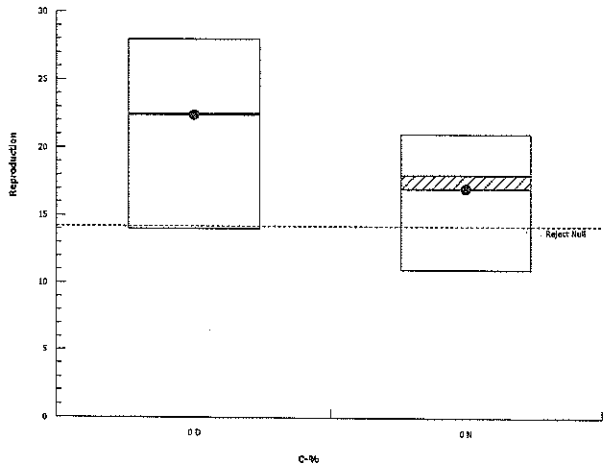
Reproduction Summary

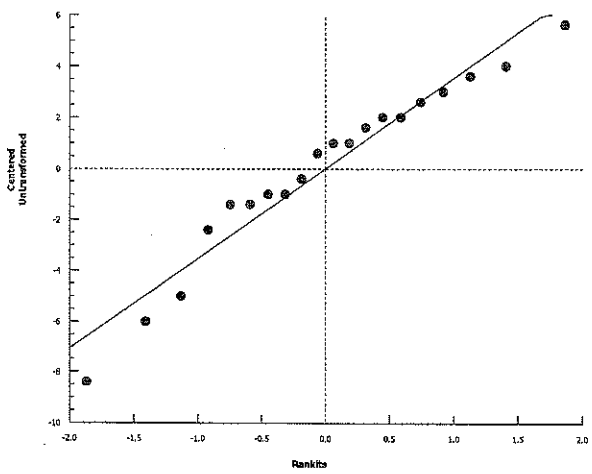
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	10	22.4	19.64	25.16	22.5	14	28	1.222	17.25%	0.0%
0	Negative Control	10	17	14.64	19.36	18	11	21	1.043	19.41%	24.11%

Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	20	22	24	26	23	25	21	28	14	21
0	Negative Control	16	19	18	20	19	21	16	12	18	11

Graphics





(1) Negative control = lab water
Dilution water = FR_UFRI site water

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	15-9911-3425	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Jan-16 13:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	01-3629-2905	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	08 Dec-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	FR_UFRI
Ending Date:	15 Dec-15 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 3h	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 13h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C < T	NA	NA	16.4%	Fails reproduction

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		Dilution Water	3.36	1.734	2.787	18	0.0017	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend		1.96	0.2050	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	145.8	145.8	1	11.29	0.0035	Significant Effect
Error	232.4	12.91111	18			
Total	378.2		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.371	6.541	0.6456	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9491	0.866	0.3534	Normal Distribution

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	10	22.4	19.64	25.16	22.5	14	28	1.222	17.25%	0.0%
0	Negative Control	10	17	14.64	19.36	18	11	21	1.043	19.41%	24.11%

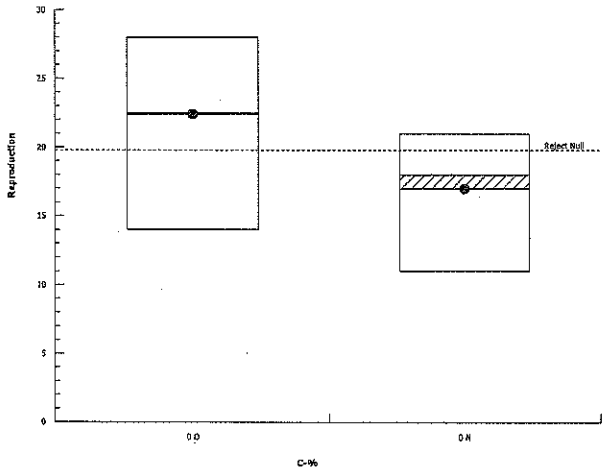
Reproduction Detail

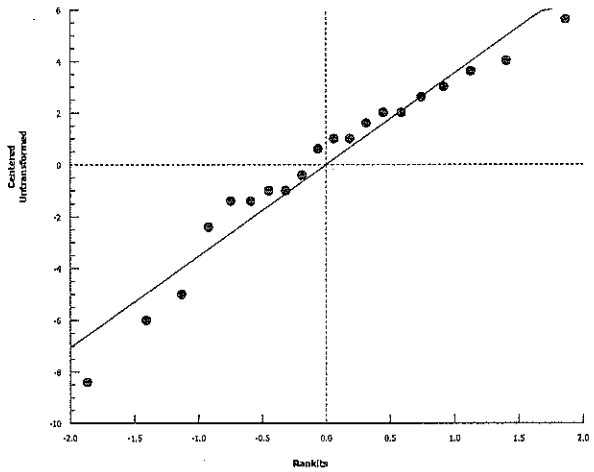
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Dilution Water	20	22	24	26	23	25	21	28	14	21
0	Negative Control	16	19	18	20	19	21	16	12	18	11

Ceriodaphnia 7-d Survival and Reproduction Test | **Nautilus Environmental**

Analysis ID:	15-9911-3425	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Jan-16 13:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Analyst:_____ QA: JGu 12/11

Client: Teck Coal

W.O.#: 16001

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
FR_UFR1 (site control)	Dec 8/15	50	9.9	10.1	194		50	9.5	190	JS
Gth_FR1 (ammended)	↓	50	10.1	10.2	200		100①	7.2	720	JS
20% Perrier	Dec 8/15	50	4.9	5.0	96		50	5.0	100	MLT

Notes: ① Diluted to 100mL w/ D.I water.

Reviewed by: JGh Date Reviewed: Jan. 7/16

APPENDIX B – *Pseudokirchneriella subcapitata* Toxicity Test Data

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck
Work Order No.: 160002

Start Date: Dec 8/15
Set up by: ML

Sample Information:

Sample ID: ~~EV_ER4 Ammended~~ (ML) EV_ER4_WS_2015-11-30_N ammended
Sample Date: Nov 30/15
Date Received: Dec 1/15
Sample Volume: 10×20L

GH_ER2_WS_2015-11-30_N (site dilution water) sampled and received on same dates as EV_ER4_WS_2015-11-30_N

Test Organism Information:

Culture Date: Dec 4/15
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC136
Stock Solution ID: 15ZnD3
Date Initiated: Dec 1/15

72-h IC50 (95% CL): 33.6 (28.7-36.8) mg/L Zn

72-h IC50 Reference Toxicant Mean and Range: 29.1 (16.5-51.1) mg/L Zn CV (%): 33

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JOL

Date reviewed: Jan-8/16

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck **Setup by:** MT

Sample ID: EV-ER4 ammended **Test Date/Time:** Dec 8/15 @ 1550h

Work Order No.: 16002 **Test Species:** *Pseudokirchneriella subcapitata*

Culture Date: Dec 4/15 **Age of Culture:** 4d **Culture Health:** Good

Culture Count: 1 224 2 230 **Average:** 227 **Culture Cell Density (c1):** 227 x 10⁴ cells/mL

v1 = (220,000 cells/ml x 100 ml) / (c1) 227 x 10⁴ cells/ml = 9.69ml

Time Zero Counts: 1 20 2 22 **Average:** 21

No. of Cells/mL: 21 x 10⁴ **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control D.I w/ nutrients	6.5	24.0	24.5	24.0	25.0	25.0	✓	✓	✓	✓
GH_ER2 (site control)	8.0	24.0	↓	↓	↓	↓	✓	✓	✓	✓
MT 30% 28.6	8.0	24.0					✓	✓	✓	✓
MT ~~44%~~ 42.7	8.0	24.0					✓	✓	✓	✓
MT ~~67%~~ 63.8	8.0	24.0					✓	✓	✓	✓
EV_ER4 MT ~~100%~~ 95.2	8.1	24.0					✓	✓	✓	✓
Initials	MT	MT	MT	MT	MT	[illegible]	MT	MT	MT	[illegible]

Initial control pH: Well 1: 6.5 Well 2: 6.5

Final control pH: Well 1: 6.8 Well 2: 6.8

Light intensity (lux): 3900 **Date measured:** Dec 8/15

Instruments: Thermometer 4 pH meter 2 Light meter 1

Sample Description: EV_ER4 ammended and diluted w/ GH_ER2

Comments:

Reviewed: JCh **Date reviewed:** Jan 8/16

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Start Date/Time: Dec 8/15 @ 1550h
Work Order #: 16002 Termination Date: Dec 11/15 @ 1550h
Sample ID: EV_ER4 ammended Test set up by: MLT

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	29					EMM
D.I. w/	B	27					
nutrients	C	30					
	D	31					
	E	26					
	F	29					
	G	31					
	H	34					
95.2 ~~100~~ or %(v/v) GH_ER2 (site control)	A	98					
	B	90					
	C	78					
	D	87					
	E A em	89					
	F B	86					
	G C	101					
	H D	97					
EV_ER4 MLT ~~30~~ 28.6	A	80					
	B	95					
	C	93					
	D	91					
EV_ER4 MLT ~~44~~ 42.7	A	86					
	B	98					
	C	96					
	D	104					
MLT ~~EV_ER4~~ ~~67~~ 63.8	A	110					
	B	124					
	C	118					
	D	110					
~~EV_ER4~~ MLT 95.2 ~~100~~ MLT EV_ER4 (ammended)	A	100					
	B	78					
	C	109					
	D	110					
95.2 ~~100~~ MLT EV_ER4 (ammended)	MLT A E	102					
	B F	81					
	C G	86					
	D H	101					

Comments:

Reviewed by: JGh Date Reviewed: Jan. 8/16

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	08-Dec-15 @ 1550h		
WO#:	16002	Termination Date:	11-Dec-15 @ 1550h		
Sample ID:	EV_ER4 ammended				
		Initial Cell Density:	9545 cell/mL		210000
					0.22
					0.01

Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		
Control	A	29				29	28.0	mean	28.7
D.I. w/ nutrients	B	27				27	26.0	SD	2.503569
	C	30				30	29.0	CV	8.732226
	D	31				31	30.0		
	E	26				26	25.0		
	F	29				29	28.0		
	G	31				31	30.0		
	H	34				34	33.0		
Control	A	98				98	97.0	mean	89.8
Site Water	B	90				90	89.0	SD	7.554563
(GH_ER2)	C	78				78	77.0	CV	8.41308
	D	87				87	86.0		
	E	89				89	88.0		
	F	86				86	85.0		
	G	101				101	100.0		
	H	97				97	96.0		
EV_ER4	A	80				80	79.0		
28.6	B	95				95	94.0		
	C	93				93	92.0		
	D	91				91	90.0		
42.7	A	86				86	85.0		
	B	98				98	97.0		
	C	96				96	95.0		
	D	104				104	103.0		
63.8	A	110				110	109.0		
	B	124				124	123.0		
	C	118				118	117.0		
	D	110				110	109.0		
95.2	A	100				100	99.0		
	B	78				78	77.0		
	C	109				109	108.0		
	D	110				110	109.0		
	E	102				102	101.0		
	F	81				81	80.0		
	G	86				86	85.0		
	H	101				101	100.0		

JGu 8/16
Jan.

CETIS Summary Report

Report Date: 12 Jan-16 10:10 (p 1 of 1)
Test Code: 16002b | 15-3455-8293

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Batch ID:	13-4623-1818	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 Dec-15 15:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Site Water
Ending Date:	11 Dec-15 15:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d

Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 7h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
06-3200-0806	Cell Yield	0	>0		16.9%		Paired Sample t Test
01-8498-2100	Cell Yield	95.2	>95.2	NA	11.9%	1.05	Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
13-9991-5958	Cell Yield	IC5	>95.2	N/A	N/A	<1.05	Linear Interpolation (ICPIN)
		IC10	>95.2	N/A	N/A	<1.05	
		IC15	>95.2	N/A	N/A	<1.05	
		IC20	>95.2	N/A	N/A	<1.05	
		IC25	>95.2	N/A	N/A	<1.05	
		IC40	>95.2	N/A	N/A	<1.05	
		IC50	>95.2	N/A	N/A	<1.05	

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	(1) Dilution Water	8	89.75	83.43	96.07	77	100	2.671	7.555	8.42%	0.0%
0	Negative Control	8	28.63	26.53	30.72	25	33	0.8851	2.504	8.75%	68.11%
28.6		4	88.75	78.09	99.41	79	94	3.351	6.702	7.55%	1.11%
42.7		4	95	83.09	106.9	85	103	3.742	7.483	7.88%	-5.85%
63.8		4	114.5	103.7	125.3	109	123	3.403	6.807	5.95%	-27.58%
95.2		8	94.88	84.44	105.3	77	109	4.414	12.48	13.16%	-5.71%

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	97	89	77	86	88	85	100	96
0	Negative Control	28	26	29	30	25	28	30	33
28.6		79	94	92	90				
42.7		85	97	95	103				
63.8		109	123	117	109				
95.2		99	77	108	109	101	80	85	100

(1) Dilution water = GH_ER2 site water
Negative control = lab control (deionized water w/ nutrients)

EC Alga Growth Inhibition Test — Nautilus Environmental

Analysis ID:	13-9991-5958	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	18 Dec-15 17:15	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	13-4623-1818	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 Dec-15 15:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Site Water
Ending Date:	11 Dec-15 15:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 7h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	589570	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9049	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	① Dilution Water	8	89.75	77	100	2.671	7.555	8.42%	0.0%
28.6		4	88.75	79	94	3.351	6.702	7.55%	1.11%
42.7		4	95	85	103	3.742	7.483	7.88%	-5.85%
63.8		4	114.5	109	123	3.403	6.807	5.95%	-27.58%
95.2		8	94.88	77	109	4.414	12.48	13.16%	-5.71%

Cell Yield Detail

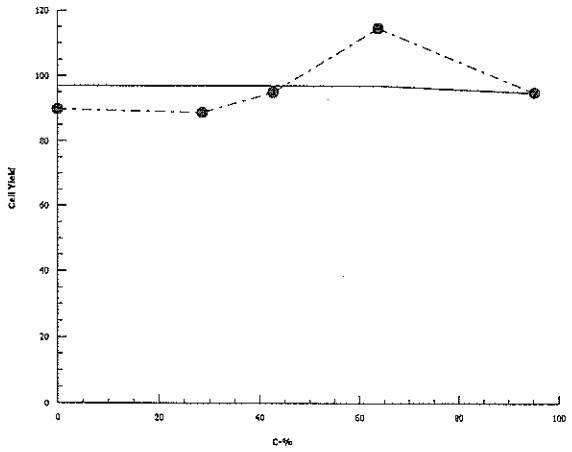
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	97	89	77	86	88	85	100	96
28.6		79	94	92	90				
42.7		85	97	95	103				
63.8		109	123	117	109				
95.2		99	77	108	109	101	80	85	100

① Dilution water = GH_ER2 Site water

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	13-9991-5958	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	18 Dec-15 17:15	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



 Analyst:_____ QA: Tan 2/16

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	07-8570-6446	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	18 Dec-15 17:15	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	13-4623-1818	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 Dec-15 15:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Site Water
Ending Date:	11 Dec-15 15:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 7h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	11.9%	95.2	>95.2	NA	1.05

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
(1) Dilution Water		28.6	-0.1782	2.322	13.03	10	0.8872	CDF	Non-Significant Effect
		42.7	0.9354	2.322	13.03	10	0.4429	CDF	Non-Significant Effect
		63.8*	4.41	2.322	13.03	10	0.0004	CDF	Significant Effect
		95.2	1.118	2.322	10.64	14	0.3605	CDF	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9049	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1894.304	473.5759	4	5.637	0.0026	Significant Effect
Error	1932.125	84.00543	23			
Total	3826.429		27			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	2.954	13.28	0.5655	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9697	0.8975	0.5713	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	8	89.75	83.43	96.07	88.5	77	100	2.671	8.42%	0.0%
28.6		4	88.75	78.09	99.41	91	79	94	3.351	7.55%	1.11%
42.7		4	95	83.09	106.9	96	85	103	3.742	7.88%	-5.85%
63.8		4	114.5	103.7	125.3	113	109	123	3.403	5.95%	-27.58%
95.2		8	94.88	84.44	105.3	99.5	77	109	4.414	13.16%	-5.71%

Cell Yield Detail

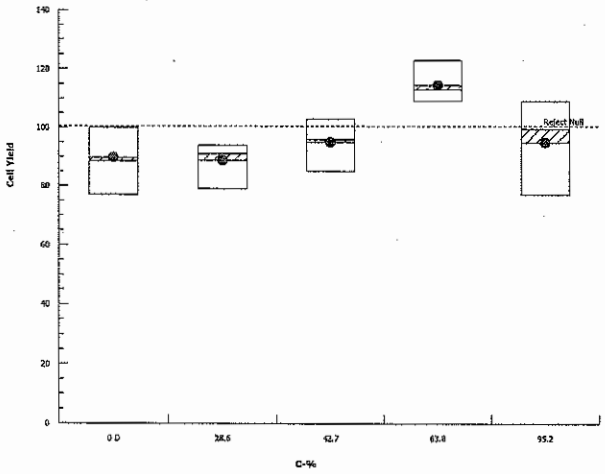
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	97	89	77	86	88	85	100	96
28.6		79	94	92	90				
42.7		85	97	95	103				
63.8		109	123	117	109				
95.2		99	77	108	109	101	80	85	100

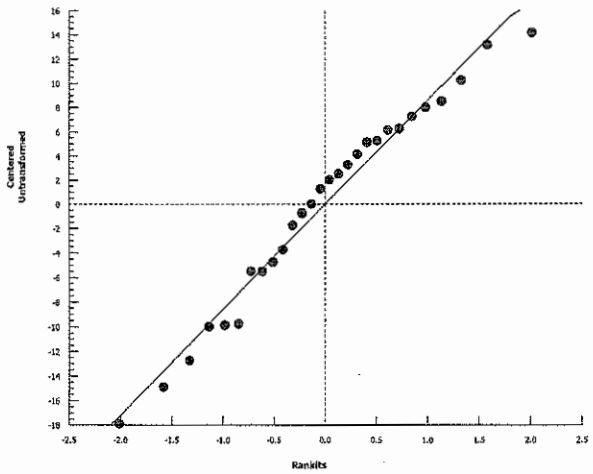
(1) Dilution water = GTL_ER2 site water

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	07-8570-6446	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	18 Dec-15 17:15	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Report Date:	12 Jan-16 10:09 (p 1 of 3)
Test Code:	16002b | 15-3455-8293

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-3200-0806	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Jan-16 10:09	**Analysis:**	Parametric-Paired Sample	**Official Results:**	Yes

Batch ID:	13-4623-1818	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 Dec-15 15:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Site Water
Ending Date:	11 Dec-15 15:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d

Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 7h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	16.9%	Passes cell yield

Paired Sample t Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
① Negative Control		Dilution Water	-23.88	1.895	4.849	7	1.0000	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	14945.06	14945.06	1	471.9	<0.0001	Significant Effect
Error	443.375	31.66964	14			
Total	15388.44		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	9.105	8.885	0.0093	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9579	0.8408	0.6234	Normal Distribution

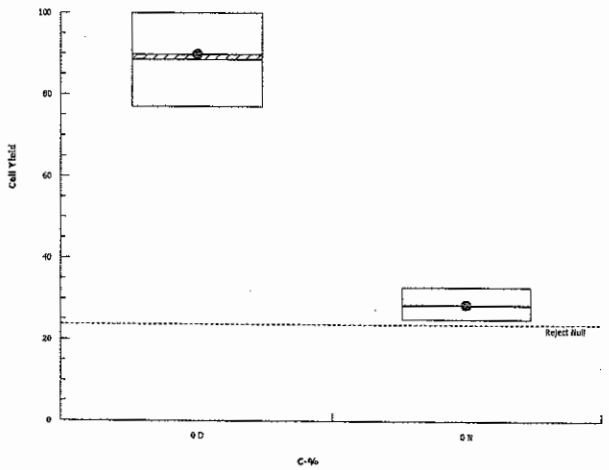
Cell Yield Summary

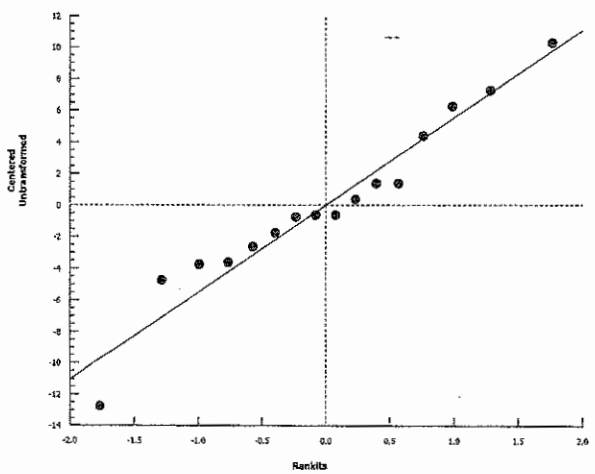
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	8	89.75	83.43	96.07	88.5	77	100	2.671	8.42%	0.0%
0	Negative Control	8	28.63	26.53	30.72	28.5	25	33	0.8851	8.75%	68.11%

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	97	89	77	86	88	85	100	96
0	Negative Control	28	26	29	30	25	28	30	33

Graphics





① Negative control = lab water (deionized water w/ nutrients)
Dilution water = GH_ER2 site water

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	14-0411-3336	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Dec-15 14:32	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	13-4623-1818	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 Dec-15 15:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Site Water
Ending Date:	11 Dec-15 15:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 7h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C < T	NA	NA	18.3%	Fails cell yield

Unequal Variance t Two-Sample Test

	Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
(1)	Negative Control		Dilution Water	21.72	1.86	5.232	8	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.2821	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	14945.06	14945.06	1	471.9	<0.0001	Significant Effect
Error	443.375	31.66964	14			
Total	15388.44		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	9.105	8.885	0.0093	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9579	0.8408	0.6234	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	8	89.75	83.43	96.07	88.5	77	100	2.671	8.42%	0.0%
0	Negative Control	8	28.63	26.53	30.72	28.5	25	33	0.8851	8.75%	68.11%

Cell Yield Detail

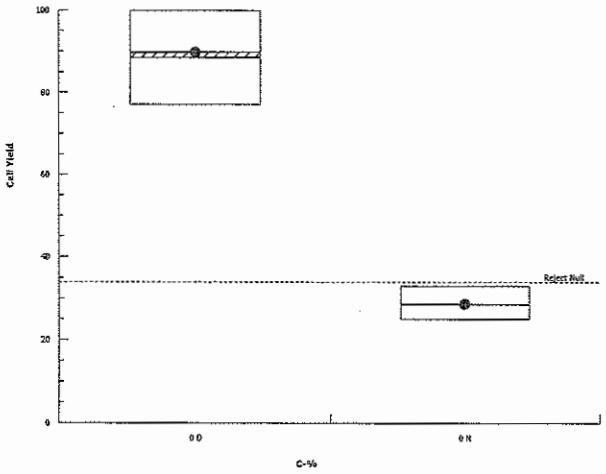
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	97	89	77	86	88	85	100	96
0	Negative Control	28	26	29	30	25	28	30	33

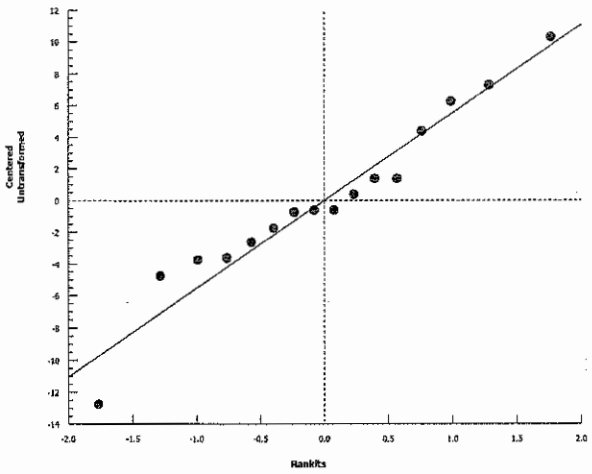
(1) Negative control = lab water (deionized water w/nutrients)
Dilution water = GH_ER2 site water

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	14-0411-3336	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 Dec-15 14:32	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck
Work Order No.: 16DD2

Start Date: Dec 8/15
Set up by: MET

Sample Information:

Sample ID: GH_FR1_WS_2015_11_30_N ammended
Sample Date: Nov 30/15
Date Received: Dec 1/15
Sample Volume: 11 x 20L
FR_UFR1-WS-20151130 1215 (site dilution water) sampled and received on the same dates as GH_FR1_WS_2015_11_30_N.

Test Organism Information:

Culture Date: Dec 4/15
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC136
Stock Solution ID: 15Zn03
Date Initiated: Dec 1/15

72-h IC50 (95% CL): 33.6 (28.7 - 36.8) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 29.1 (16.5 - 51.1) ug/L Zn CV (%): 33

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JOL

Date reviewed: Jan. 8/16

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck | Setup by: MLT

Sample ID: GH_FR1 ammended | Test Date/Time: Dec 8/15 @ 1600h

Work Order No.: 16002 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Dec 4/15 | Age of Culture: 4d ~~227~~ | Culture Health: Good

Culture Count: 1 224 2 230 | Average: 227 | Culture Cell Density (c1): 227 x 10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 227 x 10⁴ cells/ml = 9.69mL

Time Zero Counts: 1 20 2 22 | Average: 21

No. of Cells/mL: 21 x 10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality pH 0 h	Water Quality Temp (°C) 0 h	Incubator Temperature (°C) 0 h	24 h	48 h	72 h	Microplates rotated 2X per day? 0 h	24 h	48 h	72 h
Control D.I. w/ nutrients	6.5	24.0	24.5	24.0	25.0	~~25.0~~	✓	✓	✓	✓
100% (v/v) FR_UFR1 (Site control)	8.0	24.0	↓	↓	↓	↓	✓	✓	✓	✓
MLT ~~30%~~ 28.6	8.0	24.0					✓	✓	✓	✓
MLT ~~44%~~ 42.7	8.0	24.0					✓	✓	✓	✓
MLT ~~67~~ 67.8	8.0	24.0					✓	✓	✓	✓
GH-FR4 MLT ~~100%~~ 95.2	8.1	24.0					✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	~~FMM~~	MLT	MLT	MLT	~~FMM~~

Initial control pH: Well 1: 6.5 | Well 2: 6.5

Final control pH: Well 1: 6.8 | Well 2: 6.8

Light intensity (lux): 3890 | Date measured: Dec 8/15

Instruments: Thermometer 4 | pH meter 2 | Light meter 1

Sample Description: GH_FR1 ammended and diluted w/ FR_UFR1

Comments:

Reviewed: JOL | Date reviewed: Jan. 8/16

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck
Start Date/Time: Dec 8/15 @ 1600h
Work Order #: 16002
Termination Date: Dec 11/15 @ 1600h
Sample ID: GH-FR1 ammended
Test set up by: JMJ
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	29					JMM
	B	~~27~~					
D.I. w/ (nutrients)	C	30					
	D	31					
	E	26					
	F	29					
	G	31					
	H	34					
100% (v/v) FR_UFR1 (Site control)	A	88					
	B	79					
	C	72					
	D	81					
	E (A)	86					
	F (B)	88					
	G (C)	90					
	H (D)	81					
GH_FR1 MG 30 28.6	A	93					
	B	102					
	C	84					
	D	79					
GH_FR1 MG ~~44~~ 42.7	A	89					
	B	~~75~~					
	C	91					
	D	92					
MG GH_FR1 ~~67~~ 63.8	A	101					
	B	125					
	C	89					
	D	130					
GH_FR1 MG 100 95.2	A	107					
	B	109					
	C	122					
	D	120					
	F (A)	96					
	F (B)	118					
	G (C)	89					
	H (D)	134					✓

Comments:

Reviewed by: JCh
Date Reviewed: Jan. 8/16

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	08-Dec-15 @ 1600
WO#:	16002	Termination Date:	11-Dec-15 @ 1600
Sample ID:	GH_FR1 ammended		
		Initial Cell Density:	9545 cell/mL

									210000
									0.22
									0.01
Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9545.455
Control	A	29				29	28.0	mean	28.7
D.I. w/ nutrients	B	27				27	26.0	SD	2.503569
	C	30				30	29.0	CV	8.732226
	D	31				31	30.0		
	E	26				26	25.0		
	F	29				29	28.0		
	G	31				31	30.0		
	H	34				34	33.0		
Control	A	88				88	87.0	mean	82.2
Site Water	B	79				79	78.0	SD	6.010408
(FR_UFR1)	C	72				72	71.0	CV	7.314561
	D	81				81	80.0		
	E	86				86	85.0		
	F	88				88	87.0		
	G	90				90	89.0		
	H	81				81	80.0		
GH_FR1	A	93				93	92.0		
28.6	B	102				102	101.0		
	C	84				84	83.0		
	D	79				79	78.0		
42.7	A	89				89	88.0		
	B	75				75	74.0		
	C	91				91	90.0		
	D	92				92	91.0		
63.8	A	101				101	100.0		
	B	125				125	124.0		
	C	139				139	138.0		
	D	130				130	129.0		
95.2	A	107				107	106.0		
	B	109				109	108.0		
	C	122				122	121.0		
	D	120				120	119.0		
	E	96				96	95.0		
	F	118				118	117.0		
	G	89				89	88.0		
	H	134				134	133.0		

JCH Jan-8/16

CETIS Summary Report

Report Date: 12 Jan-16 10:01 (p 1 of 1)
Test Code: 16002a | 17-0377-8231

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Batch ID:	06-9261-7488	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 Dec-15 15:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Site Water
Ending Date:	11 Dec-15 15:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d

Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 16h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
00-6983-9797	Cell Yield	0	>0		15.9%		Paired Sample t Test
05-2542-9223	Cell Yield	42.7	63.8	52.19	16.3%	2.342	Dunnett Multiple Comparison Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
01-2934-5068	Cell Yield	IC5	>95.2	N/A	N/A	<1.05	Linear Interpolation (ICPIN)
		IC10	>95.2	N/A	N/A	<1.05	
		IC15	>95.2	N/A	N/A	<1.05	
		IC20	>95.2	N/A	N/A	<1.05	
		IC25	>95.2	N/A	N/A	<1.05	
		IC40	>95.2	N/A	N/A	<1.05	
		IC50	>95.2	N/A	N/A	<1.05	

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	(1) Dilution Water	8	82.13	77.1	87.15	71	89	2.125	6.01	7.32%	0.0%
0	Negative Control	8	28.63	26.53	30.72	25	33	0.8851	2.504	8.75%	65.14%
28.6		4	88.5	72.35	104.6	78	101	5.074	10.15	11.47%	-7.76%
42.7		4	85.75	73.13	98.37	74	91	3.966	7.932	9.25%	-4.41%
63.8		4	122.8	96.92	148.6	100	138	8.118	16.24	13.23%	-49.47%
95.2		8	110.9	98.63	123.1	88	133	5.18	14.65	13.22%	-35.01%

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	87	78	71	80	85	87	89	80
0	Negative Control	28	26	29	30	25	28	30	33
28.6		92	101	83	78				
42.7		88	74	90	91				
63.8		100	124	138	129				
95.2		106	108	121	119	95	117	88	133

(1) Dilution water = FR_UFR1 site water
Negative control = lab water (deionized water w/ nutrients)

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	01-2934-5068	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	18 Dec-15 17:12	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	06-9261-7488	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 Dec-15 15:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Site Water
Ending Date:	11 Dec-15 15:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 16h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2030099	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.5540	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	① Dilution Water	8	82.13	71	89	2.125	6.01	7.32%	0.0%
28.6		4	88.5	78	101	5.074	10.15	11.47%	-7.76%
42.7		4	85.75	74	91	3.966	7.932	9.25%	-4.41%
63.8		4	122.8	100	138	8.118	16.24	13.23%	-49.47%
95.2		8	110.9	88	133	5.18	14.65	13.22%	-35.01%

Cell Yield Detail

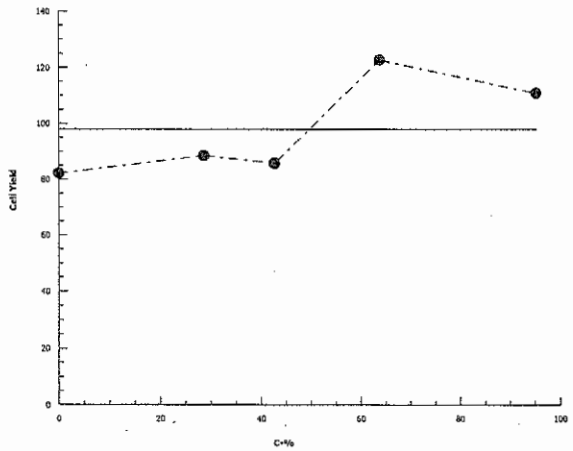
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	87	78	71	80	85	87	89	80
28.6		92	101	83	78				
42.7		88	74	90	91				
63.8		100	124	138	129				
95.2		106	108	121	119	95	117	88	133

① Dilution water = FR_UFR1 site water

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	01-2934-5068	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	18 Dec-15 17:12	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	03-6347-4922	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	18 Dec-15 17:13	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	06-9261-7488	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 Dec-15 15:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Site Water
Ending Date:	11 Dec-15 15:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 16h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	16.3%	42.7	63.8	52.19	2.342

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
(1) Dilution Water		28.6	0.9049	2.322	16.36	10	0.4572	CDF	Non-Significant Effect
		42.7	0.5145	2.322	16.36	10	0.6409	CDF	Non-Significant Effect
		63.8*	5.766	2.322	16.36	10	<0.0001	CDF	Significant Effect
		95.2*	4.998	2.322	13.36	14	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.5540	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6748.607	1687.152	4	12.75	<0.0001	Significant Effect
Error	3044.25	132.3587	23			
Total	9792.857		27			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6	13.28	0.1992	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9654	0.8975	0.4631	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	8	82.13	77.1	87.15	82.5	71	89	2.125	7.32%	0.0%
28.6		4	88.5	72.35	104.6	87.5	78	101	5.074	11.47%	-7.76%
42.7		4	85.75	73.13	98.37	89	74	91	3.966	9.25%	-4.41%
63.8		4	122.8	96.92	148.6	126.5	100	138	8.118	13.23%	-49.47%
95.2		8	110.9	98.63	123.1	112.5	88	133	5.18	13.22%	-35.01%

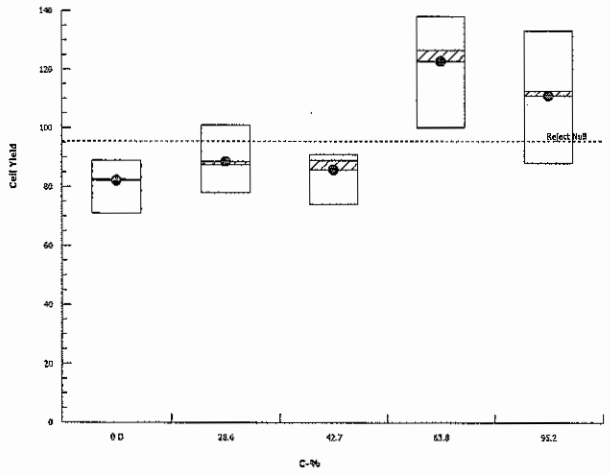
Cell Yield Detail

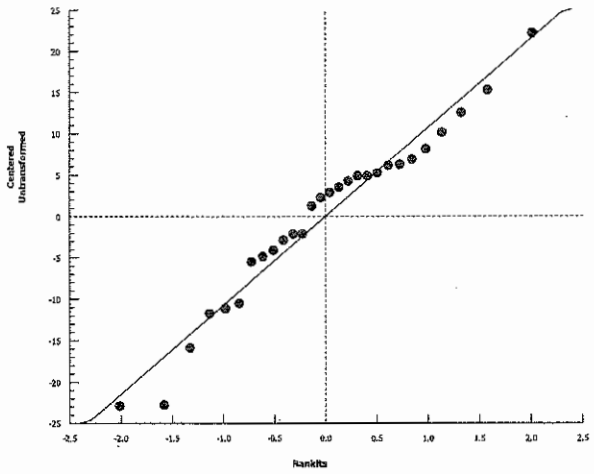
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	87	78	71	80	85	87	89	80
28.6		92	101	83	78				
42.7		88	74	90	91				
63.8		100	124	138	129				
95.2		106	108	121	119	95	117	88	133

(1) Dilution water = 1:1 FR_UFR1 site water

Analysis ID: 03-6347-4922 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 18 Dec-15 17:13 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Graphics





Analyst:_____ QA: Jan 8/16

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-6983-9797	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Jan-16 10:00	**Analysis:**	Parametric-Paired Sample	**Official Results:**	Yes
Batch ID:	06-9261-7488	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 Dec-15 15:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Site Water
Ending Date:	11 Dec-15 15:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 16h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	15.9%	Passes cell yield

Paired Sample t Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
① Negative Control		Dilution Water	-22.31	1.895	4.543	7	1.0000	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	11449	11449	1	540.1	<0.0001	Significant Effect
Error	296.75	21.19643	14			
Total	11745.75		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	5.764	8.885	0.0342	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9483	0.8408	0.4630	Normal Distribution

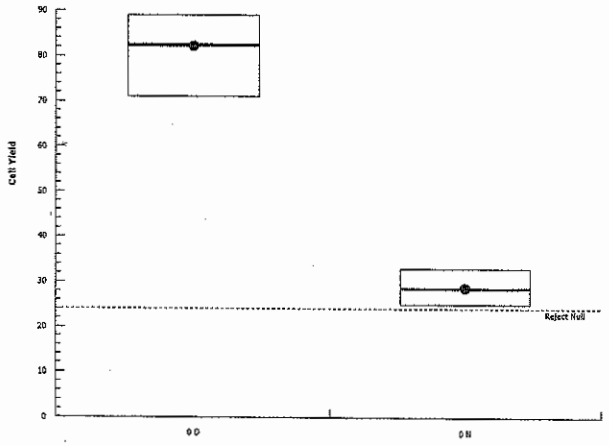
Cell Yield Summary

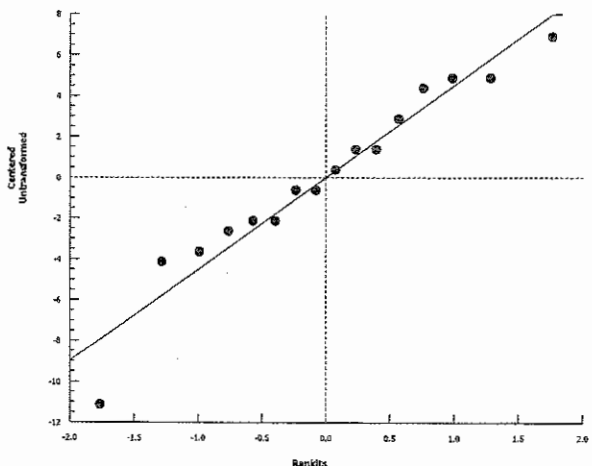
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	8	82.13	77.1	87.15	82.5	71	89	2.125	7.32%	0.0%
0	Negative Control	8	28.63	26.53	30.72	28.5	25	33	0.8851	8.75%	65.14%

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	87	78	71	80	85	87	89	80
0	Negative Control	28	26	29	30	25	28	30	33

Graphics





① negative control = lab water (deionized water w/ nutrients)
Dilution water = FR_WER1 (site water)

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	05-3606-8112	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Jan-16 13:11	**Analysis:**	Parametric-Paired Sample	**Official Results:**	Yes
Batch ID:	06-9261-7488	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 Dec-15 15:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Site Water
Ending Date:	11 Dec-15 15:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 16h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C < T	NA	NA	15.9%	Fails cell yield

Paired Sample t Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		Dilution Water	22.31	1.895	4.543	7	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.2821	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	11449	11449	1	540.1	<0.0001	Significant Effect
Error	296.75	21.19643	14			
Total	11745.75		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	5.764	8.885	0.0342	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9483	0.8408	0.4630	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	8	82.13	77.1	87.15	82.5	71	89	2.125	7.32%	0.0%
0	Negative Control	8	28.63	26.53	30.72	28.5	25	33	0.8851	8.75%	65.14%

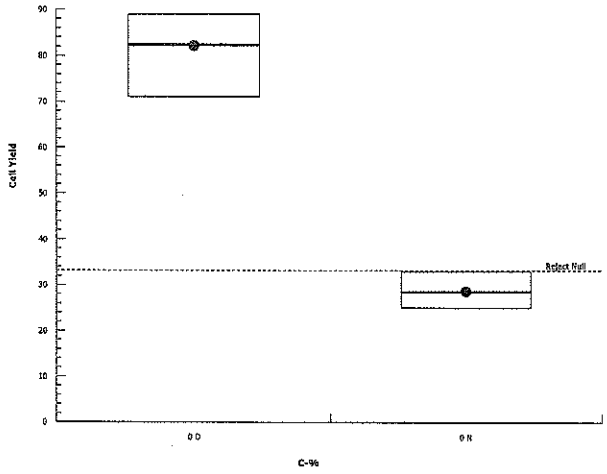
Cell Yield Detail

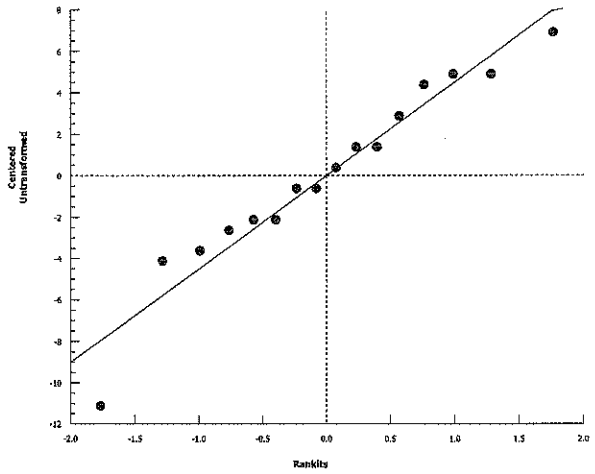
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	87	78	71	80	85	87	89	80
0	Negative Control	28	26	29	30	25	28	30	33

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	05-3606-8112	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Jan-16 13:11	**Analysis:**	Parametric-Paired Sample	**Official Results:**	Yes

Graphics





APPENDIX C – *Hyalella azteca* Toxicity Test Data

Hyalella azteca Test Summary Sheet

Client: Teck
Work Order No.: 15999

Start Date: 08-Dec-15
Set up by: KJL

Sample Information:

Sample ID: EV_ER4
Sample Date: Nov 30, Dec 7, 14, 21, 2015
Date Received: Dec 1, 8, 15, 22, 2015
Sample Volume: 10 - 15x 20L

Test Organism Information:

Species: *Hyalella azteca*
Supplier: Aquatic Research Organisms, NH
Date received: 08-Dec-15
Age or size (Day 0): 8-days

NaCl Reference Toxicant Results:

Reference Toxicant ID: HA107
Stock Solution ID: n/a
Date Initiated: 08-Dec-15

96-h LC50 (95% CL): 5.6 (4.5-6.9) g/L NaCl

96-h LC50 Reference Toxicant Mean and Range: 5.3 (4.5 - 6.2) CV (%): 9

Test Results:

Sample ID	Survival	Dry Weight
LC25 % (v/v) (95% CL)	85.4 (72.2 - n/a)	
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		99.5 (12.3 - n/a)
IC50 % (v/v) (95% CL)		>100

Reviewed by: JGU Date reviewed: Jan-26/16

Chronic *H. azteca* Toxicity Test Data Sheet
Freshwater Water Quality

Client: Teck
WO #: 15999
Sample ID: EV_ER4 green

Start Date: 08-Dec-15
Termination Date: 05-Jan-16
Test Organism: *H. azteca*

Temperature (°C)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Lab Control	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
1-ER2 Site Control	23.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
30	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
44	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
67	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
1-ER4 100 (1)	23.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
100 (2)	23.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Technician Initials	FJL	KJV	KL	KL	AD	AD	KL	KL	KL	KL	KL	AD	AD	KL	KL

Conductivity (µS)

Sample ID	Day														
	0	1	2	3	4	5	6	KL Ø 7	8	9	10	11	12	13	14
Lab Control	411	418	417	425	424	432	431	432	424	424	425	431	430	418	414
Site Control	401	404	412	413	418	418	421	426	412	407	410	414	420	404	401
30	660	650	660	668	666	677	675	677	661	658	669	664	672	639	634
44	760	772	757	761	771	763	764	771	761	760	782	772	780	742	737
67	934	920	935	943	937	949	942	935	928	931	939	950	956	895	888
100 (1)	1149	1153	1158	1161	1159	1122	1122	1143	1145	1150	1157	1169	1172	1125	1087
100 (2)	1149	1129	1156	1161	1161	1126	1122	1143	1143	1149	1154	1175	1160	1122	1093
Technician Initials	FJL	FJL	KL	KL	AD	AD	KL	KL	KL	KL	KL	AD	AD	KL	KL

Comments: 100 (1) and 100 (2) are the same sample - the 10 replicates are pooled for statistics.

Reviewed by: JGh

Date Reviewed: Jan. 26/16

Chronic *H. azteca* Toxicity Test Data Sheet
Freshwater Water Quality

Client: Teck
WO #: 15999
Sample ID: EV_ER4 green

Start Date: 08-Dec-15
Termination Date: 05-Jan-16 KL
Test Organism: *H. azteca*

Temperature (°C)

Sample ID	Day													
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Lab Control	22.0	22.0	22.0	22.0	22.0	22.0 KP	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Site Control	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
30	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
44	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
67	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
100 (1)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
100 (2)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Technician Initials	KL	KJL	JW	JW	MML	KP	MML	MML	MML	KP	HMM	MML	JW	KJL

(@22.0

Conductivity (µS)

Sample ID	Day													
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Lab Control	412	420	415	417	422	422	425	415	419	421	423	413	417	424
Site Control	399	403	403	401	405	404	403	400	402	402	403	398	405	418
30	650	667	661	666	670	664	667	644	644	649	651	625	634	618
44	761	773	770	772	775	769	762	741	740	742	743	734	738	750
67	935	950	943	940	946	936	922	911	903	905	906	894	897	899
100 (1)	1164	1187	1179	1185	1187	1174	1160	1134	1130	1129	1130	1118	1094	1120
100 (2)	1168	1189	1182	1184	1190	1173	1159	1137	1132	1133	1134	1121	1097	1118
Technician Initials	KL	KJL	JW	JW	MML	KP	MML	MML	MML	KP	HMM	MML	KJL	KJL

Comments:

Reviewed by: JGL

Date Reviewed: Jan. 26/16

Chronic *H. azteca* Toxicity Test Data Sheet

Freshwater Water Quality

Client: Teck
WO #: 15999
Sample ID: EV_ER4 green

Start Date: 08-Dec-15
Termination Date: 05-Jan-16
Test Organism: *H. azteca*

Dissolved oxygen (mg/L)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Lab Control	8.3	7.1	6.6	6.8	7.2	7.0	7.4	7.1	7.0	6.7	7.3	7.0	7.2	7.1	7.4
HER2 Site Control	8.5	7.0	6.6	6.8	7.2	7.1	7.5	7.2	7.0	6.8	7.3	7.1	7.3	7.2	7.4
30	8.5	7.0	6.6	6.9	7.1	7.0	7.4	7.2	7.1	6.8	7.1	7.0	7.2	7.2	7.1
44	8.4	7.1	6.6	6.9	7.2	7.1	7.2	7.3	7.0	6.8	7.4	6.9	7.4	7.3	7.1
67	8.4	7.0	6.6	6.9	7.2	7.1	7.2	7.4	7.1	6.8	7.4	6.8	7.2	7.2	7.3
V_ER4 100 (1)	8.5	7.0	6.6	6.9	7.2	7.0	7.3	7.4	7.0	7.2	7.4	6.9	7.3	7.3	7.4
100 (2)	8.5	7.0	6.6	6.9	7.1	7.1	7.5	7.4	7.2	7.2	7.4	7.0	7.3	7.3	7.4
Technician Initials	RJC	RJC	KL	KL	A	A	KL	KL	KL	KL	KL	A	A	KL	KL

pH

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Lab Control	7.7	7.3	7.3	7.3	7.8	7.6	7.5	7.3	7.3	7.3	7.3	7.6	7.7	7.4	7.5
Site Control	8.1	7.9	7.8	7.9	8.0	7.9	7.9	7.8	7.9	7.8	7.7	7.8	7.9	7.9	7.9
30	8.1	7.9	7.8	7.8	8.1	8.0	7.9	7.9	7.8	7.8	7.7	7.9	8.0	7.9	7.9
44	8.1	7.9	7.8	7.9	8.1	8.1	8.0	7.9	7.9	7.9	7.8	7.8	8.0	7.9	7.9
67	8.1	7.9	7.8	7.9	8.1	8.0	8.0	7.9	7.8	7.8	7.8	7.8	8.0	8.0	8.0
100 (1)	8.1	7.9	7.9	8.0	8.1	8.0	8.0	7.9	7.9	8.0	7.9	7.9	7.9	8.0	8.0
100 (2)	8.1	7.9	7.9	8.0	8.1	8.0	8.0	7.9	7.9	7.9	7.9	7.9	8.0	8.0	8.0
Technician Initials	RJC	RJC	KL	KL	A	A	KL	KL	KL	KL	KL	A	A	KL	KL

Comments:

Reviewed by: JOH

Date Reviewed: Jan-26/16

Chronic *H. azteca* Toxicity Test Data Sheet

Freshwater Water Quality

Client: Teck
WO #: 15999
Sample ID: EV_ER4 green

Start Date: 08-Dec-15
Termination Date: 05-Jan-16
Test Organism: *H. azteca*

Dissolved oxygen (mg/L)

Sample ID	Day														
	15	16	17 ① JW	18	19	20	21	22	23	24	25	26	27	28	17 ① JW
Lab Control	7.0	7.3	7.1	5.9	6.4	5.5	6.2	6.5	6.3	6.0	6.2	6.2	6.1	6.3	5.7
Site Control	7.2	7.3	7.7	6.0	6.5	6.1	6.3	6.8	6.5	6.8	6.7	6.5	6.0	6.2	6.0
30	6.8	7.2	7.6	6.0	6.7	6.2	6.5	6.9	6.8	6.6	6.7	6.3	6.1	6.3	5.6
44	7.2	7.3	7.7	5.9	6.7	6.0	6.5	6.9	6.8	6.5	6.4	6.6	6.2	6.3	5.8
67	7.4	7.1	7.8	6.4	6.5	6.0	6.4	6.6	6.6	6.0	6.5	6.7	6.2	6.2	6.7
100 (1)	7.4	7.2	7.8	6.5	6.8	6.2	6.3	6.8	6.7	6.1	6.2	6.4	6.1	6.3	6.7
100 (2)	7.4	7.2	7.8	6.4	6.7	6.0	6.4	6.9	6.7	6.3	6.2	6.5	6.2	6.2	6.4
			JW												
Technician Initials	KL	KSL	JW	JW	YMC	KLP	YMC	YMC	YMC	KLP	FMM	YMC	KSL	KSL	JW

pH

Sample ID	Day													
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Lab Control	7.4	7.4	7.1	7.1	7.3	7.1	7.3	7.2	7.2	7.1	7.2	7.2	7.1	7.1
Site Control	7.9	7.9	7.7	7.7	7.8	7.8	7.9	7.8	7.8	7.7	7.8	7.8	7.6	7.6
30	7.8	7.8	7.6	7.6	7.8 YMC	7.7	7.9	7.8	7.8	7.6	7.7	7.8	7.6	7.5
44	7.9	7.8	7.7	7.6	7.8	7.7	7.8	7.8	7.7	7.5	7.6	7.8	7.5	7.5
67	8.0	7.8	7.8	7.8	7.8	7.7	7.8	7.8	7.7	7.5	7.6	7.7	7.5	7.5
100 (1)	8.0	7.9	7.8	7.8	7.8	7.8	7.8	7.9	7.8	7.6	7.6	7.7	7.6	7.6
100 (2)	8.0	7.9	7.8	7.7	7.8	7.8	7.8	7.9	7.8	7.7	7.7	7.7	7.6	7.6
Technician Initials	KL	KSL	JW	JW	YMC	KLP	YMC	YMC	YMC	KLP	FMM	YMC	KSL	KSL

Comments:

Reviewed by: JW Date Reviewed: Jan. 26/16

H. azteca Toxicity Test Data Sheet

Freshwater Survival and Weight

Client: Teck
WO #: 15999
Sample ID: EV-ER4 green

Start Date: Dec 8/15
Termination Date: Jan 5/16
Test Organism: H. azteca

Sample ID	Rep	TI Pan No. Green	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
Lab Control	A	1	10	0	0	KJL	1028.71	1038.09	10	EC/KJL
	B	2	10	0	0	↓	1039.31	1049.20	10	
	C	3	10	0	0		1028.68	1037.31	10	
	D	4	10	0	0		1023.04	1029.89	10	
	E	5	9	0	1	↓	1024.86	1031.78	9	
Site Control	A	6	10	0	0	JW	1020.10	1027.69	10	
	B	7	10	0	0	↓	1038.94	1047.26	10	
	C	8	10	0	0		1033.89	1041.00	10	
	D	9	10	0	0		1052.55	1062.~~84~~ 69	10	
	E	10	11	0	0	↓	1028.46	1038.00	11	
30	A	11	10	0	0	KJL	1036.00	1044.48	10	
	B	12	9	0	1	↓	1018.~~24~~ 43	1026.00	9	
	C	13	10	0	0		1036.15	1043.59	10	
	D	14	10	0	0		1014.47	1022.34	10	
	E	15	10	0	0	↓	1040.80	1051.09	10	
44	A	16	10	0	0	JW	1005.03	1013.96	10	
	B	17	10	0	0	↓	1033.20	1040.74	10	
	C	18	10	0	0		1021.63	1030.82	10	
	D	19	8 ①	1	JW ~~2~~ 1		1042.26	1043.97	8	
	E	20	10	0	0	↓	1030.38	1040.09	10	↓

Comments: ① organisms very small, checked by KJL KJL 10/1. re-weigh: #1: 1038.10 mg, #15: 1051.01 mg

Reviewed by: JOL

Date Reviewed: Jan. 26/16

H. azteca Toxicity Test Data Sheet

Freshwater Survival and Weight

Client: Tedc
WO #: 15999
Sample ID: EV.ER4

Start Date: Dec 8/15
Termination Date: Jan 5/16
Test Organism: H. azteca

Sample ID	Rep	TI Pan No. Green	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
67	A	21	10	0	0	KJL	1045.43	1054.58	10	EC/KJL
	B	22	10	0	0		1071.97	1081.23	10	
	C	23	10①	0	0		1051.08	1053.52	10	
	D	24	10	0	0		1054.41	1063.84	10	
	E	25	10	0	0		1040.19	1049.43	10	
100 (1)	A	26	10	0	0	JW	1012.61	1021.52	10	
	B	27	1②	0	JW Ø 9		1046.73	1047.065	1	
	C	28	10	0	0		1061.094	1067.09	10	
	D	29	10	0	0		1025.78	1034.17	10	
	E	30	0②	4	6		1034.97	—	0	
100 (2)	A	31	9	0	1	KJL	1019.94	1025.71	9	
	B	32	1 Ø③	4	5		1038.21	1038.77	1	
	C	33	9	0	KJL Ø1		1027.05	1033.19	9	
	D	34	10	0	0		1041.86	1047.01	10	
	E	35	0	10	0		1031.72	—	0	
	A									
	B									
	C									
	D									
	E									

Comments: ① organisms very small ② checked by KJL ③ checked by JW ④ 10% re-weigh: #26: 1021.49mg, #34: 1046.93mg

Reviewed by: JW

Date Reviewed: Jan. 26/16

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Batch ID:	07-2986-0164	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	08 Dec-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Site Water
Ending Date:	05 Jan-16	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d

Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	7d 15h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
00-2427-1849	Mean Dry Weight-mg	0	>0		16.6%		Equal Variance t Two-Sample Test
05-9197-7886	Mean Dry Weight-mg	<100	100	NA	19.7%	>1	Equal Variance t Two-Sample Test
00-6671-3546	Survival Rate	0	>0		NA		Fisher Exact Test
02-0539-4994	Survival Rate	<100	100	NA	NA	>1	Fisher Exact Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
15-7210-1746	Mean Dry Weight-mg	IC5	37.31	N/A	93.36	2.68	Linear Interpolation (ICPIN)
		IC10	69	5.548	92.19	1.449	
		IC15	77.97	14.76	109.8	1.283	
		IC20	88.09	14.19	N/A	1.135	
		IC25	99.5	12.34	N/A	1.005	
		IC40	>100	N/A	N/A	<1	
		IC50	>100	N/A	N/A	<1	
11-3504-5522	Survival Rate	EC5	69.16	19.95	78.77	1.446	Linear Interpolation (ICPIN)
		EC10	72.91	67.9	103.3	1.372	
		EC15	76.86	69.37	N/A	1.301	
		EC20	81.02	70.77	N/A	1.234	
		EC25	85.4	72.18	N/A	1.171	
		EC40	100	76.16	N/A	1	
		EC50	>100	N/A	N/A	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
00-6671-3546	Survival Rate	Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria
	Survival Rate	Control Resp	0.98	0.8 - NL	Yes	Passes Acceptability Criteria
02-0539-4994	Survival Rate	Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria
11-3504-5522	Survival Rate	Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria

Mean Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	5	0.8488	0.6954	1.002	0.685	0.989	0.05524	0.1235	14.55%	0.0%
0	Reference Sed	5	0.8367	0.6921	0.9812	0.711	1.014	0.05207	0.1164	13.92%	1.43%
30		5	0.8525	0.7176	0.9874	0.744	1.029	0.0486	0.1087	12.75%	-0.44%
44		5	0.7501	0.3647	1.136	0.2137	0.971	0.1388	0.3104	41.38%	11.62%
67		5	0.7904	0.4109	1.17	0.244	0.943	0.1367	0.3056	38.67%	6.88%
100		8	0.6317	0.4803	0.783	0.3201	0.891	0.06401	0.181	28.66%	25.58%

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	5	0.98	0.9245	1	0.9	1	0.02	0.04472	4.56%	0.0%
0	Reference Sed	5	1	1	1	1	1	0	0	0.0%	-2.04%
30		5	0.98	0.9245	1	0.9	1	0.02	0.04472	4.56%	0.0%
44		5	0.96	0.8489	1	0.8	1	0.04	0.08944	9.32%	2.04%
67		5	1	1	1	1	1	0	0	0.0%	-2.04%
100		10	0.6	0.2594	0.9406	0	1	0.1506	0.4761	79.35%	38.78%

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Mean Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	0.938	0.989	0.863	0.685	0.7689					
0	Reference Sed	0.759	0.832	0.711	1.014	0.8673					
30		0.848	0.8544	0.744	0.787	1.029					
44		0.893	0.754	0.919	0.2137	0.971					
67		0.915	0.926	0.244	0.943	0.924					
100		0.891	0.3201	0.605	0.839		0.6411	0.5601	0.6822	0.515	

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	0.9					
0	Reference Sed	1	1	1	1	1					
30		1	0.9	1	1	1					
44		1	1	1	0.8	1					
67		1	1	1	1	1					
100		1	0.1	1	1	0	0.9	0.1	0.9	1	0

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	10/10	10/10	10/10	10/10	9/10					
0	Reference Sed	10/10	10/10	10/10	10/10	11/11					
30		10/10	9/10	10/10	10/10	10/10					
44		10/10	10/10	10/10	8/10	10/10					
67		10/10	10/10	10/10	10/10	10/10					
100		10/10	1/10	10/10	10/10	0/10	9/10	1/10	9/10	10/10	0/10

Hyalella 28-d Survival and Growth ~~Sediment~~ Test — **Nautilus Environmental**

Analysis ID:	11-3504-5522	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Jan-16 15:53	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-2986-0164	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	08 Dec-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Site Water
Ending Date:	05 Jan-16	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	7d 15h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1514911	200	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	69.16	19.95	78.77	1.446	1.269	5.014
EC10	72.91	67.9	103.3	1.372	0.9678	1.473
EC15	76.86	69.37	N/A	1.301	NA	1.442
EC20	81.02	70.77	N/A	1.234	NA	1.413
EC25	85.4	72.18	N/A	1.171	NA	1.385
EC40	100	76.16	N/A	1	NA	1.313
EC50	>100	N/A	N/A	<1	NA	NA

Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Reference ~~Sed~~	5	1	1	1	0	0	0.0%	0.0%	51	51
30		5	0.98	0.9	1	0.02	0.04472	4.56%	2.0%	49	50
44		5	0.96	0.8	1	0.04	0.08944	9.32%	4.0%	48	50
67		5	1	1	1	0	0	0.0%	0.0%	50	50
100		10	0.6	0	1	0.1506	0.4761	79.35%	40.0%	60	100

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Reference ~~Sed~~	1	1	1	1	1					
30		1	0.9	1	1	1					
44		1	1	1	0.8	1					
67		1	1	1	1	1					
100		1	0.1	1	1	0	0.9	0.1	0.9	1	0

Survival Rate Binomials

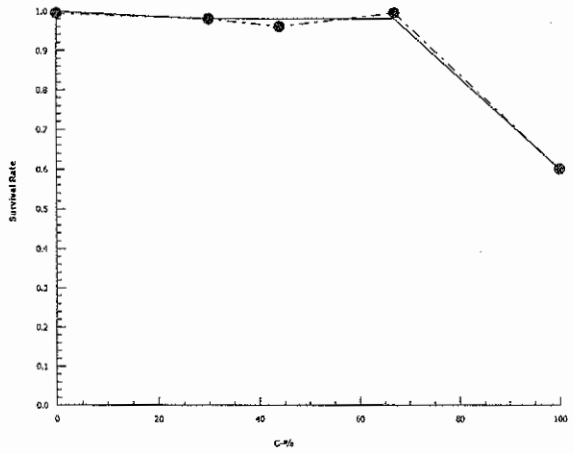
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	10/10	10/10	10/10	10/10	9/10					
0	Reference ~~Sed~~	10/10	10/10	10/10	10/10	11/11					
30		10/10	9/10	10/10	10/10	10/10					
44		10/10	10/10	10/10	8/10	10/10					
67		10/10	10/10	10/10	10/10	10/10					
100		10/10	1/10	10/10	10/10	0/10	9/10	1/10	9/10	10/10	0/10

Reference = Site Control

Hyalella 28-d Survival and Growth ~~Sediment~~ Test **Nautilus Environmental**

Analysis ID:	11-3504-5522	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Jan-16 15:53	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Hyalella 28-d Survival and Growth ~~Sediment~~ Test (WC) — **Nautilus Environmental**

Analysis ID:	02-0539-4994	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jan-16 10:04	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	07-2986-0164	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	08 Dec-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Site Water
Ending Date:	05 Jan-16	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	7d 15h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	Fails survival rate

Fisher Exact Test

Control	vs	C-%	Test Stat	P-Value	P-Type	Decision(α:5%)
Reference Sed		100	0	<0.0001	Exact	Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Reference ~~Sed~~ ER4	51	0	51	1	0	0.0%
100		60	40	100	0.6	0.4	40.0%

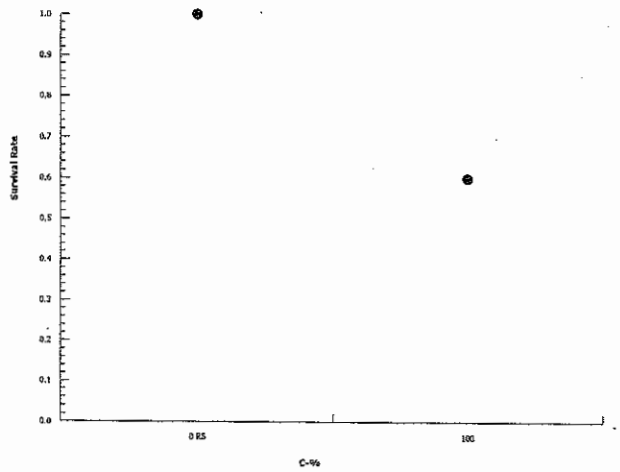
Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Reference ~~Sed~~ ER4	1	1	1	1	1					
100		1	0.1	1	1	0	0.9	0.1	0.9	1	0

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	10/10	10/10	10/10	10/10	9/10					
0	Reference ~~Sed~~ ER4	10/10	10/10	10/10	10/10	11/11					
100		10/10	1/10	10/10	10/10	0/10	9/10	1/10	9/10	10/10	0/10

Graphics



Reference = site control

CETIS Analytical Report

Report Date: 07 Jan-16 15:54 (p 1 of 1)
Test Code: 15999a | 03-8900-3321

Hyalella 28-d Survival and Growth ~~Sediment~~ WC Test — **Nautilus Environmental**

Analysis ID:	00-6671-3546	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Jan-16 15:54	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	07-2986-0164	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	08 Dec-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Site Water
Ending Date:	05 Jan-16	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	7d 15h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	Passes survival rate

Fisher Exact Test

Control	vs	Control	Test Stat	P-Value	P-Type	Decision(α:5%)
Negative Control		Reference ~~Sed~~ WC	1	1.0000	Exact	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria
Control Resp	0.98	0.8 - NL	Yes	Passes Acceptability Criteria

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Negative Contr	49	1	50	0.98	0.02	0.0%
0	Reference ~~Sed~~ WC	51	0	51	1	0	-2.04%

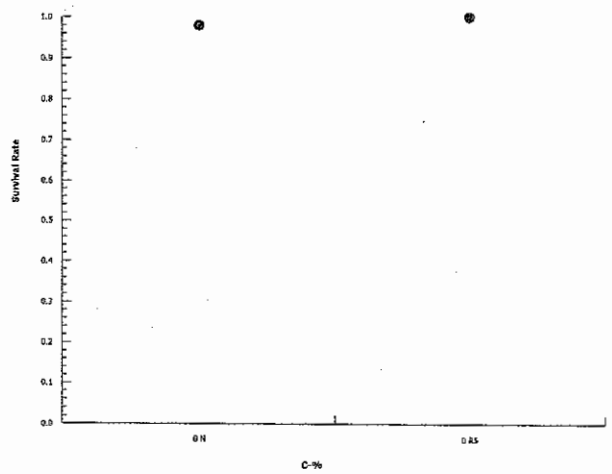
Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1	1	1	1	0.9
0	Reference ~~Sed~~ WC	1	1	1	1	1

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	10/10	10/10	10/10	10/10	9/10
0	Reference ~~Sed~~ WC	10/10	10/10	10/10	10/10	11/11

Graphics



Reference = site control

Analyst:_____ QA: JCL Jan-26/16

CETIS Analytical Report

Report Date: 07 Jan-16 15:54 (p 1 of 1)
Test Code: 15999a | 03-8900-3321

Hyalella 28-d Survival and Growth ~~Sediment~~ Test (WC) — **Nautilus Environmental**

Analysis ID:	15-7210-1746	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Jan-16 15:54	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-2986-0164	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	08 Dec-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Site Water
Ending Date:	05 Jan-16	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	7d 15h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2070277	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	37.31	N/A	93.36	2.68	1.071	NA
IC10	69	5.548	92.19	1.449	1.085	18.02
IC15	77.97	14.76	109.8	1.283	0.9105	6.774
IC20	88.09	14.19	N/A	1.135	NA	7.047
IC25	99.5	12.34	N/A	1.005	NA	8.101
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

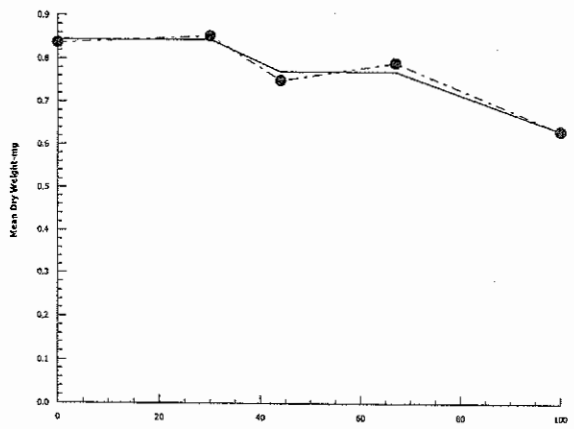
Mean Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Reference ~~Sed~~ (WC)	5	0.8367	0.711	1.014	0.05207	0.1164	13.92%	0.0%
30		5	0.8525	0.744	1.029	0.0486	0.1087	12.75%	-1.89%
44		5	0.7501	0.2137	0.971	0.1388	0.3104	41.38%	10.34%
67		5	0.7904	0.244	0.943	0.1367	0.3056	38.67%	5.53%
100		8	0.6317	0.3201	0.891	0.06401	0.181	28.66%	24.5%

Mean Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9
0	Reference ~~Sed~~ (WC)	0.759	0.832	0.711	1.014	0.8673				
30		0.848	0.8544	0.744	0.787	1.029				
44		0.893	0.754	0.919	0.2137	0.971				
67		0.915	0.926	0.244	0.943	0.924				
100		0.891	0.3201	0.605	0.839	0.6411	0.5601	0.6822	0.515	

Graphics



Reference = Site control

Analyst:_____ QA: JCH Jan. 26/16

CETIS Analytical Report

Test Code: 15999a | 03-8900-3321

Hyalella 28-d Survival and Growth ~~Sediment~~ WC Test — **Nautilus Environmental**

Analysis ID:	05-9197-7886	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jan-16 10:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	07-2986-0164	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	08 Dec-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Site Water
Ending Date:	05 Jan-16	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	7d 15h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	19.7%	Fails mean dry weight-mg

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Reference Sed		100*	2.239	1.796	0.164	11	0.0234	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1292737	0.1292737	1	5.013	0.0468	Significant Effect
Error	0.2836574	0.02578703	11			
Total	0.412931		12			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.418	21.62	0.4114	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9628	0.8138	0.7966	Normal Distribution

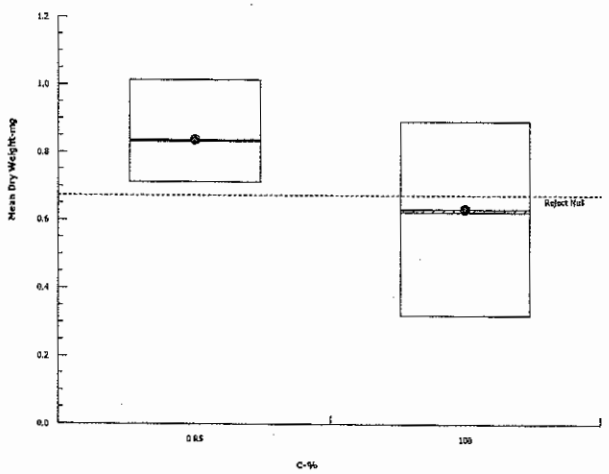
Mean Dry Weight-mg Summary

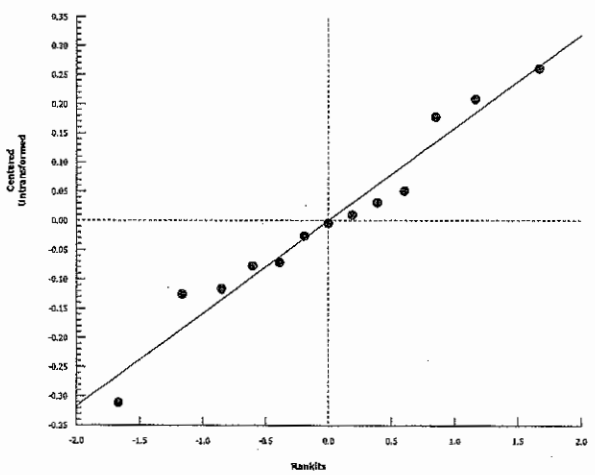
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Reference ~~Sed~~ WC	5	0.8367	0.6921	0.9812	0.832	0.711	1.014	0.05207	13.92%	0.0%
100		8	0.6317	0.4803	0.783	0.623	0.3201	0.891	0.06401	28.66%	24.5%

Mean Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9
0	Reference ~~Sed~~ WC	0.759	0.832	0.711	1.014	0.8673				
100		0.891	0.3201	0.605	0.839	0.6411	0.5601	0.6822	0.515	

Graphics





Reference = site Control

 Analyst:_____ QA: JCL Jan. 26/16

CETIS Analytical Report

Hyalella 28-d Survival and Growth ~~Sediment~~ Test — **Nautilus Environmental**

Analysis ID:	00-2427-1849	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Jan-16 15:54	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	07-2986-0164	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	08 Dec-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Site Water
Ending Date:	05 Jan-16	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	7d 15h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	16.6%	Passes mean dry weight-mg

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		Reference ~~Sed~~	0.1597	1.86	0.141	8	0.4385	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003674814	0.0003674814	1	0.02551	0.8771	Non-Significant Effect
Error	0.1152527	0.01440659	8			
Total	0.1156202		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.125	23.15	0.9116	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9648	0.7411	0.8390	Normal Distribution

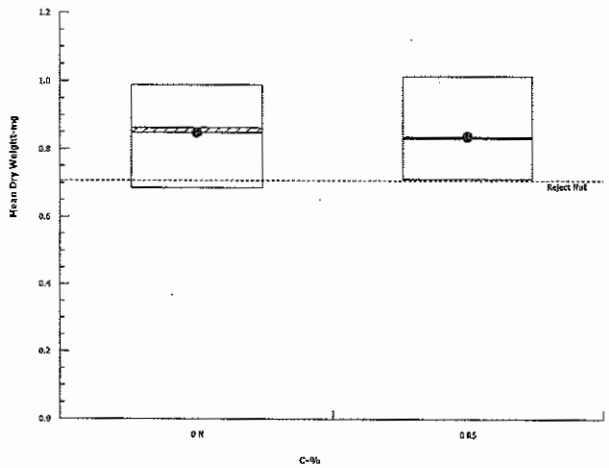
Mean Dry Weight-mg Summary

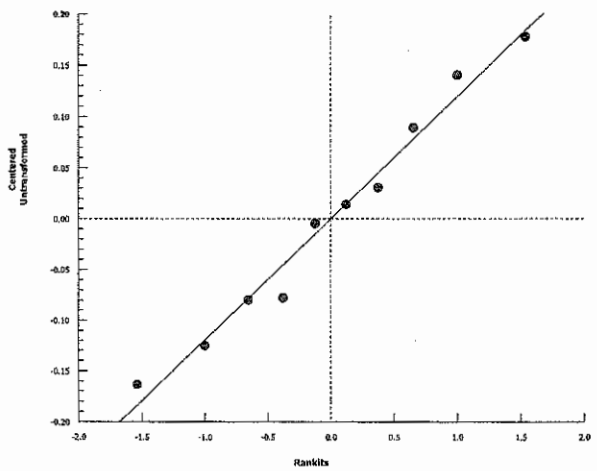
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Reference ~~Sed~~	5	0.8367	0.6921	0.9812	0.832	0.711	1.014	0.05207	13.92%	0.0%
0	Negative Control	5	0.8488	0.6954	1.002	0.863	0.685	0.989	0.05524	14.55%	-1.45%

Mean Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.938	0.989	0.863	0.685	0.7689
0	Reference ~~Sed~~	0.759	0.832	0.711	1.014	0.8673

Graphics





Reference = site control

Hyalella azteca Test Summary Sheet

Client: Teck
Work Order No.: 15999

Start Date: 08-Dec-15
Set up by: KJL

Sample Information:

Sample ID: GH_FR1
Sample Date: Nov 30, Dec 7, 14, 21, 2015
Date Received: Dec 1, 8, 15, 22, 2015
Sample Volume: 10 - 15x 20L

Test Organism Information:

Species: *Hyalella azteca*
Supplier: Aquatic Research Organisms, NH
Date received: 08-Dec-15
Age or size (Day 0): 8-days

NaCl Reference Toxicant Results:

Reference Toxicant ID: HA107
Stock Solution ID: n/a
Date Initiated: 08-Dec-15

96-h LC50 (95% CL): 5.6 (4.5-6.9) g/L NaCl

96-h LC50 Reference Toxicant Mean and Range: 5.3 (4.5 - 6.2) CV (%): 9

Test Results:

Sample ID	Survival	Dry Weight
LC25 % (v/v) (95% CL)	>100	
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: JCh

Date reviewed: Jan. 28/16

Chronic *H. azteca* Toxicity Test Data Sheet

Freshwater Water Quality

Client: Teck
WO #: 15999
Sample ID: GH_FR1 ~~[illegible]~~ KJL Black

Start Date: 08-Dec-15
Termination Date: 05-Jan-16
Test Organism: *H. azteca*

Temperature (°C)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Lab Control	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Site Control	23.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
30	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
44	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
67	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
100 (1)	23.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
100 (2)	23.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Technician Initials	KJL	KJL	KL	KL	[illegible]	[illegible]	KL	KL	KL	KL	KL	[illegible]	[illegible]	KL	KL

Conductivity (µS)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Lab Control	411	413	419	425	424	431	430	428	422	427	423	443	441	420	415
Site Control	437	434	455	458	448	464	462	463	455	454	449	454	462	444	440
30	729	716	719	723	716	718	717	732	720	731	727	742	743	708	711
44	837	826	830	831	823	853	836	836	838	849	844	859	870	827	819
67	1004	1012	1010	1025	1023	1034	1029	1020	1019	1039	1039	1060	1063	1009	999
100 (1)	1253	1242	1267	1267	1265	1234	1208	1209	1228	1288	1298	1325	1327	1289	1232
100 (2)	1253	1239	1272	1275	1266	1236	1209	1227	1236	1288	1298	1328	1328	1287	1238
Technician Initials	KJL	KJL	KL	KL	[illegible]	[illegible]	KL	KL	KL	KL	KL	[illegible]	[illegible]	KL	KL

Comments: 100(1) and 100(2) are the same sample. Running 2 sets at the request of the client. All 10 reps will be pooled for analysis.

Reviewed by: JCh

Date Reviewed: Jan 26/16

Chronic *H. azteca* Toxicity Test Data Sheet
Freshwater Water Quality

Client: Teck
WO #: 15999
Sample ID: GH_FR1 black

Start Date: 08-Dec-15
Termination Date: 05-Jan-16
Test Organism: *H. azteca*

Temperature (°C)

Sample ID	Day														
	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
Lab Control	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	
Site Control	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	
30	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	
44	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	
67	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	
100 (1)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	
100 (2)	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	
Technician Initials	KL	KJL	JW	JW	YML	KLP	YML	YML	YML	KLP	TMM	YML	JW	KJL	

Conductivity (µS)

Sample ID	Day														
	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
Lab Control	415	417	414	416	421	419	421	413	416	416	417	413	417	416	
Site Control	444	451	456	455	459	444	444	435	441	437	440	430	441	~~397~~ 394	③394
30	714	724	725	722	724	726	722	727	730	721	730	721	727	718	
44	829	840	838	843	854	835	823	844	842	844	846	793	815	822	
67	1007	1010	1006	1002	1009	1003	1002	1038	1035	1041	1042	1022	1026	1028	
100 (1)	1250	1257	1247	1242	1247	1260	1252	1300	1312	1307	1310	1285	1290	1295	
100 (2)	1251	1252	1246	1251	1249	1254	1260	1299	1315	1309	1314	1283	1296	1296	
Technician Initials	KL	KJL	JW	JW	YML	KLP	YML	YML	YML	KLP	TMM	YML	KJL	KJL	

Comments: ③ Double checked measurement in sample bucket

Reviewed by: JGL

Date Reviewed: Jan. 26/16

Chronic *H. azteca* Toxicity Test Data Sheet

Freshwater Water Quality

Client: Teck
WO #: 15999
Sample ID: GH_FR1 black

Start Date: 08-Dec-15
Termination Date: 05-Jan-16
Test Organism: *H. azteca*

Dissolved oxygen (mg/L)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Lab Control	8.3	7.0	6.0	6.9	7.1	7.4	7.0	7.1	7.1	6.6	7.2	7.0	7.3	7.1	7.3
Site Control	8.5	7.1	6.1	7.1	7.2	7.1	7.0	7.2	7.1	6.5	7.1	7.1	7.2	7.[illegible]21	7.4
30	8.5	7.1	6.3	7.1	7.2	7.2	7.0	7.2	7.1	6.5	7.2	7.0	7.2	7.[illegible]21	7.4
44	8.5	7.0	6.3	7.1	7.3	7.1	7.0	7.1	7.0	6.5	7.2	6.9	7.3	[illegible]6.9	7.1
67	8.5	7.0	6.3	7.1	7.2	7.2	7.0	7.1	6.9	6.5	7.2	7.0	7.2	7.2	7.1
100 (1)	8.5	7.0	6.3	7.0	7.2	7.1	7.0	7.3	7.1	6.6	7.2	7.0	7.3	7.[illegible]30	7.1
100 (2)	8.5	7.0	6.3	7.0	7.2	7.0	7.1	7.3	7.1	6.6	7.1	7.0	7.2	7.[illegible]30	7.1
Technician Initials	KJL	KJL	KL	KL	[illegible]	[illegible]	KL	KL	KL	KL	KL	[illegible]	[illegible]	KL	KL

pH

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Lab Control	7.7	7.5	7.3	7.4	7.8	7.6	7.6	7.4	7.4	7.4	7.3	7.7	7.7	7.4	7.5
Site Control	8.0	7.9	7.8	7.9	8.1	8.1	7.9	7.9	7.8	7.7	7.7	7.9	7.8	7.9	7.9
30	8.0	7.9	7.8	7.9	8.0	8.0	7.9	7.9	7.8	7.8	7.7	7.8	8.0	7.9	7.9
44	8.1	7.9	7.8	7.9	8.1	8.0	8.0	7.9	7.8	7.8	7.[illegible]8	7.8	8.0	7.9	7.9
67	8.1	8.0	7.9	8.0	8.1	8.0	8.0	8.0	7.9	7.9	7.8	7.7	8.0	8.0	8.0
100 (1)	8.1	8.1	8.0	8.0	8.1	8.0	8.1	8.0	7.9	7.9	7.8	7.8	8.0	8.0	8.0
100 (2)	8.1	8.1	8.0	8.0	8.1	8.0	8.1	8.0	7.9	8.0	7.9	7.7	7.9	8.1	8.1
Technician Initials	KJL	KJL	KL	KL	[illegible]	[illegible]	KL	KL	KL	KL	KL	[illegible]	[illegible]	KL	KL

Comments:

Reviewed by: JM

Date Reviewed: Jan. 26/16

Nautilus Environmental

Chronic *H. azteca* Toxicity Test Data Sheet

Freshwater Water Quality

Client: Teck
WO #: 15999
Sample ID: GH_FR1 blank

Start Date: 08-Dec-15
Termination Date: 05-Jan-16
Test Organism: *H. azteca*

Dissolved oxygen (mg/L)

Sample ID	Day													
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Lab Control	7.3	7.3	6.2	6.5	6.4	6.0	6.6	6.9	6.7	6.0	6.3	6.5	6.2	6.3
Site Control	7.4	7.3	6.1	6.4	6.6	6.3	6.7	7.0	6.8	6.3	6.5	6.7	6.2	6.4
30	7.4	7.3	6.1	6.3	6.4	6.4	6.7	7.0	6.9	6.5	6.7	6.9	6.1	6.7
44	7.3	7.2	6.2	6.4	6.5	6.3	6.4	6.9	6.9	6.2	6.7	6.9	6.2	6.3
67	7.2	7.2	6.2	6.4	6.6	6.3	6.3	6.9	6.9	6.2	6.6	6.8	6.3	6.4
100 (1)	7.1	7.3	6.2	6.4	6.7	6.3	6.4	6.8	6.8	6.5	6.6	6.8	6.2	6.3
100 (2)	7.1	7.3	6.4	6.4	6.7	6.3	6.4	6.9	6.8	6.5	6.7	6.9	6.2	6.3
Technician Initials	KL	KJL	JW	JW	MM	KL	MM	MM	MM	KL	MM	MM	KJL	KJL

pH

Sample ID	Day													
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Lab Control	7.5	7.4	7.2	7.3	7.3	7.3	7.3	7.3	7.3	7.2	7.3	7.2	7.0	7.1
Site Control	7.9	7.9	7.8	7.7	7.7	7.9	7.8	7.9	7.8	7.7	7.8	7.9	7.7	7.6
30	7.9	7.9	7.8	7.7	7.8	7.9	7.8	7.9	7.8	7.8	7.8	7.9	7.7	7.6
44	7.9	7.9	7.8	7.8	7.8	7.9	7.8	7.9	7.8	7.7	7.8	7.9	7.7	7.6
67	8.0	7.9	7.8	7.8	7.8	7.9	7.8	7.9	7.9	7.8	7.9	7.9	7.7	7.6
100 (1)	8.0	8.0	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.9	7.9	7.7	7.7
100 (2)	8.1	8.0	7.9	7.9	7.8	7.9	7.9	7.9	7.9	7.8	7.9	7.9	7.7	7.7
Technician Initials	KL	KJL	JW	JW	MM	KL	MM	MM	MM	KL	MM	MM	KJL	KJL

Comments:

Reviewed by: JW

Date Reviewed: Jan. 26/16

H. azteca Toxicity Test Data Sheet
Freshwater Survival and Weight

Client: Teck
WO #: 15999
Sample ID: GH_FR1 black

Start Date: Dec 8/~~16~~ 15 KM
Termination Date: Jan 5/16
Test Organism: H. azteca

Sample ID	Rep	T2 Pan No. Black	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
Lab Control	A	1	10	0	0	KJL	1014.31	1023.55	10	EC/KJL
	B	2	10	0	0		1030.06	1038.78	10	
	C	3	10	0	0		1044.28	1053.51	10	
	D	4	11	0	0		1052.85	1063.30	11	
	E	5	10	0	0		1024.57	1033.65	10	
Site Control	A	6	9 ①	0	1	JW	1011.04	1019.37	9	
	B	7	10	0	0		1028.71	1037.39	10	
	C	8	9	1	0		1014.87	1022.01	9	
	D	9	11	0	0		1035.79	1044.62	11	
	E	10	9	0	1		1031.21	1039.77	9	
30	A	11	10	0	0	KJL	1047.85	1055.08	10	
	B	12	10	0	0		1037.94	1047.84	10	
	C	13	10	0	0		1038.68	1046.70	10	
	D	14	9	0	1		1028.38	1037.45	9	
	E	15	10	0	0		1039.75	1047.58	10	
44	A	16	10	0	0	JW	1027.42	1033.14	10	
	B	17	10	0	0		1024.44	1033.75	10	
	C	18	10	0	0		1032.25	1041.65	10	
	D	19	10	0	0		1025.30	1033.84	10	
	E	20	9	0	1		1012.15	1020.56	9	

Comments: ① Young observed ~~②~~ KL 10% re-weigh: #1: 1023.34 mg, #13: 1046.62mg.

Reviewed by: JGL

Date Reviewed: Jan. 26/16

H. azteca Toxicity Test Data Sheet

Freshwater Survival and Weight

Client: Teck
WO #: 15999
Sample ID: GH-FR1 Black

Start Date: Dec 8/15
Termination Date: Jan 5/16
Test Organism: H. azteca

Sample ID	Rep	T2 Pan No. Black	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
67	A	21	10	0	0	KJL	1040.97	1049.98	10	EC/KJL
	B	22	10	0	0	↓	1037.19	1042.84	10	↓
	C	23	10	0	0		1058.22	1066.85	10	
	D	24	10	0	0		1041.38	1049.42	10	
	E	25	10	0	0	↓	1021.65	1028.76	10	
100 (1)	A	26	10	0	0	JW	1049.13	1054.44	10	
	B	27	10	0	0	↓	1035.21	1042.69	10	
	C	28	9 ①	0	1		1027.61	1034.33	9	
	D	29	9	0	1		1025.40	1033.50	9	
	E	30	10	0	0	↓	1044.01	1051.93	10	
100 (2)	A	31	10	0	0	KJL	1042.60	1049.97 KJL	10	
	B	32	8	1	1	↓	1060.15	1066.543	8	
	C	33	10	0	0		1018.81	1026.12	10	
	D	34	10	0	0		1028.25	1038.700	10	
	E	35	10	0	0	↓	1025.05	1032.38 KJL	10	↓
	A									
	B									
	C									
	D									
	E									

Comments: ① young observed ② KL 10% re-weigh: #25: 1028.67 mg, #35: 1032.23 mg

Reviewed by: JGL

Date Reviewed: Jan. 26/16

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Batch ID:	20-7357-8637	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	08 Dec-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Site Water
Ending Date:	05 Jan-16	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 0h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
14-4483-6638	Mean Dry Weight-mg	0	>0		6.94%		Equal Variance t Two-Sample Test
20-2661-0890	Mean Dry Weight-mg	<100	100	NA	10.3%	>1	Equal Variance t Two-Sample Test
03-3989-4950	Survival Rate	0	>0		NA		Fisher Exact Test
09-8911-7751	Survival Rate	100	>100	NA	NA	1	Fisher Exact Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
06-6363-9105	Mean Dry Weight-mg	IC5	44.26	N/A	90.45	2.259	Nonlinear Regression
		IC10	76.1	36.69	113.1	1.314	
		IC15	106.4	48.53	164.7	0.9396	
		IC20	137	12.55	271.4	0.7298	
		IC25	168.8	N/A	448.7	0.5924	
		IC40	279.1	N/A	N/A	0.3583	
		IC50	374.5	N/A	N/A	0.267	
07-2448-7617	Survival Rate	EC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC10	>100	N/A	N/A	<1	
		EC15	>100	N/A	N/A	<1	
		EC20	>100	N/A	N/A	<1	
		EC25	>100	N/A	N/A	<1	
		EC40	>100	N/A	N/A	<1	
		EC50	>100	N/A	N/A	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
03-3989-4950	Survival Rate	Control Resp	0.94	0.8 - NL	Yes	Passes Acceptability Criteria
	Survival Rate	Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria
07-2448-7617	Survival Rate	Control Resp	0.94	0.8 - NL	Yes	Passes Acceptability Criteria
09-8911-7751	Survival Rate	Control Resp	0.94	0.8 - NL	Yes	Passes Acceptability Criteria

Mean Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	5	0.9154	0.8799	0.9509	0.872	0.95	0.01278	0.02858	3.12%	0.0%
0	Reference Sed	5	0.8681	0.7802	0.9561	0.7933	0.9511	0.03167	0.07081	8.16%	5.16%
30		5	0.8612	0.7007	1.022	0.723	1.008	0.05779	0.1292	15.01%	5.93%
44		5	0.8463	0.6509	1.042	0.572	0.94	0.07037	0.1573	18.59%	7.55%
67		5	0.7688	0.6017	0.9359	0.565	0.901	0.06019	0.1346	17.51%	16.01%
100		10	0.7591	0.6875	0.8307	0.531	0.9	0.03164	0.1001	13.18%	17.07%

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	5	1	1	1	1	1	0	0	0.0%	0.0%
0	Reference Sed	5	0.94	0.872	1	0.9	1	0.02449	0.05477	5.83%	6.0%
30		5	0.98	0.9245	1	0.9	1	0.02	0.04472	4.56%	2.0%
44		5	0.98	0.9245	1	0.9	1	0.02	0.04472	4.56%	2.0%
67		5	1	1	1	1	1	0	0	0.0%	0.0%
100		10	0.96	0.91	1	0.8	1	0.02211	0.06992	7.28%	4.0%

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Mean Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	0.924	0.872	0.923	0.95	0.908					
0	Reference Sed	0.9256	0.868	0.7933	0.8027	0.9511					
30		0.723	0.99	0.802	1.008	0.783					
44		0.572	0.931	0.94	0.854	0.9344					
67		0.901	0.565	0.863	0.804	0.711					
100		0.531	0.748	0.7467	0.9	0.792	0.737	0.7975	0.731	0.875	0.733

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1					
0	Reference Sed	0.9	1	0.9	1	0.9					
30		1	1	1	0.9	1					
44		1	1	1	1	0.9					
67		1	1	1	1	1					
100		1	1	0.9	0.9	1	1	0.8	1	1	1

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	10/10	10/10	10/10	11/11	10/10					
0	Reference Sed	9/10	10/10	9/10	11/11	9/10					
30		10/10	10/10	10/10	9/10	10/10					
44		10/10	10/10	10/10	10/10	9/10					
67		10/10	10/10	10/10	10/10	10/10					
100		10/10	10/10	9/10	9/10	10/10	10/10	8/10	10/10	10/10	10/10

CETIS Analytical Report

Hyalella 28-d Survival and Growth ~~Sediment~~ Test — **Nautilus Environmental**

Analysis ID:	07-2448-7617	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Jan-16 16:01	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	20-7357-8637	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	08 Dec-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Site Water
Ending Date:	05 Jan-16	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 0h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	849891	200	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.94	0.8 - NL	Yes	Passes Acceptability Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Reference ~~Sed~~	5	0.94	0.9	1	0.02449	0.05477	5.83%	0.0%	48	51
30		5	0.98	0.9	1	0.02	0.04472	4.56%	-4.26%	49	50
44		5	0.98	0.9	1	0.02	0.04472	4.56%	-4.26%	49	50
67		5	1	1	1	0	0	0.0%	-6.38%	50	50
100		10	0.96	0.8	1	0.02211	0.06992	7.28%	-2.13%	96	100

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Reference ~~Sed~~	0.9	1	0.9	1	0.9					
30		1	1	1	0.9	1					
44		1	1	1	1	0.9					
67		1	1	1	1	1					
100		1	1	0.9	0.9	1	1	0.8	1	1	1

Survival Rate Binomials

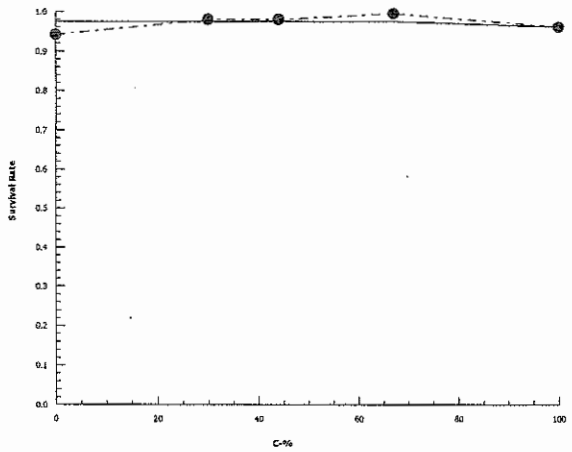
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	10/10	10/10	10/10	11/11	10/10					
0	Reference ~~Sed~~	9/10	10/10	9/10	11/11	9/10					
30		10/10	10/10	10/10	9/10	10/10					
44		10/10	10/10	10/10	10/10	9/10					
67		10/10	10/10	10/10	10/10	10/10					
100		10/10	10/10	9/10	9/10	10/10	10/10	8/10	10/10	10/10	10/10

Reference = site control

Hyalella 28-d Survival and Growth ~~Sediment~~ Test | **Nautilus Environmental**

Analysis ID:	07-2448-7617	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Jan-16 16:01	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA: JGa Jan-26/16

CETIS Analytical Report

Report Date: 14 Jan-16 10:05 (p 1 of 1)
Test Code: 15999b | 03-4012-5811

Hyalella 28-d Survival and Growth ~~Sediment~~ Test — **Nautilus Environmental**

Analysis ID:	09-8911-7751	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jan-16 10:05	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	20-7357-8637	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	08 Dec-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Site Water
Ending Date:	05 Jan-16	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 0h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	Passes survival rate

Fisher Exact Test

Control	vs	C-%	Test Stat	P-Value	P-Type	Decision(α:5%)
Reference ~~Sed~~		100	1	1.0000	Exact	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.94	0.8 - NL	Yes	Passes Acceptability Criteria

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Reference ~~Sed~~	48	3	51	0.9412	0.05882	0.0%
100		96	4	100	0.96	0.04	-2.0%

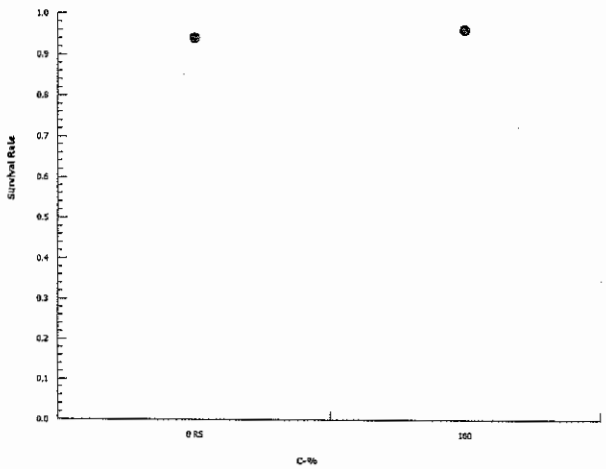
Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Reference ~~Sed~~	0.9	1	0.9	1	0.9					
100		1	1	0.9	0.9	1	1	0.8	1	1	1

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	10/10	10/10	10/10	11/11	10/10					
0	Reference ~~Sed~~	9/10	10/10	9/10	11/11	9/10					
100		10/10	10/10	9/10	9/10	10/10	10/10	8/10	10/10	10/10	10/10

Graphics



Reference = site control

CETIS Analytical Report

Hyalella 28-d Survival and Growth ~~Sediment~~ Test — **Nautilus Environmental**

Analysis ID:	03-3989-4950	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Jan-16 16:02	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	20-7357-8637	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	08 Dec-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Site Water
Ending Date:	05 Jan-16	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 0h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	Passes survival rate

Fisher Exact Test

Control	vs	Control	Test Stat	P-Value	P-Type	Decision(α:5%)
Negative Control		Reference ~~Sed~~	0.1213	0.1213	Exact	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	0.94	0.8 - NL	Yes	Passes Acceptability Criteria
Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Negative Contr	51	0	51	1	0	0.0%
0	Reference ~~Sed~~	48	3	51	0.9412	0.05882	5.88%

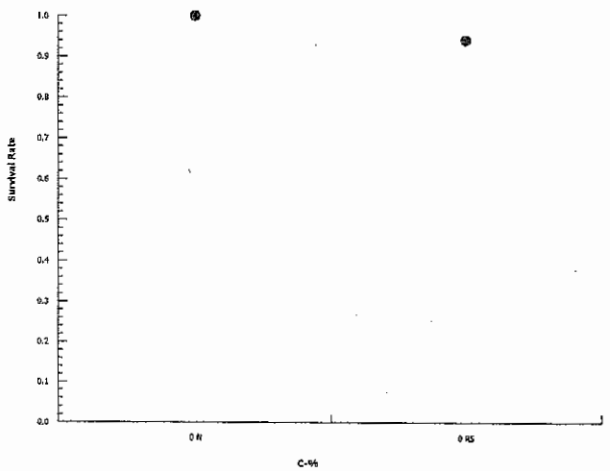
Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	1	1	1	1	1
0	Reference ~~Sed~~	0.9	1	0.9	1	0.9

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	10/10	10/10	10/10	11/11	10/10
0	Reference ~~Sed~~	9/10	10/10	9/10	11/11	9/10

Graphics



Reference = site control

CETIS Analytical Report

Hyalella 28-d Survival and Growth ~~Sediment~~ Test — **Nautilus Environmental**

Analysis ID:	06-6363-9105	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Jan-16 16:01	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	20-7357-8637	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	08 Dec-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Site Water
Ending Date:	05 Jan-16	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 0h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
3P Log-Logistic EV [Y=A/(1+(X/D)^C)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
14	51.52	-96.11	-92.83	0.0886	Yes	0.2664	3.385	0.7683	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	44.26	N/A	90.45	2.259	1.106	NA
IC10	76.1	36.69	113.1	1.314	0.8844	2.725
IC15	106.4	48.53	164.7	0.9396	0.6073	2.061
IC20	137 >100	12.55	271.4	0.7298	0.3684	7.968
IC25	168.8	N/A	448.7	0.5924	0.2229	NA
IC40	279.1	N/A	N/A	0.3583	NA	NA
IC50	374.5	N/A	N/A	0.267	NA	NA

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	0.8751	0.0499	0.7773	0.9729	17.54	<0.0001	Significant Parameter
C	1.379	1.452	-1.468	4.225	0.9495	0.3508	Non-Significant Parameter
D	374.5	498.1	-601.9	1351	0.7518	0.4587	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	0.063521	0.063521	1	4.819	0.0369	Significant
Lack of Fit	0.007425	0.003712	2	0.2664	0.7683	Non-Significant
Pure Error	0.348454	0.013938	25			
Residual	0.355879	0.013181	27			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	2.752	9.488	0.6002	Equal Variances
	Mod Levene Equality of Variance	0.5579	2.84	0.6956	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.937	0.9303	0.0755	Normal Distribution
	Anderson-Darling A2 Normality	0.5756	2.492	0.1385	Normal Distribution

Mean Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Reference ~~Sed~~	5	0.8681	0.7933	0.9511	0.03167	0.07081	8.16%	0.0%
30		5	0.8612	0.723	1.008	0.05779	0.1292	15.01%	0.81%
44		5	0.8463	0.572	0.94	0.07037	0.1573	18.59%	2.52%
67		5	0.7688	0.565	0.901	0.06019	0.1346	17.51%	11.44%
100		10	0.7591	0.531	0.9	0.03164	0.1001	13.18%	12.56%

Reference = site control

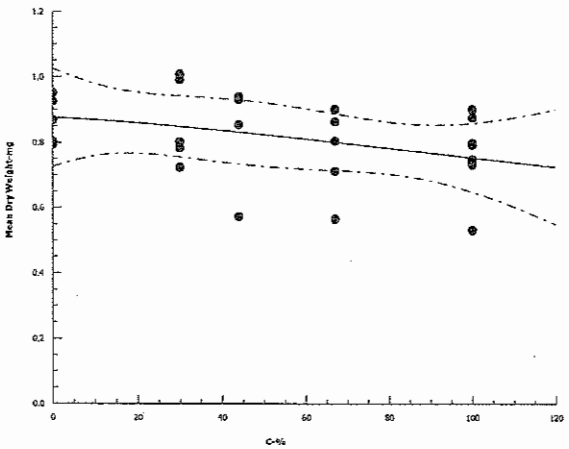
Hyalella 28-d Survival and Growth ~~Sediment~~ Test (BC) **Nautilus Environmental**

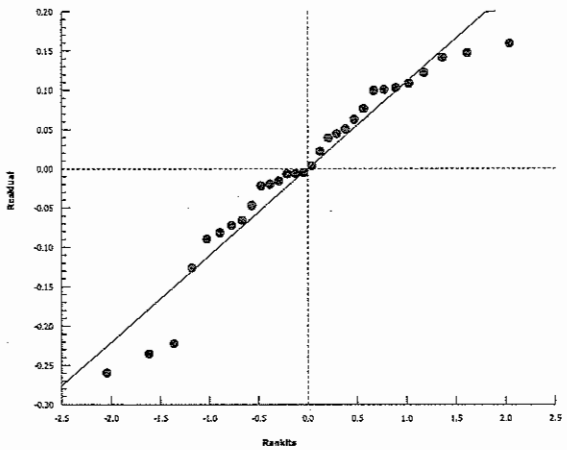
Analysis ID:	06-6363-9105	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Jan-16 16:01	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes

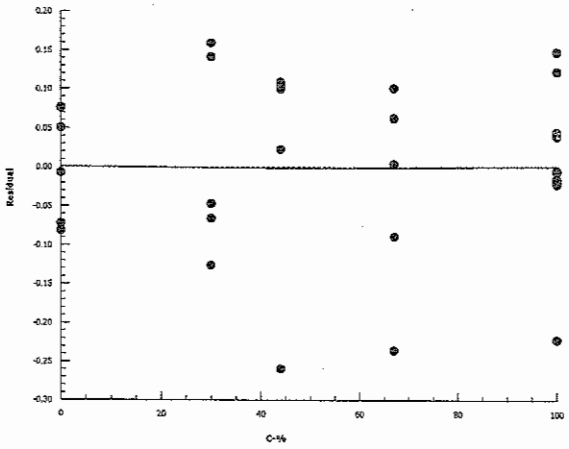
Mean Dry Weight-mg Detail

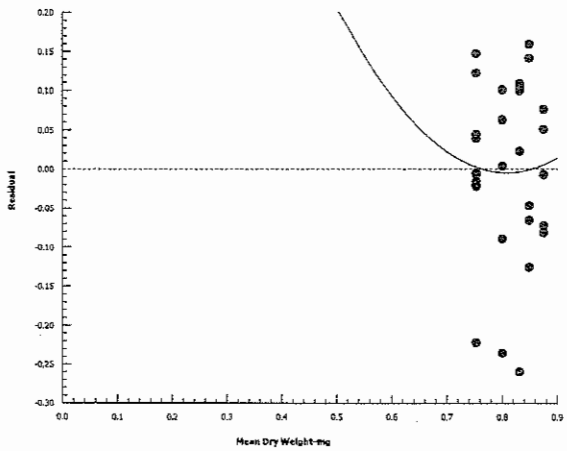
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Reference Sed	0.9256	0.868	0.7933	0.8027	0.9511					
30		0.723	0.99	0.802	1.008	0.783					
44		0.572	0.931	0.94	0.854	0.9344					
67		0.901	0.565	0.863	0.804	0.711					
100		0.531	0.748	0.7467	0.9	0.792	0.737	0.7975	0.731	0.875	0.733

Graphics 3P Log-Logistic EV [Y=A/(1+(X/D)^C)]









CETIS Analytical Report

Hyalella 28-d Survival and Growth ~~Sediment~~ Test — **Nautilus Environmental**

Analysis ID:	20-2661-0890	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 Jan-16 10:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	20-7357-8637	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	08 Dec-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Site Water
Ending Date:	05 Jan-16	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 0h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	10.3%	Fails mean dry weight-mg

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Reference Sed		100*	2.162	1.771	0.089	13	0.0249	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.03962696	0.03962696	1	4.676	0.0498	Significant Effect
Error	0.1101693	0.008474561	13			
Total	0.1497963		14			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.997	21.14	0.5271	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.931	0.8328	0.2827	Normal Distribution

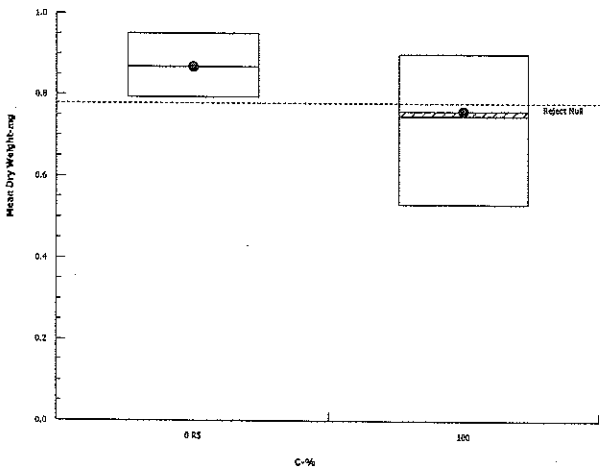
Mean Dry Weight-mg Summary

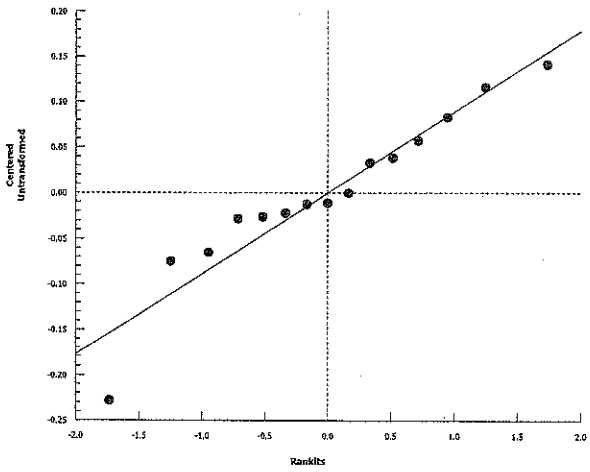
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Reference ~~Sed~~	5	0.8681	0.7802	0.9561	0.868	0.7933	0.9511	0.03167	8.16%	0.0%
100		10	0.7591	0.6875	0.8307	0.7473	0.531	0.9	0.03164	13.18%	12.56%

Mean Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Reference ~~Sed~~	0.9256	0.868	0.7933	0.8027	0.9511					
100		0.531	0.748	0.7467	0.9	0.792	0.737	0.7975	0.731	0.875	0.733

Graphics





Reference = site control

CETIS Analytical Report

Hyalella 28-d Survival and Growth ~~Sediment~~ Test — **Nautilus Environmental**

Analysis ID:	14-4483-6638	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Jan-16 16:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	20-7357-8637	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	08 Dec-15	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Site Water
Ending Date:	05 Jan-16	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 0h	**Source:**	Aquatic Research Organisms, NH	**Age:**	8-d
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 0h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	6.94%	Passes mean dry weight-mg

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		Reference ~~Sed~~	1.384	1.86	0.064	8	0.1019	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.005582346	0.005582346	1	1.915	0.2038	Non-Significant Effect
Error	0.02332496	0.00291562	8			
Total	0.02890731		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	6.138	23.15	0.1068	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9637	0.7411	0.8269	Normal Distribution

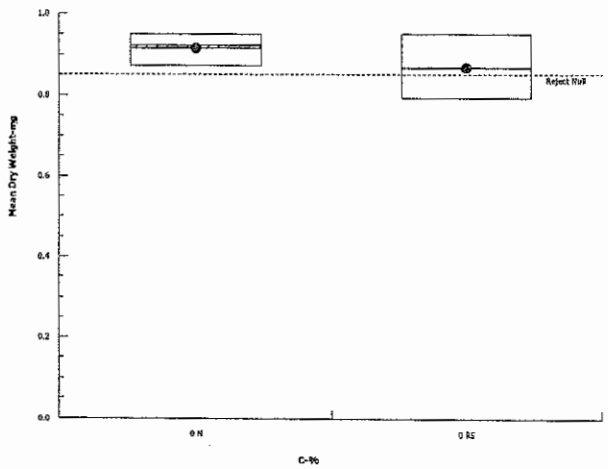
Mean Dry Weight-mg Summary

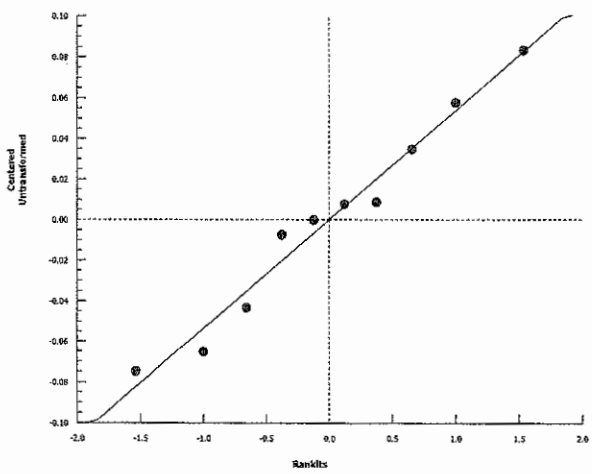
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Reference ~~Sed~~	5	0.8681	0.7802	0.9561	0.868	0.7933	0.9511	0.03167	8.16%	0.0%
0	Negative Control	5	0.9154	0.8799	0.9509	0.923	0.872	0.95	0.01278	3.12%	-5.44%

Mean Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Negative Control	0.924	0.872	0.923	0.95	0.908
0	Reference ~~Sed~~	0.9256	0.868	0.7933	0.8027	0.9511

Graphics





Reference = site control

Client: Teck

W.O.#: 159909

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Lab Control	08-Dec-15	50	2.8	2.9	54		50	7.3	146	KL
FR_UFR1	08-Dec-15	↓	7.4	7.6	144		50	10.6	212	↓
GH_FR1	08-Dec-15	↓	KL ~~7.8~~ 9.7	KL ~~7.9~~ 9.9	KL ~~154~~ 190		10①	6.8 KL 8.3	~~680~~ KL 830	↓
GH_ER2	08-Dec-15	↓	7.7 KL 6	7.8	148		50	8.8	176	↓
EV_ER4	08-Dec-15	↓	6.8	7.0	132		10①	7.5	750	↓
Lab Control	05-Jan-16	50	2.9	3.0	56		50	7.4	148	KL
FR_UFR1	05-Jan-16	↓	~~7~~ KL 7.5	7.7	146		50	9.9	198	↓
GH_FR1	05-Jan-16	↓	10.2 KL ~~8~~ ~~9.5~~	~~9.6~~ KL 10.4	200 ~~188~~ KL		10①	7.2 ~~8.9~~ KL	720 ~~890~~ KL	↓
GH_ER2	05-Jan-16	↓	7.7	7.8	152		50	9.2	184	↓
EV_ER4	05-Jan-16	↓	8.1	8.3	158		10①	7.8	~~7~~80	↓

Notes: ① Sample diluted w/ DI up to 100mL.

Reviewed by: JGW

Date Reviewed: Jan. 25/16

Client: Teek

W.O.#: 159997

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
MHW Batch 120415	Dec 7/15	50	2.9	3.0	56		50	5.9	118	JS

Notes: _____

Reviewed by: _____ Date Reviewed: _____

APPENDIX D – *Pimephales promelas* Toxicity Test Data

Nautilus Environmental

ATTN: Krysta Pearcy
Nautilus Environmental
8664 Commerce Court
Burnaby, BC
Canada

Received: various dates
Report Date: 2016/03/01
Version: REVISION 2

HydroQual Test Report

Client: NAU104
Reference: 15-1640; 15-1641
Client Reference: EV_ER4_WS
GH_ER2_WS

Billing: not given

Senior Verifier

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.

Internal Tracking Sheet

Client:	NAU104
Reference:	15-1640

Client:

Client:	Nautilus Environmental	Operation:	Burnaby
Address:	8664 Commerce Court	Billing:	not given
City:	Burnaby	Contact:	Krysta Pearcy
Province:	BC	Tel:	604 420 8773
Country:	Canada	Fax:	not given
Postal Code:	V5A 4N7	Email:	krysta@nautilusenvironmental.com

Sample:

type:	water			collection method:	grab
collected:	various dates	at:	various times	by:	not given
shipped:	various dates	by:	drop off		
received:	various dates	at:	various times	by:	MC
signed-in:	various dates	at:	various times	by:	MC
container:	5 x 20 L carboys			sample condition:	good condition
seals present:	no			initials on seals:	no
storage:	4 +/- 2 degrees in darkness			initial temperature (°C):	6, 6, 6, 9

Samples are disposed following PERS-SWI-004

Chemical and Physical Measurements at Sample Receipt:

sample:	01	02	03	04	
client code:	EV_ER4_WS_2015-11-30_N	EV_ER4_WS_2015-12-07_N	EV_ER4_WS_2015-12-14_N	EV_ER4_WS_2015-12-21_N	**EV_ER4_WS**
collection date:	2015/11/30	2015/12/07	2015/12/14	2015/12/21	
collection time:	0845	0915	1115	0930	

pH:	8.2	7.9	7.8	8.1
EC (µS/cm):	540	521	503	576
DO (mg/L):	9.6	9.3	9.9	9.9
temp (°C):	8.4	16.0	16.8	14.2
hardness:	185	249	284	224
alkalinity:	195	146	168	223
colour:	colorless	colorless	colorless	colorless
odour:	odourless	odourless	odourless	odourless

Meter/Probe Used: chem cart 1/chem cart 2/**chem cart 3**/product/soils

Each sampling container EC checked (initials): ML__

Test Log:

test code:	FM-32D
started:	2015/12/08
ended:	2016/01/09
prelim made:	-
prelim sent:	-
reported:	2016/02/11

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.

Nautilus Environmental (Calgary), #4, 6125 12th Street SE, Calgary, Alberta, Canada T2H 2K1
Tel (403) 253-7121 fax (403) 252-9363 www.nautilusenvironmental.ca

Internal Tracking Sheet

Client:	NAU104
Reference:	15-1641

Client:

Client:	Nautilus Environmental	Operation:	Burnaby
Address:	8664 Commerce Court	Billing:	not given
City:	Burnaby	Contact:	Krysta Pearcy
Province:	BC	Tel:	604 420 8773
Country:	Canada	Fax:	not given
Postal Code:	V5A 4N7	Email:	krysta@nautilusenvironmental.com

Sample:

type:	water			collection method:	grab
collected:	various dates	at:	various times	by:	not given
shipped:	various dates	by:	drop off		
received:	various dates	at:	various times	by:	MC
signed-in:	various dates	at:	various times	by:	MC
container:	5 x 20 L carboys			sample condition:	good condition
seals present:	no			initials on seals:	no
storage:	4 +/- 2 degrees in darkness			initial temperature (°C):	5.4, 6,6,11

Samples are disposed following PERS-SWI-004

Chemical and Physical Measurements at Sample Receipt:

sample:	01	02	03	04	
client code:	GH_ER2_WS_2015_11_30_N	GH_ER2_WS_2015_12_07_NP	GH_ER2_WS_2015_12_14_NP	GH_ER2_WS_2015_12_21_NP	**GH_ER2_WS**
collection date:	2015/11/30	2015/12/07	2015/12/14	2015/12/21	
collection time:	1000	not given	not given	not given	

pH:	8.0	7.8	7.8	7.9
EC (µS/cm):	353	335	325	362
DO (mg/L):	9.9	8.9	9.5	9.8
temp (°C):	9.0	16.9	17.4	14.2
hardness:	183	179	187	153
alkalinity:	169	142	144	168
colour:	colorless	colorless	colorless	colorless
odour:	odourless	odourless	odourless	odourless

Meter/Probe Used: chem cart 1/chem cart 2/**chem cart 3**/product/soils

Each sampling container EC checked (initials): ML__

Test Log:

test code:	FM-32D
started:	2015/12/08
ended:	2016/01/09
prelim made:	-
prelim sent:	-
reported:	2016/02/11

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.

Nautilus Environmental (Calgary), #4, 6125 12th Street SE, Calgary, Alberta, Canada T2H 2K1
Tel (403) 253-7121 fax (403) 252-9363 www.nautilusenvironmental.ca

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1640 Site Control: 15-1641

Organism Information

Source: Aquatox Batch: 20151208ELS Egg Stage: 15 somites

Test Log

Date	Day	Time	Technicians	Chem Cart Used	Fed		Feeding Rate (mL)	Sample/Site Control Pre-Aeration Time (minutes)	Bench Sheet Review	
					AM	PM			First	Second
2015/12/08	0	1600	DS/JN/HS	2	-	-	-	60	DS	JN
2015/12/09	1	1030	DS/JN	2	-	-	-	60	DS	ML
2015/12/10	2	0930	ML/JN	2	-	-	-	60	ML	JN
2015/12/11	3	1030	ML/DS	2	-	-	-	60	DS	ML
2015/12/12	4	1300	HS/ML	2	-	-	-	60	ML	HS
2015/12/13	5	1100	CQ/EP	2	-	✓	1	60	CQ	JK
2015/12/14	6	1330	NM/HS	2	✓	✓	1	45	NM	CQ
2015/12/15	7	1000	HS/DS	2	✓	✓	1	60	DS	HS
2015/12/16	8	1410	NM/DS	2	✓	✓	1	45	DS	NM
2015/12/17	9	1335	JN/ML	2	✓	✓	1	45	ML	JN
2015/12/18	10	1100	HS/JN	2	✓	✓	1	60	HS	JN
2015/12/19	11	1230	DS	2	✓	✓	1	60	DS	ML
2015/12/20	12	1330	CQ/JK	2	✓	✓	1	60	JK	CQ
2015/12/21	13	1030	HS/EP	2	✓	✓	1	60	HS	JP
2015/12/22	14	1330	HS/EP	2	✓	✓	1	60	HS	ML
2015/12/23	15	1400	DS/HS	2	✓	✓	1.5	60	DS	HS
2015/12/24	16	0915	DS/HS	2	✓	✓	1.5	60	HS	DS
2015/12/25	17	1000	DS/JN	2	✓	✓	1.5	60	JN	DS
2015/12/26	18	0945	ML/DS	2	✓	✓	1.5	45	DS	ML
2015/12/27	19	1000	HS/JN	2	✓	✓	1.5	45	HS	JN
2015/12/28	20	1000	HS/JW	2	✓	✓	1.5	45	HS	CQ
2015/12/29	21	1030	HS/DS	2	✓	✓	1.5	45	DS	HS
2015/12/30	22	0930	JN	2	✓	✓	1.5	45	JN	JK
2015/12/31	23	0930	CQ	2	✓	✓	1.5	60	CQ	EP
2016/01/01	24	0930	JK/JW	2	✓	✓	1.5	60	JK	ML
2016/01/02	25	1030	JK/JW	2	✓	✓	1.5	60	JK	ML
2016/01/03	26	1000	JN/EP	2	✓	✓	1.5	60	JN	HS
2016/01/04	27	1400	HS/JN	2	✓	✓	1.5	60	JN	HS
2016/01/05	28	0930	JK/EP	2	✓	✓	1.5	60	JK	HS
2016/01/06	29	1010	JK/HS	2	✓	✓	1.5	60	HS	JK
2016/01/07	30	1330	JK/HS	2	✓	✓	1.5	60	HS	JK
2016/01/08	31	1100	JK/JW	2	✓	✓	1.5	60	JK	ML
2016/01/09	32	1320	ML/JK/EP	2	-	-	-	-	ML	JK

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1640 Site Control: 15-1641

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

	Lab CTL		Lab CTL 20 ug/L		Site CTL		30%		44%		67%		100%A		100%B	
	Day 1		Day 1		Day 1		Day 1		Day 1		Day 1		Day 1		Day 1	
replicate	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos
a	15	0	15	0	14	1	12	3	15	0	13	2	15	0	14	1
b	15	0	15	0	15	0	15	0	14	1	12	3	15	0	15	0
c	15	0	15	0	15	0	14	1	13	2	14	1	14	1	12	3
d	14	1	15	0	15	0	13	2	14	1	14	1	15	0	15	0
e	30	0	30	0	26	4	29	1	29	1	29	1	30	0	30	0
f	0	0	30	0	27	3	30	0	26	4	28	2	27	3	28	2

Comments/Observations:

Number of Alive Embryos and Hatched Organisms

	Lab CTL			Lab CTL 20 ug/L			Site CTL			30%		
	Day 2			Day 2			Day 2			Day 2		
replicate	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Dead Embryos	Cull to 15
a	8	7	15	8	7	15	10	4	15	12	0	15
b	15	0	15	15	0	15	14	1	15	5	10	15
c	5	10	15	14	1	15	14	1	15	12	2	15
d	9	5	15	12	3	15	15	0	15	10	3	15
e	30	0		6	24		21	5		28	1	
f	28	2		6	24		21	6		30	0	

	44%			67%			100%A			100%B		
	Day 2			Day 2			Day 2			Day 2		
replicate	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Dead Embryos	Cull to 15
a	15	0	15	13	0	15	15	0	15	14	0	15
b	14	0	15	12	0	15	14	1	15	15	0	15
c	13	0	15	14	0	15	14	0	15	12	0	15
d	14	0	15	14	0	15	15	0	15	14	1	15
e	29	0		29	0		30	0		30	0	
f	25	1		28	0		27	0		27	1	

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2

Comments/Observations:

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1640 Site Control: 15-1641

Number of Alive Embryos and Hatched Organisms

	Lab CTL		Lab CTL 20 ug/L		Site CTL		30%		44%		67%		100%A		100%B	
	Day 3		Day 3		Day 3		Day 3		Day 3		Day 3		Day 3		Day 3	
replicate	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched
a	14	1	15	0	15	0	14	1	15	0	15	0	15	0	12	2
b	15	0	15	0	15	0	15	0	14	1	14	1	15	0	15	0
c	15	0	15	0	15	0	13	2	13	2	15	0	15	0	14	1
d	15	0	15	0	14	1	14	1	14	1	15	0	51	0	15	0

Comments/Observations:

	Lab CTL		Lab CTL 20 ug/L		Site CTL		30%		44%		67%		100%A		100%B	
	Day 4		Day 4		Day 4		Day 4		Day 4		Day 4		Day 4		Day 4	
replicate	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched
a	12	3	6	9	11	4	7	8	7	8	12	3	14	1	9	5
b	9	6	5	10	7	8	11	4	5	10	6	9	11	4	13	2
c	14	1	6	9	10	5	7	8	4	11	11	4	11	4	13	2
d	14	1	6	7	8	7	9	6	9	6	14	1	14	1	11	4

Comments/Observations:

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 5	Day 5	Day 5	Day 5	Day 5	Day 5	Day 5	Day 5
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14	14 (1e)	13 (2e)	15	15	15	14 (1e)	15
b	15	15	15	15	15	15	15	15
c	15	14 (1e)	15	15	15	15	15	15
d	14 (1e)	15	15	14 (1e)	14	15	15	15

Comments/Observations: e = embryo

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 6	Day 6	Day 6	Day 6	Day 6	Day 6	Day 6	Day 6
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14	14	12	15	15	15 (1)	13	15
b	15	13	15	15	15	15	15	15
c	14	15	15	13	14	15	15	15
d	14	15	15	14	14	15	15	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1640 Site Control: 15-1641

Number of Alive Embryos and Hatched Organisms

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 7	Day 7	Day 7	Day 7	Day 7	Day 7	Day 7	Day 7
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14	14 (2)	12	15	15	15 (1)	13 (2)	13 (1)
b	15	13	15	14 (1)	15 (1)	15	15	15 (2)
c	14 (1)	15	15 (1)	13	14	14	15	15
d	14	15	15	14	14 (3)	15	15	15 (1)

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 8	Day 8	Day 8	Day 8	Day 8	Day 8	Day 8	Day 8
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	14(2)	12 (1)	15	15	14	12 (1)	13 (1)
b	15	13	15	14 (1)	15	15	15	15
c	14	15	15	13	14	14	15	15
d	14	14	15	14	14 (2)	15	15	15 (1)

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 9	Day 9	Day 9	Day 9	Day 9	Day 9	Day 9	Day 9
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	13	12 (1)	15	15	14	11 (1)	13
b	15	13	15	14	15	15	15	15
c	14 (1)	15	15	13	14	14	15	14
d	14	14	14	14	14 (1)	15	15	15 (2)

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 10	Day 10	Day 10	Day 10	Day 10	Day 10	Day 10	Day 10
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	12 (1)	11	15	15	14	11	13
b	15	13 (1)	15	14	15	15	15	15
c	14 (1)	15	15	13	14	14 (1)	15	14
d	14	14	14	14	14 (1)	15	15	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1640 Site Control: 15-1641

Number of Alive Embryos and Hatched Organisms

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 11	Day 11	Day 11	Day 11	Day 11	Day 11	Day 11	Day 11
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	12 (1)	11 (1)	15	15 (1)	14	11	13
b	15	13 (1)	15	14 (1)	15 (1)	15	15	15 (1)
c	14 (1)	15	15	13	14	14 (1)	15	14
d	14	14	14 (1)	14	14 (1)	15	15	15 (1)

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 12	Day 12	Day 12	Day 12	Day 12	Day 12	Day 12	Day 12
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	12 (1)	11 (1)	15	15 (1)	14	11	13
b	15	13 (1)	15	13	14	15	15	15 (1)
c	14 (1)	15	15 (1)	13	14	14	15	14
d	14	14	15	14	14 (1)	15	15	15 (1)

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 13	Day 13	Day 13	Day 13	Day 13	Day 13	Day 13	Day 13
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	12	10	15	14	14	11	13
b	15	12	15	13	14	15	15	14
c	14	15	15	13	14	13	15	14
d	14	14	15	14	14 (1)	15	15	13

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 14	Day 14	Day 14	Day 14	Day 14	Day 14	Day 14	Day 14
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	12 (1)	10	15	14	14	10	13
b	15	12	15	13	14	15	15	14
c	14	15	15	13	14	13	15	14
d	14 (1)	14	15	14	14 (1)	15	14	11 (1)

Comments/Observations: Day 14 and 15- 44% rep D- 1 fish had a bent tail, bracketed # indicates number of fish displaying atypical swimming within test vessel

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1640 Site Control: 15-1641

Number of Alive Embryos and Hatched Organisms

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 15	Day 15	Day 15	Day 15	Day 15	Day 15	Day 15	Day 15
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	12 (1)	10	15	14	13	10	13
b	15	12	15	13	14	15	15	14
c	14	15	15	13	14	13	15	14
d	14 (1)	14	15	14	14	15	14	11

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 16	Day 16	Day 16	Day 16	Day 16	Day 16	Day 16	Day 16
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	10	15	14	13	10	13
b	15	11	14	13	14	15	15	14
c	14	15	14	13	14	13	15	14
d	14 (1)	14	15	14	13	15	14	11

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 17	Day 17	Day 17	Day 17	Day 17	Day 17	Day 17	Day 17
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	10	15	14	13	10	13
b	15	11	14	13	14	15	15	14
c	14	15 (1)	14	13	14	13	15	14
d	14 (1)	14	15	14	13	15	14	11

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 18	Day 18	Day 18	Day 18	Day 18	Day 18	Day 18	Day 18
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	10	15	14	13	10	13
b	15 (1)	11	14	13	14 (1)	15	15	14
c	14	15 (1)	14	13	14	13	15	14
d	14 (1)	14	15	13	13	15	14	11

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1640 Site Control: 15-1641

Number of Alive Embryos and Hatched Organisms

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 19	Day 19	Day 19	Day 19	Day 19	Day 19	Day 19	Day 19
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	10	15	14	13	10	13
b	15	11	14	13	13	15	15	14
c	14	14	14 (1)	13	14	13	15	14
d	14 (1)	14	15	13	13	15	14	10

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 20	Day 20	Day 20	Day 20	Day 20	Day 20	Day 20	Day 20
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	10	15	14	13	10	13
b	15	11	14	13	13	15	15	14
c	14	14	13	13 (1)	14	13	15	14
d	13	14	15 (1)	13	13	15	14	10

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 21	Day 21	Day 21	Day 21	Day 21	Day 21	Day 21	Day 21
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	10	15	14	13	10	13
b	14	11	14	13	13	15	15	14
c	14	14	13	12 (1)	14	13	15	14
d	13	14	15 (1)	13	13	15	14	10

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 22	Day 22	Day 22	Day 22	Day 22	Day 22	Day 22	Day 22
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	10	15	14	13	10	13
b	14	11	14	13	13	15	15	14
c	14	14	13	12	14	13	15	14
d	13	14	15	13	13	15	14	10

Comments/Observations:

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1640 Site Control: 15-1641

Number of Alive Embryos and Hatched Organisms

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 23	Day 23	Day 23	Day 23	Day 23	Day 23	Day 23	Day 23
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	10	15	14	13	10	13
b	14	11	14 (1)	13	13	15	15	14
c	14	14	13	10	14	13	15	14
d	13	14	14 (1)	13	13	15	14	10

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 24	Day 24	Day 24	Day 24	Day 24	Day 24	Day 24	Day 24
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	10	15	14	13	10	13
b	13	11	13	13	13	15	15	14
c	14	14	13	10 (1)	14	13	15	14
d	13	14	13 (2)	13	13	15	14	10

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 25	Day 25	Day 25	Day 25	Day 25	Day 25	Day 25	Day 25
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	10	15	14	13	10	13
b	13	11	13	13 (1)	13	15	15	14
c	14	14	13	10 (1)	14	13	15	14
d	13	14	13 (2)	13	13	15	14	10

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 26	Day 26	Day 26	Day 26	Day 26	Day 26	Day 26	Day 26
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	10	15	14	13	10	13
b	13	11	13	13 (1)	13	15	15	14
c	14	14	13	10 (1)	14	13	15	14
d	13	14	13 (2)	13	13	15	14	10

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1640 Site Control: 15-1641

Number of Alive Embryos and Hatched Organisms

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 27	Day 27	Day 27	Day 27	Day 27	Day 27	Day 27	Day 27
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	10	15	14	13	10	13
b	13	11	13	13 (1)	13	15	15	14
c	14	14	13	10 (1)	14	13	15	14
d	13	14	12 (1)	13	13	15	14	10

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 28	Day 28	Day 28	Day 28	Day 28	Day 28	Day 28	Day 28
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	9	10	15	14	13	10	13
b	13	11	13	13 (1)	13	15	15	14
c	14	14	13	10 (1)	14	13	15	14
d	13	13	12 (1)	13	13	15	14	10

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 29	Day 29	Day 29	Day 29	Day 29	Day 29	Day 29	Day 29
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	8	10	15	14	13	10	13
b	13	11	13	12	13	15	15	14
c	14	14	13	9	14	13	15	14
d	13	13	11	13	13	15	14	10

Comments/Observations:

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 30	Day 30	Day 30	Day 30	Day 30	Day 30	Day 30	Day 30
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	8	10	15	14	13	10	13
b	13	11	13	12	13	15	15	14
c	14	14	13	9	14	13	15	14
d	13	13 (1)	11	13	13	15	14	10

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1640 Site Control: 15-1641

Number of Alive Embryos and Hatched Organisms

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 31	Day 31	Day 31	Day 31	Day 31	Day 31	Day 31	Day 31
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	8 (1)	10	15	14	13	10	13
b	13	11	13	12	13	15	15	14
c	14	13	13	9	14	13	15	14
d	13	13	11	13	13	15	14	10

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 32	Day 32	Day 32	Day 32	Day 32	Day 32	Day 32	Day 32
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	7	10	15	14	13	10	13
b	13	11	13	12	13	15	15	14
c	14	13	13	9	14	13	15	14
d	13	13	11	13	13	15	14	10

Comments/Observations:

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample 15-1641 Site Control 15-1640

New Solutions

Conc. (%)	Lab CTL	Lab CTL	Site CTL	30	44	67	100A	100B
Day		20 ug/L						
				pH (units)				
0	8.1	8.0	7.9	7.9	7.9	7.9	8.0	7.9
1	8.2	8.1	8.2	8.2	8.2	8.2	8.2	8.2
2	8.2	8.2	8.3	8.3	8.3	8.4	8.3	8.4
3	8.0	8.0	8.2	8.2	8.2	8.2	8.1	8.1
4	8.1	8.1	8.1	8.1	8.2	8.2	8.1	8.1
5	8.3	8.1	8.3	8.3	8.3	8.3	8.2	8.2
6	7.9	7.9	7.9	8.0	8.1	8.0	8.0	7.3
7	7.9	7.9	8.1	8.1	8.0	8.1	8.1	8.1
8	8.0	8.0	8.0	8.0	8.0	8.0	8.1	8.1
				Conductance (µS/cm)				
0	435	425	306	613	742	940	1189	1201
1	450	435	330	617	768	957	1207	1228
2	416	437	333	629	757	955	1214	1228
3	427	440	379	621	758	963	1209	1208
4	429	443	332	618	760	961	1212	1224
5	436	448	336	620	762	966	1221	1235
6	451	457	320	727	761	965	1218	1229
7	445	461	327	624	754	950	1181	1221
8	461	467	324	556	689	834	1066	1066
				Dissolved Oxygen (mg/L) (**40-100% saturation**)				
0	7.2	7.3	7.3	7.3	7.1	7.3	7.3	7.2
1	7.3	7.3	7.3	7.3	7.3	7.3	7.2	7.2
2	7.3	7.3	7.2	7.2	7.2	7.2	7.1	7.1
3	7.2	7.3	7.2	7.2	7.2	7.2	7.2	7.2
4	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
5	7.3	7.3	7.1	7.2	7.2	7.1	7.1	7.1
6	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
7	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
8	7.3	7.1	7.3	7.3	7.3	7.3	7.3	7.3
				Temperature (°C)				
0	24	24	26	24	24	24	24	24
1	24	24	24	24	24	24	24	24
2	25	24	25	24	25	25	25	24
3	24	24	25	25	25	25	25	25
4	24	24	24	24	24	24	24	24
5	24	24	24	24	24	24	24	24
6	24	24	24	24	24	24	24	24
7	24	24	24	24	24	24	24	24
8	24	24	24	24	24	24	24	24

Old Solutions

Lab CTL	Lab CTL	Site CTL	30	44	67	100A	100B
	20 ug/L						
			pH (units)				
7.9	7.9	8.0	8.0	8.1	8.1	8.1	8.1
8.0	8.1	8.2	8.3	8.3	8.3	8.3	8.3
8.0	8.0	8.2	8.2	8.2	8.2	8.2	8.2
8.0	7.9	8.2	8.1	8.2	8.2	8.1	8.1
8.1	8.1	8.3	8.3	8.3	8.2	8.2	8.2
7.9	7.8	8.1	8.1	8.1	8.0	8.0	8.0
7.8	7.7	8.0	8.1	8.0	8.0	8.0	8.0
7.7	7.9	8.2	8.1	8.1	8.0	8.0	8.0
			Conductance (µS/cm)				
450	436	314	617	769	966	1225	1243
448	439	320	628	763	966	1223	1231
427	440	324	620	755	963	1183	1225
465	449	325	601	759	957	1213	1221
471	461	333	623	760	1001	1168	1217
456	461	337	622	754	977	1183	1219
456	460	326	622	760	876	1201	1221
455	403	330	643	742	933	1181	1201
			Dissolved Oxygen (mg/L) (**40-100% saturation**)				
7.0	7.0	7.3	6.9	6.9	7.1	7.0	7.0
7.1	7.2	7.0	7.0	7.0	7.0	7.0	7.0
7.3	7.3	7.3	7.3	7.1	7.1	7.1	7.2
7.3	7.3	7.3	7.2	7.2	7.2	7.2	7.2
7.1	7.0	6.9	7.0	7.0	7.0	7.0	7.0
7.3	7.0	6.7	6.7	6.7	6.7	6.7	6.6
7.3	7.1	7.3	6.8	6.9	6.9	6.7	6.7
6.8	7.0	7.3	7.3	7.3	7.3	7.2	7.2
			Temperature (°C)				
24	24	24	24	24	24	24	24
24	24	24	24	24	24	24	24
24	24	24	24	24	24	24	24
24	24	24	24	24	24	24	24
24	24	24	24	24	24	24	24
24	24	24	24	24	24	24	24
24	24	24	24	24	24	24	24
24	24	24	24	24	24	24	24

DO Levels (60-100% saturation) -

4.4 to 7.3 mg/L at 24°C

4.5 to 7.2 mg/L at 25°C

4.3 to 7.1 mg/L at 26°C

Comments:

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample 15-1641 Site Control 15-1640

New Solutions

Conc. (%)	Lab CTL	Lab CTL	Site CTL	30	44	67	100A	100B
Day		20 ug/L						
	pH (units)							
9	8.1	8.1	8.1	8.2	8.2	8.2	8.1	8.1
10	7.9	8.0	8.1	8.1	8.1	8.2	8.1	8.1
11	8.1	8.0	8.1	8.2	8.2	8.2	8.2	8.2
12	8.0	8.0	8.1	8.1	8.1	8.0	8.1	8.1
13	7.8	7.8	8.0	7.9	8.0	8.0	8.0	8.0
14	8.0	7.9	8.1	8.1	8.1	8.1	8.0	8.1
15	8.0	7.9	8.0	8.0	8.1	8.1	8.1	8.1
16	8.1	8.1	8.2	8.1	8.1	8.1	8.1	8.0
17	8.1	8.1	8.0	8.0	8.1	8.1	8.0	8.0
	Conductance (µS/cm)							
9	462	423	320	554	672	841	1062	1062
10	449	453	311	559	678	840	1039	1039
11	449	448	322	564	657	830	1056	1056
12	446	455	314	560	672	834	1056	1077
13	456	458	314	557	669	836	1058	1069
14	459	458	322	558	672	834	1049	1065
15	470	463	319	566	674	840	1059	1065
16	478	465	325	596	728	905	1182	1196
17	453	467	324	609	731	921	1186	1203
	Dissolved Oxygen (mg/L) (**40-100% saturation**)							
9	7.3	7.3	7.2	7.3	7.2	7.2	7.2	7.2
10	7.3	7.3	7.2	7.3	7.2	7.2	7.2	7.2
11	7.2	7.2	7.2	7.3	7.2	7.2	7.1	7.1
12	7.3	7.1	7.3	7.2	7.1	7.1	7.0	7.0
13	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
14	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
15	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
16	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
17	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
	Temperature (°C)							
9	24	24	25	24	25	25	25	25
10	24	24	25	24	25	25	25	25
11	24	25	24	24	24	25	24	24
12	24	24	24	24	24	24	24	24
13	24	24	24	24	24	24	24	24
14	24	24	24	24	24	24	24	24
15	24	24	24	24	24	24	24	24
16	24	24	24	24	24	24	24	24
17	24	24	24	24	24	24	24	24

Old Solutions

	Lab CTL	Lab CTL	Site CTL	30	44	67	100A	100B
		20 ug/L						
	pH (units)							
9	8.0	8.0	8.1	8.1	8.1	8.1	8.1	8.1
10	8.1	8.1	8.2	8.3	8.2	8.2	8.2	8.2
11	8.1	8.0	8.1	8.2	8.1	8.1	8.1	8.1
12	7.9	8.0	8.1	8.1	8.1	8.0	8.1	8.1
13	7.8	7.9	8.1	8.2	8.1	8.1	8.1	8.1
14	7.9	7.9	8.0	8.1	8.1	8.1	8.1	8.1
15	7.9	7.9	8.1	8.1	8.1	8.1	8.1	8.1
16	8.1	8.0	8.1	8.2	8.2	8.2	8.2	8.3
17	8.0	8.0	7.9	8.0	8.1	8.0	8.1	8.1
	Conductance (µS/cm)							
9	451	473	320	597	705	866	1116	1124
10	470	498	330	575	686	844	1077	1091
11	470	472	322	572	673	827	1056	1071
12	465	467	320	559	679	841	1053	1068
13	452	464	324	562	675	823	1054	1068
14	472	465	332	592	677	810	1040	1053
15	473	462	359	589	679	817	1058	1058
16	482	470	339	582	674	820	1048	1061
17	452	471	356	603	719	868	1114	1128
	Dissolved Oxygen (mg/L) (**40-100% saturation**)							
9	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
10	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
11	7.3	7.1	7.3	7.1	7.1	7.2	7.1	7.1
12	7.2	7.0	6.8	6.6	6.3	6.4	6.4	6.7
13	7.2	7.2	7.3	7.2	7.2	7.3	7.3	7.2
14	7.2	7.2	7.3	7.3	7.3	7.3	7.3	7.2
15	7.3	7.3	7.3	7.3	7.2	7.3	7.2	7.2
16	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
17	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
	Temperature (°C)							
9	24	24	24	24	24	24	24	24
10	24	24	24	24	24	24	24	24
11	24	24	24	24	24	24	24	24
12	24	24	24	24	24	24	24	24
13	24	24	24	24	24	24	24	24
14	24	24	24	24	24	24	24	24
15	24	24	24	24	24	24	24	24
16	24	24	24	24	24	24	24	24
17	24	24	24	24	24	24	24	24

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample 15-1641 Site Control 15-1640

New Solutions

Conc. (%)	Lab CTL	Lab CTL	Site CTL	30	44	67	100A	100B
Day		20 ug/L						
				pH (units)				
18	8.0	8.0	8.2	8.3	8.3	8.1	8.3	8.3
19	7.9	7.9	8.0	8.0	8.0	8.0	8.1	8.1
20	8.0	8.0	8.1	8.1	8.1	8.1	8.1	8.1
21	7.9	8.0	8.1	8.1	8.1	8.1	8.1	8.1
22	8.2	8.1	8.2	8.1	8.1	8.1	8.2	8.2
23	8.1	8.0	8.1	8.1	8.1	8.1	8.1	8.1
24	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1
25	8.1	8.0	8.1	8.1	8.1	8.1	8.1	8.1
26	8.1	8.2	8.2	8.2	8.2	8.1	8.1	8.1
				Conductance (µS/cm)				
18	443	483	320	620	741	933	1191	1191
19	446	480	345	608	738	910	1180	1190
20	472	456	316	602	734	919	1170	1184
21	458	468	314	607	740	926	1181	1198
22	455	452	331	621	745	938	1199	1199
23	473	451	325	577	678	834	1023	1045
24	499	453	334	557	664	801	1013	1027
25	469	475	322	558	665	814	1017	1023
26	462	485	325	566	665	816	1015	1028
				Dissolved Oxygen (mg/L) (**40-100% saturation**)				
18	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
19	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
20	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
21	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
22	7.3	7.3	7.2	7.3	7.2	7.2	7.2	7.2
23	7.6	7.5	7.4	7.4	7.4	7.4	7.4	7.4
24	7.6	7.5	7.5	7.5	7.6	7.5	7.6	7.5
25	7.4	7.4	7.4	7.5	7.4	7.4	7.4	7.3
26	7.3	7.3	7.2	7.2	7.1	7.2	7.2	7.2
				Temperature (°C)				
18	24	24	24	24	24	24	24	24
19	24	24	24	24	24	24	24	24
20	24	24	24	24	24	24	24	24
21	24	24	24	24	24	24	24	24
22	24	24	25	25	25	25	25	25
23	22	24	24	24	24	23	23	23
24	24	24	24	24	24	24	24	24
25	24	24	24	24	24	24	24	24
26	24	24	25	25	25	25	25	25

Old Solutions

	Lab CTL	Lab CTL	Site CTL	30	44	67	100A	100B
		20 ug/L						
				pH (units)				
18	8.0	8.1	7.7	8.2	8.2	8.1	8.2	8.2
19	7.8	7.8	7.8	8.0	8.1	8.0	8.2	8.1
20	8.0	7.9	8.0	8.0	8.1	8.1	8.2	8.2
21	7.9	8.0	8.1	8.1	8.1	8.1	8.2	8.2
22	8.0	7.9	8.1	7.9	8.2	7.9	8.1	8.1
23	8.0	8.0	7.8	8.2	8.2	8.1	8.2	8.2
24	8.0	8.0	8.1	8.0	8.2	8.2	8.2	8.1
25	7.9	8.0	8.2	8.2	8.2	8.1	8.1	8.1
26	8.0	8.0	8.1	8.0	8.2	7.9	8.1	8.1
				Conductance (µS/cm)				
18	456	474	333	607	721	903	1141	1143
19	451	485	331	615	734	910	1181	1183
20	450	469	367	618	738	926	1172	1192
21	480	473	340	612	740	921	1184	1188
22	467	473	326	600	746	944	1181	1195
23	463	463	340	628	750	940	1204	1196
24	470	472	329	496	702	861	1119	1074
25	495	471	329	473	670	828	1048	1037
26	487	479	322	460	669	813	1011	1010
				Dissolved Oxygen (mg/L) (**40-100% saturation**)				
18	7.3	7.3	6.0	6.9	7.0	7.1	7.2	7.2
19	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
20	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
21	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
22	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
23	7.3	7.3	5.8	7.2	7.2	7.2	7.2	7.3
24	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
25	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
26	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
				Temperature (°C)				
18	24	24	24	24	24	24	24	24
19	24	24	24	24	24	24	24	24
20	24	24	24	24	24	24	24	24
21	24	24	24	24	24	24	24	24
22	24	24	24	24	24	24	24	24
23	24	24	24	24	24	23	23	23
24	24	24	24	24	24	24	24	24
25	24	24	24	24	24	24	24	24
26	24	24	24	24	24	24	24	24

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments: Day 23, 24, 25 DO higher, most likely due to the lower temperature, as well as from being taken from the chem cup rather than the jar

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample 15-1641
Site Control 15-1640

New Solutions

Conc. (%) / Day	Lab CTL	Lab CTL 20 ug/L	Site CTL	30	44	67	100A	100B
pH (units)								
27	7.9	8.0	8.1	8.1	8.1	8.1	8.0	8.0
28	8.1	8.1	8..2	8.1	8.2	8.1	8.1	8.1
29	7.9	7.9	8.1	8.1	8.1	8.0	8.0	8.0
30	7.9	7.9	8.0	8.1	8.0	7.9	7.9	7.9
31	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
32								
Conductance (µS/cm)								
27	440	455	330	556	661	709	1006	1023
28	437	458	321	560	660	811	1008	1119
29	427	451	314	535	637	778	980	987
30	421	451	311	539	640	785	992	990
31	434	457	312	539	636	781	987	992
32								
Dissolved Oxygen (mg/L) (40-100% saturation)								
27	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
28	7.2	7.3	7.2	7.2	7.2	7.2	7.2	7.2
29	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
30	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
31	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
32								
Temperature (°C)								
27	24	24	24	24	24	24	24	24
28	25	24	25	25	25	25	25	25
29	24	24	24	24	24	24	24	24
30	24	24	24	24	24	24	24	24
31	24	24	24	24	24	24	24	24
32								

Old Solutions

Day	Lab CTL	Lab CTL 20 ug/L	Site CTL	30	44	67	100A	100B
pH (units)								
27	7.9	7.9	8.2	8.2	8.2	8.1	8.0	8.1
28	8.0	8.0	8.2	8.2	8.1	8.1	8.1	8.1
29	7.9	7.9	8.1	8.0	8.1	8.0	8.1	8.0
30	7.9	7.9	8.1	7.9	8.0	8.0	8.0	8.0
31	8.0	8.0	8.2	7.9	8.1	8.0	8.0	7.9
32	8.0	8.0	8.1	7.9	8.0	8.0	8.0	8.0
Conductance (µS/cm)								
27	477	481	348	565	657	796	984	1007
28	483	490	331	550	657	783	988	989
29	464	465	319	545	627	758	944	960
30	452	457	336	552	612	750	936	945
31	440	454	323	546	645	758	949	986
32	450	467	325	550	630	760	940	970
Dissolved Oxygen (mg/L) (40-100% saturation)								
27	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
28	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
29	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
30	7.3	7.1	7.3	7.3	7.3	7.3	7.3	7.3
31	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
32	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
Temperature (°C)								
27	24	24	24	24	24	24	24	24
28	24	24	24	24	24	24	24	24
29	24	24	24	24	24	24	24	24
30	24	24	24	24	24	24	24	24
31	24	24	24	24	24	24	24	24
32	24	24	24	24	24	24	24	24

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1641 Site Control: 15-1640

Test Termination

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc.

Lab CTL

Replicate A			Replicate B			Replicate C			Replicate D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	8	Normal	1	7	Normal	1	8	Normal	1	9	Normal
2	8	Normal	2	9	Normal	2	8	Normal	2	7	Normal
3	10	Normal	3	9	Normal	3	8	Normal	3	8	Normal
4	9	Normal	4	8	Normal	4	8	Normal	4	8	Normal
5	8	Normal	5	7	Normal	5	7	Normal	5	9	Normal
6	9	Normal	6	9	Normal	6	6	Normal	6	11	Normal
7	9	Normal	7	9	Normal	7	7	Normal	7	8	Normal
8	10	Normal	8	9	Normal	8	7	Normal	8	6	Normal
9	8	Normal	9	8	Normal	9	7	Normal	9	7	Normal
10	9	Normal	10	8	Normal	10	8	Normal	10	9	Normal
11	7	Normal	11	7	Normal	11	10	Normal	11	9	Normal
12	7	Normal	12	8	Normal	12	6	Normal	12	7	Normal
13	7	Normal	13	6	Normal	13	7	Normal	13	10	Normal
14	-	-	14	-	-	14	9	Normal	14	-	-
15	-	-	15	-	-	15	-	-	15	-	-

Comments

Lab CTL 20 ug/L

Replicate A			Replicate B			Replicate C			Replicate D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	6	Normal	1	9	Normal	1	8	Abnormal F	1	8	Normal
2	6	Normal	2	8	Normal	2	8	Normal	2	10	Normal
3	7	Normal	3	9	Normal	3	9	Normal	3	4	Normal
4	10	Normal	4	8	Normal	4	11	Normal	4	6	Normal
5	10	Normal	5	9	Normal	5	11	Normal	5	11	Normal
6	10	Normal	6	7	Normal	6	8	Normal	6	9	Normal
7	11	Normal	7	11	Normal	7	9	Normal	7	9	Normal
8	-	-	8	8	Normal	8	9	Normal	8	11	Normal
9	-	-	9	10	Normal	9	11	Normal	9	10	Normal
10	-	-	10	10	Normal	10	10	Normal	10	10	Normal
11	-	-	11	10	Normal	11	6	Normal	11	10	Normal
12	-	-	12	-	-	12	7	Normal	12	7	Normal
13	-	-	13	-	-	13	11	Normal	13	9	Normal
14	-	-	14	-	-	14	-	-	14	-	-
15	-	-	15	-	-	15	-	-	15	-	-

Comments

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1641 Site Control: 15-1640

Test Termination

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc.
SITE CTL

Replicate A			Replicate B			Replicate C			Replicate D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	9	Normal	1	7	Normal	1	6	Abnormal F	1	8	Normal
2	9	Normal	2	8	Normal	2	6	Abnormal S	2	9	Normal
3	12	Normal	3	8	Normal	3	7	Normal	3	8	Normal
4	10	Normal	4	9	Normal	4	10	Normal	4	8	Normal
5	9	Normal	5	10	Normal	5	10	Normal	5	7	Normal
6	9	Normal	6	10	Normal	6	8	Normal	6	11	Normal
7	7	Normal	7	8	Normal	7	10	Normal	7	7	Normal
8	9	Normal	8	10	Normal	8	8	Normal	8	10	Normal
9	11	Normal	9	7	Normal	9	9	Normal	9	9	Normal
10	8	Normal	10	9	Normal	10	8	Normal	10	10	Normal
11	-	-	11	9	Normal	11	9	Normal	11	9	Normal
12	-	-	12	8	Normal	12	7	Normal	12	-	-
13	-	-	13	8	Normal	13	10	Normal	13	-	-
14	-	-	14	-	-	14	-	-	14	-	-
15	-	-	15	-	-	15	-	-	15	-	-

Comments

30%

Replicate A			Replicate B			Replicate C			Replicate D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	8	Normal	1	10	Normal	1	11	Normal	1	9	Normal
2	8	Normal	2	10	Normal	2	9	Normal	2	9	Normal
3	9	Normal	3	10	Normal	3	8	Normal	3	10	Normal
4	8	Normal	4	9	Normal	4	10	Normal	4	9	Normal
5	10	Normal	5	12	Normal	5	9	Normal	5	8	Normal
6	10	Normal	6	10	Normal	6	9	Normal	6	8	Normal
7	10	Normal	7	9	Normal	7	10	Normal	7	12	Normal
8	8	Normal	8	9	Normal	8	11	Normal	8	8	Normal
9	9	Normal	9	9	Normal	9	11	Normal	9	8	Normal
10	9	Normal	10	9	Normal	10	-	-	10	10	Normal
11	9	Normal	11	9	Normal	11	-	-	11	8	Normal
12	11	Normal	12	10	Normal	12	-	-	12	9	Normal
13	10	Normal	13	-	-	13	-	-	13	8	Normal
14	10	Normal	14	-	-	14	-	-	14	-	-
15	10	Normal	15	-	-	15	-	-	15	-	-

Comments

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1641 Site Control: 15-1640

Test Termination

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. **44%**

Replicate A			Replicate B			Replicate C			Replicate D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	8	Normal	1	8	Normal	1	7	Normal	1	10	Normal
2	10	Normal	2	7	Normal	2	8	Normal	2	5	Normal
3	11	Normal	3	9	Normal	3	9	Normal	3	8	Normal
4	8	Normal	4	8	Normal	4	8	Normal	4	7	Normal
5	8	Normal	5	9	Normal	5	8	Normal	5	7	Normal
6	9	Normal	6	10	Normal	6	8	Normal	6	9	Normal
7	7	Normal	7	8	Normal	7	9	Normal	7	10	Normal
8	8	Normal	8	8	Normal	8	9	Normal	8	8	Normal
9	8	Normal	9	8	Normal	9	7	Normal	9	6	Normal
10	8	Normal	10	8	Normal	10	9	Normal	10	10	Normal
11	9	Normal	11	9	Normal	11	8	Normal	11	9	Normal
12	9	Normal	12	9	Normal	12	8	Normal	12	9	Normal
13	8	Normal	13	8	Normal	13	8	Normal	13	9	Normal
14	9	Normal	14	-	-	14	8	Normal	14	-	-
15	-	-	15	-	-	15	-	-	15	-	-

Comments

67%A

Replicate A			Replicate B			Replicate C			Replicate D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	9	Normal	1	8	Normal	1	8	Normal	1	9	Normal
2	10	Normal	2	9	Normal	2	9	Normal	2	9	Normal
3	9	Normal	3	9	Normal	3	9	Normal	3	9	Normal
4	8	Normal	4	9	Normal	4	8	Normal	4	9	Normal
5	8	Normal	5	8	Normal	5	9	Normal	5	7	Normal
6	11	Normal	6	9	Normal	6	9	Normal	6	7	Normal
7	9	Normal	7	8	Normal	7	8	Normal	7	9	Normal
8	8	Normal	8	9	Normal	8	9	Normal	8	7	Normal
9	9	Normal	9	9	Normal	9	9	Normal	9	7	Normal
10	9	Normal	10	7	Normal	10	8	Normal	10	8	Normal
11	9	Normal	11	8	Normal	11	9	Normal	11	9	Normal
12	9	Normal	12	10	Normal	12	9	Normal	12	9	Normal
13	9	Normal	13	10	Normal	13	8	Normal	13	9	Normal
14	-	-	14	9	Normal	14	-	-	14	9	Normal
15	-	-	15	8	Normal	15	-	-	15	9	Normal

Comments

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1641 Site Control: 15-1640

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. **100%A**

Replicate A			Replicate B			Replicate C			Replicate D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	8	Normal	1	9	Normal	1	9	Normal	1	8	Normal
2	9	Normal	2	9	Normal	2	9	Normal	2	9	Normal
3	10	Normal	3	8	Normal	3	7	Normal	3	9	Normal
4	9	Normal	4	10	Normal	4	8	Normal	4	9	Normal
5	10	Normal	5	9	Normal	5	9	Normal	5	9	Normal
6	11	Normal	6	6	Normal	6	10	Normal	6	10	Normal
7	8	Normal	7	7	Normal	7	8	Normal	7	7	Normal
8	10	Normal	8	8	Normal	8	8	Normal	8	7	Normal
9	9	Normal	9	9	Normal	9	8	Normal	9	9	Normal
10	10	Normal	10	10	Normal	10	7	Normal	10	9	Normal
11	-	-	11	8	Normal	11	7	Normal	11	9	Normal
12	-	-	12	10	Normal	12	9	Normal	12	7	Normal
13	-	-	13	8	Normal	13	9	Normal	13	9	Normal
14	-	-	14	8	Normal	14	8	Normal	14	7	Normal
15	-	-	15	8	Normal	15	8	Normal	15	-	-

Comments

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. **100%B**

Replicate A			Replicate B			Replicate C			Replicate D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	8	Normal	1	9	Normal	1	9	Normal	1	11	Normal
2	11	Normal	2	10	Normal	2	9	Normal	2	10	Normal
3	10	Normal	3	8	Normal	3	10	Normal	3	8	Normal
4	8	Normal	4	10	Normal	4	9	Normal	4	8	Normal
5	8	Normal	5	10	Normal	5	9	Normal	5	10	Normal
6	9	Normal	6	7	Normal	6	10	Normal	6	10	Normal
7	8	Normal	7	7	Normal	7	10	Normal	7	10	Normal
8	10	Normal	8	8	Normal	8	9	Normal	8	9	Normal
9	11	Normal	9	9	Normal	9	10	Normal	9	10	Normal
10	10	Normal	10	9	Normal	10	8	Normal	10	7	Normal
11	9	Normal	11	9	Normal	11	11	Normal	11	-	-
12	11	Normal	12	10	Normal	12	8	Normal	12	-	-
13	8	Normal	13	9	Normal	13	8	Normal	13	-	-
14	-	-	14	10	Normal	14	7	Normal	14	-	-
15	-	-	15	-	-	15	-	-	15	-	-

Comments

Nautilus Environmental
Quality Management System

Organism Weights Bench Sheet

Client NAU104 Sample 15-1641 Organism FM
Site Control 15-1640

Initial Weight (mg) (dried pan)

Conc.	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B	
Replicate									
a	965.89	985.23	955.63	989.91	984.47	932.81	939.52	934.10	
b	975.93	1057.54	1006.06	973.71	1001.45	947.50	1016.34	921.68	
c	964.63	1031.91	988.71	992.05	938.79	935.97	1005.95	934.03	
d	996.14	1021.01	1000.17	1020.55	939.62	941.12	986.85	946.87	
e									

Final Weight (mg) (dried pan+organisms)

Conc.	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B	
Replicate									
a	980.07	996.18	972.78	1007.23	1000.01	949.32	958.23	952.09	
b	989.89	1073.09	1022.38	989.86	1016.28	963.28	1032.19	939.65	
c	978.12	1048.66	1004.19	1007.76	953.96	952.17	1022.52	950.61	
d	1008.76	1038.03	1014.73	1031.98	952.6	957.32	1003.67	963.37	
e									

Nautilus Environmental
Quality Management System

Organism Weights Bench Sheet

Client NAU104 Sample 15-1641 Organism FM
Site Control 15-1640

Organism weight per replicate (mg)

Dose	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
replicate								
a	14.18	10.95	17.15	17.32	15.54	16.51	18.71	17.99
b	13.96	15.55	16.32	16.15	14.83	15.78	15.85	17.97
c	13.49	16.75	15.48	15.71	15.17	16.2	16.57	16.58
d	12.62	17.02	14.56	11.43	12.98	16.2	16.82	16.5
e								

Dry Weight per Fish (mg)

Dose	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
replicate								
a	1.09	1.56	1.72	1.15	1.11	1.27	1.87	1.38
b	1.07	1.41	1.26	1.35	1.14	1.05	1.06	1.28
c	0.96	1.29	1.19	1.75	1.08	1.25	1.10	1.18
d	0.97	1.31	1.32	0.88	1.00	1.08	1.20	1.65
Average	1.02	1.39	1.37	1.28	1.08	1.16	1.31	1.38

Nautilus Environmental

32 Day Fathead Minnow Data Summary

Method FMD 32 Day ELS Client NAU104 Reference: 15-1640
15-1641

Concentration: LAB CTL

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	93%	93%	87%	8	1.09	0%
b	100%	87%	87%	8	1.07	0%
c	100%	93%	93%	8	0.96	0%
d	93%	93%	87%	8	0.97	0%
Average	**97%**	**91%**	**88%**	**8**	**1.02**	**0%**

Concentration: LAB CTL 20 ug/L

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	93%	50%	47%	9	1.56	0%
b	100%	73%	73%	9	1.41	0%
c	100%	87%	87%	9	1.29	8%
d	100%	87%	87%	9	1.31	0%
Average	**98%**	**74%**	**73%**	**9**	**1.39**	**2%**

Concentration: SITE CTL

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	87%	77%	67%	9	1.72	0%
b	100%	87%	87%	9	1.26	0%
c	100%	87%	87%	8	1.19	15%
d	100%	73%	73%	9	1.32	0%
Average	**97%**	**81%**	**78%**	**9**	**1.37**	**4%**

Concentration: 30%

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	100%	100%	100%	9	1.15	0%
b	100%	80%	80%	10	1.35	0%
c	100%	60%	60%	10	1.75	0%
d	93%	93%	87%	9	0.88	0%
Average	**98%**	**83%**	**82%**	**9**	**1.28**	**0%**

Nautilus Environmental

32 Day Fathead Minnow Data Summary

Concentration: 44%

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	100%	93%	93%	9	1.11	0%
b	100%	87%	87%	8	1.14	0%
c	100%	93%	93%	8	1.08	0%
d	93%	93%	87%	8	1.00	0%
Average	**98%**	**92%**	**90%**	**8**	**1.08**	**0%**

Concentration: 67%

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	100%	87%	87%	9	1.27	0%
b	100%	100%	100%	9	1.05	0%
c	100%	87%	87%	9	1.25	0%
d	100%	100%	100%	8	1.08	0%
Average	**100%**	**93%**	**93%**	**9**	**1.16**	**0%**

Concentration: 100A%

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	93%	71%	67%	9	1.87	0%
b	100%	100%	100%	9	1.06	0%
c	100%	100%	100%	8	1.10	0%
d	100%	93%	93%	8	1.20	0%
Average	**98%**	**91%**	**90%**	**9**	**1.31**	**0%**

Concentration: 100B%

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	100%	87%	87%	9	1.38	0%
b	100%	93%	93%	9	1.28	0%
c	100%	93%	93%	9	1.18	0%
d	100%	67%	67%	9	1.65	0%
Average	**100%**	**85%**	**85%**	**9**	**1.38**	**0%**

Nautilus Environmental

Warning Chart
Fathead minnow

Test Method: 7 days Fathead minnow Survival and Growth Test (7 treatments plus a control)
Test Method: WTR-ME-046

Reference: Biological Test Method: Test of Larval Growth and Survival Using Fathead minnows. Environment Canada, EPS 1/RM/22, Second Edition, February 2011.

Test Organism:

test species:	*Pimephales promelas*
culture source:	Aquatox (Arkansas, USA)
temp of breeding aquaria:	23 - 26 ^{o}C
food type:	newly-hatched brine shrimp nauplii
frequency of feeding:	daily
breeding colony mortality:	<1% (last 7 days)
age of test organisms:	<24 hours
condition prior to test initiation:	normal
batch number:	20151207FMELS

Test Design:

test type:	static renewal
toxicant:	sodium chloride
test vessel:	polypropylene cups, 11 x 9 cm
volume of test vessel (ml):	500
test volume (ml):	250
depth of test solution:	>3 cm
replicates per treatment:	3 replicates
organisms per replicate:	10
feeding:	twice daily
temperature (^{o}C):	24-26
photoperiod:	16 hours light: 8 hours dark
light level (surface):	100-500 lux (full spectrum)

Control/Dilution Water:

source:	dechlorinated City of Calgary tap water no chemicals were added to the dilution water
pH (units):	7.0
conductance (µS/cm):	447
dissolved oxygen (mg/L):	9.5
NH_4^+ (mg/L):	<0.1
hardness (mg $CaCO_3$/L):	218
alkalinity (mg $CaCO_3$/L):	136
total residual chlorine (mg/L):	<0.01

Comments: None

The test data and results are authorized and verified correct.

Jacklyn Poole

Senior Verifier

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results in part or in whole.

Nautilus Environmental (Calgary), #4, 6125 12th Street SE, Calgary, Alberta, Canada T2H 2K1
Tel (403) 253-7121 Fax (403) 252-9363 www.nautilusenvironmental.ca

Warning Chart
Fathead minnow

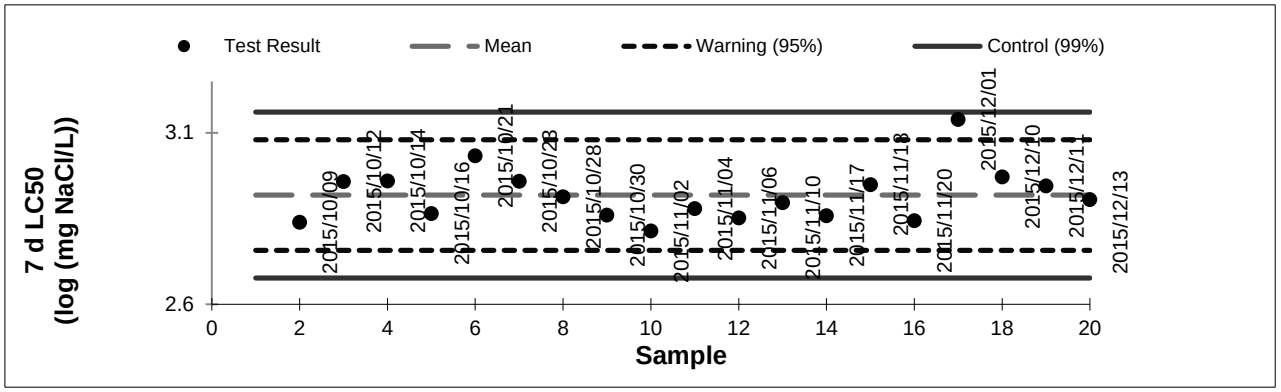
Mortality

Current Test

toxicant	Sodium Chloride (NaCl)				
started on	2015/12/13	ended on	2015/12/20		
Result (7 d LC50):	2.91	log (mg NaCl/L); geometric mean			
Confidence Limits (95%)	lower	2.83	upper	2.98	

Historical Values

mean	2.92	sd	0.08	cv(%):	12.3
	lower	upper			
warning limits (±2 sd)	2.76	3.08	(95% confidence limits)		
control limits (±3 sd)	2.68	3.16	(99% confidence limits)		

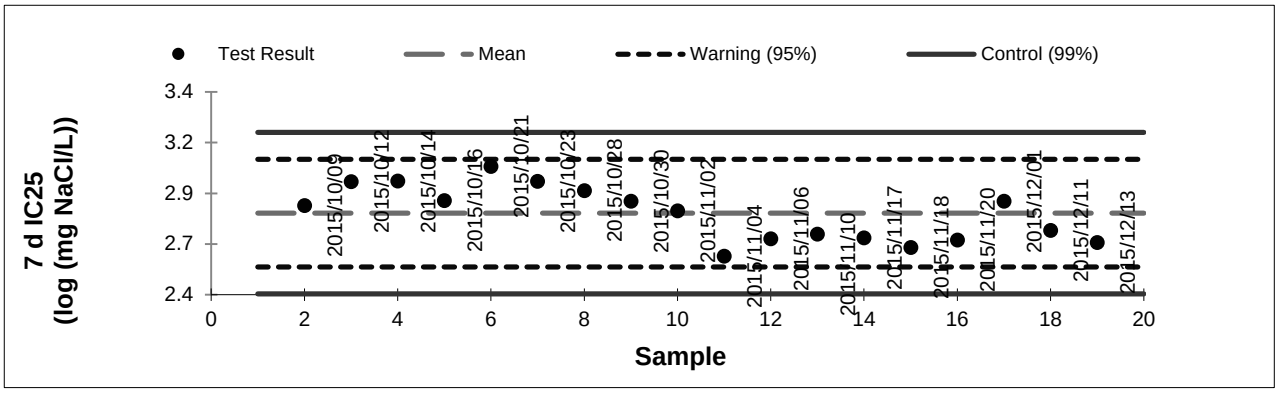


Biomass

started on	2015/12/13	ended on	2015/12/20		
Result (7 d IC25):	2.66	log (mg NaCl/L); geometric mean			
Confidence Limits (95%)	lower	2.31	upper	2.77	

Historical Values

mean	2.80	sd	0.13	cv(%):	20.3
	lower	upper			
warning limits (±2 sd)	2.54	3.07	(95% confidence limits)		
control limits (±3 sd)	2.40	3.20	(99% confidence limits)		



notes: sd, standard deviation; cv, coefficient of variance; N/A, could not be calculated

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results in part or in whole.

Nautilus Environmental (Calgary), #4, 6125 12th Street SE, Calgary, Alberta, Canada T2H 2K1
Tel (403) 253-7121 Fax (403) 252-9363 www.nautilusenvironmental.ca

GENERAL TERMS AND CONDITIONS:

These terms and conditions are incorporated into and form part of the Chain of Custody between HydroQual Laboratories Ltd. ("HydroQual") and the party named in the Chain of Custody (the "Client").

1. **Definitions:** Capitalized terms shall have the definition ascribed as such in these General Terms and Conditions and the Chain of Custody.
2. **The Services:** HydroQual will provide the Services to the Client as listed and described in the Chain of Custody.
3. **Prices:** HydroQual may review and change all prices, fees, surcharges or other charges as set out in proposals and/or price quotations if there are changes to HydroQual's cost beyond HydroQual's control, including changes in legislative requirements, Client variations of sample numbers and Client requests for changes to standard reporting requirements. Notwithstanding condition 3, all quotations are reviewed and updated on a yearly basis.
4. **Payment Terms:** The Client shall pay HydroQual within 30 days of the invoice date as provided by HydroQual. HydroQual may, for reasonable business reasons, require the Client to arrange for payment in advance.
5. **Quotation Numbers:** The Client shall provide the proposal and/or price quotation number to HydroQual (where applicable) to ensure correct pricing.
6. **Taxes:** Applicable taxes are not included in prices, surcharges and additional fees and will be added at the time of invoicing.
7. **No Guarantee of Results:** The Client is responsible for informing itself on the limitation of the results and acknowledges that the results are not guaranteed.
8. **Standard of Care:** HydroQual will use reasonable care and diligence as required by the laws of the province or territory where the sample is tested, subject to that level of care and skill ordinarily exercised by other laboratories currently practicing under similar conditions in the same locality, subject to the time limits and financial, physical or other constraints applicable to the Services. No warranty, express or implied, is made.
9. **Storage:** Where possible, HydroQual will store samples until a final report is issued to the Client, after which time HydroQual may discard the sample.
10. **Holds:** If the Client requests a sample be placed on hold, HydroQual will store the sample for the mutually agreed upon written time and price, after which HydroQual will invoice the Client and discard the sample.
11. **Archives:** If the Client requests a sample be archived, HydroQual will store the sample for a mutually agreed upon written time frame and price, after which HydroQual will invoice the Client and discard the sample.
12. **Handling Protocol:** Legal sample handling protocol must be arranged, and provided in writing, before samples are collected. HydroQual will provide a price quotation for legal sample protocol. Samples processed under legal protocol are stored indefinitely, subject to a storage charge as advised by HydroQual.
13. **Samples:** The quality, condition, content and source of samples stored and tested are not known to HydroQual except as declared and described on the Chain of Custody completed and submitted by the Client and accompanying the sample.
14. **Risk of Loss:** HydroQual will use reasonable care to protect samples during storage, however, all samples are stored at the Client's risk and the Client is responsible for obtaining appropriate insurance, if desired. The Client acknowledges that during the performance of the Services samples may be altered, lost, damaged or destroyed and the client forever releases HydroQual from any and all claims the Client may have for any loss or damage to the sample.
15. **Environmental:** the Client must comply with all applicable environmental legislation, including labeling all hazardous samples to comply with Canada's *Workplace Hazardous Materials Information System* and the Alberta *Transfer of Dangerous Goods* regulations, and must provide appropriate material safety data sheets that include the nature of the hazard and a contact name and phone number to call for information. The Client shall defend, indemnify and hold harmless HydroQual for all loss or damages, including any fine or cost of complying with an order of any government authority, resulting from the Client's breach of this paragraph.
16. **Hazardous Materials Disposal:** HydroQual may return, at the Client's cost, hazardous material to the Client for disposal.
17. **Hazardous Materials Surcharge:** HydroQual may apply an additional surcharge for handling of hazardous samples or samples with Naturally Occurring Radioactive Materials ("NORM"), such as and including without limitation, H_2S and CN.
18. **Sample Containers:** HydroQual may ship sample containers to the Client's location by the most cost effective means using HydroQual's preferred courier suppliers, within the specified project timeline. Shipping will be charged back to the Client.
19. **Additional Charges:** HydroQual may charge the Client:
    (a) for pick-up and delivery services when provided subject in each instance to a minimum charge of $50.00; and,
    (b) for rush service (processing samples and/or reporting).
20. **Large Bottle Orders:** The Client shall provide HydroQual with not less than 24 hours' notice for large bottle orders.
21. **Re-Tests:** HydroQual reserves the right to re-test any samples that remain in HydroQual's possession. Re-tests requested by the Client may be charged to Client and Client agrees to pay for such charges.
22. **Waiver:** The Client is responsible for making any assessment regarding the suitability of the Services and the intended results for the Client's purposes and waives any and all claims against HydroQual that the Client may have against HydroQual as a result of the interpretation of the results provided to the Client. The Client shall defend, indemnify and save harmless HydroQual for any and all claims made by any third party against HydroQual in respect of all losses however arising from the performance of the Services or the use of any report provided in the performance of the Services.
23. **LIMITATION OF LIABILITY:** IN NO EVENT SHALL HYDROQUAL BE RESPONSIBLE FOR ANY CONSEQUENTIAL, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY OR PUNITIVE DAMAGES, WHETHER FORESEEABLE OR UNFORESEEABLE (INCLUDING CLAIMS FOR LOSS OF PROFITS OR REVENUE OR LOSSES CAUSED BY STOPPAGE OF OTHER WORK OR IMPAIRMENT OF OTHER ASSETS) INCURRED BY THE CLIENT ARISING OUT OF BREACH OR FAILURE OF EXPRESS OF IMPLIED WARRANTY, BREACH OF CONTRACT, BREACH OF WARRANTY, MISREPRESENTATION, NEGLIGENCE, STRICT LIABILITY IN TORT OR OTHERWISE. IN ANY EVENT, THE LIABILITY OF HYDROQUAL TO THE CLIENT SHALL BE LIMITED TO THE COST OF TESTING THE SAMPLE AS REQUESTED IN THE CHAIN OF CUSTODY UNDER WHICH THE SAMPLE WAS ORIGINALLY DEPOSITED. FOR THE PURPOSES OF THIS PARAGRAPH AND PARAGRAPHS 7, 14, 15, 22, AND 24, AS APPLICABLE, "HYDROQUAL" INCLUDES WITHOUT LIMITATIONS ITS DIRECTORS, OFFICERS, EMPLOYEES AND AFFILIATES AND THE "CLIENT" INCLUDES WITHOUT LIMITATION ANY THIRD PARTY THAT MAY HAVE A CLAIM AGAINST HYDROQUAL THROUGH THE CLIENT.
24. **Notice of Liability:** Notwithstanding paragraph 23, HydroQual shall not be liable to the Client unless the Client provides notice in writing to HydroQual of such loss or damage, together with full particulars thereof, within 30 days of the Client's receipt of the report of the analysis of the sample giving rise to such liability. The provisions of this paragraph allocate the risk between the Client and HydroQual, and the fees to be paid by the Client to HydroQual reflect this allocation of any such risks and the limitations of liability in these General Terms and Conditions.
25. **Entire Agreement:** These General Terms and Conditions, the Chain of Custody and price quotations constitute the entire agreement between the parties and supersede and take precedence over any terms and conditions contained in any documentation provided by the Client. HydroQual's execution of any subsequent documentation from the Client only acknowledges receipt and not acceptance of any terms or conditions therein unless expressly stipulated otherwise by HydroQual. If there is a conflict between these General Terms and Conditions and any other document, these General Terms and Conditions prevail.

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Batch ID:	14-9164-8459	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 Dec-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	GH_ER2
Ending Date:	09 Jan-16	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	7d 15h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
07-5688-4050	Hatched Rate	0	>0		NA		Fisher Exact Test
11-0820-5489	Length-mm	0	>0		8.52%		Equal Variance t Two-Sample Test
13-0525-5060	Mean Dry Biomass-mg	0	>0		9.38%		Equal Variance t Two-Sample Test
19-6368-7794	Proportion Normal	0	>0		NA		Fisher Exact Test
07-7485-7106	Survival Rate	0	>0		NA		Fisher Exact Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
05-7789-9551	Hatched Rate	EC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC10	>100	N/A	N/A	<1	
		EC15	>100	N/A	N/A	<1	
		EC20	>100	N/A	N/A	<1	
		EC25	>100	N/A	N/A	<1	
		EC40	>100	N/A	N/A	<1	
		EC50	>100	N/A	N/A	<1	
19-9633-0359	Length-mm	IC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		IC10	>100	N/A	N/A	<1	
		IC15	>100	N/A	N/A	<1	
		IC20	>100	N/A	N/A	<1	
		IC25	>100	N/A	N/A	<1	
		IC40	>100	N/A	N/A	<1	
		IC50	>100	N/A	N/A	<1	
21-3619-4414	Mean Dry Biomass-mg	IC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		IC10	>100	N/A	N/A	<1	
		IC15	>100	N/A	N/A	<1	
		IC20	>100	N/A	N/A	<1	
		IC25	>100	N/A	N/A	<1	
		IC40	>100	N/A	N/A	<1	
		IC50	>100	N/A	N/A	<1	
10-5018-5589	Proportion Normal	EC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC10	>100	N/A	N/A	<1	
		EC15	>100	N/A	N/A	<1	
		EC20	>100	N/A	N/A	<1	
		EC25	>100	N/A	N/A	<1	
		EC40	>100	N/A	N/A	<1	
		EC50	>100	N/A	N/A	<1	
18-9927-5080	Survival Rate	EC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC10	>100	N/A	N/A	<1	
		EC15	>100	N/A	N/A	<1	
		EC20	>100	N/A	N/A	<1	
		EC25	>100	N/A	N/A	<1	
		EC40	>100	N/A	N/A	<1	
		EC50	>100	N/A	N/A	<1	

Hatched Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.9667	0.8606	1	0.8667	1	0.03333	0.06667	6.9%	0.0%
0	Lab Water	4	0.9833	0.9303	1	0.9333	1	0.01667	0.03333	3.39%	-1.72%
0	Negative Control	4	0.9667	0.9054	1	0.9333	1	0.01925	0.03849	3.98%	0.0%
30		4	0.9833	0.9303	1	0.9333	1	0.01667	0.03333	3.39%	-1.72%
44		4	0.9833	0.9303	1	0.9333	1	0.01667	0.03333	3.39%	-1.72%
67		4	1	1	1	1	1	0	0	0.0%	-3.45%
100		8	0.9917	0.972	1	0.9333	1	0.008333	0.02357	2.38%	-2.59%

Length-mm Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	8.72	8.047	9.393	8.31	9.3	0.2115	0.4231	4.85%	0.0%
0	Lab Water	4	8.855	8.487	9.223	8.57	9.08	0.1155	0.231	2.61%	-1.55%
0	Negative Control	4	8.065	7.478	8.652	7.57	8.38	0.1845	0.369	4.58%	7.51%
30		4	9.425	8.777	10.07	8.92	9.78	0.2037	0.4075	4.32%	-8.09%
44		4	8.33	8.031	8.629	8.14	8.57	0.09407	0.1881	2.26%	4.47%
67		4	8.672	8.278	9.067	8.4	9	0.1239	0.2478	2.86%	0.54%
100		8	8.898	8.522	9.273	8.27	9.4	0.1587	0.4489	5.05%	-2.04%

Mean Dry Biomass-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	1.059	0.9405	1.176	0.9707	1.143	0.03706	0.07413	7.0%	0.0%
0	Lab Water	4	1.004	0.7055	1.303	0.73	1.135	0.09395	0.1879	18.7%	5.1%
0	Negative Control	4	0.9042	0.8309	0.9775	0.8413	0.9453	0.02304	0.04607	5.1%	14.58%
30		4	1.01	0.7372	1.283	0.762	1.155	0.08577	0.1715	16.98%	4.57%
44		4	0.9753	0.8547	1.096	0.8653	1.036	0.03792	0.07584	7.78%	7.86%
67		4	1.078	1.046	1.11	1.052	1.101	0.00999	0.01998	1.85%	-1.86%
100		8	1.142	1.087	1.196	1.057	1.247	0.02304	0.06517	5.71%	-7.85%

Proportion Normal Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.9615	0.8391	1	0.8462	1	0.03846	0.07692	8.0%	0.0%
0	Lab Water	4	0.9808	0.9196	1	0.9231	1	0.01923	0.03846	3.92%	-2.0%
0	Negative Control	4	1	1	1	1	1	0	0	0.0%	-4.0%
30		4	1	1	1	1	1	0	0	0.0%	-4.0%
44		4	1	1	1	1	1	0	0	0.0%	-4.0%
67		4	1	1	1	1	1	0	0	0.0%	-4.0%
100		8	1	1	1	1	1	0	0	0.0%	-4.0%

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.7833	0.6242	0.9425	0.6667	0.8667	0.05	0.1	12.77%	0.0%
0	Lab Water	4	0.7333	0.4333	1	0.4667	0.8667	0.09428	0.1886	25.71%	6.38%
0	Negative Control	4	0.8833	0.8303	0.9364	0.8667	0.9333	0.01667	0.03333	3.77%	-12.77%
30		4	0.8167	0.5515	1	0.6	1	0.08333	0.1667	20.41%	-4.26%
44		4	0.9	0.8388	0.9612	0.8667	0.9333	0.01925	0.03849	4.28%	-14.89%
67		4	0.9333	0.8108	1	0.8667	1	0.03849	0.07698	8.25%	-19.15%
100		8	0.875	0.7618	0.9882	0.6667	1	0.04787	0.1354	15.47%	-11.7%

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Hatched Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	0.8667	1	1	1				
0	Lab Water	0.9333	1	1	1				
0	Negative Control	0.9333	1	1	0.9333				
30		1	1	1	0.9333				
44		1	1	1	0.9333				
67		1	1	1	1				
100		0.9333	1	1	1	1	1	1	1

Length-mm Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	9.3	8.54	8.31	8.73				
0	Lab Water	8.57	9	9.08	8.77				
0	Negative Control	8.38	8	7.57	8.31				
30		9.27	9.73	9.78	8.92				
44		8.57	8.38	8.14	8.23				
67		9	8.67	8.62	8.4				
100		9.4	8.47	8.27	8.43	9.31	8.93	9.07	9.3

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	1.143	1.088	1.032	0.9707				
0	Lab Water	0.73	1.037	1.117	1.135				
0	Negative Control	0.9453	0.9307	0.8993	0.8413				
30		1.155	1.077	1.047	0.762				
44		1.036	0.9887	1.011	0.8653				
67		1.101	1.052	1.08	1.08				
100		1.247	1.057	1.105	1.121	1.199	1.198	1.105	1.1

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	1	1	0.8462	1				
0	Lab Water	1	1	0.9231	1				
0	Negative Control	1	1	1	1				
30		1	1	1	1				
44		1	1	1	1				
67		1	1	1	1				
100		1	1	1	1	1	1	1	1

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	0.6667	0.8667	0.8667	0.7333				
0	Lab Water	0.4667	0.7333	0.8667	0.8667				
0	Negative Control	0.8667	0.8667	0.9333	0.8667				
30		1	0.8	0.6	0.8667				
44		0.9333	0.8667	0.9333	0.8667				
67		0.8667	1	0.8667	1				
100		0.6667	1	1	0.9333	0.8667	0.9333	0.9333	0.6667

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Hatched Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	13/15	15/15	15/15	15/15				
0	Lab Water	14/15	15/15	15/15	15/15				
0	Negative Control	14/15	15/15	15/15	14/15				
30		15/15	15/15	15/15	14/15				
44		15/15	15/15	15/15	14/15				
67		15/15	15/15	15/15	15/15				
100		14/15	15/15	15/15	15/15	15/15	15/15	15/15	15/15

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	10/10	13/13	11/13	11/11				
0	Lab Water	7/7	11/11	12/13	13/13				
0	Negative Control	13/13	13/13	14/14	13/13				
30		15/15	12/12	9/9	13/13				
44		14/14	13/13	14/14	13/13				
67		13/13	15/15	13/13	15/15				
100		10/10	15/15	15/15	14/14	13/13	14/14	14/14	10/10

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	10/15	13/15	13/15	11/15				
0	Lab Water	7/15	11/15	13/15	13/15				
0	Negative Control	13/15	13/15	14/15	13/15				
30		15/15	12/15	9/15	13/15				
44		14/15	13/15	14/15	13/15				
67		13/15	15/15	13/15	15/15				
100		10/15	15/15	15/15	14/15	13/15	14/15	14/15	10/15

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	05-7789-9551	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Feb-16 15:02	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	14-9164-8459	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 Dec-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	GH_ER2
Ending Date:	09 Jan-16	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	7d 15h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1354859	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Hatched Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Dilution Water	4	0.9667	0.8667	1	0.03333	0.06667	6.9%	0.0%	58	60
30		4	0.9833	0.9333	1	0.01667	0.03333	3.39%	-1.72%	59	60
44		4	0.9833	0.9333	1	0.01667	0.03333	3.39%	-1.72%	59	60
67		4	1	1	1	0	0	0.0%	-3.45%	60	60
100		8	0.9917	0.9333	1	0.008333	0.02357	2.38%	-2.59%	119	120

Hatched Rate Detail

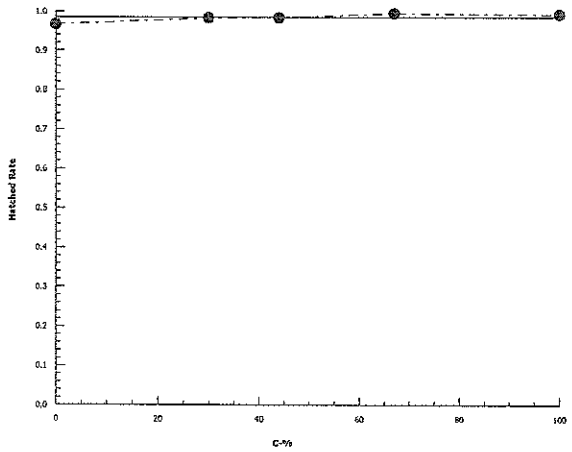
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	0.8667	1	1	1				
30		1	1	1	0.9333				
44		1	1	1	0.9333				
67		1	1	1	1				
100		0.9333	1	1	1	1	1	1	1

Hatched Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	13/15	15/15	15/15	15/15				
0	Lab Water	14/15	15/15	15/15	15/15				
0	Negative Control	14/15	15/15	15/15	14/15				
30		15/15	15/15	15/15	14/15				
44		15/15	15/15	15/15	14/15				
67		15/15	15/15	15/15	15/15				
100		14/15	15/15	15/15	15/15	15/15	15/15	15/15	15/15

Analysis ID:	05-7789-9551	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Feb-16 15:02	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	07-5688-4050	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Mar-16 14:57	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	14-9164-8459	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 Dec-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	GH_ER2
Ending Date:	09 Jan-16	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	7d 15h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C <> T	NA	NA	Passes hatched rate

Fisher Exact Test

Control	vs	Control	Test Stat	P-Value	P-Type	Decision(α:5%)
Negative Control		Dilution Water	1	1.0000	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Dilution Water	58	2	60	0.9667	0.03333	0.0%
0	Negative Contr	58	2	60	0.9667	0.03333	0.0%

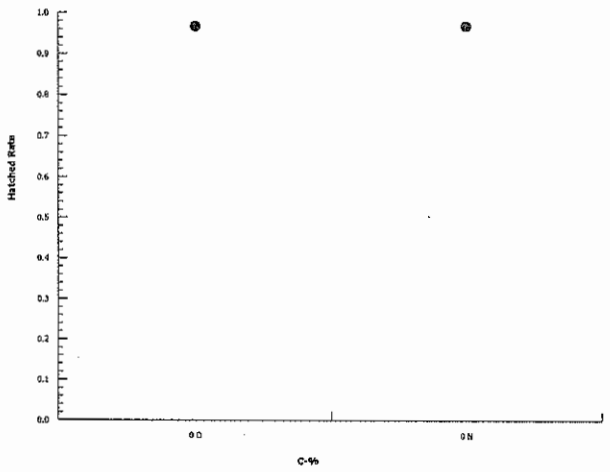
Hatched Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.8667	1	1	1
0	Negative Control	0.9333	1	1	0.9333

Hatched Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	13/15	15/15	15/15	15/15
0	Lab Water	14/15	15/15	15/15	15/15
0	Negative Control	14/15	15/15	15/15	14/15

Graphics



Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	18-9927-5080	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Feb-16 11:55	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	14-9164-8459	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 Dec-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	GH_ER2
Ending Date:	09 Jan-16	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	7d 15h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1457863	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Dilution Water	4	0.7833	0.6667	0.8667	0.05	0.1	12.77%	0.0%	47	60
30		4	0.8167	0.6	1	0.08333	0.1667	20.41%	-4.26%	49	60
44		4	0.9	0.8667	0.9333	0.01925	0.03849	4.28%	-14.89%	54	60
67		4	0.9333	0.8667	1	0.03849	0.07698	8.25%	-19.15%	56	60
100		8	0.875	0.6667	1	0.04787	0.1354	15.47%	-11.7%	105	120

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	0.6667	0.8667	0.8667	0.7333				
30		1	0.8	0.6	0.8667				
44		0.9333	0.8667	0.9333	0.8667				
67		0.8667	1	0.8667	1				
100		0.6667	1	1	0.9333	0.8667	0.9333	0.9333	0.6667

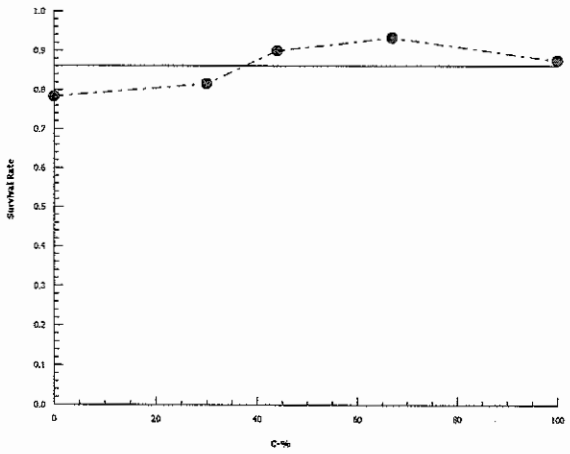
Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	10/15	13/15	13/15	11/15				
0	Lab Water	7/15	11/15	13/15	13/15				
0	Negative Control	13/15	13/15	14/15	13/15				
30		15/15	12/15	9/15	13/15				
44		14/15	13/15	14/15	13/15				
67		13/15	15/15	13/15	15/15				
100		10/15	15/15	15/15	14/15	13/15	14/15	14/15	10/15

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Analysis ID:	18-9927-5080	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Feb-16 11:55	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Test Code: 16000b | 09-7774-6095

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	07-7485-7106	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Mar-16 15:00	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	14-9164-8459	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 Dec-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	GH_ER2
Ending Date:	09 Jan-16	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	7d 15h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C <> T	NA	NA	Passes survival rate

Fisher Exact Test

Control	vs	Control	Test Stat	P-Value	P-Type	Decision(α:5%)
Negative Control		Dilution Water	0.2201	0.2201	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Dilution Water	47	13	60	0.7833	0.2167	11.32%
0	Negative Contr	53	7	60	0.8833	0.1167	0.0%

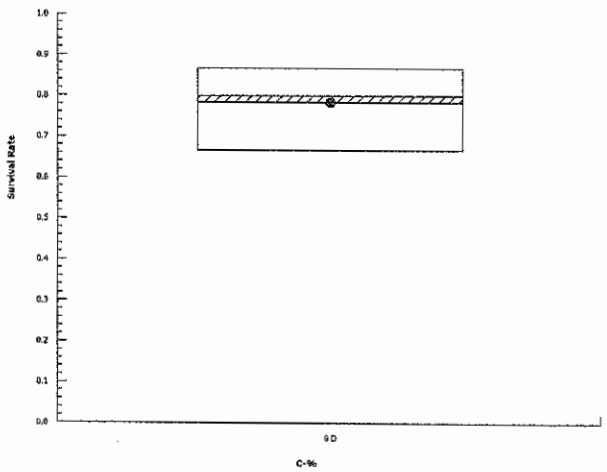
Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.6667	0.8667	0.8667	0.7333
0	Negative Control	0.8667	0.8667	0.9333	0.8667

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	10/15	13/15	13/15	11/15
0	Lab Water	7/15	11/15	13/15	13/15
0	Negative Control	13/15	13/15	14/15	13/15

Graphics



 Analyst:_____ QA: JGL March 1/16

CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	21-3619-4414	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Feb-16 12:06	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	14-9164-8459	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 Dec-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	GH_ER2
Ending Date:	09 Jan-16	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	7d 15h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1041114	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>100	N/A	N/A	<1	NA	NA
IC10	>100	N/A	N/A	<1	NA	NA
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

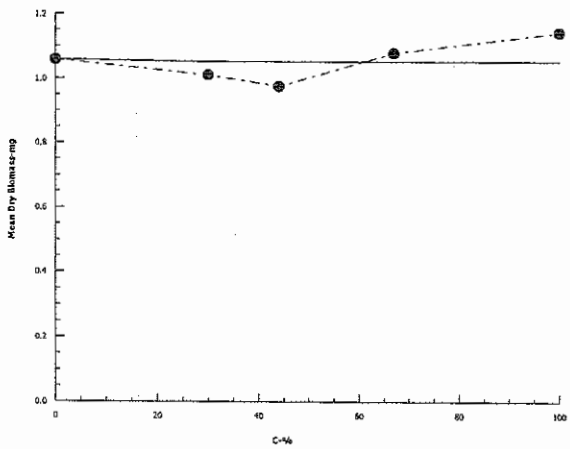
Mean Dry Biomass-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	1.059	0.9707	1.143	0.03706	0.07413	7.0%	0.0%
30		4	1.01	0.762	1.155	0.08577	0.1715	16.98%	4.57%
44		4	0.9753	0.8653	1.036	0.03792	0.07584	7.78%	7.86%
67		4	1.078	1.052	1.101	0.009989	0.01998	1.85%	-1.86%
100		8	1.142	1.057	1.247	0.02304	0.06517	5.71%	-7.85%

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	1.143	1.088	1.032	0.9707				
30		1.155	1.077	1.047	0.762				
44		1.036	0.9887	1.011	0.8653				
67		1.101	1.052	1.08	1.08				
100		1.247	1.057	1.105	1.121	1.199	1.198	1.105	1.1

Graphics



CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	13-0525-5060	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Mar-16 14:55	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	14-9164-8459	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 Dec-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	GH_ER2
Ending Date:	09 Jan-16	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	7d 15h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	9.38%	Passes mean dry biomass-mg

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		Dilution Water	-3.537	1.943	0.085	6	0.9939	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.04763768	0.04763768	1	12.51	0.0123	Significant Effect
Error	0.0228527	0.003808784	6			
Total	0.07049038		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.588	47.47	0.4554	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9708	0.6451	0.9041	Normal Distribution

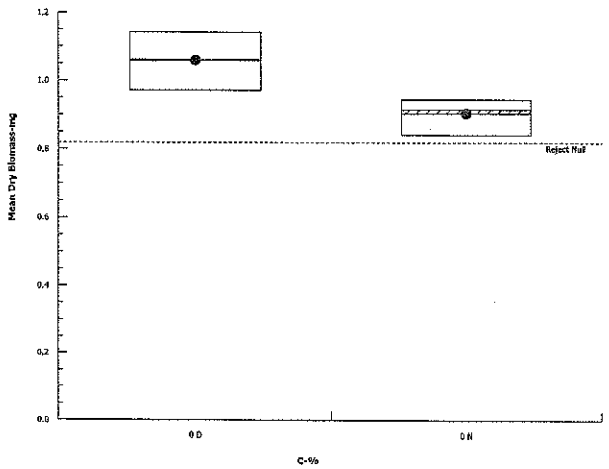
Mean Dry Biomass-mg Summary

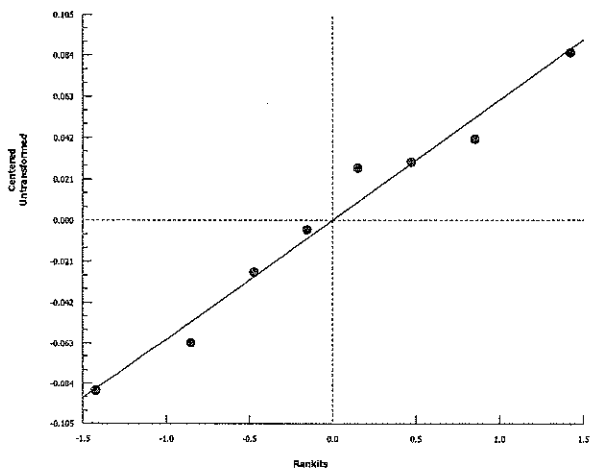
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	1.059	0.9405	1.176	1.06	0.9707	1.143	0.03706	7.0%	0.0%
0	Negative Control	4	0.9042	0.8309	0.9775	0.915	0.8413	0.9453	0.02304	5.1%	14.58%

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1.143	1.088	1.032	0.9707
0	Negative Control	0.9453	0.9307	0.8993	0.8413

Graphics





CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	19-9633-0359	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Mar-16 14:37	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	14-9164-8459	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 Dec-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	GH_ER2
Ending Date:	09 Jan-16	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	7d 15h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1243588	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>100	N/A	N/A	<1	NA	NA
IC10	>100	N/A	N/A	<1	NA	NA
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

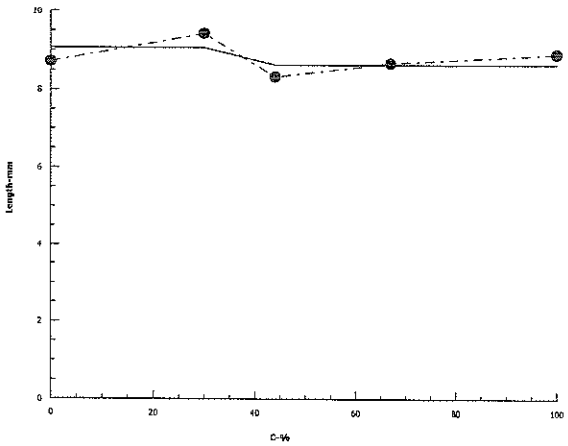
Length-mm Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	8.72	8.31	9.3	0.2115	0.4231	4.85%	0.0%
30		4	9.425	8.92	9.78	0.2037	0.4075	4.32%	-8.09%
44		4	8.33	8.14	8.57	0.09408	0.1882	2.26%	4.47%
67		4	8.672	8.4	9	0.1239	0.2478	2.86%	0.54%
100		8	8.898	8.27	9.4	0.1587	0.4489	5.05%	-2.04%

Length-mm Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	9.3	8.54	8.31	8.73				
30		9.27	9.73	9.78	8.92				
44		8.57	8.38	8.14	8.23				
67		9	8.67	8.62	8.4				
100		9.4	8.47	8.27	8.43	9.31	8.93	9.07	9.3

Graphics



Analyst:_____ QA: JCW March 2/16

CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	11-0820-5489	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Mar-16 14:38	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	14-9164-8459	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 Dec-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	GH_ER2
Ending Date:	09 Jan-16	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	7d 15h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C <> T	NA	NA	8.52%	Passes length-mm

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		Dilution Water	2.333	2.447	0.687	6	0.0584	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.8580496	0.8580496	1	5.445	0.0584	Non-Significant Effect
Error	0.9455	0.1575833	6			
Total	1.80355		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.315	47.47	0.8275	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9715	0.6451	0.9096	Normal Distribution

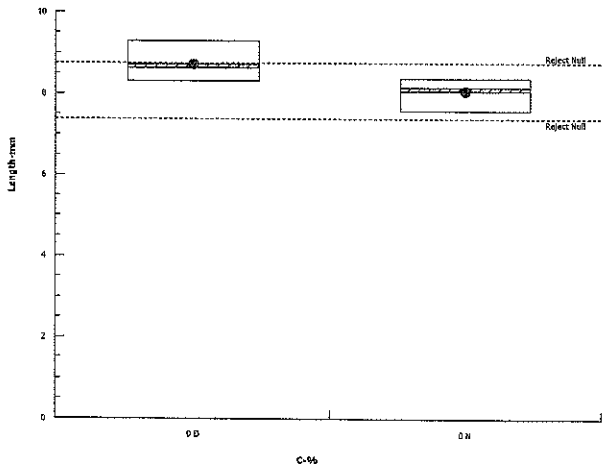
Length-mm Summary

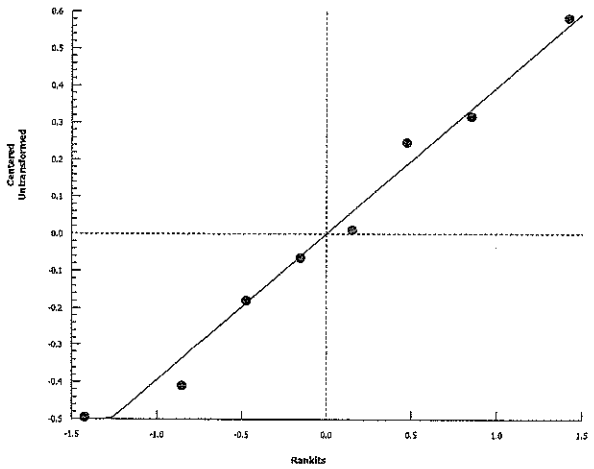
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	8.72	8.047	9.393	8.635	8.31	9.3	0.2115	4.85%	0.0%
0	Negative Control	4	8.065	7.478	8.652	8.155	7.57	8.38	0.1845	4.58%	7.51%

Length-mm Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	9.3	8.54	8.31	8.73
0	Negative Control	8.38	8	7.57	8.31

Graphics





Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	10-5018-5589	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Feb-16 12:29	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	14-9164-8459	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 Dec-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	GH_ER2
Ending Date:	09 Jan-16	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	7d 15h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	868690	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Dilution Water	4	0.9615	0.8462	1	0.03846	0.07692	8.0%	0.0%	45	47
30		4	1	1	1	0	0	0.0%	-4.0%	49	49
44		4	1	1	1	0	0	0.0%	-4.0%	54	54
67		4	1	1	1	0	0	0.0%	-4.0%	56	56
100		8	1	1	1	0	0	0.0%	-4.0%	105	105

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	1	1	0.8462	1				
30		1	1	1	1				
44		1	1	1	1				
67		1	1	1	1				
100		1	1	1	1	1	1	1	1

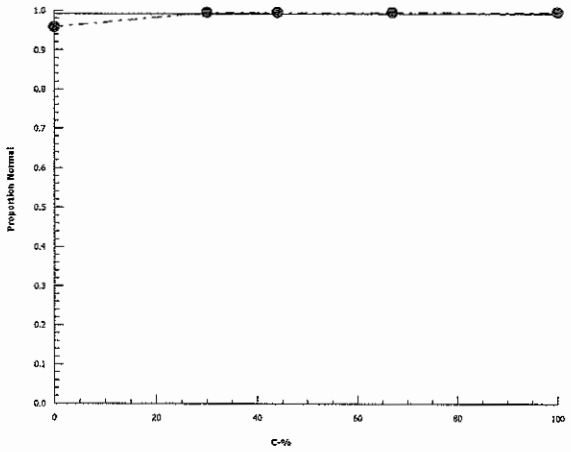
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	10/10	13/13	11/13	11/11				
0	Lab Water	7/7	11/11	12/13	13/13				
0	Negative Control	13/13	13/13	14/14	13/13				
30		15/15	12/12	9/9	13/13				
44		14/14	13/13	14/14	13/13				
67		13/13	15/15	13/13	15/15				
100		10/10	15/15	15/15	14/14	13/13	14/14	14/14	10/10

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	10-5018-5589	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Feb-16 12:29	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	19-6368-7794	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Mar-16 15:02	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	14-9164-8459	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 Dec-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	GH_ER2
Ending Date:	09 Jan-16	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	7d 15h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C <> T	NA	NA	Passes proportion normal

Fisher Exact Test

Control	vs	Control	Test Stat	P-Value	P-Type	Decision(α:5%)
Negative Control		Dilution Water	0.2184	0.2184	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Dilution Water	45	2	47	0.9574	0.04255	4.26%
0	Negative Contr	53	0	53	1	0	0.0%

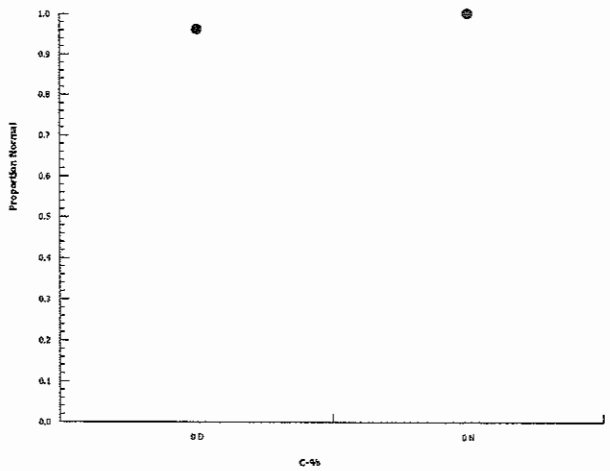
Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	1	0.8462	1
0	Negative Control	1	1	1	1

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	10/10	13/13	11/13	11/11
0	Lab Water	7/7	11/11	12/13	13/13
0	Negative Control	13/13	13/13	14/14	13/13

Graphics



Nautilus Environmental

ATTN: Krysta Pearcy
Nautilus Environmental
8664 Commerce Court
Burnaby, BC
Canada

Received: various dates
Report Date: 2016/03/01
Version: REVISION 4

HydroQual Test Report

Client: NAU104
Reference: 15-1639; 15-1642
Client Reference: GH_FR1
FR_UFR1

Billing: not given

Senior Verifier

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.

Internal Tracking Sheet

Client:	NAU104
Reference:	15-1639

Client:

Client:	Nautilus Environmental	Operation:	Burnaby
Address:	8664 Commerce Court	Billing:	not given
City:	Burnaby	Contact:	Krysta Pearcy
Province:	BC	Tel:	604 420 8773
Country:	Canada	Fax:	not given
Postal Code:	V5A 4N7	Email:	krysta@nautilusenvironmental.com

Sample:

type:	water			collection method:	grab
collected:	various dates	at:	various times	by:	not given
shipped:	various dates	by:	drop off		
received:	various dates	at:	various times	by:	MC
signed-in:	various dates	at:	various times	by:	MC
container:	5 x 20 L carboys			sample condition:	good condition
seals present:	no			initials on seals:	no
storage:	4 +/- 2 degrees in darkness			initial temperature (°C):	5.3; 6; 6; 9.2

Samples are disposed following PERS-SWI-004

Chemical and Physical Measurements at Sample Receipt:

sample:	01	02	03	04	
client code:	FR_UFR1-WS-201511301215	FR_UFR1_M_07122015_N	FR_UFR1-WS-201512141046	FR_UFR1-WS-201512211151	**FR_UFR1-WS**
collection date:	2015/11/30	2015/12/07	2015/12/14	2015/12/21	
collection time:	1215	1144	1046	1151	

pH:	7.9	7.9	7.9	7.9
EC (µS/cm):	366	384	371	377
DO (mg/L):	10.0	8.8	9.7	9.5
temp (°C):	9.2	17.4	17.0	14.6
hardness:	228	172	436	117
alkalinity:	224	133	179	181
colour:	colorless	colorless	colorless	colorless
odour:	odourless	odourless	odourless	odourless

Meter/Probe Used: chem cart 1/chem cart 2/**chem cart 3**/product/soils
Each sampling container EC checked (initials): ML__

Test Log:

test code:	FM-32D
started:	2015/12/08
ended:	2016/01/09
prelim made:	-
prelim sent:	-
reported:	2016/02/11

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results.

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Tel (403) 253-7121 fax (403) 252-9363 www.nautilusenvironmental.ca

Internal Tracking Sheet

Client:	NAU104
Reference:	15-1642

Client:

Client:	Nautilus Environmental	Operation:	Burnaby
Address:	8664 Commerce Court	Billing:	not given
City:	Burnaby	Contact:	Krysta Pearcy
Province:	BC	Tel:	604 420 8773
Country:	Canada	Fax:	not given
Postal Code:	V5A 4N7	Email:	krysta@nautilusenvironmental.com

Sample:

type:	water			collection method:	grab
collected:	various dates	at:	various times	by:	not given
shipped:	various dates	by:	drop off		
received:	various dates	at:	various times	by:	MC
signed-in:	various dates	at:	various times	by:	MC
container:	5 x 20 L carboys			sample condition:	good condition
seals present:	no			initials on seals:	no
storage:	4 +/- 2 degrees in darkness			initial temperature (°C):	5.5, 6, 7, 8.3

Samples are disposed following PERS-SWI-004

Chemical and Physical Measurements at Sample Receipt:

sample:	01	02	03	04	
client code:	GH_FR1_WS_2015_11_30_N	GH_FR1_WS_2015_12_07_NP	GH_FR1_WS_2015_12_14_NP	GH_FR1_WS_2015_12_21_NP	**GH_FR1_WS**
collection date:	2015/11/30	2015/12/07	2015/12/14	2015/12/21	
collection time:	1000	not given	1057	0934	

pH:	7.9	7.9	7.8	7.1
EC (µS/cm):	768	784	787	975
DO (mg/L):	6.3	9.0	9.9	8.5
temp (°C):	11.2	10.8	17.1	15.6
hardness:	187	161	185	441
alkalinity:	443	-	131	185
colour:	colorless	colorless	colorless	colorless
odour:	odourless	odourless	odourless	odourless

Meter/Probe Used: chem cart 1/chem cart 2/**chem cart 3**/product/soils
Each sampling container EC checked (initials): ML__

Test Log:

test code:	FM-32D
started:	2015/12/08
ended:	2016/01/09
prelim made:	-
prelim sent:	-
reported:	2016/02/11

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Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1642 Site Control: 15-1639

Organism Information

Source: Aquatox Batch: 20151208ELS Egg Stage: 15 somites

Test Log

Date	Day	Time	Technicians	Chem Cart Used	Fed		Feeding Rate (mL)	Sample/Site Control Pre-Aeration Time (minutes)	Bench Sheet Review	
					AM	PM			First	Second
2015/12/08	0	1600	DS/JN/HS	2	-	-	-	60	DS	JN
2015/12/09	1	1030	DS/JN	2	-	-	-	60	DS	JN
2015/12/10	2	0930	ML/JN	2	-	-	-	60	ML	JN
2015/12/11	3	1030	ML/DS	2	-	-	-	60	DS	ML
2015/12/12	4	1300	HS/ML	2	-	-	-	60	HS	ML
2015/12/13	5	1100	CQ/EP	2	-	✓	1	60	CQ	JK
2015/12/14	6	1330	NM/HS	2	✓	✓	1	45	NM	CQ
2015/12/15	7	1000	HS/DS	2	✓	✓	1	60	DS	HS
2015/12/16	8	1400	NM/DS	2	✓	✓	1	45	NM	DS
2015/12/17	9	1335	JN/ML	2	✓	✓	1	45	ML	JN
2015/12/18	10	1100	DS/JN	2	✓	✓	1	60	HS	JN
2015/12/19	11	1230	DS	2	✓	✓	1	60	DS	ML
2015/12/20	12	1330	CQ/JK	2	✓	✓	1	60	JK	CQ
2015/12/21	13	1030	HS/EP	2	✓	✓	1	60	HS	JP
2015/12/22	14	1330	HS/EP	2	✓	✓	1	60	HS	ML
2015/12/23	15	1400	DS/HS	2	✓	✓	1.5	60	DS	HS
2015/12/24	16	0915	DS/HS	2	✓	✓	1.5	60	HS	DS
2015/12/25	17	1000	DS/JN	2	✓	✓	1.5	60	JN	DS
2015/12/26	18	0945	ML/DS	2	✓	✓	1.5	45	DS	ML
2015/12/27	19	1000	HS/JN	2	✓	✓	1.5	45	HS	JN
2015/12/28	20	1000	HS/JW	2	✓	✓	1.5	45	HS	CQ
2015/12/29	21	1030	HS/DS	2	✓	✓	1.5	45	DS	HS
2015/12/30	22	0930	JN	2	✓	✓	1.5	45	JN	JK
2015/12/31	23	0930	CQ/EP	2	✓	✓	1.5	60	CQ	EP
2016/01/01	24	0930	JK/JW	2	✓	✓	1.5	60	JK	ML
2016/01/02	25	1030	JK/JW	2	✓	✓	1.5	60	JK	ML
2016/01/03	26	1000	JN/EP	2	✓	✓	1.5	60	HS	JN
2016/01/04	27	1400	HS/JN	2	✓	✓	1.5	60	JN	HS
2016/01/05	28	0935	JK	2	✓	✓	1.5	60	JK	HS
2016/01/06	29	1010	JK/HS	2	✓	✓	1.5	60	HS	JK
2016/01/07	30	1330	JK/HS	2	✓	✓	1.5	60	HS	JK
2016/01/08	31	1200	JK/JW	2	✓	✓	1.5	60	JK	ML
2016/01/09	32	1500	ML/JK/EP	2	-	-	-	-	ML	JK

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1642 Site Control: 15-1639

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

	Lab CTL		Lab CTL 20 ug/L		Site CTL		30%		44%		67%		100%A		100%B	
	Day 1		Day 1		Day 1		Day 1		Day 1		Day 1		Day 1		Day 1	
replicate	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos
a	15	0	15	0	14	1	14	1	15	0	14	1	14	1	15	0
b	15	0	15	0	14	1	15	0	15	0	15	0	15	0	14	1
c	15	0	15	0	13	2	15	0	15	0	15	0	15	0	15	0
d	14	1	15	0	15	0	13	2	12	2	15	0	15	0	14	1
e	30	0	30	0	27	0	27	3	30	0	29	0	29	1	29	1
f	0	0	30	0	30	0	30	0	30	0	30	0	27	3	30	0

Comments/Observations:

Number of Alive Embryos and Hatched Organisms

	Lab CTL			Lab CTL 20 ug/L			Site CTL			30%		
	Day 2			Day 2			Day 2			Day 2		
replicate	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Dead Embryos	Cull to 15
a	8	7	15	8	7	15	14	0	15	11	3	15
b	15	0	15	15	0	15	10	4	15	7	8	15
c	5	10	15	14	1	15	13	0	15	9	6	15
d	9	5	15	12	3	15	10	5	15	6	7	15
e	30	0		6	24		20	7		8	19	
f	28	2		6	24		24	6		10	20	

	44%			67%			100%A			100%B		
	Day 2			Day 2			Day 2			Day 2		
replicate	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Dead Embryos	Cull to 15
a	14	1	15	13	1	15	14	0	15	15	0	15
b	15	0	15	14	1	15	15	0	15	13	1	15
c	15	0	15	15	0	15	15	0	15	15	0	15
d	11	1	15	10	5	15	14	1	15	14	0	15
e	29	1		29	0		27	2		27	2	
f	29	1		28	2		24	3		29	1	

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2

Comments/Observations:

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1642 Site Control: 15-1639

Number of Alive Embryos and Hatched Organisms

	Lab CTL		Lab CTL 20 ug/L		Site CTL		30%		44%		67%		100%A		100%B	
	Day 3		Day 3		Day 3		Day 3		Day 3		Day 3		Day 3		Day 3	
replicate	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched
a	14	1	15	0	15	0	15	0	15	0	15	0	15	0	13	2
b	15	0	15	0	15	0	15	0	15	0	15	0	14	1	14	1
c	15	0	15	0	15	0	13	2	14	1	15	0	14	1	15	0
d	15	0	15	0	10	5	15	0	15	0	15	0	14	1	14	1

Comments/Observations:

	Lab CTL		Lab CTL 20 ug/L		Site CTL		30%		44%		67%		100%A		100%B	
	Day 4		Day 4		Day 4		Day 4		Day 4		Day 4		Day 4		Day 4	
replicate	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched	Alive Embryos	Alive Hatched
a	12	3	6	9	6	9	11	4	4	11	5	10	9	6	12	3
b	9	6	5	10	7	8	11	4	7	8	7	7	10	5	8	7
c	14	1	6	9	10	5	11	3	7	8	8	7	10	5	8	7
d	14	1	6	7	8	7	12	3	7	8	13	2	10	5	8	7

Comments/Observations:

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 5	Day 5	Day 5	Day 5	Day 5	Day 5	Day 5	Day 5
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14	14 (1e)	15 (1)	15	15	15	15	15
b	15	15	14 (1e)	15	15	15	15	15
c	15	14 (1e)	15	14	15	15	15	15
d	14 (1e)	15	14 (1e)	15	15	15	15	15

Comments/Observations: e = embryo

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 6	Day 6	Day 6	Day 6	Day 6	Day 6	Day 6	Day 6
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14	14	15	14	15	15 (1)	14	15
b	15	13	14	15	15	15 (1)	15	15
c	14	15	15	13	15	14	15	15
d	14	15	15 (1)	13	14	15	15	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1642 Site Control: 15-1639

Number of Alive Embryos and Hatched Organisms

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 7	Day 7	Day 7	Day 7	Day 7	Day 7	Day 7	Day 7
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14	14 (2)	15	13	15	15	14 (1)	15
b	15	13	13 (1)	15	15	15	15	15
c	14 (1)	15	15	12	15	14 (1)	14	15
d	14	15	14	12	14 (1)	14	15	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 8	Day 8	Day 8	Day 8	Day 8	Day 8	Day 8	Day 8
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	14(2)	15 (1)	13	15	15	14 (1)	15
b	15	13	13 (1)	15	14	15	15	15
c	14	15	15	12	15	14 (1)	14	15
d	14	14	13	11	14	14	15	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 9	Day 9	Day 9	Day 9	Day 9	Day 9	Day 9	Day 9
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	13	15 (1)	13	15	15 (1)	14 (1)	15
b	15	13	13	15	14	15	15	15
c	14 (1)	15	15	12 (1)	15	14	14	15 (1)
d	14	14	13	11 (1)	14 (2)	14	15	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 10	Day 10	Day 10	Day 10	Day 10	Day 10	Day 10	Day 10
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	12 (1)	15	13	15 (1)	14 (1)	14	15
b	15	13 (1)	13	15	14	15	15	15
c	14 (1)	15	15 (1)	11 (1)	15	14	14	14
d	14	14	13	11 (1)	13	14	15	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1642 Site Control: 15-1639

Number of Alive Embryos and Hatched Organisms

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 11	Day 11	Day 11	Day 11	Day 11	Day 11	Day 11	Day 11
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	12 (1)	15	13	15 (1)	14 (1)	13	15
b	15	13 (1)	13	15 (3)	14 (1)	15	15 (1)	15 (1)
c	14 (1)	15	15 (1)	11 (1)	15	14 (1)	14 (1)	14 (2)
d	14	14	13	11 (1)	13	14	15	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 12	Day 12	Day 12	Day 12	Day 12	Day 12	Day 12	Day 12
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	12 (1)	15	13	15	14 (1)	13	15
b	15	13 (1)	13	15 (3)	14 (1)	15	15	14 (1)
c	14 (1)	15	15	11 (1)	15	13	14	13
d	14	14	13	11 (1)	13	14	14	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 13	Day 13	Day 13	Day 13	Day 13	Day 13	Day 13	Day 13
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	12	15	13	15 (1)	14 (1)	12	15
b	15	12	13	15	14	15	15	14
c	14	15	15	11	15	13	13	13
d	14	14	13	10	13	14	14	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 14	Day 14	Day 14	Day 14	Day 14	Day 14	Day 14	Day 14
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	12 (1)	15	13	14	13	12	15
b	15	12	13	15 (1)	13	15	15	12
c	14	15	15	12 (1)	15	13	13	12 (1)
d	14 (1)	14	13	10	14	14	14	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1642 Site Control: 15-1639

Number of Alive Embryos and Hatched Organisms

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 15	Day 15	Day 15	Day 15	Day 15	Day 15	Day 15	Day 15
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	12 (1)	14	13	14	13	12	15
b	15	12	13	15	13	14	14	12
c	14	15	15	12 (1)	15	13	13	11
d	14 (1)	14	13	10	14	14	14	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 16	Day 16	Day 16	Day 16	Day 16	Day 16	Day 16	Day 16
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	14	13	14	13	12	15
b	15	11	13	15	12	14	14	11
c	14	15	15	11	15	13	13	11
d	14 (1)	14	13	10	13	14	14	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 17	Day 17	Day 17	Day 17	Day 17	Day 17	Day 17	Day 17
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	14	13	14	13	12	15
b	15	11	13	15	12	14	14	11
c	14	15 (1)	15	11	15	13	13	11
d	14 (1)	14	13	10	13	14	14	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 18	Day 18	Day 18	Day 18	Day 18	Day 18	Day 18	Day 18
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	14	13	14	13	12	15
b	15 (1)	11	13 (1)	15	12	14	14	11
c	14	15 (1)	15	11	15	13 (1)	13	11
d	14 (1)	14	13	10	13	14	14	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1642 Site Control: 15-1639

Number of Alive Embryos and Hatched Organisms

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 19	Day 19	Day 19	Day 19	Day 19	Day 19	Day 19	Day 19
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	14	13	14	13	12	15
b	15	11	13 (1)	15	12	14	14	11
c	14	14	15	11	15	13 (1)	13	11
d	14 (1)	14	13	10 (1)	13	14	14	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 20	Day 20	Day 20	Day 20	Day 20	Day 20	Day 20	Day 20
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	14	13	14	13	12	15
b	15	11	13 (1)	15	12	14	14	11
c	14	14	15	11	15	13	13	11
d	13	14	13	10	13	14	14	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 21	Day 21	Day 21	Day 21	Day 21	Day 21	Day 21	Day 21
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	14	13	14	13	12	15
b	14	11	13 (1)	15	12	14	14	11
c	14	14	14	11	15	13	13	11
d	13	14	13	10	13	14	13	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 22	Day 22	Day 22	Day 22	Day 22	Day 22	Day 22	Day 22
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	14	13	14	13	12	15
b	14	11	13 (1)	15	12	14	14	11
c	14	14	14	11	15	12	13	11
d	13	14	13 (1)	10	13	14	13	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1642 Site Control: 15-1639

Number of Alive Embryos and Hatched Organisms

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 23	Day 23	Day 23	Day 23	Day 23	Day 23	Day 23	Day 23
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	14	13	14	13	12	15
b	14	11	13 (1)	15	12	14	14	11
c	14	14	14	11 (1)	15	12	13	11
d	13	14	12	10	13	14	13	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 24	Day 24	Day 24	Day 24	Day 24	Day 24	Day 24	Day 24
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	14	13	14	13	12	15
b	13	11	13 (1)	15	12	14	14	11
c	14	14	14	11 (1)	15	12	13	11
d	13	14	12	10	13	14	13	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 25	Day 25	Day 25	Day 25	Day 25	Day 25	Day 25	Day 25
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	14	13	14	13	12	15
b	13	11	13 (1)	15	12	14	14	11
c	14	14	14	11 (1)	15	12	13	11
d	13	14	12	10	13	14	13	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 26	Day 26	Day 26	Day 26	Day 26	Day 26	Day 26	Day 26
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	14	13	14	13	12	15
b	13	11	12	15	12	14	14	11
c	14	14	14	11	15	12	13	11
d	13	14	12	10	13	14	13	15

Comments/Observations:

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1642 Site Control: 15-1639

Number of Alive Embryos and Hatched Organisms

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 27	Day 27	Day 27	Day 27	Day 27	Day 27	Day 27	Day 27
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	11	14	13	14	13	12	15
b	13	11	12	15	12	14	14	11
c	14	14	14	11	15	12	13	11
d	13	14	12	10	13	14	13	15

Comments/Observations:

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 28	Day 28	Day 28	Day 28	Day 28	Day 28	Day 28	Day 28
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	9	14	13	14	13	12	15
b	13	11	12	15 (1)	12	14	14	11
c	14	14	14	11	15	12	13	11
d	13	13	12	10	13	14	13	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 29	Day 29	Day 29	Day 29	Day 29	Day 29	Day 29	Day 29
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	8	14	13	14	12	12	15
b	13	11	12	15	12	14	14	11
c	14	14	14	11 (1)	15	12	13	11
d	13	13	12	10	13	14	13	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 30	Day 30	Day 30	Day 30	Day 30	Day 30	Day 30	Day 30
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	8	14	13	14	12	12	15
b	13	11	12	15	12	14	14	11
c	14	14	14	10	15	12	13	11
d	13	13 (1)	12	10	13	14	13	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1642 Site Control: 15-1639

Number of Alive Embryos and Hatched Organisms

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 31	Day 31	Day 31	Day 31	Day 31	Day 31	Day 31	Day 31
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	8 (1)	14	13	14	12	12	15
b	13	11	12	15	12	13	14	11
c	14	13	14	10	15	12	13	11
d	13	13	12	10	13	14	13	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
	Day 32	Day 32	Day 32	Day 32	Day 32	Day 32	Day 32	Day 32
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	7	14	13	14	12	12	15
b	13	11	12	15 (1)	12	13	14	11
c	14	13	14	10	15	12	13	11
d	13	13	12	10	13	14	13	15

Comments/Observations: bracketed # indicates number of fish displaying atypical swimming within test vessel

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample 15-1642
Site Control 15-1639

New Solutions

Conc. (%)	Lab CTL	Lab CTL	Site CTL	30	44	67	100A	100B
Day		20 ug/L						
	pH (units)							
0	8.1	8.0	8.0	8.0	8.1	8.1	8.0	8.2
1	8.2	8.1	8.1	8.2	8.2	8.2	8.1	8.2
2	8.2	8.2	8.2	8.3	8.3	8.4	8.3	8.3
3	8.0	8.0	8.3	8.3	8.3	8.3	8.1	8.1
4	8.1	8.1	8.2	8.3	8.2	8.2	8.1	8.1
5	8.3	8.1	8.3	8.3	8.3	8.3	8.2	8.2
6	7.9	7.9	8.1	8.1	8.1	8.1	8.1	8.0
7	7.9	7.9	8.0	8.0	8.0	8.0	8.0	8.0
8	8.0	8.0	7.9	8.2	8.0	8.2	8.1	8.1
	Conductance (µS/cm)							
0	435	425	346	665	759	964	1190	1260
1	450	435	356	650	785	996	1268	1275
2	416	437	367	671	797	1008	1262	1265
3	427	440	368	675	795	1004	1270	1271
4	429	443	350	644	790	989	1248	1252
5	436	448	362	663	800	990	1259	1281
6	451	457	357	664	807	999	1256	1276
7	445	461	357	665	793	982	1257	1274
8	461	467	349	664	793	989	1250	1250
	Dissolved Oxygen (mg/L) (**40-100% saturation**)							
0	7.2	7.3	7.1	7.2	7.0	7.3	7.2	7.1
1	7.3	7.3	7.3	7.3	7.2	7.2	7.2	7.2
2	7.3	7.3	7.2	7.2	7.1	7.1	7.1	7.1
3	7.2	7.3	7.2	7.2	7.2	7.2	7.2	7.2
4	7.3	7.3	7.3	7.2	7.3	7.3	7.3	7.2
5	7.3	7.3	7.4	7.3	7.3	7.3	7.3	7.2
6	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
7	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
8	7.3	7.1	7.3	7.3	7.3	7.3	7.3	7.3
	Temperature (°C)							
0	24	24	24	24	24	24	24	24
1	24	24	24	24	24	24	24	24
2	25	24	25	25	25	25	25	25
3	24	24	25	25	25	25	25	25
4	24	24	24	24	24	24	24	24
5	24	24	24	24	24	24	24	24
6	24	24	24	24	24	24	24	24
7	24	24	24	24	24	24	24	24
8	24	24	24	24	24	24	24	24

Old Solutions

	Lab CTL	Lab CTL	Site CTL	30	44	67	100A	100B
		20 ug/L						
	pH (units)							
0								
1	7.9	7.9	8.0	8.0	8.1	8.1	8.1	8.1
2	8.0	8.1	8.3	8.3	8.3	8.4	8.4	8.3
3	8.0	8.0	8.2	8.3	8.3	8.3	8.2	8.2
4	8.0	7.9	8.1	8.1	8.1	8.0	8.0	8.0
5	8.1	8.1	8.3	8.3	8.3	8.2	8.1	8.2
6	7.9	7.8	8.0	8.2	8.1	8.0	8.0	8.0
7	7.8	7.7	8.0	8.0	8.0	8.0	7.9	7.9
8	7.7	7.9	8.1	8.1	8.1	8.0	8.0	8.0
	Conductance (µS/cm)							
0								
1	450	436	351	659	804	1006	1252	1285
2	448	439	355	663	806	1014	1280	1287
3	427	440	376	665	797	1006	1259	1272
4	465	449	363	635	784	982	1256	1272
5	471	461	391	683	818	1007	1276	1283
6	456	461	380	678	800	986	1251	1275
7	456	460	381	673	798	1005	1264	1270
8	455	403	366	666	783	970	1235	1242
	Dissolved Oxygen (mg/L) (**40-100% saturation**)							
0								
1	7.0	7.0	7.1	6.9	6.9	6.9	7.0	7.0
2	7.1	7.2	7.0	7.1	7.1	7.0	7.0	7.0
3	7.3	7.3	7.3	7.2	7.2	7.1	7.1	7.1
4	7.3	7.3	7.3	7.2	7.2	7.2	7.2	7.1
5	7.1	7.0	7.0	7.0	7.0	6.9	7.0	7.2
6	7.3	7.0	6.9	6.9	6.8	6.7	6.7	6.6
7	7.3	7.1	7.3	7.3	7.2	7.1	6.9	6.9
8	6.8	7.0	7.3	7.2	7.3	7.2	7.3	7.2
	Temperature (°C)							
0								
1	24	24	24	24	24	24	24	24
2	24	24	24	24	24	24	24	24
3	24	24	24	24	24	24	24	24
4	24	24	24	24	24	24	24	24
5	24	24	24	24	24	24	24	24
6	24	24	24	24	24	24	24	24
7	24	24	24	24	24	24	24	24
8	24	24	24	24	24	24	24	24

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C

4.5 to 7.2 mg/L at 25°C

4.3 to 7.1 mg/L at 26°C

Comments:

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample 15-1642 Site Control 15-1639

New Solutions

Conc. (%)	Lab CTL	Lab CTL	Site CTL	30	44	67	100A	100B
Day		20 ug/L						
	pH (units)							
9	8.1	8.1	8.1	8.2	8.2	8.2	8.1	8.1
10	7.9	8.0	8.2	8.2	8.2	8.2	8.1	8.1
11	8.1	8.0	8.2	8.3	8.2	8.2	8.1	8.1
12	8.0	8.0	8.0	8.0	8.0	8.1	8.0	8.0
13	7.8	7.8	8.1	8.1	8.1	8.1	8.0	8.0
14	8.0	7.9	8.1	8.1	8.1	8.1	8.0	8.1
15	8.0	7.9	8.1	8.1	8.1	8.1	8.0	8.0
16	8.1	8.1	8.1	8.1	8.1	8.1	8.0	8.0
17	8.1	8.1	8.1	8.1	8.1	8.1	8.0	8.0
	Conductance (µS/cm)							
9	462	423	362	613	785	990	1235	1235
10	449	453	350	640	785	990	1249	1249
11	449	448	364	654	788	966	1240	1240
12	446	455	351	649	783	985	1249	1268
13	456	458	367	654	790	995	1261	1268
14	459	458	353	645	783	977	1245	1264
15	470	463	350	644	793	979	1247	1261
16	478	465	357	645	787	996	1257	1287
17	453	467	354	661	796	997	1291	1290
	Dissolved Oxygen (mg/L) (**40-100% saturation**)							
9	7.3	7.3	7.3	7.3	7.2	7.2	7.2	7.2
10	7.3	7.3	7.2	7.2	7.2	7.3	7.3	7.3
11	7.2	7.2	7.3	7.2	7.2	7.2	7.1	7.1
12	7.3	7.1	7.3	7.3	7.1	7.1	7.1	7.0
13	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
14	7.3	7.3	7.3	7.3	7.3	7.3	7.1	7.3
15	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
16	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
17	7.3	7.3	7.3	7.3	7.2	7.3	7.3	7.2
	Temperature (°C)							
9	24	24	24	24	25	25	25	25
10	24	24	25	25	25	24	25	25
11	24	25	24	24	25	24	25	25
12	24	24	24	24	24	24	24	24
13	24	24	24	24	24	24	24	24
14	24	24	24	24	24	24	24	25
15	24	24	24	24	24	24	24	24
16	24	24	24	24	24	24	24	24
17	24	24	24	25	24	24	24	24

Old Solutions

	Lab CTL	Lab CTL	Site CTL	30	44	67	100A	100B
		20 ug/L						
	pH (units)							
9	8.0	8.0	8.1	8.1	8.1	8.0	8.1	8.1
10	8.1	8.1	8.2	8.3	8.3	8.1	8.1	8.1
11	8.1	8.0	8.1	8.2	8.2	8.0	8.1	8.1
12	7.9	8.0	8.1	8.0	8.1	8.0	7.9	8.0
13	7.8	7.9	8.2	8.2	8.2	8.1	8.1	8.1
14	7.9	7.9	8.2	8.2	8.2	8.1	8.1	8.1
15	7.9	7.9	8.1	8.2	8.1	8.0	8.0	8.0
16	8.1	8.0	8.2	8.2	8.2	8.0	8.0	8.0
17	8.0	8.0	8.1	8.1	8.1	8.1	8.0	8.0
	Conductance (µS/cm)							
9	451	473	362	666	788	989	1218	1249
10	470	498	360	680	795	982	1237	1248
11	470	472	372	655	788	984	1209	1229
12	465	467	358	655	783	983	1239	1234
13	452	464	372	659	792	969	1236	1253
14	472	465	370	631	784	972	1206	1222
15	473	462	367	644	780	977	1200	1235
16	482	470	365	648	789	989	1215	1250
17	452	471	360	648	789	974	1227	1231
	Dissolved Oxygen (mg/L) (**40-100% saturation**)							
9	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
10	7.3	7.3	7.3	7.3	7.2	7.2	7.3	7.3
11	7.3	7.1	7.3	7.2	7.2	7.1	7.0	7.0
12	7.2	7.0	7.1	6.9	6.7	6.7	6.7	6.7
13	7.2	7.2	7.3	7.2	7.2	7.1	7.0	7.0
14	7.2	7.2	7.3	7.2	7.2	7.3	7.1	7.3
15	7.3	7.3	7.3	7.3	7.3	7.3	7.2	7.3
16	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
17	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
	Temperature (°C)							
9	24	24	24	24	24	24	24	24
10	24	24	24	24	24	24	24	24
11	24	24	24	24	24	24	24	24
12	24	24	24	24	24	24	24	24
13	24	24	24	24	24	24	24	24
14	24	24	24	24	24	24	24	24
15	24	24	24	24	24	24	24	24
16	24	24	24	24	24	24	24	24
17	24	24	24	24	24	24	24	24

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample 15-1642 Site Control 15-1639

New Solutions

Conc. (%)	Lab CTL	Lab CTL	Site CTL	30	44	67	100A	100B
Day		20 ug/L						
				pH (units)				
18	8.0	8.0	8.3	8.3	8.3	8.3	8.2	8.2
19	7.9	7.9	8.1	8.1	8.1	8.1	8.0	8.0
20	8.0	8.0	8.0	8.1	8.1	8.1	8.0	8.0
21	7.9	8.0	8.0	8.0	8.0	8.1	8.0	8.0
22	8.2	8.1	8.1	8.1	8.1	8.1	8.2	8.1
23	8.1	8.0	8.0	8.0	8.0	8.0	7.9	8.1
24	8.1	8.1	8.1	8.0	8.1	8.1	8.0	8.0
25	8.1	8.0	8.1	8.2	8.2	8.1	8.0	8.1
26	8.1	8.2	8.1	8.2	8.2	8.1	8.0	8.1
				Conductance (µS/cm)				
18	443	483	355	655	796	998	1270	1270
19	446	480	361	672	795	1003	1277	1265
20	472	456	364	645	787	984	1264	1265
21	458	468	358	656	789	997	1261	1282
22	455	452	367	672	793	1000	1281	1281
23	473	451	367	614	733	908	1146	1167
24	499	453	372	595	726	897	1134	1151
25	469	475	344	617	729	899	1134	1134
26	462	485	366	623	730	898	1140	1147
				Dissolved Oxygen (mg/L) (**40-100% saturation**)				
18	7.3	7.3	7.3	7.3	7.3	7.3	7.2	7.2
19	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
20	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
21	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
22	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
23	7.6	7.5	7.5	7.5	7.4	7.4	7.4	7.4
24	7.6	7.5	7.6	7.6	7.5	7.5	7.5	7.5
25	7.4	7.4	7.4	7.4	7.5	7.4	7.4	7.4
26	7.3	7.3	7.2	7.1	7.1	7.1	7.1	7.1
				Temperature (°C)				
18	24	24	24	24	24	24	25	25
19	24	24	24	24	24	24	24	24
20	24	24	24	24	24	24	24	24
21	24	24	24	24	24	24	24	24
22	24	24	24	24	24	24	24	24
23	22	24	24	24	24	24	24	24
24	24	24	24	24	24	24	24	24
25	24	24	24	24	24	24	24	24
26	24	24	25	26	26	26	26	25

Old Solutions

	Lab CTL	Lab CTL	Site CTL	30	44	67	100A	100B
		20 ug/L						
				pH (units)				
18	8.0	8.1	8.2	8.2	8.3	8.2	8.2	8.2
19	7.8	7.8	8.1	8.1	8.2	8.0	8.0	8.0
20	8.0	7.9	7.9	8.1	8.1	7.9	8.0	8.0
21	7.9	8.0	8.1	8.2	8.1	8.0	8.0	8.1
22	8.0	7.9	7.8	7.9	8.0	7.9	7.9	8.0
23	8.0	8.0	8.1	8.0	8.1	8.1	7.8	8.0
24	8.0	8.0	8.1	8.1	8.2	8.0	8.0	8.0
25	7.9	8.0	8.0	8.1	8.1	7.9	7.9	7.9
26	8.0	8.0	8.1	8.1	8.2	8.0	7.8	8.0
				Conductance (µS/cm)				
18	456	474	363	653	783	980	1242	1254
19	451	485	367	651	799	992	1260	1276
20	450	469	386	650	793	985	1248	1266
21	480	473	394	659	790	1000	1256	1266
22	467	473	368	654	796	1001	1250	1282
23	463	463	388	664	795	993	1273	1265
24	470	472	401	637	757	945	1151	1173
25	495	471	364	618	741	921	1135	1144
26	487	479	358	614	730	887	1331	1094
				Dissolved Oxygen (mg/L) (**40-100% saturation**)				
18	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
19	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
20	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
21	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
22	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
23	7.3	7.3	7.4	7.2	7.0	7.2	6.1	7.0
24	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
25	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
26	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
				Temperature (°C)				
18	24	24	24	24	24	24	24	24
19	24	24	24	24	24	24	24	24
20	24	24	24	24	24	24	24	24
21	24	24	24	24	24	24	24	24
22	24	24	24	24	24	24	24	24
23	24	24	24	24	24	24	24	24
24	24	24	24	24	24	24	24	24
25	24	24	24	24	24	24	24	24
26	24	24	24	24	24	24	24	24

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments: Day 23, 24, 25 DO higher, most likely due to the lower temperature, as well as from being taken from the chem cup rather than the jar

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample 15-1642
Site Control 15-1639

New Solutions

Conc. (%) / Day	Lab CTL	Lab CTL 20 ug/L	Site CTL	30	44	67	100A	100B
pH (units)								
27	7.9	8.0	8.0	8.0	8.1	8.0	8.0	8.0
28	8.1	8.1	8.1	8.1	8.1	8.1	8.0	8.1
29	7.9	7.9	8.0	8.0	8.0	8.0	7.9	7.9
30	7.9	7.9	8.0	8.0	8.0	8.0	7.9	7.9
31	8.0	8.0	8.1	8.1	8.2	8.1	8.0	8.0
32								
Conductance (µS/cm)								
27	440	455	356	607	723	892	1130	1146
28	437	458	362	622	812	894	1129	1140
29	427	451	348	592	706	868	1106	1110
30	421	451	347	597	711	867	1097	1100
31	434	457	348	588	708	866	1101	1101
32								
Dissolved Oxygen (mg/L) (40-100% saturation)								
27	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
28	7.2	7.3	7.3	7.1	7.2	7.1	7.1	7.0
29	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
30	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
31	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
32								
Temperature (°C)								
27	24	24	24	24	24	24	24	24
28	25	24	24	25	25	25	26	25
29	24	24	24	24	24	24	24	24
30	24	24	24	24	24	24	24	24
31	24	24	24	24	24	24	24	24
32								

Old Solutions

Lab CTL	Lab CTL 20 ug/L	Site CTL	30	44	67	100A	100B
pH (units)							
7.9	7.9	8.1	8.0	8.1	8.0	8.0	8.0
8.0	8.0	8.2	8.2	8.2	8.1	8.0	8.0
7.9	7.9	8.1	8.0	8.1	7.9	7.9	7.9
7.9	7.9	7.9	8.0	8.1	8.0	7.9	7.9
8.0	8.0	8.0	8.1	8.1	8.0	7.7	7.8
8.0	8.0	8.0	8.1	8.1	8.1	7.9	8.0
Conductance (µS/cm)							
477	481	377	614	733	872	1077	1113
483	490	368	615	726	862	1080	1126
464	465	348	599	717	866	1062	1084
452	457	377	600	722	854	1068	1072
440	454	352	599	710	839	1068	1076
450	467	354	598	721	833	1093	1072
Dissolved Oxygen (mg/L) (40-100% saturation)							
7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
7.3	7.1	7.3	7.3	7.3	7.3	7.3	7.3
7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
Temperature (°C)							
24	24	24	24	24	24	24	24
24	24	24	24	24	24	24	24
24	24	24	24	24	24	24	24
24	24	24	24	24	24	24	24
24	24	24	24	24	24	24	24
24	24	24	24	24	24	24	24

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1642 Site Control: 15-1639

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc.

Lab CTL

Replicate A			Replicate B			Replicate C			Replicate D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	8	Normal	1	7	Normal	1	8	Normal	1	9	Normal
2	8	Normal	2	9	Normal	2	8	Normal	2	7	Normal
3	10	Normal	3	9	Normal	3	8	Normal	3	8	Normal
4	9	Normal	4	8	Normal	4	8	Normal	4	8	Normal
5	8	Normal	5	7	Normal	5	7	Normal	5	9	Normal
6	9	Normal	6	9	Normal	6	6	Normal	6	11	Normal
7	9	Normal	7	9	Normal	7	7	Normal	7	8	Normal
8	10	Normal	8	9	Normal	8	7	Normal	8	6	Normal
9	8	Normal	9	8	Normal	9	7	Normal	9	7	Normal
10	9	Normal	10	8	Normal	10	8	Normal	10	9	Normal
11	7	Normal	11	7	Normal	11	10	Normal	11	9	Normal
12	7	Normal	12	8	Normal	12	6	Normal	12	7	Normal
13	7	Normal	13	6	Normal	13	7	Normal	13	10	Normal
14	-	-	14	-	-	14	9	Normal	14	-	-
15	-	-	15	-	-	15	-	-	15	-	-

Comments

Lab CTL 20 ug/L

Replicate A			Replicate B			Replicate C			Replicate D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	6	Normal	1	9	Normal	1	8	Abnormal F	1	8	Normal
2	6	Normal	2	8	Normal	2	8	Normal	2	10	Normal
3	7	Normal	3	9	Normal	3	9	Normal	3	4	Normal
4	10	Normal	4	8	Normal	4	11	Normal	4	6	Normal
5	10	Normal	5	9	Normal	5	11	Normal	5	11	Normal
6	10	Normal	6	7	Normal	6	8	Normal	6	9	Normal
7	11	Normal	7	11	Normal	7	9	Normal	7	9	Normal
8	-	-	8	8	Normal	8	9	Normal	8	11	Normal
9	-	-	9	10	Normal	9	11	Normal	9	10	Normal
10	-	-	10	10	Normal	10	10	Normal	10	10	Normal
11	-	-	11	10	Normal	11	6	Normal	11	10	Normal
12	-	-	12	-	-	12	7	Normal	12	7	Normal
13	-	-	13	-	-	13	11	Normal	13	9	Normal
14	-	-	14	-	-	14	-	-	14	-	-
15	-	-	15	-	-	15	-	-	15	-	-

Comments

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1642 Site Control: 15-1639

Test Termination

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc.
SITE CTL

Replicate A			Replicate B			Replicate C			Replicate D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	9	Normal	1	6	Normal	1	9	Normal	1	6	Normal
2	10	Normal	2	7	Normal	2	10	Normal	2	8	Normal
3	9	Normal	3	8	Normal	3	9	Normal	3	10	Normal
4	7	Normal	4	10	Normal	4	11	Normal	4	8	Normal
5	11	Normal	5	10	Normal	5	7	Normal	5	11	Normal
6	9	Normal	6	11	Normal	6	10	Normal	6	7	Normal
7	8	Normal	7	6	Normal	7	6	Normal	7	9	Normal
8	3	Normal	8	8	Normal	8	10	Normal	8	11	Normal
9	8	Normal	9	10	Normal	9	8	Normal	9	10	Normal
10	9	Normal	10	10	Normal	10	10	Normal	10	10	Normal
11	9	Normal	11	8	Normal	11	10	Normal	11	8	Normal
12	9	Normal	12	8	Normal	12	10	Normal	12	8	Normal
13	9	Normal	13	-	-	13	6	Normal	13	-	-
14	10	Normal	14	-	-	14	8	Normal	14	-	-
15	-	-	15	-	-	15	-	-	15	-	-

Comments

30%

Replicate A			Replicate B			Replicate C			Replicate D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	11	Normal	1	9	Normal	1	11	Normal	1	11	Normal
2	8	Normal	2	6	Normal	2	8	Normal	2	9	Normal
3	6	Normal	3	8	Normal	3	10	Normal	3	9	Normal
4	11	Normal	4	10	Normal	4	7	Normal	4	11	Normal
5	9	Normal	5	11	Normal	5	9	Normal	5	10	Normal
6	8	Normal	6	9	Normal	6	7	Normal	6	10	Normal
7	12	Normal	7	10	Normal	7	10	Normal	7	9	Normal
8	10	Normal	8	8	Normal	8	11	Normal	8	11	Normal
9	7	Normal	9	6	Normal	9	11	Normal	9	11	Normal
10	10	Normal	10	10	Normal	10	10	Normal	10	10	Normal
11	8	Normal	11	10	Normal	11	-	-	11	-	-
12	10	Normal	12	7	Normal	12	-	-	12	-	-
13	11	Normal	13	11	Normal	13	-	-	13	-	-
14	-	-	14	11	Normal	14	-	-	14	-	-
15	-	-	15	9	Normal	15	-	-	15	-	-

Comments

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1642 Site Control: 15-1639

Test Termination

For normal/abnormal column, use the following notation:
N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. **44%**

Replicate A			Replicate B			Replicate C			Replicate D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	7	Normal	1	10	Normal	1	9	Normal	1	9	Normal
2	8	Normal	2	10	Normal	2	9	Normal	2	9	Normal
3	8	Normal	3	9	Normal	3	8	Normal	3	5	Normal
4	9	Normal	4	9	Normal	4	8	Normal	4	9	Normal
5	9	Normal	5	9	Normal	5	6	Normal	5	9	Normal
6	10	Normal	6	10	Normal	6	10	Normal	6	5	Normal
7	10	Normal	7	8	Normal	7	10	Normal	7	10	Normal
8	10	Normal	8	8	Normal	8	7	Normal	8	9	Normal
9	7	Normal	9	8	Normal	9	10	Normal	9	10	Normal
10	9	Normal	10	10	Normal	10	9	Normal	10	10	Normal
11	9	Normal	11	5	Normal	11	9	Normal	11	9	Normal
12	10	Normal	12	9	Normal	12	9	Normal	12	8	Normal
13	11	Normal	13	-	-	13	10	Normal	13	11	Normal
14	11	Normal	14	-	-	14	9	Normal	14	-	-
15	-	-	15	-	-	15	9	Normal	15	-	-

Comments

67%A

Replicate A			Replicate B			Replicate C			Replicate D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	9	Normal	1	9	Normal	1	9	Normal	1	10	Normal
2	10	Normal	2	9	Normal	2	9	Normal	2	9	Normal
3	9	Normal	3	9	Normal	3	9	Normal	3	10	Normal
4	9	Normal	4	10	Normal	4	11	Normal	4	11	Normal
5	11	Normal	5	10	Normal	5	9	Normal	5	6	Normal
6	9	Normal	6	10	Normal	6	9	Normal	6	10	Normal
7	9	Normal	7	10	Normal	7	9	Normal	7	10	Normal
8	9	Normal	8	9	Normal	8	9	Normal	8	9	Normal
9	8	Normal	9	9	Normal	9	10	Normal	9	8	Normal
10	10	Normal	10	9	Normal	10	11	Normal	10	10	Normal
11	8	Normal	11	11	Normal	11	11	Normal	11	8	Normal
12	9	Normal	12	11	Normal	12	11	Normal	12	11	Normal
13	-	-	13	10	Normal	13	-	-	13	10	Normal
14	-	-	14	-	-	14	-	-	14	10	Normal
15	-	-	15	-	-	15	-	-	15	-	-

Comments

Nautilus Environmental

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client NAU104 Sample: 15-1642 Site Control: 15-1639

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. **100%A**

Replicate A			Replicate B			Replicate C			Replicate D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	10	Normal	1	9	Normal	1	9	Normal	1	10	Normal
2	12	Normal	2	9	Normal	2	9	Normal	2	9	Normal
3	11	Normal	3	10	Normal	3	8	Normal	3	10	Normal
4	10	Normal	4	8	Normal	4	11	Normal	4	9	Normal
5	11	Normal	5	9	Normal	5	10	Normal	5	7	Normal
6	9	Normal	6	9	Normal	6	10	Normal	6	8	Normal
7	10	Normal	7	11	Normal	7	12	Normal	7	9	Normal
8	10	Normal	8	10	Normal	8	9	Normal	8	9	Normal
9	9	Normal	9	8	Normal	9	10	Normal	9	9	Normal
10	9	Normal	10	9	Normal	10	10	Normal	10	10	Normal
11	10	Normal	11	9	Normal	11	9	Normal	11	9	Normal
12	10	Normal	12	9	Normal	12	9	Normal	12	11	Normal
13	-	-	13	10	Normal	13	8	Normal	13	9	Normal
14	-	-	14	10	Normal	14	-	-	14	-	-
15	-	-	15	-	-	15	-	-	15	-	-

Comments

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. **100%B**

Replicate A			Replicate B			Replicate C			Replicate D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	9	Normal	1	10	Normal	1	10	Normal	1	9	Normal
2	10	Normal	2	10	Normal	2	10	Normal	2	9	Normal
3	8	Normal	3	10	Normal	3	8	Normal	3	10	Normal
4	11	Normal	4	9	Normal	4	9	Normal	4	10	Normal
5	10	Normal	5	10	Normal	5	10	Normal	5	9	Normal
6	9	Normal	6	9	Normal	6	9	Normal	6	8	Normal
7	10	Normal	7	10	Normal	7	10	Normal	7	8	Normal
8	11	Normal	8	11	Normal	8	10	Normal	8	9	Normal
9	9	Normal	9	8	Normal	9	10	Normal	9	10	Normal
10	10	Normal	10	10	Normal	10	9	Normal	10	9	Normal
11	8	Normal	11	9	Normal	11	8	Normal	11	12	Normal
12	9	Normal	12	-	-	12	-	-	12	8	Normal
13	10	Normal	13	-	-	13	-	-	13	8	Normal
14	8	Normal	14	-	-	14	-	-	14	9	Normal
15	10	Normal	15	-	-	15	-	-	15	9	Normal

Comments

Nautilus Environmental
Quality Management System

Organism Weights Bench Sheet

Client NAU104 Sample 15-1642 Organism FM
Site Control 15-1639

Initial Weight (mg) (dried pan)

Conc.	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
Replicate								
a	965.89	985.23	1004.43	1010.22	1011.15	1008.16	986.29	1023.81
b	975.93	1057.54	1002.12	1007.27	939.46	1006.51	995.75	974.66
c	964.63	1031.91	936.98	949.59	927.79	936.77	990.64	970.63
d	996.14	1021.01	936.8	959.96	986.06	940.79	992.88	1015.76
e								

Final Weight (mg) (dried pan+organisms)

Conc.	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
Replicate								
a	980.07	996.18	1020.19	1026.93	1034.29	1021.26	1003.63	1041.36
b	989.89	1073.09	1016.41	1024.34	954.75	1024.83	1006.76	989.75
c	978.12	1048.66	951.47	965.41	944.95	953.26	1006.37	988.86
d	1008.76	1038.03	950.16	977.42	1002.74	957.78	1010.16	1030.36
e								

Nautilus Environmental
Quality Management System

Organism Weights Bench Sheet

Client NAU104 Sample 15-1642 Organism FM
Site Control 15-1639

Organism weight per replicate (mg)

Dose	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
replicate								
a	14.18	10.95	15.76	16.71	23.14	13.1	17.34	17.55
b	13.96	15.55	14.29	17.07	15.29	18.32	11.01	15.09
c	13.49	16.75	14.49	15.82	17.16	16.49	15.73	18.23
d	12.62	17.02	13.36	17.46	16.68	16.99	17.28	14.6
e								

Dry Weight per Fish (mg)

Dose	Lab CTL	Lab CTL 20 ug/L	Site CTL	30%	44%	67%	100%A	100%B
replicate								
a	1.09	1.56	1.13	1.29	1.65	1.09	1.44	1.17
b	1.07	1.41	1.19	1.14	1.27	1.41	0.79	1.37
c	0.96	1.29	1.04	1.58	1.14	1.37	1.21	1.66
d	0.97	1.31	1.11	1.75	1.28	1.21	1.33	0.97
Average	1.02	1.39	1.12	1.44	1.34	1.27	1.19	1.29

Nautilus Environmental 32 Day Fathead Minnow Data Summary

Method FMD 32 Day ELS Client NAU104 Reference: 15-1639
15-1642

Concentration: LAB CTL

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	93%	93%	87%	8	1.09	0%
b	100%	87%	87%	8	1.07	0%
c	100%	93%	93%	8	0.96	0%
d	93%	93%	87%	8	0.97	0%
Average	**97%**	**91%**	**88%**	**8**	**1.02**	**0%**

Concentration: LAB CTL 20 ug/L

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	93%	50%	47%	9	1.56	0%
b	100%	73%	73%	9	1.41	0%
c	100%	87%	87%	9	1.29	8%
d	100%	87%	87%	9	1.31	0%
Average	**98%**	**74%**	**73%**	**9**	**1.39**	**2%**

Concentration: SITE CTL

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	100%	93%	93%	9	1.13	0%
b	93%	86%	80%	9	1.19	0%
c	100%	93%	93%	9	1.04	0%
d	100%	80%	80%	9	1.11	0%
Average	**98%**	**88%**	**87%**	**9**	**1.12**	**0%**

Concentration: 30%

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	100%	87%	87%	9	1.29	0%
b	100%	100%	100%	9	1.14	0%
c	93%	71%	67%	9	1.58	0%
d	100%	67%	67%	10	1.75	0%
Average	**98%**	**81%**	**80%**	**9**	**1.44**	**0%**

Nautilus Environmental

32 Day Fathead Minnow Data Summary

Concentration: 44%

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	100%	93%	93%	9	1.65	0%
b	100%	80%	80%	9	1.27	0%
c	100%	100%	100%	9	1.14	0%
d	100%	87%	87%	9	1.28	0%
Average	**100%**	**90%**	**90%**	**9**	**1.34**	**0%**

Concentration: 67%

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	100%	80%	80%	9	1.09	0%
b	100%	87%	87%	10	1.41	0%
c	100%	80%	80%	10	1.37	0%
d	100%	93%	93%	9	1.21	0%
Average	**100%**	**85%**	**85%**	**10**	**1.27**	**0%**

Concentration: 100A%

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	100%	80%	80%	10	1.44	0%
b	100%	93%	93%	9	0.79	0%
c	100%	87%	87%	10	1.21	0%
d	100%	87%	87%	9	1.33	0%
Average	**100%**	**87%**	**87%**	**10**	**1.19**	**0%**

Concentration: 100B%

replicate	Hatching Success	Post Hatch Survival	Cumulative Survival	Average Length (mm)	Dry Weight per fish (mg)	Incidence of Deformities
a	100%	100%	100%	9	1.17	0%
b	100%	73%	73%	10	1.37	0%
c	100%	73%	73%	9	1.66	0%
d	100%	100%	100%	9	0.97	0%
Average	**100%**	**87%**	**87%**	**9**	**1.29**	**0%**

Nautilus Environmental

Warning Chart
Fathead minnow

Test Method: 7 days Fathead minnow Survival and Growth Test (7 treatments plus a control)
Test Method: WTR-ME-046

Reference: Biological Test Method: Test of Larval Growth and Survival Using Fathead minnows. Environment Canada, EPS 1/RM/22, Second Edition, February 2011.

Test Organism:

test species:	*Pimephales promelas*
culture source:	Aquatox (Arkansas, USA)
temp of breeding aquaria:	23 - 26 ^{o}C
food type:	newly-hatched brine shrimp nauplii
frequency of feeding:	daily
breeding colony mortality:	<1% (last 7 days)
age of test organisms:	<24 hours
condition prior to test initiation:	normal
batch number:	20151207FMELS

Test Design:

test type:	static renewal
toxicant:	sodium chloride
test vessel:	polypropylene cups, 11 x 9 cm
volume of test vessel (ml):	500
test volume (ml):	250
depth of test solution:	>3 cm
replicates per treatment:	3 replicates
organisms per replicate:	10
feeding:	twice daily
temperature (^{o}C):	24-26
photoperiod:	16 hours light: 8 hours dark
light level (surface):	100-500 lux (full spectrum)

Control/Dilution Water:

source:	dechlorinated City of Calgary tap water no chemicals were added to the dilution water
pH (units):	7.0
conductance (µS/cm):	447
dissolved oxygen (mg/L):	9.5
NH_4^+ (mg/L):	<0.1
hardness (mg $CaCO_3$/L):	218
alkalinity (mg $CaCO_3$/L):	136
total residual chlorine (mg/L):	<0.01

Comments: None

The test data and results are authorized and verified correct.

Jacklyn Poole

Senior Verifier

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling or transport of the sample, application or interpretation of the test data or results in part or in whole.

Nautilus Environmental (Calgary), #4, 6125 12th Street SE, Calgary, Alberta, Canada T2H 2K1
Tel (403) 253-7121 Fax (403) 252-9363 www.nautilusenvironmental.ca

Warning Chart
Fathead minnow

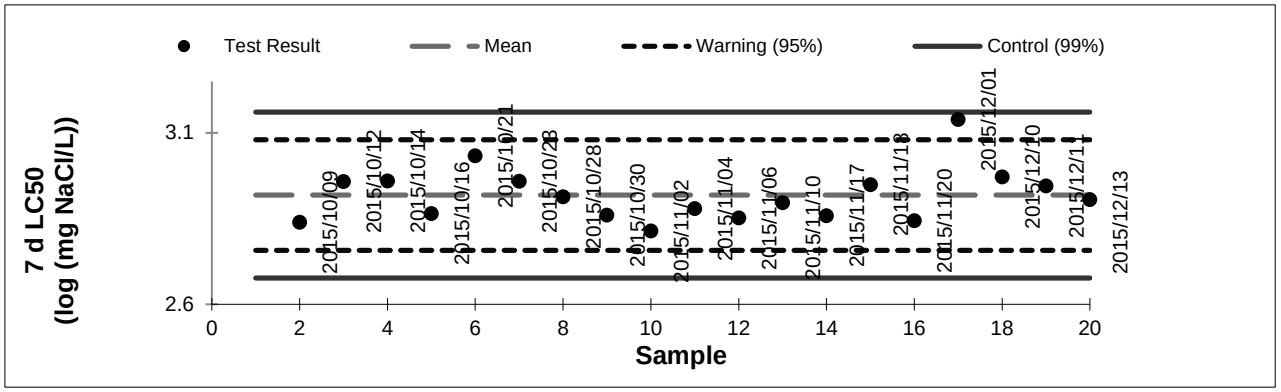
Mortality

Current Test

toxicant	Sodium Chloride (NaCl)				
started on	2015/12/13	ended on	2015/12/20		
Result (7 d LC50):	2.91	log (mg NaCl/L); geometric mean			
Confidence Limits (95%)	lower	2.83	upper	2.98	

Historical Values

mean	2.92	sd	0.08	cv(%):	12.3
	lower	upper			
warning limits (±2 sd)	2.76	3.08	(95% confidence limits)		
control limits (±3 sd)	2.68	3.16	(99% confidence limits)		

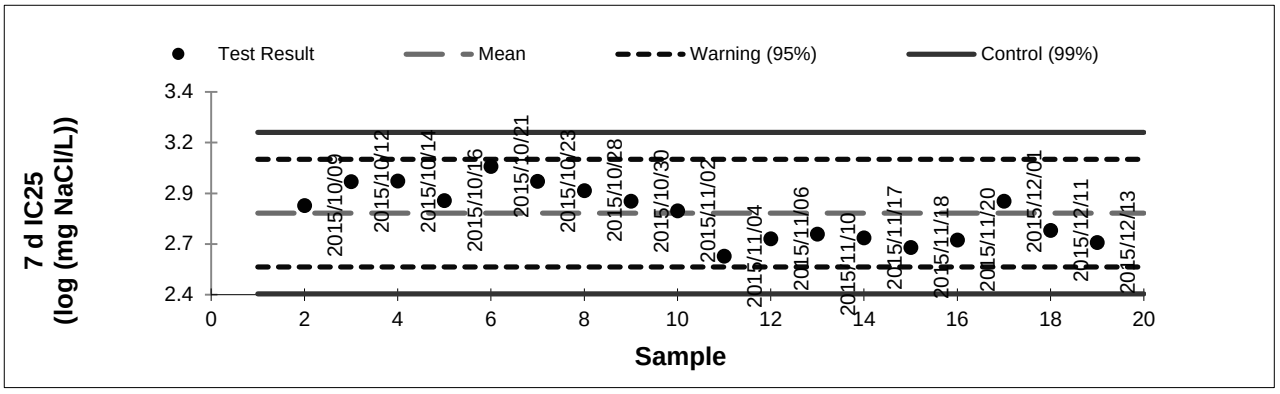


Biomass

started on	2015/12/13	ended on	2015/12/20		
Result (7 d IC25):	2.66	log (mg NaCl/L); geometric mean			
Confidence Limits (95%)	lower	2.31	upper	2.77	

Historical Values

mean	2.80	sd	0.13	cv(%):	20.3
	lower	upper			
warning limits (±2 sd)	2.54	3.07	(95% confidence limits)		
control limits (±3 sd)	2.40	3.20	(99% confidence limits)		



notes: sd, standard deviation; cv, coefficient of variance; N/A, could not be calculated

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GENERAL TERMS AND CONDITIONS:

These terms and conditions are incorporated into and form part of the Chain of Custody between HydroQual Laboratories Ltd. ("HydroQual") and the party named in the Chain of Custody (the "Client").

1. **Definitions:** Capitalized terms shall have the definition ascribed as such in these General Terms and Conditions and the Chain of Custody.
2. **The Services:** HydroQual will provide the Services to the Client as listed and described in the Chain of Custody.
3. **Prices:** HydroQual may review and change all prices, fees, surcharges or other charges as set out in proposals and/or price quotations if there are changes to HydroQual's cost beyond HydroQual's control, including changes in legislative requirements, Client variations of sample numbers and Client requests for changes to standard reporting requirements. Notwithstanding condition 3, all quotations are reviewed and updated on a yearly basis.
4. **Payment Terms:** The Client shall pay HydroQual within 30 days of the invoice date as provided by HydroQual. HydroQual may, for reasonable business reasons, require the Client to arrange for payment in advance.
5. **Quotation Numbers:** The Client shall provide the proposal and/or price quotation number to HydroQual (where applicable) to ensure correct pricing.
6. **Taxes:** Applicable taxes are not included in prices, surcharges and additional fees and will be added at the time of invoicing.
7. **No Guarantee of Results:** The Client is responsible for informing itself on the limitation of the results and acknowledges that the results are not guaranteed.
8. **Standard of Care:** HydroQual will use reasonable care and diligence as required by the laws of the province or territory where the sample is tested, subject to that level of care and skill ordinarily exercised by other laboratories currently practicing under similar conditions in the same locality, subject to the time limits and financial, physical or other constraints applicable to the Services. No warranty, express or implied, is made.
9. **Storage:** Where possible, HydroQual will store samples until a final report is issued to the Client, after which time HydroQual may discard the sample.
10. **Holds:** If the Client requests a sample be placed on hold, HydroQual will store the sample for the mutually agreed upon written time and price, after which HydroQual will invoice the Client and discard the sample.
11. **Archives:** If the Client requests a sample be archived, HydroQual will store the sample for a mutually agreed upon written time frame and price, after which HydroQual will invoice the Client and discard the sample.
12. **Handling Protocol:** Legal sample handling protocol must be arranged, and provided in writing, before samples are collected. HydroQual will provide a price quotation for legal sample protocol. Samples processed under legal protocol are stored indefinitely, subject to a storage charge as advised by HydroQual.
13. **Samples:** The quality, condition, content and source of samples stored and tested are not known to HydroQual except as declared and described on the Chain of Custody completed and submitted by the Client and accompanying the sample.
14. **Risk of Loss:** HydroQual will use reasonable care to protect samples during storage, however, all samples are stored at the Client's risk and the Client is responsible for obtaining appropriate insurance, if desired. The Client acknowledges that during the performance of the Services samples may be altered, lost, damaged or destroyed and the client forever releases HydroQual from any and all claims the Client may have for any loss or damage to the sample.
15. **Environmental:** the Client must comply with all applicable environmental legislation, including labeling all hazardous samples to comply with Canada's *Workplace Hazardous Materials Information System* and the Alberta *Transfer of Dangerous Goods* regulations, and must provide appropriate material safety data sheets that include the nature of the hazard and a contact name and phone number to call for information. The Client shall defend, indemnify and hold harmless HydroQual for all loss or damages, including any fine or cost of complying with an order of any government authority, resulting from the Client's breach of this paragraph.
16. **Hazardous Materials Disposal:** HydroQual may return, at the Client's cost, hazardous material to the Client for disposal.
17. **Hazardous Materials Surcharge:** HydroQual may apply an additional surcharge for handling of hazardous samples or samples with Naturally Occurring Radioactive Materials ("NORM"), such as and including without limitation, H_2S and CN.
18. **Sample Containers:** HydroQual may ship sample containers to the Client's location by the most cost effective means using HydroQual's preferred courier suppliers, within the specified project timeline. Shipping will be charged back to the Client.
19. **Additional Charges:** HydroQual may charge the Client:
    (a) for pick-up and delivery services when provided subject in each instance to a minimum charge of $50.00; and,
    (b) for rush service (processing samples and/or reporting).
20. **Large Bottle Orders:** The Client shall provide HydroQual with not less than 24 hours' notice for large bottle orders.
21. **Re-Tests:** HydroQual reserves the right to re-test any samples that remain in HydroQual's possession. Re-tests requested by the Client may be charged to Client and Client agrees to pay for such charges.
22. **Waiver:** The Client is responsible for making any assessment regarding the suitability of the Services and the intended results for the Client's purposes and waives any and all claims against HydroQual that the Client may have against HydroQual as a result of the interpretation of the results provided to the Client. The Client shall defend, indemnify and save harmless HydroQual for any and all claims made by any third party against HydroQual in respect of all losses however arising from the performance of the Services or the use of any report provided in the performance of the Services.
23. **LIMITATION OF LIABILITY:** IN NO EVENT SHALL HYDROQUAL BE RESPONSIBLE FOR ANY CONSEQUENTIAL, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY OR PUNITIVE DAMAGES, WHETHER FORESEEABLE OR UNFORESEEABLE (INCLUDING CLAIMS FOR LOSS OF PROFITS OR REVENUE OR LOSSES CAUSED BY STOPPAGE OF OTHER WORK OR IMPAIRMENT OF OTHER ASSETS) INCURRED BY THE CLIENT ARISING OUT OF BREACH OR FAILURE OF EXPRESS OF IMPLIED WARRANTY, BREACH OF CONTRACT, BREACH OF WARRANTY, MISREPRESENTATION, NEGLIGENCE, STRICT LIABILITY IN TORT OR OTHERWISE. IN ANY EVENT, THE LIABILITY OF HYDROQUAL TO THE CLIENT SHALL BE LIMITED TO THE COST OF TESTING THE SAMPLE AS REQUESTED IN THE CHAIN OF CUSTODY UNDER WHICH THE SAMPLE WAS ORIGINALLY DEPOSITED. FOR THE PURPOSES OF THIS PARAGRAPH AND PARAGRAPHS 7, 14, 15, 22, AND 24, AS APPLICABLE, "HYDROQUAL" INCLUDES WITHOUT LIMITATIONS ITS DIRECTORS, OFFICERS, EMPLOYEES AND AFFILIATES AND THE "CLIENT" INCLUDES WITHOUT LIMITATION ANY THIRD PARTY THAT MAY HAVE A CLAIM AGAINST HYDROQUAL THROUGH THE CLIENT.
24. **Notice of Liability:** Notwithstanding paragraph 23, HydroQual shall not be liable to the Client unless the Client provides notice in writing to HydroQual of such loss or damage, together with full particulars thereof, within 30 days of the Client's receipt of the report of the analysis of the sample giving rise to such liability. The provisions of this paragraph allocate the risk between the Client and HydroQual, and the fees to be paid by the Client to HydroQual reflect this allocation of any such risks and the limitations of liability in these General Terms and Conditions.
25. **Entire Agreement:** These General Terms and Conditions, the Chain of Custody and price quotations constitute the entire agreement between the parties and supersede and take precedence over any terms and conditions contained in any documentation provided by the Client. HydroQual's execution of any subsequent documentation from the Client only acknowledges receipt and not acceptance of any terms or conditions therein unless expressly stipulated otherwise by HydroQual. If there is a conflict between these General Terms and Conditions and any other document, these General Terms and Conditions prevail.

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Batch ID:	19-1412-2046	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 Dec-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	FR_UFRI
Ending Date:	09 Jan-16	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 0h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
17-9372-4932	Hatched Rate	0	>0		NA		Fisher Exact Test
02-1037-3808	Length-mm	<0	0		6.24%		Equal Variance t Two-Sample Test
21-4314-0642	Mean Dry Biomass-mg	0	>0		10.9%		Equal Variance t Two-Sample Test
02-1236-3514	Proportion Normal	0	>0		NA		Fisher Exact Test
19-5930-3882	Survival Rate	0	>0		NA		Fisher Exact Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
15-2560-4674	Hatched Rate	EC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC10	>100	N/A	N/A	<1	
		EC15	>100	N/A	N/A	<1	
		EC20	>100	N/A	N/A	<1	
		EC25	>100	N/A	N/A	<1	
		EC40	>100	N/A	N/A	<1	
		EC50	>100	N/A	N/A	<1	
18-0854-6134	Length-mm	IC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		IC10	>100	N/A	N/A	<1	
		IC15	>100	N/A	N/A	<1	
		IC20	>100	N/A	N/A	<1	
		IC25	>100	N/A	N/A	<1	
		IC40	>100	N/A	N/A	<1	
		IC50	>100	N/A	N/A	<1	
02-0435-2693	Mean Dry Biomass-mg	IC5	11010000	N/A	N/A	0.0000090	Nonlinear Regression
		IC10	22610000	N/A	N/A	0.0000044	
		IC15	34880000	N/A	N/A	0.0000028	
		IC20	47890000	N/A	N/A	0.0000020	>100% (v low)
		IC25	61740000	N/A	N/A	0.0000016	
		IC40	10960000	N/A	N/A	0.0000009	
		IC50	14870000	N/A	N/A	0.0000006	
17-9093-9790	Proportion Normal	EC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC10	>100	N/A	N/A	<1	
		EC15	>100	N/A	N/A	<1	
		EC20	>100	N/A	N/A	<1	
		EC25	>100	N/A	N/A	<1	
		EC40	>100	N/A	N/A	<1	
		EC50	>100	N/A	N/A	<1	
01-1101-9313	Survival Rate	EC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC10	>100	N/A	N/A	<1	
		EC15	>100	N/A	N/A	<1	
		EC20	>100	N/A	N/A	<1	
		EC25	>100	N/A	N/A	<1	
		EC40	>100	N/A	N/A	<1	
		EC50	>100	N/A	N/A	<1	

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Hatched Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.9833	0.9303	1	0.9333	1	0.01667	0.03333	3.39%	0.0%
0	Lab Water	4	0.9833	0.9303	1	0.9333	1	0.01667	0.03333	3.39%	0.0%
0	Negative Control	4	0.9667	0.9054	1	0.9333	1	0.01925	0.03849	3.98%	1.7%
30		4	0.9833	0.9303	1	0.9333	1	0.01667	0.03333	3.39%	0.0%
44		4	1	1	1	1	1	0	0	0.0%	-1.7%
67		4	1	1	1	1	1	0	0	0.0%	-1.7%
100		8	1	1	1	1	1	0	0	0.0%	-1.7%

Length-mm Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	8.69	8.401	8.979	8.5	8.86	0.09083	0.1817	2.09%	0.0%
0	Lab Water	4	8.827	8.429	9.226	8.57	9.08	0.1251	0.2502	2.84%	-1.58%
0	Negative Control	4	8.065	7.478	8.652	7.57	8.38	0.1845	0.369	4.58%	7.19%
30		4	9.453	8.713	10.19	9	10.1	0.2322	0.4644	4.91%	-8.77%
44		4	8.845	8.524	9.166	8.69	9.14	0.1009	0.2017	2.28%	-1.78%
67		4	9.51	9.087	9.933	9.17	9.75	0.1329	0.2658	2.8%	-9.44%
100		8	9.457	9.199	9.716	9.13	10.08	0.1091	0.3087	3.26%	-8.83%

Mean Dry Biomass-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.965	0.8602	1.07	0.8907	1.051	0.03294	0.06587	6.83%	0.0%
0	Lab Water	4	1.004	0.7055	1.303	0.73	1.135	0.09395	0.1879	18.7%	-4.09%
0	Negative Control	4	0.9042	0.8309	0.9775	0.8413	0.9453	0.02304	0.04607	5.1%	6.3%
30		4	1.118	1.043	1.192	1.055	1.164	0.02335	0.0467	4.18%	-15.82%
44		4	1.205	0.836	1.573	1.019	1.543	0.1158	0.2316	19.22%	-24.82%
67		4	1.082	0.846	1.317	0.8733	1.221	0.07406	0.1481	13.69%	-12.09%
100		8	1.057	0.9264	1.187	0.734	1.215	0.0552	0.1561	14.77%	-9.53%

Proportion Normal Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	1	1	1	1	1	0	0	0.0%	0.0%
0	Lab Water	4	0.9808	0.9196	1	0.9231	1	0.01923	0.03846	3.92%	1.92%
0	Negative Control	4	1	1	1	1	1	0	0	0.0%	0.0%
30		4	1	1	1	1	1	0	0	0.0%	0.0%
44		4	1	1	1	1	1	0	0	0.0%	0.0%
67		4	1	1	1	1	1	0	0	0.0%	0.0%
100		8	1	1	1	1	1	0	0	0.0%	0.0%

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.8667	0.7442	0.9892	0.8	0.9333	0.03849	0.07698	8.88%	0.0%
0	Lab Water	4	0.7333	0.4333	1	0.4667	0.8667	0.09428	0.1886	25.71%	15.38%
0	Negative Control	4	0.8833	0.8303	0.9364	0.8667	0.9333	0.01667	0.03333	3.77%	-1.92%
30		4	0.8	0.5402	1	0.6667	1	0.08165	0.1633	20.41%	7.69%
44		4	0.9	0.763	1	0.8	1	0.04303	0.08607	9.56%	-3.85%
67		4	0.85	0.7484	0.9516	0.8	0.9333	0.03191	0.06383	7.51%	1.92%
100		8	0.8667	0.7773	0.956	0.7333	1	0.0378	0.1069	12.34%	0.0%

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Hatched Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	1	0.9333	1	1				
0	Lab Water	0.9333	1	1	1				
0	Negative Control	0.9333	1	1	0.9333				
30		1	1	0.9333	1				
44		1	1	1	1				
67		1	1	1	1				
100		1	1	1	1	1	1	1	1

Length-mm Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	8.57	8.5	8.86	8.83				
0	Lab Water	8.57	9	9.08	8.66				
0	Negative Control	8.38	8	7.57	8.31				
30		9.31	9	9.4	10.1				
44		9.14	8.75	8.8	8.69				
67		9.17	9.69	9.75	9.43				
100		10.08	9.29	9.54	9.15	9.47	9.64	9.36	9.13

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	1.051	0.9527	0.966	0.8907				
0	Lab Water	0.73	1.037	1.117	1.135				
0	Negative Control	0.9453	0.9307	0.8993	0.8413				
30		1.114	1.138	1.055	1.164				
44		1.543	1.019	1.144	1.112				
67		0.8733	1.221	1.099	1.133				
100		1.156	0.734	1.049	1.152	1.17	1.006	1.215	0.9733

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	1	1	1	1				
0	Lab Water	1	1	0.9231	1				
0	Negative Control	1	1	1	1				
30		1	1	1	1				
44		1	1	1	1				
67		1	1	1	1				
100		1	1	1	1	1	1	1	1

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	0.9333	0.8	0.9333	0.8				
0	Lab Water	0.4667	0.7333	0.8667	0.8667				
0	Negative Control	0.8667	0.8667	0.9333	0.8667				
30		0.8667	1	0.6667	0.6667				
44		0.9333	0.8	1	0.8667				
67		0.8	0.8667	0.8	0.9333				
100		0.8	0.9333	0.8667	0.8667	1	0.7333	0.7333	1

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Hatched Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	15/15	14/15	15/15	15/15				
0	Lab Water	14/15	15/15	15/15	15/15				
0	Negative Control	14/15	15/15	15/15	14/15				
30		15/15	15/15	14/15	15/15				
44		15/15	15/15	15/15	15/15				
67		15/15	15/15	15/15	15/15				
100		15/15	15/15	15/15	15/15	15/15	15/15	15/15	15/15

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	14/14	12/12	14/14	12/12				
0	Lab Water	7/7	11/11	12/13	13/13				
0	Negative Control	13/13	13/13	14/14	13/13				
30		13/13	15/15	10/10	10/10				
44		14/14	12/12	15/15	13/13				
67		12/12	13/13	12/12	14/14				
100		12/12	14/14	13/13	13/13	15/15	11/11	11/11	15/15

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	14/15	12/15	14/15	12/15				
0	Lab Water	7/15	11/15	13/15	13/15				
0	Negative Control	13/15	13/15	14/15	13/15				
30		13/15	15/15	10/15	10/15				
44		14/15	12/15	15/15	13/15				
67		12/15	13/15	12/15	14/15				
100		12/15	14/15	13/15	13/15	15/15	11/15	11/15	15/15

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	15-2560-4674	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Feb-16 13:09	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	19-1412-2046	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 Dec-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	FR_UFRI
Ending Date:	09 Jan-16	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 0h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2044419	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Hatched Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Dilution Water	4	0.9833	0.9333	1	0.01667	0.03333	3.39%	0.0%	59	60
30		4	0.9833	0.9333	1	0.01667	0.03333	3.39%	0.0%	59	60
44		4	1	1	1	0	0	0.0%	-1.7%	60	60
67		4	1	1	1	0	0	0.0%	-1.7%	60	60
100		8	1	1	1	0	0	0.0%	-1.7%	120	120

Hatched Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	1	0.9333	1	1				
30		1	1	0.9333	1				
44		1	1	1	1				
67		1	1	1	1				
100		1	1	1	1	1	1	1	1

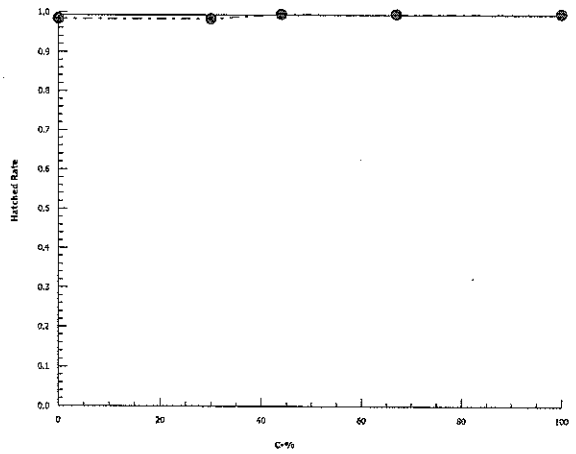
Hatched Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	15/15	14/15	15/15	15/15				
0	Lab Water	14/15	15/15	15/15	15/15				
0	Negative Control	14/15	15/15	15/15	14/15				
30		15/15	15/15	14/15	15/15				
44		15/15	15/15	15/15	15/15				
67		15/15	15/15	15/15	15/15				
100		15/15	15/15	15/15	15/15	15/15	15/15	15/15	15/15

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Analysis ID:	15-2560-4674	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 Feb-16 13:09	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	17-9372-4932	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Mar-16 15:29	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	19-1412-2046	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 Dec-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	FR_UFRI
Ending Date:	09 Jan-16	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 0h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C <> T	NA	NA	Passes hatched rate

Fisher Exact Test

Control	vs	Control	Test Stat	P-Value	P-Type	Decision(α:5%)
Negative Control		Dilution Water	0.6218	0.6218	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Dilution Water	59	1	60	0.9833	0.01667	-1.72%
0	Negative Contr	58	2	60	0.9667	0.03333	0.0%

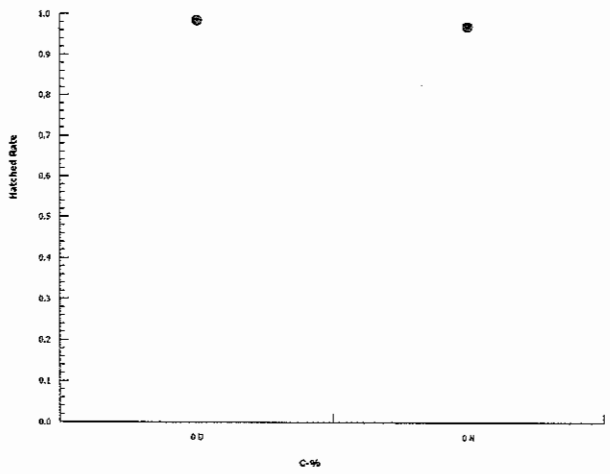
Hatched Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	0.9333	1	1
0	Negative Control	0.9333	1	1	0.9333

Hatched Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	15/15	14/15	15/15	15/15
0	Lab Water	14/15	15/15	15/15	15/15
0	Negative Control	14/15	15/15	15/15	14/15

Graphics



Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	01-1101-9313	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Feb-16 15:07	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	19-1412-2046	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 Dec-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	FR_UFRI
Ending Date:	09 Jan-16	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 0h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	231737	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Dilution Water	4	0.8667	0.8	0.9333	0.03849	0.07698	8.88%	0.0%	52	60
30		4	0.8	0.6667	1	0.08165	0.1633	20.41%	7.69%	48	60
44		4	0.9	0.8	1	0.04303	0.08607	9.56%	-3.85%	54	60
67		4	0.85	0.8	0.9333	0.03191	0.06383	7.51%	1.92%	51	60
100		8	0.8667	0.7333	1	0.0378	0.1069	12.34%	0.0%	104	120

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	0.9333	0.8	0.9333	0.8				
30		0.8667	1	0.6667	0.6667				
44		0.9333	0.8	1	0.8667				
67		0.8	0.8667	0.8	0.9333				
100		0.8	0.9333	0.8667	0.8667	1	0.7333	0.7333	1

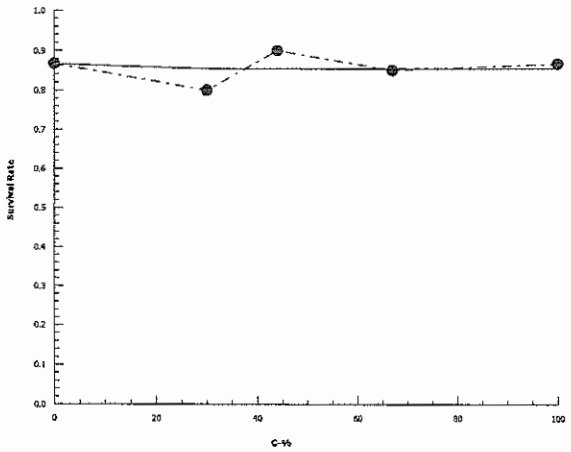
Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	14/15	12/15	14/15	12/15				
0	Lab Water	7/15	11/15	13/15	13/15				
0	Negative Control	13/15	13/15	14/15	13/15				
30		13/15	15/15	10/15	10/15				
44		14/15	12/15	15/15	13/15				
67		12/15	13/15	12/15	14/15				
100		12/15	14/15	13/15	13/15	15/15	11/15	11/15	15/15

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Analysis ID:	01-1101-9313	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Feb-16 15:07	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	19-5930-3882	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Mar-16 15:29	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	19-1412-2046	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 Dec-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	FR_UFRI
Ending Date:	09 Jan-16	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 0h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C <> T	NA	NA	Passes survival rate

Fisher Exact Test

Control	vs	Control	Test Stat	P-Value	P-Type	Decision(α:5%)
Negative Control		Dilution Water	1	1.0000	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Dilution Water	52	8	60	0.8667	0.1333	1.89%
0	Negative Contr	53	7	60	0.8833	0.1167	0.0%

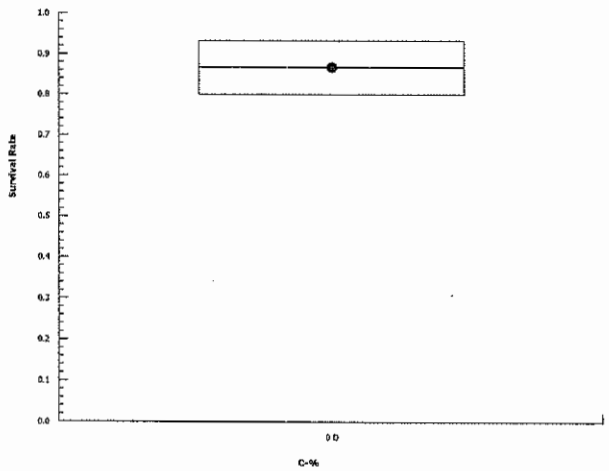
Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	0.9333	0.8	0.9333	0.8
0	Negative Control	0.8667	0.8667	0.9333	0.8667

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	14/15	12/15	14/15	12/15
0	Lab Water	7/15	11/15	13/15	13/15
0	Negative Control	13/15	13/15	14/15	13/15

Graphics



Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	02-0435-2693	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Feb-16 15:12	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	19-1412-2046	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 Dec-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	FR_UFRI
Ending Date:	09 Jan-16	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 0h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
2P Exponential EV [Y=A*exp(log(0.5)*X/D)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
6	33.39	-62.21	-60.42		Yes	1.968	3.127	0.1531	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	11010000	N/A	N/A	0.0000090	NA	NA
IC10	22610000	N/A	N/A	0.0000044	NA	NA
IC15	34880000	N/A	N/A	0.0000028	NA	NA
IC20	47890000	N/A	N/A	0.0000020	NA	NA
IC25	61740000	N/A	N/A	0.0000016	NA	NA
IC40	10960000	N/A	N/A	0.0000009	NA	NA
IC50	14870000	N/A	N/A	0.0000006	NA	NA

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	1.066	0.05966	0.9495	1.183	17.88	<0.0001	Significant Parameter
D	1.49E+08	2.65E+13	-5.2E+13	5.19E+13	5.62E-06	1.0000	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	0	0	1	0	1.0000	Non-Significant
Lack of Fit	0.129523	0.043174	3	1.968	0.1531	Non-Significant
Pure Error	0.416905	0.021942	19			
Residual	0.546429	0.024838	22			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	7.483	9.488	0.1125	Equal Variances
	Mod Levene Equality of Variance	0.7708	2.895	0.5575	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9238	0.9169	0.0710	Normal Distribution
	Anderson-Darling A2 Normality	0.6934	2.492	0.0702	Normal Distribution

Mean Dry Biomass-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	0.965	0.8907	1.051	0.03294	0.06587	6.83%	0.0%
30		4	1.118	1.055	1.164	0.02335	0.0467	4.18%	-15.82%
44		4	1.205	1.019	1.543	0.1158	0.2316	19.22%	-24.82%
67		4	1.082	0.8733	1.221	0.07406	0.1481	13.69%	-12.09%
100		8	1.057	0.734	1.215	0.0552	0.1561	14.77%	-9.53%

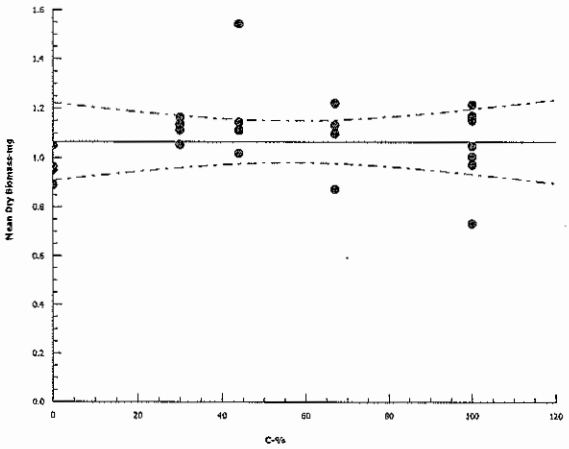
Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

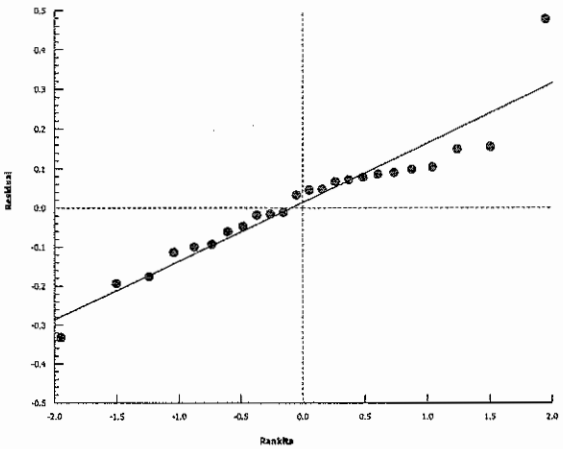
Analysis ID:	02-0435-2693	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Feb-16 15:12	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes

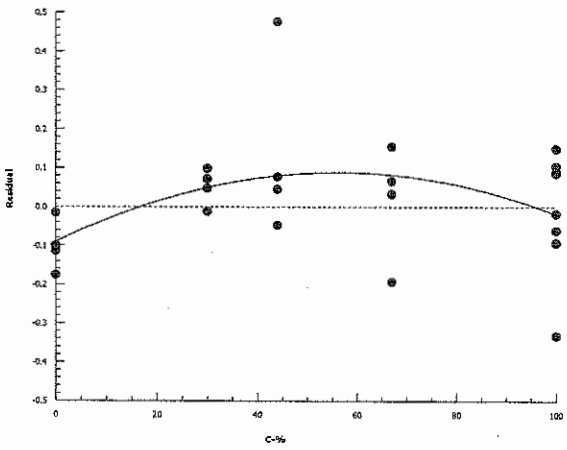
Mean Dry Biomass-mg Detail

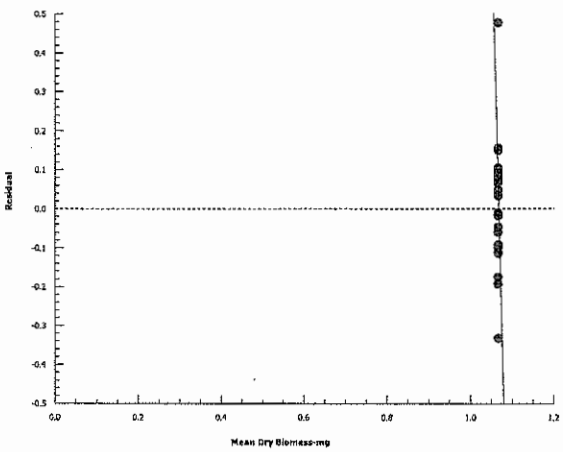
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	1.051	0.9527	0.966	0.8907				
30		1.114	1.138	1.055	1.164				
44		1.543	1.019	1.144	1.112				
67		0.8733	1.221	1.099	1.133				
100		1.156	0.734	1.049	1.152	1.17	1.006	1.215	0.9733

Graphics 2P Exponential EV [Y=A*exp(log(0.5)*X/D)]









CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	21-4314-0642	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Mar-16 15:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	19-1412-2046	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 Dec-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	FR_UFRI
Ending Date:	09 Jan-16	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 0h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C <> T	NA	NA	10.9%	Passes mean dry biomass-mg

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		Dilution Water	1.514	2.447	0.098	6	0.1809	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.007401241	0.007401241	1	2.291	0.1809	Non-Significant Effect
Error	0.01938603	0.003231005	6			
Total	0.02678727		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.044	47.47	0.5720	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9659	0.6451	0.8637	Normal Distribution

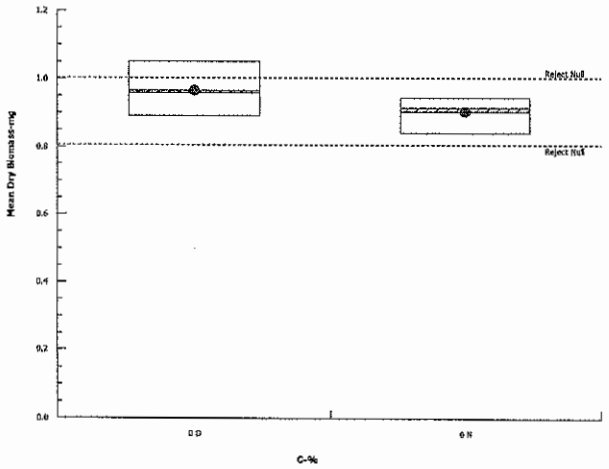
Mean Dry Biomass-mg Summary

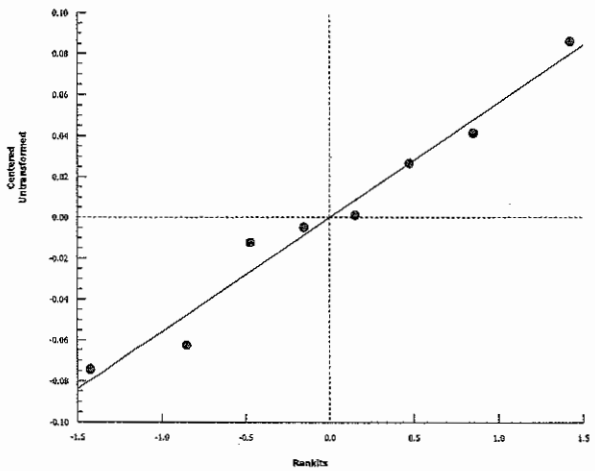
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	0.965	0.8602	1.07	0.9593	0.8907	1.051	0.03294	6.83%	0.0%
0	Negative Control	4	0.9042	0.8309	0.9775	0.915	0.8413	0.9453	0.02304	5.1%	6.3%

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1.051	0.9527	0.966	0.8907
0	Negative Control	0.9453	0.9307	0.8993	0.8413

Graphics





CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	18-0854-6134	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Mar-16 15:24	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	19-1412-2046	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 Dec-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	FR_UFRI
Ending Date:	09 Jan-16	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 0h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1748628	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>100	N/A	N/A	<1	NA	NA
IC10	>100	N/A	N/A	<1	NA	NA
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

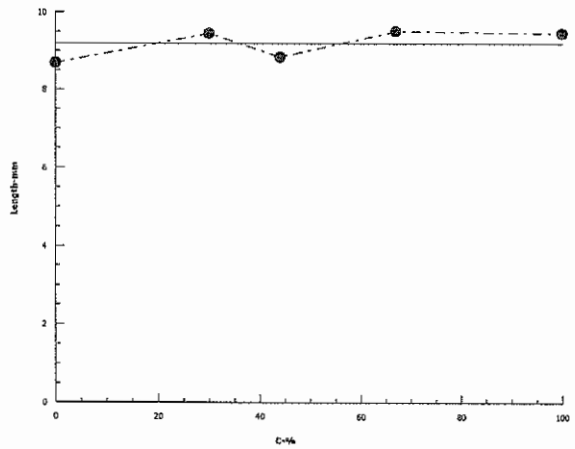
Length-mm Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	4	8.69	8.5	8.86	0.09083	0.1817	2.09%	0.0%
30		4	9.453	9	10.1	0.2322	0.4644	4.91%	-8.77%
44		4	8.845	8.69	9.14	0.1009	0.2017	2.28%	-1.78%
67		4	9.51	9.17	9.75	0.1329	0.2658	2.8%	-9.44%
100		8	9.457	9.13	10.08	0.1091	0.3087	3.26%	-8.83%

Length-mm Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	8.57	8.5	8.86	8.83				
30		9.31	9	9.4	10.1				
44		9.14	8.75	8.8	8.69				
67		9.17	9.69	9.75	9.43				
100		10.08	9.29	9.54	9.15	9.47	9.64	9.36	9.13

Graphics



CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	18-2800-2137	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Mar-16 11:56	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	19-1412-2046	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 Dec-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	FR_UFRI
Ending Date:	09 Jan-16	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 0h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	4.95%	Passes length-mm

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		Dilution Water	-3.039	1.943	0.4	6	0.9886	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.7812491	0.7812491	1	9.236	0.0228	Significant Effect
Error	0.5075001	0.08458334	6			
Total	1.288749		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	4.126	47.47	0.2748	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9383	0.6451	0.5941	Normal Distribution

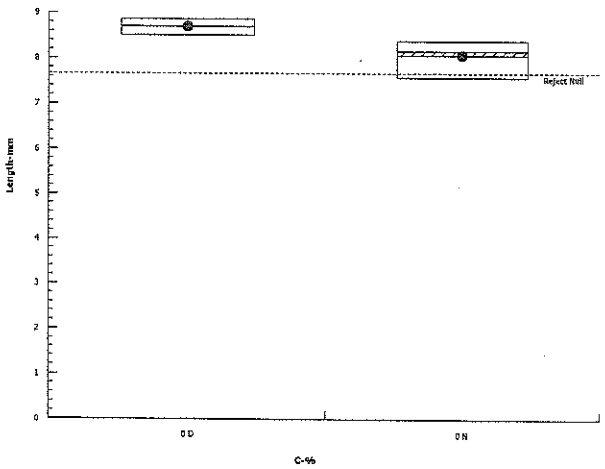
Length-mm Summary

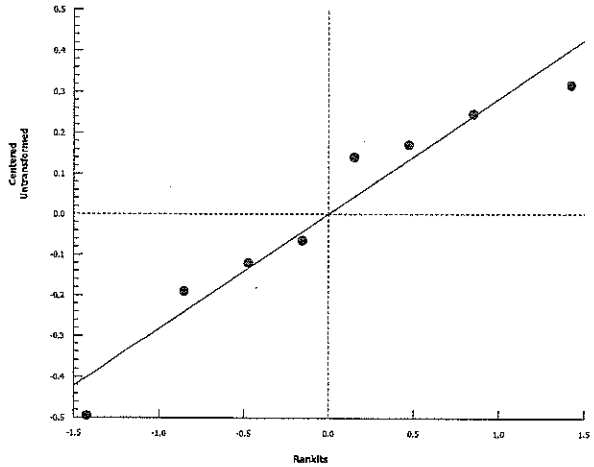
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Dilution Water	4	8.69	8.401	8.979	8.7	8.5	8.86	0.09083	2.09%	0.0%
0	Negative Control	4	8.065	7.478	8.652	8.155	7.57	8.38	0.1845	4.58%	7.19%

Length-mm Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	8.57	8.5	8.86	8.83
0	Negative Control	8.38	8	7.57	8.31

Graphics





Analyst:_____ QA: JGh March 2/1

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	17-9093-9790	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Feb-16 15:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	19-1412-2046	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 Dec-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	FR_UFRI
Ending Date:	09 Jan-16	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 0h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	426441	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Dilution Water	4	1	1	1	0	0	0.0%	0.0%	52	52
30		4	1	1	1	0	0	0.0%	0.0%	48	48
44		4	1	1	1	0	0	0.0%	0.0%	54	54
67		4	1	1	1	0	0	0.0%	0.0%	51	51
100		8	1	1	1	0	0	0.0%	0.0%	104	104

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	1	1	1	1				
30		1	1	1	1				
44		1	1	1	1				
67		1	1	1	1				
100		1	1	1	1	1	1	1	1

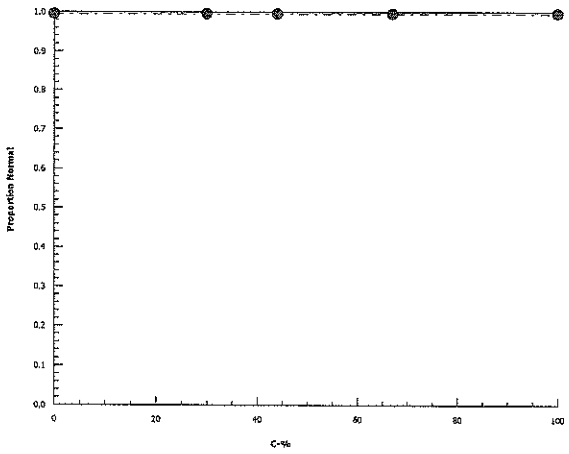
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	14/14	12/12	14/14	12/12				
0	Lab Water	7/7	11/11	13/13	13/13				
0	Negative Control	13/13	13/13	14/14	13/13				
30		13/13	15/15	10/10	10/10				
44		14/14	12/12	15/15	13/13				
67		12/12	13/13	12/12	14/14				
100		12/12	14/14	13/13	13/13	15/15	11/11	11/11	15/15

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Analysis ID:	17-9093-9790	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Feb-16 15:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	02-1236-3514	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Mar-16 15:27	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	19-1412-2046	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 Dec-15	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	FR_UFRI
Ending Date:	09 Jan-16	**Species:**	Pimephales promelas	**Brine:**	
Duration:	32d 0h	**Source:**	Aquatox, AR	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 0h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C <> T	NA	NA	Passes proportion normal

Fisher Exact Test

Control	vs	Control	Test Stat	P-Value	P-Type	Decision(α:5%)
Negative Control		Dilution Water	1	1.0000	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Dilution Water	52	0	52	1	0	0.0%
0	Negative Contr	53	0	53	1	0	0.0%

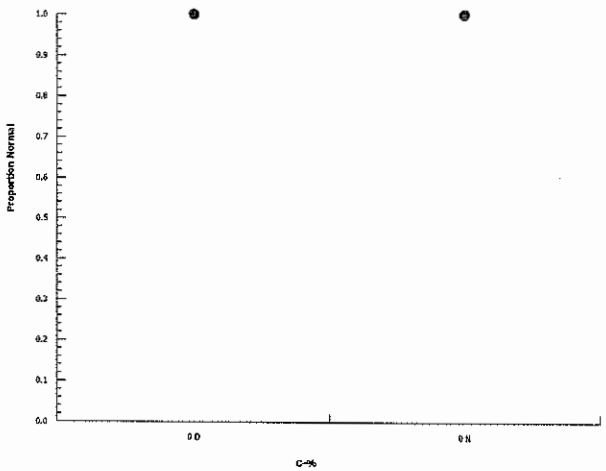
Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	1	1	1	1
0	Negative Control	1	1	1	1

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Dilution Water	14/14	12/12	14/14	12/12
0	Lab Water	7/7	11/11	13/13	13/13
0	Negative Control	13/13	13/13	14/14	13/13

Graphics



APPENDIX E – *Oncorhynchus mykiss* Toxicity Test Data

Embryo-Alevin Test Summary Sheet

Client: Teck
Work Order No.: 15998b
Test Date: December 8, 2015 - January 6, 2016
Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: EV_ER4 (Amended in-house)
Sample Date: November 30, December 7, December 14 & December 21, 2015
Date Received: December 1, December 8, December 15 & December 22, 2015
Sample Volume: (10 - 15) x 20 L per refresh

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L CaCO3): 8 - 12
Alkalinity (mg/L CaCO3): 6 - 10

Test Organism Information:

Batch No: 120815
Source: Vancouver Island Trout Hatchery, Duncan, BC
Loading Density: 0.92 g / L
Number male broodstock used: 4
Number female broodstock used: 4

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE83
Stock Solution ID: 15S03
Date Initiated: December 8, 2015
7-d EC50 (95% CL): 7.3 (7.1 - 7.5) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.2 - 7.3) mg/L SDS
Reference Toxicant CV (%): 36

Test Results:

Sample ID: **EV_ER4 (Amended)**	Survival	Viability	Length	Wet weight
EC25 (%) (v/v)	>100	>100		
EC50 (%) (v/v)	>100	>100		
IC25 (%) (v/v)			>100	>100
IC50 (%) (v/v)			>100	>100

Reviewed by: JCh
Date reviewed: Jan-27/16

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: EV_ER4 (Amended)
Work Order #: 15498

Start Date & Time: December 8, 2015 @ 1635h
Stop Date & Time: January 6, 2016 @ 1500h
Test Species: *Oncorhynchus mykiss*

Lab Control — Concentration (% v/v)

	Days 0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	14.5	14.0	14.5	14.5	15.0	14.5	15.0	14.5	15.0	14.5	14.5
DO (mg/L)	9.9	9.8	9.7	9.9	9.8	9.6	9.8	9.8	9.7	9.8	9.8	9.8	9.3
pH	6.7	6.7	6.8	6.8	6.9	6.7	6.8	7.0	7.1	7.0	7.0	6.7	6.9
Cond. (µS/cm)	29	29		28		28		26		26		25	
Initials	YML	SSD		YML		SSD		AA		AA		YML	

Site Control — Concentration GH_ER2-10%

	Days 0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.0	14.5	14.0	14.5	13.5	15.0	14.0	15.0	14.0	15.0	13.0	14.5
DO (mg/L)	9.9	9.7	9.8	9.9	9.7	9.9	9.8	9.9	9.5	9.8	9.7	9.9	9.5
pH	8.2	8.4	8.0	8.4	8.1	8.4	8.1	8.3	8.2	8.2	8.1	8.2	8.2
Cond. (µS/cm)	317	324		322		318		319		315		317	
Initials	YML	SSD		YML		SSD		AA		AA		YML	

30 — Concentration Amended EV_ER4

	Days 0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.0	14.5	14.0	14.5	13.5	15.0	14.0	15.0	14.0	15.0	13.0	14.5
DO (mg/L)	9.9	9.8	9.8	10.0	9.8	9.9	9.8	9.9	9.9	9.9	9.8	9.7	9.5
pH	8.2	8.4	8.0	8.4	8.1	8.3	8.2	8.2	8.3	8.2	8.2	8.1	8.1
Cond. (µS/cm)	573	630		588		607		578		580		564	
Initials	YML	SSD		YML		SSD		AA		AA		YML	

44 — Concentration Amended EV_ER4

	Days 0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.0	14.5	14.0	14.5	13.5	15.0	14.0	15.0	14.0	15.0	13.0	14.5
DO (mg/L)	10.0	9.9	9.8	10.0	9.7	10.0	9.9	9.8	9.9	9.9	9.9	9.7	9.4
pH	8.2	8.4	8.0	8.4	8.1	8.3	8.2	8.2	8.2	8.2	8.2	8.1	8.1
Cond. (µS/cm)	688	676		701		686		676		680		683	
Initials	YML	SSD		YML		SSD		AA		AA		YML	

Thermometer: Temp-7 **DO meter:** DO-2 13 **pH meter:** pH-1 13 **Conductivity meter:** C-213

	Lab Control	Site Control GH_ER7	Amended EV_ER4	
Hardness*	10	186	710	
Alkalinity*	10	194	174	

* mg/L as CaCO3

Analysts: SSD, AWD, YML
Reviewed by: [illegible]
Date reviewed: Jan. 21/16

Sample Description: clear, colourless, no particulates, no odour.

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: EV-ER4 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @1635h
Stop Date & Time: January 6, 2016 @ 1500h
Test Species: *Oncorhynchus mykiss*

67% Amended EV-ER4 Concentration (%v/v)	Days 0			1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.0	14.5	14.0	14.5	13.5	15.0	14.0	15.0	14.0	15.0	13.0	14.5		
DO (mg/L)	9.9	9.9	9.9	10.0	9.8	10.0	9.9	9.9	9.8	9.9	9.7	10.0	9.4		
pH	8.2	8.4	8.0	8.4	8.1	8.3	8.2	8.3	8.2	8.2	8.2	8.0	8.1		
Cond. (µS/cm)	839	874		866		881		875		871		839			
Initials	YML	SSD		YML		SSD						YML			

(Amended) 100 Concentration EV-ER4	Days 0			1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.5	14.0	14.5	13.5	15.0	14.0	15.0	14.0	15.0	13.0	14.5		
DO (mg/L)	9.9	9.9	9.9	10.0	9.7	10.1	9.8	9.9	9.8	9.9	9.8	9.9	9.4		
pH	8.2	8.4	8.0	8.4	8.1	8.3	8.2	8.2	8.2	8.3	8.2	8.0	8.1		
Cond. (µS/cm)	1077	1096		1090		1076		1067		1066		1040			
Initials	YML	SSD		YML		SSD						YML			

Concentration	Days												
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)													
DO (mg/L)													
pH													
Cond. (µS/cm)													
Initials													

Concentration	Days												
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)													
DO (mg/L)													
pH													
Cond. (µS/cm)													
Initials													

Thermometer: temp-7 **DO meter:** DO-2/3 **pH meter:** pH-1/3 **Conductivity meter:** C-2/3

	Lab Control	Site Control GH-ER2	Amended EV-ER4
Hardness*	10	~~186~~ ~~174~~ YML	~~710~~ ~~670~~ YML
Alkalinity*	10	~~194~~ ~~176~~ YML	~~174~~ ~~166~~ YML

* mg/L as CaCO3

Analysts: SSD, AWD, YML

Reviewed by: JOH
Date reviewed: Jan-21/16

Sample Description: clear, colourless, no particulates, no odour.

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: EV-ER4 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @ 1635h
Stop Date & Time: January 6, 2016 @ 1500h
Test Species: *Oncorhynchus mykiss*

Lab Control Concentration (% v/v)	Days 7 new	7 old	8 new	8 old	9 new	9 old	10 new	10 old	11 new	11 old	12 new	12 old	13 new	13 old
Temperature (°C)	14.5	14.5	14.6	14.6	14.0	14.6	14.0	14.5	14.6	14.6	14.6	14.6	14.5	14.5
DO (mg/L)	9.7	9.8	9.8	9.9	9.8	9.8	10.0	9.7	9.8	9.9	9.9	9.7	10.0	9.6
pH	6.7	6.9	7.1	7.0	7.0	7.1	6.8	7.1	6.8	7.0	6.8	7.1	6.8	6.9
Cond. (µS/cm)	27		26		26		25		26		26		25	
Initials	YML		A		A		YML		A		A		YML	

Site Control Concentration GH-ER2-100	Days 7 new	7 old	8 new	8 old	9 new	9 old	10 new	10 old	11 new	11 old	12 new	12 old	13 new	13 old
Temperature (°C)	13.0	14.5	13.0	14.5	14.0	14.5	14.5	14.5	14.6	14.6	14.6	14.6	14.5	14.5
DO (mg/L)	10.3	9.8	10.2	10.0	9.8	9.9	9.8	9.7	9.8	9.8	9.8	9.7	9.9	9.6
pH	8.1	8.0	8.1	8.0	8.1	8.0	8.0	8.1	8.0	8.0	8.0	8.0	8.1	8.0
Cond. (µS/cm)	313		312		313		314		313		310		305	
Initials	YML		A		A		A		A		A		YML	

30 Concentration Amended EV_ER4	Days 7 new	7 old	8 new	8 old	9 new	9 old	10 new	10 old	11 new	11 old	12 new	12 old	13 new	13 old
Temperature (°C)	13.0	14.5	13.0	14.6	14.0	14.6	14.6	14.5	14.6	14.6	14.6	14.6	14.5	14.5
DO (mg/L)	10.2	9.7	10.1	9.9	9.8	9.9	9.8	9.6	9.9	9.8	9.9	9.6	9.8	9.7
pH	8.0	7.9	8.1	8.0	8.1	8.0	8.1	8.0	8.0	8.0	8.0	8.1	8.1	8.1
Cond. (µS/cm)	560		570		568		577		562		565		549	
Initials	YML		A		A		A		A		A		YML	

44 Concentration Amended EV_ER4	Days 7 new	7 old	8 new	8 old	9 new	9 old	10 new	10 old	11 new	11 old	12 new	12 old	13 new	13 old
Temperature (°C)	13.0	14.5	13.0	14.6	14.0	14.6	14.6	14.5	14.6	14.6	14.6	14.6	14.5	14.5
DO (mg/L)	10.2	9.7	10.2	9.9	9.8	9.9	9.8	9.7	9.8	9.7	9.8	9.9	9.9	9.6
pH	8.0	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.1	8.1
Cond. (µS/cm)	690		690		684		658		665		668		659	
Initials	YML		A		A		A		A		A		YML	

Thermometer: temp-7 **DO meter:** DO-213 **pH meter:** pH-113 **Conductivity meter:** C-213

	Lab Control	Site Control GH-ER2	Amended EV-ER4	
Hardness*	10	174	670	
Alkalinity*	10	146	166	

* mg/L as CaCO3

Analysts: AWD, YML
Reviewed by: JOL
Date reviewed: Jan 21/16

Sample Description: clear, colourless, no particulates, no odour.

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: EV_ER4 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @ 1635h
Stop Date & Time: January 6, 2016 @ 1500h
Test Species: *Oncorhynchus mykiss*

6.7 Amended EV_ER4 Concentration (% v/v)	Days 7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	~~14.5~~ ① 13.0	14.5	13.0	14.5	14.0	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.3	9.7	10.2	9.8	9.8	9.9	9.8	9.7	9.8	9.7	9.9	9.6	9.8	9.6
pH	8.0	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.1	8.1
Cond. (µS/cm)	842		849		852		850		852		850		829	
Initials			A		A		A		A		A		YML	

~~(Amended)~~ 100 Concentration EV_ER4	Days 7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	~~14.5~~ ② 13.0	14.5	13.0	14.5	14.0	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.3	9.0	10.2	9.9	9.8	9.9	9.8	9.8	9.8	9.8	9.9	9.7	9.9	9.7
pH	8.0	7.9	8.0	7.9	8.0	8.0	8.0	8.1	8.0	8.1	8.0	8.0	8.1	8.1
Cond. (µS/cm)	1061		1058		1062		1062		1060		1061		1035	
Initials	YML		A		A		A		A		A		YML	

Concentration	Days													
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: temp-7 **DO meter:** DO-213 **pH meter:** pH-113 **Conductivity meter:** C-213

	Lab Control	Site Control GH_ER2	Amended EV_ER4	
Hardness*	10	174	670	
Alkalinity*	10	146	166	✓

* mg/L as CaCO3

Analysts: AWD, YML
Reviewed by: JOL
Date reviewed: Jan 21/16

Sample Description: clear, colourless, no particulates, no odour

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: EV_ER4 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @ 1635h
Stop Date & Time: January 6, 2016 @ 1500h
Test Species: *Oncorhynchus mykiss*

Lab Control Concentration (% v/v)	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.0	15.0	14.5	14.5	14.5	14.5	14.0	14.5
DO (mg/L)	9.8	9.8	9.9	9.7	9.9	9.6	9.8	9.9	9.9	9.5	10.0	9.5	10.0	9.7
pH	6.7	6.8	6.8	6.7	6.8	6.9	6.63	6.9	6.2	6.2	6.7	6.8	6.3	6.8
Cond. (µS/cm)	24		24		26		IV 25		25		26		24	
Initials	YML		SSD		YML		JW		JW		YML		KLP	

Site Control Concentration GH_ER2-100	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	14.5	13.5	14.5	13.0	14.5	13.0	15.0	14.0	14.5	13.5	14.5	13.0	14.5
DO (mg/L)	10.1	9.8	10.0	9.5	10.2	9.7	10.2	9.9	10.0	9.6	10.1	9.5	10.3	9.8
pH	8.0	7.9	8.2	8.1	8.1	7.9	8.0	7.9	7.9	8.0	8.1	7.9	8.0	8.1
Cond. (µS/cm)	305		295		306		302		312		300		294	
Initials	YML		SSD		YML		JW		JW		YML		KLP	

30 Concentration Amended EV_ER4	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	14.5	13.5	14.5	13.0	14.5	13.0	15.0	14.0	14.5	13.5	14.5	13.0	14.5
DO (mg/L)	10.1	9.7	10.1	9.8	10.3	9.6	10.2	9.9	10.2	9.7	10.2	9.7	10.3	9.9
pH	8.0	7.9	8.2	8.1	8.1	7.9	8.0	7.9	8.0	8.0	8.0	7.9	8.0	8.1
Cond. (µS/cm)	562		535		568		565		560		546		539	
Initials	YML		SSD		YML		JW		JW		YML		KLP	

44 Concentration Amended EV_ER4	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	14.5	13.5	14.5	13.0	14.5	13.0	15.0	14.0	14.5	13.5	14.5	13.0	14.5
DO (mg/L)	10.2	9.8	10.1	9.9	10.2	9.5	10.2	9.9	10.2	9.7	10.1	9.8	10.3	9.8
pH	8.0	7.9	8.2	8.1	8.1	8.0	8.0	7.9	8.0	8.0	8.0	8.0	8.0	8.1
Cond. (µS/cm)	678		628		669		697		687		676		647	
Initials	YML		SSD		YML		JW		JW		YML		KLP	

Thermometer: temp-7 **DO meter:** DO-213 **pH meter:** pH-113 **Conductivity meter:** C-213

	Lab Control	Site Control GH_ER2	Amended EV_ER4	
Hardness*	12	188	690	
Alkalinity*	8	148	170	

* mg/L as CaCO3

Analysts: SSD, JW, KLP, YML
Reviewed by: JW
Date reviewed: Jan. 21/16

Sample Description: clear, colourless, no particulates, no odour

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: EV_ER4 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @1635h
Stop Date & Time: January 6, 2016 @1500h
Test Species: *Oncorhynchus mykiss*

67% Amended EV_ER4 Concentration (% v/v)	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	14.5	13.5	14.5	13.0	14.5	13.0	15.0	14.0	14.5	13.5	14.5	13.0	14.5
DO (mg/L)	10.2	9.7	10.1	9.9	10.3	9.7	10.3	10.0	10.2	9.7	10.1	9.8	10.3	9.8
pH	8.0	7.9	8.2	8.1	8.1	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.9	8.1
Cond. (µS/cm)	836		788		827		846		817		839		808	
Initials	YML		SSD		YML		JW		JW		YML		KLP	

(Amended) 100 Concentration EV_ER4	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	14.5	13.5	14.5	13.0	14.5	13.0	15.0	14.0	14.5	13.5	14.5	13.0	14.5
DO (mg/L)	10.2	9.8	10.1	9.9	10.3	9.8	10.2	9.9	10.2	9.7	10.2	9.9	10.3	9.8
pH	8.1	7.9	8.2	8.1	8.2	8.0	8.0	8.0	8.0	8.0	8.1	8.0	7.9	8.1
Cond. (µS/cm)	1087		1059		1089		1086		1081		1089		1042	
Initials	YML		SSD		YML		JW		JW		YML		KLP	

Concentration	Days													
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: temp-7 **DO meter:** DO-213 **pH meter:** pH-113 **Conductivity meter:** C-213

	Lab Control	Site Control GH_ER2	Amended EV_ER4	
Hardness*	12	198	690	
Alkalinity*	8	148	170	

*mg/L as CaCO3

Analysts: SSD, JW, KLP, YML

Reviewed by: JOL
Date reviewed: Jan. 21/16

Sample Description: clear, colourless, no particulates, no odour.

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: EV_ER4 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @1635h
Stop Date & Time: January 6, 2016 @1500h
Test Species: *Oncorhynchus mykiss*

Lab Control Concentration (% v/v)	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.0	14.5	15.0	14.0	14.5	14.0	14.5	14.0	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.9	10.0	9.8	10.0	10.0	9.9	9.9	9.3	10.0	9.6	9.8	9.8	9.7	9.8
pH	6.7	6.8	6.8	6.7	6.7	6.8	6.7	7.1	6.7	7.1	6.7	6.9	6.7	6.9
Cond. (µS/cm)	25		24		23		24		25		25		25	
Initials	YML		SSD		YML		KLP		EMM		YML		YML	

Site Control Concentration GH_ER2 -100	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.0	14.0	13.0	15.0	13.0	14.5	14.0	14.5	14.0	14.5	13.5	14.5	13.0	14.5
DO (mg/L)	10.2	10.0	10.1	10.0	10.3	9.9	10.3	9.4	10.3	9.6	10.3	9.8	10.3	9.8
pH	8.0	7.7	8.2	8.0	8.1	7.9	8.3	8.2	8.2	8.1	8.1	8.0	8.1	8.1
Cond. (µS/cm)	304		295		307		295		291		306		307	
Initials	YML		SSD		YML		KLP		EMM		YML		YML	

30 Concentration Amended EV_ER4	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.0	14.0	13.0	15.0	13.0	14.5	14.0	14.5	14.0	14.5	13.5	14.5	13.0	14.5
DO (mg/L)	10.2	10.0	10.2	10.0	10.3	9.9	10.3	9.4	10.3	9.7	10.3	9.9	10.3	9.8
pH	8.0	7.7	8.2	8.0	8.1	7.9	8.3	8.2	8.2	8.1	8.1	8.0	8.1	8.0
Cond. (µS/cm)	542		522		564		531		548		553		549	
Initials	YML		SSD		YML		KLP		EMM		YML		YML	

44 Concentration Amended EV_ER4	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.0	14.0	13.0	15.0	13.0	14.5	14.0	14.5	14.0	14.5	13.5	14.5	13.5	14.5
DO (mg/L)	10.2	9.9	10.2	10.1	10.2	10.0	10.3	9.4	10.3	9.6	10.3	9.9	10.3	9.8
pH	8.0	7.8	8.2	8.0	8.1	7.9	8.3	8.2	8.2	8.1	8.1	8.0	8.1	8.0
Cond. (µS/cm)	635		642		646		633		647		662		652	
Initials	YML		SSD		YML		KLP		EMM		YML		YML	

Thermometer: temp-1 **DO meter:** DO-2/3 **pH meter:** pH+2/3 **Conductivity meter:** C-2/3

	Lab Control	Site control GH_ER2	Amended EV_ER4	
Hardness*	8	178	820	
Alkalinity*	6	148	174	

* mg/L as CaCO3

Analysts: SSD, KLP, EMM, YML

Reviewed by: JBL
Date reviewed: Jan. 21/16

Sample Description: clear, colourless, no particulates, no odour.

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: EV-ER4 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @ 1635h
Stop Date & Time: January 6, 2016 @ 1500h
Test Species: *Oncorhynchus mykiss*

6.7% Amended EV-ER4 Concentration (% v/v)	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.0	14.0	13.0	15.0	13.0	14.5	14.0	14.5	14.0	14.5	13.5	14.5	13.5	14.5
DO (mg/L)	10.2	9.9	10.2	10.0	10.2	9.9	10.3	9.5	10.3	9.7	10.3	9.8	10.2	9.8
pH	8.0	7.8	8.2	8.0	8.1	7.9	8.3	8.2	8.2	8.1	8.1	8.0	8.1	8.0
Cond. (µS/cm)	787		792		808		789		800		806		799	
Initials	YML		SSD		YML		KP		EMM		YML		YML	

(Amended) 100 Concentration EV-ER4	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.0	14.0	13.0	15.0	13.0	14.5	14.5	14.5	14.0	14.5	13.5	14.5	13.5	14.5
DO (mg/L)	10.2	9.9	10.2	10.0	10.3	9.9	10.3	9.5	10.3	9.7	10.3	9.8	10.3	9.7
pH	8.0	7.9	8.2	8.0	8.1	7.9	8.3	8.2	8.2	8.1	8.2	8.0	8.1	8.0
Cond. (µS/cm)	1032		1018		1054		1014		1024		1047		1042	
Initials	YML		SSD		YML		KP		EMM		YML		YML	

Concentration	Days													
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: temp-7 **DO meter:** DO-213 **pH meter:** pH-1213 **Conductivity meter:** C-213

	Lab Control	Site Control GH-ER2	Amended EV-ER4	
Hardness*	8	178	820	
Alkalinity*	6	148	174	

* mg/L as CaCO3

Analysts: SSD, KP, EMM, YML

Reviewed by: JBL
Date reviewed: Jan-21/16

Sample Description: clear, colourless, no particulates, no odour

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: EV-ER4 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @ ~~1500h~~ 1635h
Stop Date & Time: January 6, 2016 @ 1500h
Test Species: *Oncorhynchus mykiss*

Lab Control Concentration (% v/v)	Days													
	28		29											
	new	old	new	old final	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.5	\	14.5										
DO (mg/L)	9.9	9.8	\	9.8										
pH	6.7	6.7	\	6.9										
Cond. (µS/cm)	24		29											
Initials	YML		YML											

Site Control Concentration GH_ER2 -100	Days													
	28		29											
	new	old	new	old final	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	14.5	\	14.5										
DO (mg/L)	10.2	9.9	\	9.8										
pH	8.0	8.0	\	7.8										
Cond. (µS/cm)	295		310											
Initials	YML		YML											

30 Concentration Amended EV_ER4	Days													
	28		29											
	new	old	new	old final	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	14.5	\	14.5										
DO (mg/L)	10.3	9.8	\	9.8										
pH	8.0	8.0	\	7.8										
Cond. (µS/cm)	531		561											
Initials	YML		YML											

44 Concentration Amended EV_ER4	Days													
	28		29											
	new	old	new	old final	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	14.5	\	14.5										
DO (mg/L)	10.3	9.8	\	9.7										
pH	8.0	8.0	\	7.8										
Cond. (µS/cm)	626		665											
Initials	YML		YML											

Thermometer: temp-7 **DO meter:** DO-213 **pH meter:** pH-113 **Conductivity meter:** C-213

	Lab Control	Site control GH-ER2	Amended EV-ER4	
Hardness*	8 12 YML	178	820	
Alkalinity*	6 8 YML	148	174	

* mg/L as CaCO3

Analysts: YML
Reviewed by: JCL
Date reviewed: Jan-21/16

Sample Description: clear, colourless, no particulates, no odour.

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: EV-ER4 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @ 1635h
Stop Date & Time: January 6, 2016 @ 1500h
Test Species: *Oncorhynchus mykiss*

6.7 Amended EV-ER4 (% v/v) Concentration	Days													
	28		29 Final											
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	14.5	\	14.5										
DO (mg/L)	10.3	9.8	\	9.7										
pH	8.0	8.0	\	7.8										
Cond. (µS/cm)	~~7602~~		812											
Initials	YML		YML											

(Amended) 100 EV-ER4 Concentration	Days													
	28		29 Final											
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	14.6	\	14.5										
DO (mg/L)	10.3	9.7	\	9.8										
pH	8.0	8.0	\	7.9										
Cond. (µS/cm)	1013 ~~2915~~		1055											
Initials	YML		YML											

Concentration	Days													
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: temp-7 **DO meter:** DO-2/3 **pH meter:** pH-1/3 **Conductivity meter:** C-2/3

	Lab Control	Site control GH-ER2	Amended EV-ER4	
Hardness*	8 12 YML	178	820	
Alkalinity*	6 8 YML	148	174	

* mg/L as CaCO3

Analysts: YML
Reviewed by: JGL
Date reviewed: Jan. 21/16

Sample Description: clear, colourless, no particulates, no odour.

Comments:

Embryo-Alevin Toxicity Test
Daily Mortality

Client: Teck
Sample ID: EV_ER4 (Amended)
Work Order #: 15998

Start Date & Time: December 9, 2015 @1635h
Stop Date & Time: January 6, 2016 @1500h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities												Total Dead Eggs/Embryos/ Alevins
		1	2	3	4	5	6	7	8	9	10	11	12	
Lab Control	1	0	0	0	0	0	0	0	1	1	0	0	0	2
	2	↓	↓	↓	↓	↓	↓	0	1	1	0 ~~0~~	↓	↓	2
	3	↓	↓	↓	↓	↓	↓	2	0	0	0 ~~0~~	↓	↓	2
	4	↓	↓	↓	↓	↓	↓	2	0	0	0	↓	↓	2
Site Control	1	↓	↓	↓	↓	↓	↓	0	↓	0	↓	0	↓	0
GH-ER2	2	↓	↓	↓	↓	↓	↓	0	↓	1	↓	1	1	3
100	3	↓	↓	↓	↓	↓	↓	1	↓	0	↓	0	0	2
	4	↓	↓	↓	↓	↓	0	0	↓	↓	↓	↓	↓	0
30	1	↓	↓	↓	↓	↓	↓	0	0	↓	↓	↓	↓	0
Amended EV_ER4	2	↓	↓	↓	↓	↓	↓	0	0	↓	↓	↓	↓	0
	3	↓	↓	↓	↓	↓	↓	2	1	↓	↓	↓	↓	3
	4	↓	↓	↓	↓	↓	↓	0	0	↓	↓	↓	↓	0
44	1	↓	↓	↓	↓	↓	↓	↓	1	↓	1 ~~0~~	↓	↓	2
Amended EV_ER4	2	↓	↓	↓	↓	↓	↓	↓	1	↓	0	↓	↓	1
	3	↓	↓	↓	↓	↓	↓	↓	0	↓	0	↓	↓	0
	4	↓	↓	↓	↓	↓	↓	↓	0	↓	0	↓	↓	0
~~44~~ 67	1	↓	↓	↓	↓	0	↓	↓	0	↓	0	1	0	1
Amended EV_ER4	2	↓	↓	↓	↓	1	↓	↓	0	↓	0	1	1	3
	3	↓	↓	↓	↓	0	↓	↓	0	↓	0	0	0	0
	4	↓	↓	↓	↓	↓	↓	↓	1	↓	0	1	1	4
Amended	1	↓	↓	↓	↓	↓	↓	0	0	↓	0	0	0	0
EV_ER4	2	↓	↓	↓	↓	↓	↓	0	↓	↓	0	0	↓	0
100	3	↓	↓	↓	↓	↓	↓	0	↓	1	0	0	↓	1
	4	↓	↓	↓	↓	↓	↓	0	↓	0	1	0	↓	1
	1													
	2													
	3													
	4													
	1													
	2													
	3													
	4													
Tech Initials		SSD	A	SSD	A	A	YMC	YMC	A	M	A	A	~	YMC

Comments: _____

Reviewed by: JCL **Date reviewed:** Jan. 21/16

Embryo-Alevin Toxicity Test
Daily Mortality

Client: Teck
Sample ID: EV_ER4 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @ 1635h
Stop Date & Time: January 6, 2016 @ 1500h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities												Total Dead Eggs/Embryos/ Alevins
		13 ①	14	15	16	17	18	19	20	21	22 ③	23	24	
Lab Control	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	↓	↓	↓	↓	↓	0	0	0	0	0	0	0	0
	3	↓	↓	↓	↓	↓	0	0 ②	0	0	0	0	0	0
	4	↓	↓	↓	↓	↓	0	0	0	0 ②	0	0	0	0
Site Control	1	↓	↓	↓	↓	↓	3	3 ②	1	4	0	~~1~~	0	12
GH_ER2	2	↓	↓	↓	2	↓	1	1 ②	0	1	1	~~2~~	0	8
100	3	↓	↓	↓	0	↓	0	1	0 ②	2	1	0	0	4
	4	↓	↓	↓	1	↓	0	1	1	1 ②	0	0	0	3
30	1	↓	↓	↓	↓	↓	0	0	1 ②	4 ②	1	0	0	6
Amended EV_ER4	2	↓	1	↓	↓	↓	0	1 ②	0	0	1	0	0	3
	3	2	0	↓	↓	↓	1	0 ②	0	0	0	0	0	3
	4	0	↓	1	↓	↓	0	0	0 ②	4	0	1	0	6
44	1	↓	↓	0	1	↓	0	0	0 ②	1	0	0	0	2
Amended EV_ER4	2	↓	↓	↓	0	↓	0	2 ②	0	4	1	0	0	7
	3	↓	↓	↓	0	↓	0	1	0 ②	1	0	2	0	4
	4	↓	↓	↓	0	↓	0	1	0 ②	2	1	0	2	6
~~44~~ 67	1	↓	↓	↓	0	↓	0	2	0 ②	2	0	0	0	4
Amended EV_ER4	2	↓	↓	↓	1	↓	1	0	0 ②	1	0	0	0	3
	3	↓	↓	↓	0	↓	0	0	0	0 ②	1	0	0	1
	4	↓	↓	↓	↓	↓	0	0 ②	0	0	0	0	0	2
Amended-	1	0	0	↓	↓	↓	0	0 ②	0	2	~~1~~	1	0	4
EV_ER4	2	↓	↓	↓	↓	↓	0	0	0 ②	0	1	0	0	1
100	3	↓	↓	↓	↓	↓	2	0	0 ②	0	0	0	1	3
	4	↓	↓	↓	↓	↓	0	0	0 ②	2	0	0	0	2
	1													
	2													
	3													
	4													
	1													
	2													
	3													
	4													
Tech Initials		YMM	YMM	SSD	YMM	JW	JW	YMM	KP	YMM	SSD	YMM	KP	YMM

Comments: ① at eyed stage (all) ② starting to hatch ③ >50% hatched (all)

Reviewed by: JW **Date reviewed:** Jan. 21/16

Embryo-Alevin Toxicity Test
Daily Mortality

Client: Teck
Sample ID: EV_ER4 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @ 1635h
Stop Date & Time: January 6, 2016 @ 1500h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities 25	26	27	28	29			Total Dead Embryos/ Alevins	Total Undeveloped/ Unhatched (Abnormal)	Total No. Alevins (Normal)	Total Exposed Eggs
Lab Control	1	0	2	1	1	0			4	1	24	31
	2	0	1	0	1				2	2	25	31
	3	1	0	0	2				3	0	25	30
	4	0	1	2	0				3	2	22	29
Site Control	1	0	0	0	0				0	1	16	29
GH_ER2	2	1		0	2				3	0	16	30
100	3	0		0	0				0	0	24	30
	4	0		0	0				0	0	27	30
30	1	0	↓	0	0				0	1	22	29
Amended EV_ER4	2	1	2	1	1				4	2	19	28
	3	1	0	0	0				0	1	23	30
	4	1	0	1	↓				0	1	21	28
44	1	1	1	1	1	1			2	1	21	28
Amended EV_ER4	2	1	1	1	1	1			2	0	20	30
	3	1	0	1	1	0			0	0	27	31
	4	1	0	1	1	↓			0	1	24	31
67	1	1	0	↓	1	0			0	2	22	29
Amended EV_ER4	2	1	0	1	1	0			1	0	23	30
	3	1	0	0	1	0			0	2	27	30
	4	1	0	1	1	↓			1	2	21	30
Amended	1	1	1	2	1	0			3	1	22	30
EV_ER4	2	1	1	0	1	0			1	0	28	30
100	3	1	0	0	1	0			0	2	25	31
	4	↓	0	0	↓	↓			0	1	24	29
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		MM	MM	MM	MM	MM			MM	MM	MM	MM

Comments: See Alevin Test Datasheets for details on normality assessments, lengths & wet weights.

Reviewed by: JGM **Date reviewed:** Jan. 21/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**
Start Date: **December 8, 2015**
Sample ID: **EV_ER4 (Amended)**
Termination Date: **January 6, 2016**
Work Order No.: **15998**

Treatment and Replicate (% v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
Lab Control A	1	19.0	✓		
	2	19.5	✓		
	3	17.5	✓		
	4	19.5	✓		
	5	18.0	✓		
	6	19.0	✓		
	7	20.0	✓		
	8	~~26.0 20.0~~	✓		
	9	18.5	✓		
	10	19.0	✓		
	11	19.0	✓		
	12	19.5	✓		
	13	18.5	✓		
	14	19.0	✓		
	15	~~16.0~~ 16.5	✓		
	16	19.0	✓		
	17	18.5	✓		
	18	19.5	✓		
	19	17.5	✓		
	20	20.0	✓		
	21	19.5	✓		
	22	18.5	✓		
	23	17.5	✓		
	24	19.5	✓		
	25	17.0		✓	Pale, wl yolksac ~~e~~ edema
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.48g
Number of survivors: 25
Number of deformed/have difficulty swimming: 1 / 0
Initials: YHL / KSL

Reviewed by: JCH
Date Reviewed: Jan. 21/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**
Start Date: **December 8, 2015**
Sample ID: **EV_ER4 (Amended)**
Termination Date: **January 6, 2016**
Work Order No.: **15998**

Treatment and Replicate (1% v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
Lab Control B	1	16.5	✓		
	2	17.0	✓		
	3	19.0	✓		
	4	19.0	✓		
	5	18.5	✓		
	6	20.0	✓		
	7	19.0	✓		
	8	17.0	✓		
	9	19.0	✓		
	10	18.0	✓		
	11	17.5	✓		
	12	18.5	✓		
	13	15.5	✓		
	14	19.0	✓		
	15	20.0	✓		
	16	20.0	✓		
	17	17.0	✓		
	18	19.0	✓		
	19	18.5	✓		
	20	17.0	✓		
	21	18.0	✓		
	22	17.5	✓		
	23	19.0	✓		
	24	18.5	✓		
	25	18.0	✓		
	26	15.0		✓	Yolksac edema, Pale, Bent Spine, abnormal swimming
	27	11.5		✓	Bent tail, ~~abnormal~~ EC
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.36 g
Number of survivors: 27
Number of deformed/have difficulty swimming: 2/1
Initials: KSL/YML

Reviewed by: JOL
Date Reviewed: Jan-21/16

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**
Start Date: **December 8, 2015**
Sample ID: **EV_ER4 (Amended)**
Termination Date: **January 6, 2016**
Work Order No.: **15998**

Treatment and Replicate (1/2/3/4)	Fish	Length (mm)	Normal	Abnormal	Comments
Lab Control C	1	19.0	✓		
	2	17.0	✓		
	3	19.0	✓		
	4	18.0	✓		
	5	18.0	✓		
	6	17.0	✓		
	7	15.0	✓		
	8	19.5	✓		
	9	18.0	✓		
	10	17.0	✓		
	11	18.0	✓		
	12	19.0	✓		
	13	18.5	✓		
	14	17.5	✓		
	15	19.0	✓		
	16	17.0	✓		
	17	17.0	✓		
	18	18.0	✓		
	19	17.5	✓		
	20	17.0	✓		
	21	18.0	✓		
	22	18.0	✓		
	23	19.0	✓		
	24	18.0	✓		
	25	18.0	✓		
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 1.949 g
Number of survivors: 25
Number of deformed/have difficulty swimming: 0 / 0
Initials: KSL / YML

Reviewed by: JBL
Date Reviewed: Jan. 21/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**
Start Date: **December 8, 2015**
Sample ID: **EV_ER4 (Amended)**
Termination Date: **January 6, 2016**
Work Order No.: **15998**

Treatment and Replicate (40 v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
Lab Control D	1	18.5	✓		
	2	17.5	✓		
	3	17.5	✓		
	4	17.0	✓		
	5	19.0	✓		
	6	19.0	✓		
	7	19.0	✓		
	8	19.0	✓		
	9	19.0	✓		
	10	18.0	✓		
	11	20.0	✓		
	12	16.5	✓		
	13	19.0	✓		
	14	18.0	✓		
	15	17.5	✓		
	16	19.0	✓		
	17	19.5	✓		
	18	20.0	✓		
	19	16.5	✓		
	20	18.0	✓		
	21	16.5	✓		
	22	18.5	✓		
	23	14.0		✓	Bent tail, edema,
	24	15.0		✓	Bent tail
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.04 g
Number of survivors: 24
Number of deformed/have difficulty swimming: 2 | 0
Initials: KSL/YL

Reviewed by: JCU
Date Reviewed: Jan-21/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**
Start Date: **December 8, 2015**
Sample ID: **EV_ER4 (Amended)**
Termination Date: **January 6, 2016**
Work Order No.: **15998**

Treatment and Replicate (Lo v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
Site Control GHER2 100 A	1	18.5	✓		
	2	17.5	✓		
	3	17.0	✓		
	4	17.0	✓		
	5	17.5	✓		
	6	16.5	✓		
	7	20.0	✓		
	8	18.5	✓		
	9	17.5	✓		
	10	18.0	✓		
	11	19.0	✓		
	12	19.0	✓		
	13	19.0	✓		
	14	17.5	✓		
	15	18.5	✓		
	16	18.0	✓		
	17	15.0		✓	~~twist~~ missing tail fin, erratic swimming
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 1.38 g
Number of survivors: 17
Number of deformed/have difficulty swimming: 1 / 1
Initials: YHL/KSL

Reviewed by: JOL
Date Reviewed: Jan. 21/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**
Start Date: **December 8, 2015**
Sample ID: **EV_ER4 (Amended)**
Termination Date: **January 6, 2016**
Work Order No.: **15998**

Treatment and Replicate (1/2 vial)	Fish	Length (mm)	Normal	Abnormal	Comments
Site Control GH_ER2 100 B	1	16.5	✓		
	2	18.5	✓		
	3	18.5	✓		
	4	17.5	✓		
	5	20.0	✓		
	6	17.0	✓		
	7	18.0	✓		
	8	19.0	✓		
	9	19.0	✓		
	10	17.0	✓		
	11	19.0	✓		
	12	19.0	✓		
	13	20.0	✓		
	14	18.5	✓		
	15	17.0	✓		
	16	20.0	✓		
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 1.31 g
Number of survivors: 16
Number of deformed/have difficulty swimming: 0 / 0
Initials: YHL/KSL

Reviewed by: JGH
Date Reviewed: Jan. 21/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**
Sample ID: **EV_ER4 (Amended)**
Work Order No.: **15998**

Start Date: **December 8, 2015**
Termination Date: **January 6, 2016**

Treatment and Replicate (Pooled)	Fish	Length (mm)	Normal	Abnormal	Comments
Site Control GH-ER2 100 C	1	19.5	✓		
	2	18.5	✓		
	3	17.5	✓		
	4	17.5	✓		
	5	18.0	✓		
	6	19.0	✓		
	7	19.0	✓		
	8	19.0	✓		
	9	18.5	✓		
	10	18.0	✓		
	11	18.0	✓		
	12	17.5	✓		
	13	16.5	✓		
	14	18.5	✓		
	15	18.5	✓		
	16	19.0	✓		
	17	18.0	✓		
	18	18.5	✓		
	19	18.5	✓		
	20	17.0	✓		
	21	18.0 FL 5	✓		
	22	16.5	✓		
	23	18.0	✓		
	24	19.5	✓		
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 1.99 g
Number of survivors: 24
Number of deformed/have difficulty swimming: 0 / 0
Initials: KSL/YYL

Reviewed by: JGh
Date Reviewed: Jan. 21/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **EV_ER4 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate (% v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
Site Control GH-ER2 100 D	1	19.0	✓		
	2	19.0	✓		
	3	16.5	✓		
	4	18.5	✓		
	5	19.0	✓		
	6	18.0	✓		
	7	14.5	✓		
	8	17.0	✓		
	9	17.5	✓		
	10	18.5	✓		
	11	18.5	✓		
	12	17.0	✓		
	13	18.5	✓		
	14	19.0	✓		
	15	19.0	✓		
	16	18.5	✓		
	17	18.5	✓		
	18	17.0	✓		
	19	16.0	✓		
	20	19.0	✓		
	21	15.5	✓		
	22	18.0	✓		
	23	19.0	✓		
	24	18.0	✓		
	25	17.5	✓		
	26	18.0	✓		
	27	17.5	✓		
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.16g

Number of survivors: 27

Number of deformed/have difficulty swimming: 0 / 0

Initials: KSL/YYL

Reviewed by: JGh

Date Reviewed: Jan. 21/16

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **EV_ER4 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
(Pooled) Amended EV_ER4 30 A	1	16.0	✓		
	2	18.5	✓		
	3	16.0	✓		
	4	20.0	✓		
	5	19.0	✓		
	6	18.0	✓		
	7	18.0	✓		
	8	18.0	✓		
	9	19.0	✓		
	10	20.0	✓		
	11	17.0	✓		
	12	17.5	✓		
	13	18.5	✓		
	14	20.0	✓		
	15	20.0	✓		
	16	17.5	✓		
	17	18.0	✓		
	18	15.0	✓		
	19	20.5	✓		
	20	20.0	✓		
	21	18.5	✓		
	22	17.5	✓		
	23	19.0		✓	wr ~~Dent fair~~ Lordosis
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.039 g

Number of survivors: 23

Number of deformed/have difficulty swimming: 1 | 0

Initials: KSL/YYL

Reviewed by: JOL

Date Reviewed: Jan. 21/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **EV_ER4 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
(%v/v) Amended EV_ER4 30 B	1	17.5	✓		
	2	17.0	✓		
	3	19.0	✓		
	4	18.5	✓		
	5	17.5	✓		
	6	17.5	✓		
	7	16.5	✓		
	8	17.5	✓		
	9	17.5	✓		
	10	18.5	✓		
	11	17.0	✓		
	12	18.0	✓		
	13	18.5	✓		
	14	18.0	✓		
	15	18.0	✓		
	16	19.0	✓		
	17	18.0	✓		
	18	17.0	✓		
	19	19.0	✓		
	20	10.0		✓	missing tail, erratic swimming
	21	16.5		✓	Lordosis
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 1.71 g

Number of survivors: 21

Number of deformed/have difficulty swimming: 2 | 1

Initials: KSL | YML

Reviewed by: JOM

Date Reviewed: Jan. 21/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**
Start Date: **December 8, 2015**
Sample ID: **EV_ER4 (Amended)**
Termination Date: **January 6, 2016**
Work Order No.: **15998**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
(10%W) Amended EV_ER4 30 C	1	19.0	✓		
	2	20.0	✓		
	3	18.0	✓		
	4	19.0	✓		
	5	18.5	✓		
	6	19.5	✓		
	7	19.0	✓		
	8	19.0	✓		
	9	19.0	✓		
	10	16.5	✓		
	11	18.5	✓		
	12	18.5	✓		
	13	19.0	✓		
	14	~~14.0~~ 18.0	✓		
	15	18.5	✓		
	16	19.0	✓		
	17	19.0	✓		
	18	18.0	✓		
	19	17.5	✓		
	20	19.5	✓		
	21	17.5	✓		
	22	18.5	✓		
	23	18.0	✓		
	24	17.5		✓	Lordosis
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.20g
Number of survivors: 24
Number of deformed/have difficulty swimming: 1 | 0
Initials: KSL/YML

Reviewed by: JCM
Date Reviewed: Jan. 21/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **EV_ER4 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate (% v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
Amended EV_ER4 30 D	1	18.5	✓		
	2	17.5	✓		
	3	20.0	✓		
	4	20.0	✓		
	5	20.0	✓		
	6	19.5	✓		
	7	19.5	✓		
	8	19.0	✓		
	9	18.5	✓		
	10	20.0	✓		
	11	19.0	✓		
	12	18.0	✓		
	13	18.0	✓		
	14	19.0	✓		
	15	20.0	✓		
	16	20.0	✓		
	17	20.5	✓		
	18	20.0	✓		
	19	19.5	✓		
	20	17.5	✓		
	21	14.0	✓		
	22	12.5		✓	Bent tail
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.31 g

Number of survivors: 22

Number of deformed/have difficulty swimming: 1 / 0

Initials: KSL/YYL

Reviewed by: JGL

Date Reviewed: Jan. 21/16

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **EV_ER4 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
(Pooled) Amended EV_ER4 44 A	1	20.5	✓		
	2	19.0	✓		
	3	18.5	✓		
	4	19.0	✓		
	5	20.0	✓		
	6	19.0	✓		
	7	20.0	✓		
	8	19.0	✓		
	9	19.0	✓		
	10	20.0	✓		
	11	19.0	✓		
	12	20.0	✓		
	13	17.5	✓		
	14	19.0	✓		
	15	19.0	✓		
	16	18.0	✓		
	17	20.0	✓		
	18	19.0	✓		
	19	20.5	✓		
	20	19.0	✓		
	21	20.0	✓		
	22	19.5		✓	Yolksac Edema, Bent Tail
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.269

Number of survivors: 22

Number of deformed/have difficulty swimming: 1 | 0

Initials: KSL/YML

Reviewed by: JOL

Date Reviewed: Jan. 21/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **EV_ER4 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
(Pooled) Amended EV-ER4 44 B	1	18.5	✓		
	2	19.0	✓		
	3	19.0	✓		
	4	20.5	✓		
	5	20.0	✓		
	6	18.0	✓		
	7	18.0	✓		
	8	20.5	✓		
	9	~~21~~ 18.0	✓		
	10	19.0	✓		
	11	17.5	✓		
	12	18.0	✓		
	13	19.0	✓		
	14	18.0	✓		
	15	20.0	✓		
	16	20.0	✓		
	17	19.0	✓		
	18	20.0	✓		
	19	20.0	✓		
	20	16.5	✓		
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 1.73 g

Number of survivors: 20

Number of deformed/have difficulty swimming: 0 | 0

Initials: KSc | YML

Reviewed by: JCL

Date Reviewed: Jan-21/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **EV_ER4 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate (% v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
Amended EV_ER4 44 C	1	19.5	✓		
	2	20.0	✓		
	3	19.0	✓		
	4	18.5	✓		
	5	19.0	✓		
	6	19.0	✓		
	7	18.5	✓		
	8	19.0	✓		
	9	19.5	✓		
	10	17.0	✓		
	11	18.5	✓		
	12	19.0	✓		
	13	19.5	✓		
	14	19.0	✓		
	15	19.0	✓		
	16	19.0	✓		
	17	19.0	✓		
	18	21.0	✓		
	19	20.5	✓		
	20	18.0	✓		
	21	18.5	✓		
	22	20.0	✓		
	23	19.5	✓		
	24	20.0	✓		
	25	20.0	✓		
	26	18.5	✓		
	27	17.5	✓		
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.30g

Number of survivors: 27

Number of deformed/have difficulty swimming: 0/0

Initials: KSL/YYL

Reviewed by: JBL

Date Reviewed: Jan. 21/16

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**
Start Date: **December 8, 2015**
Sample ID: **EV_ER4 (Amended)**
Termination Date: **January 6, 2016**
Work Order No.: **15998**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
(6% v/v) Amended EV_ER4 44 D	1	18.0	✓		
	2	18.5	✓		
	3	18.0	✓		
	4	18.5	✓		
	5	17.5	✓		
	6	19.0	✓		
	7	20.0	✓		
	8	17.5	✓		
	9	17.5	✓		
	10	19.5	✓		
	11	19.0	✓		
	12	19.5	✓		
	13	18.0	✓		
	14	20.0	✓		
	15	20.5	✓		
	16	20.0	✓		
	17	20.5	✓		
	18	19.5	✓		
	19	17.0	✓		
	20	19.0	✓		
	21	18.0	✓		
	22	18.0	✓		
	23	19.0	✓		
	24	19.5	✓		
	25	13.0		✓	Extra growth on spine, ~~20~~ Lordosis
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.11 g
Number of survivors: 25
Number of deformed/have difficulty swimming: 1 | 0
Initials: KSL/YYL

Reviewed by: JOL
Date Reviewed: Jan. 21/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **EV_ER4 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
(%v/v) Amended EV_ER4 ~~6~~ 67 A	1	19.0	✓		
	2	19.0	✓		
	3	20.0	✓		
	4	21.0	✓		
	5	19.0	✓		
	6	19.0	✓		
	7	19.0	✓		
	8	19.0	✓		
	9	21.0	✓		
	10	18.5	✓		
	11	19.5	✓		
	12	18.0	✓		
	13	20.0	✓		
	14	19.0	✓		
	15	20.0	✓		
	16	21.0	✓		
	17	17.5	✓		
	18	19.0	✓		
	19	19.0	✓		
	20	19.5	✓		
	21	16.5	✓		
	22	15.5	✓		
	23	14.0	~~✓~~ EL	✓	missing tail fin, erratic swimming
	24	15.0		✓	kyphosis
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.26 g

Number of survivors: 24

Number of deformed/have difficulty swimming: 2 / 1

Initials: KSL/YYL

Reviewed by: JBK

Date Reviewed: Jan. 21/16

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**
Start Date: **December 8, 2015**
Sample ID: **EV_ER4 (Amended)**
Termination Date: **January 6, 2016**
Work Order No.: **15998**

Treatment and Replicate (%, v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
Amended EV_ER4 100% B	1	19.0	✓		
	2	19.5	✓		
	3	20.0	✓		
	4	20.0	✓		
	5	20.0	✓		
	6	19.0	✓		
	7	20.0	✓		
	8	19.0	✓		
	9	20.0	✓		
	10	18.0	✓		
	11	20.0	✓		
	12	20.0	✓		
	13	20.5	✓		
	14	21.0	✓		
	15	19.0	✓		
	16	20.0	✓		
	17	19.5	✓		
	18	20.0	✓		
	19	20.5	✓		
	20	20.0	✓		
	21	20.5	✓		
	22	19.0	✓		
	23	20.0	✓		
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.32 g
Number of survivors: 23
Number of deformed/have difficulty swimming: 0 | 0
Initials: YNL/KSL

Reviewed by: JGR
Date Reviewed: Jan. 21/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **EV_ER4 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate (% v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
Amended EV_ER4	1	19.5	✓		
4-4 ~~6~~ 67	2	19.0	✓		
	3	19.5	✓		
	4	19.0	✓		
C	5	19.0	✓		
	6	20.0	✓		
	7	19.0	✓		
	8	17.5	✓		
	9	20.0	✓		
	10	20.0	✓		
	11	19.0	✓		
	12	20.0	✓		
	13	18.5	✓		
	14	18.0	✓		
	15	19.5	✓		
	16	19.0	✓		
	17	19.5	✓		
	18	19.5	✓		
	19	20.0	✓		
	20	20.0	✓		
	21	20.0	✓		
	22	19.0	✓		
	23	19.5	✓		
	24	19.0	✓		
	25	19.5	✓		
	26	20.0	✓		
	27	20.0	✓		
	28	15.0		✓	~~Wt.~~ Bent Tail
	29	4-4 ~~13.5~~ 13.5		✓	Bent Tail
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.75 g

Number of survivors: 29

Number of deformed/have difficulty swimming: 2 / 0

Initials: KSL/YYL

Reviewed by: JGh

Date Reviewed: Jan. 21/16

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **EV_ER4 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
(%v/v) Amended EV_ER4 667 D	1	20.0	✓		
	2	17.5	✓		
	3	19.0	✓		
	4	19.0	✓		
	5	19.0	✓		
	6	20.0	✓		
	7	19.5	✓		
	8	18.0	✓		
	9	19.0	✓		
	10	20.0	✓		
	11	19.5	✓		
	12	19.5	✓		
	13	20.5	✓		
	14	19.0	✓		
	15	18.0	✓		
	16	20.5	✓		
	17	19.0	✓		
	18	21.0	✓		
	19	19.0	✓		
	20	19.5	✓		
	21	19.0	✓		
	22	16.0		✓	Yolk Sac Edema, Pale
	23	15.5		✓	Yolk Sac Edema, Pale
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.28 g

Number of survivors: 23

Number of deformed/have difficulty swimming: 2 / 0

Initials: KSL/YYL

Reviewed by: JGu

Date Reviewed: Jan. 21/16

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**
Start Date: **December 8, 2015**
Sample ID: **EV_ER4 (Amended)**
Termination Date: **January 6, 2016**
Work Order No.: **15998**

Treatment and Replicate (19+4)	Fish	Length (mm)	Normal	Abnormal	Comments
EV_ER4 Amended 100 A	1	20.0	✓		
	2	18.5	✓		
	3	18.5	✓		
	4	20.5	✓		
	5	20.0	✓		
	6	17.0	✓		
	7	18.0	✓		
	8	18.5	✓		
	9	20.0	✓		
	10	18.5	✓		
	11	19.0	✓		
	12	19.5	✓		
	13	18.5	✓		
	14	18.5	✓		
	15	18.0	✓		
	16	19.5	✓		
	17	18.5	✓		
	18	18.5	✓		
	19	19.0	✓		
	20	18.5	✓		
	21	19.5	✓		
	22	19.0	✓		
	23	10.0		✓	Bent Tail
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.109
Number of survivors: 23
Number of deformed/have difficulty swimming: 1 10
Initials: KSL YYL

Reviewed by: JOL
Date Reviewed: Jan. 21/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **EV_ER4 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate (%v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
EVER4 Amended 100 B	1	18.0	✓		
	2	20.5	✓		
	3	20.0	✓		
	4	18.5	✓		
	5	18.0	✓		
	6	20.0	✓		
	7	20.5	✓		
	8	20.0	✓		
	9	20.0	✓		
	10	19.0	✓		
	11	20.5	✓		
	12	17.5	✓		
	13	18.5	✓		
	14	19.0	✓		
	15	17.0	✓		
	16	19.0	✓		
	17	18.5	✓		
	18	20.0	✓		
	19	19.5	✓		
	20	19.0	✓		
	21	20.0 EV	✓		
	22	20.5	✓		
	23	20.0	✓		
	24	19.5	✓		
	25	20.0	✓		
	26	20.0	✓		
	27	18.5	✓		
	28	16.0	✓		
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.78 g

Number of survivors:

Number of deformed/have difficulty swimming: 0/0

Initials: KSL/YVL

Reviewed by: JCL

Date Reviewed: Jan-21/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **EV_ER4 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate (No VIF)	Fish	Length (mm)	Normal	Abnormal	Comments
EV_ER4 Amended 100 C	1	20.0	✓		
	2	21.0	✓		
	3	20.0	✓		
	4	21.5	✓		
	5	19.0	✓		
	6	20.5	✓		
	7	19.5	✓		
	8	21.0	✓		
	9	20.0	✓		
	10	21.0	✓		
	11	20.0	✓		
	12	20.5	✓		
	13	20.0	✓		
	14	20.5	✓		
	15	19.0	✓		
	16	20.0	✓		
	17	19.0	✓		
	18	20.5	✓		
	19	21.0	✓		
	20	19.0	✓		
	21	20.5	✓		
	22	19.0	✓		
	23	19.0	✓		
	24	21.0	✓		
	25	20.5	✓		
	26	13.0		✓	Bent tail
	27	13.5		✓	Yolk Sac Edema.
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.778

Number of survivors: 27

Number of deformed/have difficulty swimming: 2 | 0

Initials: KSL/YYL

Reviewed by: JOL

Date Reviewed: Jan. 21/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **EV_ER4 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate (1,2,3,4)	Fish	Length (mm)	Normal	Abnormal	Comments
EVER4 Amended 100 D	1	19.5	✓		
	2	19.0	✓		
	3	17.0	✓		
	4	18.0	✓		
	5	20.0	✓		
	6	18.0	✓		
	7	20.0	✓		
	8	19.0	✓		
	9	19.5	✓		
	10	20.0	✓		
	11	20.0	✓		
	12	19.5	✓		
	13	18.5	✓		
	14	20.0	✓		
	15	20.0	✓		
	16	20.0	✓		
	17	19.0	✓		
	18	19.0	✓		
	19	17.0	✓		
	20	19.0	✓		
	21	18.0	✓		
	22	20.0	✓		
	23	19.0	✓		
	24	15.0	✓		
	25	15.0	~~✓~~	✓	~~Sac~~ Yolk Sac Edema.
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.37

Number of survivors: 25

Number of deformed/have difficulty swimming: 1 | 0

Initials: KSL/YML

Reviewed by: JGL

Date Reviewed: Jan. 21/16

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Batch ID:	15-8223-9884	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 15:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(amended)	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 8h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
16-2847-5358	Proportion Normal (viability)	100	>100	NA	NA	1	Fisher Exact Test
17-8530-7107	Survival Rate	100	>100	NA	NA	1	Fisher Exact Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
16-1178-4381	Proportion Normal (viability)	EC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC10	>100	N/A	N/A	<1	
		EC15	>100	N/A	N/A	<1	
		EC20	>100	N/A	N/A	<1	
		EC25	>100	N/A	N/A	<1	
		EC40	>100	N/A	N/A	<1	
		EC50	>100	N/A	N/A	<1	
20-1567-0515	Survival Rate	EC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		EC10	>100	N/A	N/A	<1	
		EC15	>100	N/A	N/A	<1	
		EC20	>100	N/A	N/A	<1	
		EC25	>100	N/A	N/A	<1	
		EC40	>100	N/A	N/A	<1	
		EC50	>100	N/A	N/A	<1	

Proportion Normal Summary (viability)

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.7931	0.74	0.8463	0.7586	0.8333	0.01669	0.03338	4.21%	0.0%
0	Upstream Contr	4	0.6963	0.4062	0.9864	0.5333	0.9	0.09115	0.1823	26.18%	12.22%
30		4	0.7385	0.674	0.8029	0.6786	0.7667	0.02025	0.0405	5.49%	6.9%
44		4	0.7655	0.6317	0.8992	0.6667	0.871	0.04204	0.08408	10.98%	3.49%
67		4	0.7813	0.6468	0.9158	0.7	0.9	0.04226	0.08451	10.82%	1.49%
100		4	0.8326	0.6985	0.9666	0.7333	0.9333	0.04212	0.08424	10.12%	-4.97%

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.8346	0.7918	0.8773	0.8065	0.871	0.01343	0.02687	3.22%	0.0%
0	Upstream Contr	4	0.7049	0.4283	0.9815	0.5333	0.9	0.08691	0.1738	24.66%	15.54%
30		4	0.7822	0.7468	0.8176	0.75	0.8	0.01112	0.02225	2.84%	6.28%
44		4	0.7825	0.6467	0.9182	0.6667	0.871	0.04265	0.0853	10.9%	6.25%
67		4	0.8319	0.6818	0.982	0.7667	0.9667	0.04716	0.09432	11.34%	0.32%
100		4	0.866	0.7529	0.979	0.7667	0.9333	0.03553	0.07106	8.21%	-3.76%

Sample GH_ER2 is the upstream control

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Proportion Normal Detail (viability)

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.7742	0.8065	0.8333	0.7586
0	Upstream Contr	0.5517	0.5333	0.8	0.9
30		0.7586	0.6786	0.7667	0.75
44		0.75	0.6667	0.871	0.7742
67		0.7586	0.7667	0.9	0.7
100		0.7333	0.9333	0.8065	0.8571

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.8065	0.871	0.8333	0.8276
0	Upstream Contr	0.5862	0.5333	0.8	0.9
30		0.7931	0.75	0.8	0.7857
44		0.7857	0.6667	0.871	0.8065
67		0.8276	0.7667	0.9667	0.7667
100		0.7667	0.9333	0.871	0.8929

Proportion Normal Binomials (viability)

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	24/31	25/31	25/30	22/29
0	Upstream Contr	16/29	16/30	24/30	27/30
30		22/29	19/28	23/30	21/28
44		21/28	20/30	27/31	24/31
67		22/29	23/30	27/30	21/30
100		22/30	28/30	25/31	24/28

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	25/31	27/31	25/30	24/29
0	Upstream Contr	17/29	16/30	24/30	27/30
30		23/29	21/28	24/30	22/28
44		22/28	20/30	27/31	25/31
67		24/29	23/30	29/30	23/30
100		23/30	28/30	27/31	25/28

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	20-1567-0515	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Jan-16 12:21	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	15-8223-9884	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 15:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(amended)	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 8h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	295017	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Upstream Contro	4	0.7049	0.5333	0.9	0.08691	0.1738	24.66%	0.0%	84	119
30		4	0.7822	0.75	0.8	0.01112	0.02225	2.84%	-10.97%	90	115
44		4	0.7825	0.6667	0.871	0.04265	0.0853	10.9%	-11.0%	94	120
67		4	0.8319	0.7667	0.9667	0.04716	0.09432	11.34%	-18.02%	99	119
100		4	0.866	0.7667	0.9333	0.03553	0.07106	8.21%	-22.85%	103	119

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Upstream Control	0.5862	0.5333	0.8	0.9
30		0.7931	0.75	0.8	0.7857
44		0.7857	0.6667	0.871	0.8065
67		0.8276	0.7667	0.9667	0.7667
100		0.7667	0.9333	0.871	0.8929

Survival Rate Binomials

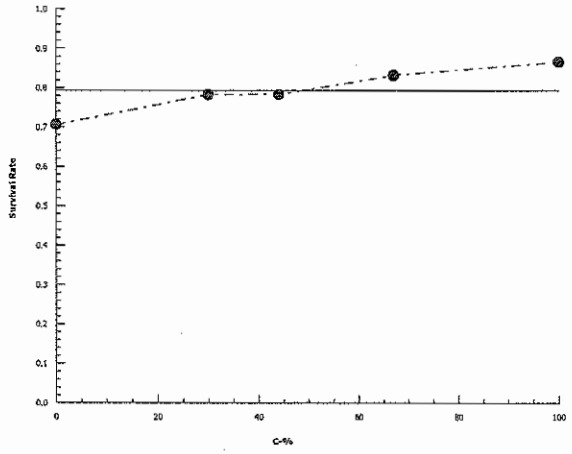
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	25/31	27/31	25/30	24/29
0	Upstream Contr	17/29	16/30	24/30	27/30
30		23/29	21/28	24/30	22/28
44		22/28	20/30	27/31	25/31
67		24/29	23/30	29/30	23/30
100		23/30	28/30	27/31	25/28

Sample GH_ER2 is the upstream control

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID:	20-1567-0515	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Jan-16 12:21	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	17-8530-7107	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Jan-16 12:21	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	15-8223-9884	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 15:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(amended)	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 8h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	Passes survival rate

Fisher Exact Test

Control	vs	C-%	Test Stat	P-Value	P-Type	Decision(α:5%)
Upstream Control		100	1	1.0000	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Upstream Contr	84	35	119	0.7059	0.2941	0.0%
100		103	16	119	0.8655	0.1345	-22.62%

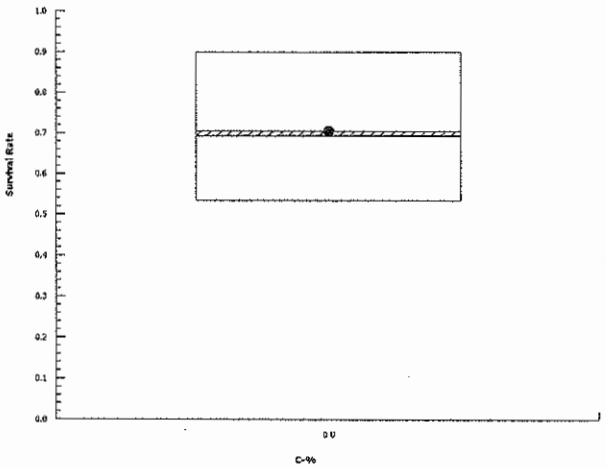
Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Upstream Contr	0.5862	0.5333	0.8	0.9
100		0.7667	0.9333	0.871	0.8929

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	25/31	27/31	25/30	24/29
0	Upstream Contr	17/29	16/30	24/30	27/30
100		23/30	28/30	27/31	25/28

Graphics



Sample GH_ER2 is the upstream control.

CETIS Analytical Report

Test Code: 15998b1 | 01-7483-7263

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	20-6261-0195	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Mar-16 7:52	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	15-8223-9884	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 15:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 8h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	Fails survival rate

Fisher Exact Test

Control	vs	Control	Test Stat	P-Value	P-Type	Decision(α:5%)
Negative Control		Upstream Control	0.01294	0.0129	Exact	Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Negative Contr	101	20	121	0.8347	0.1653	0.0%
0	Upstream Contr	84	35	119	0.7059	0.2941	15.43%

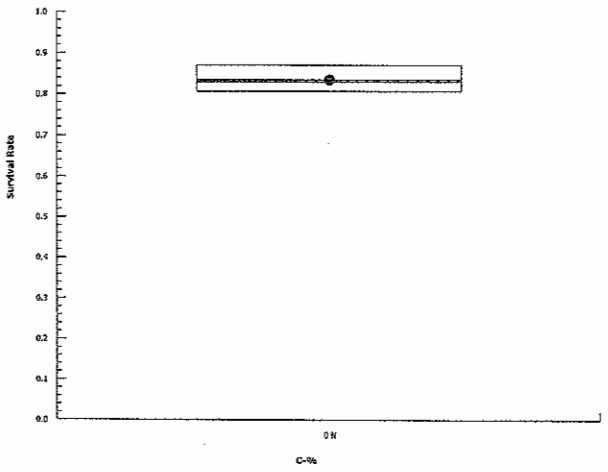
Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.8065	0.871	0.8333	0.8276
0	Upstream Contr	0.5862	0.5333	0.8	0.9

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	25/31	27/31	25/30	24/29
0	Upstream Contr	17/29	16/30	24/30	27/30

Graphics



Analyst:_____ QA: JCL March 4/16

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	16-1178-4381	**Endpoint:**	Proportion Normal (Viability)	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Jan-16 12:21	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	15-8223-9884	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 15:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(amended)	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 8h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	822682	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary (Viability) — Calculated Variate(A/B)

C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Upstream Contro	4	0.6963	0.5333	0.9	0.09115	0.1823	26.18%	0.0%	83	119
30		4	0.7385	0.6786	0.7667	0.02025	0.0405	5.49%	-6.06%	85	115
44		4	0.7655	0.6667	0.871	0.04204	0.08408	10.98%	-9.94%	92	120
67		4	0.7813	0.7	0.9	0.04226	0.08451	10.82%	-12.22%	93	119
100		4	0.8326	0.7333	0.9333	0.04212	0.08424	10.12%	-19.58%	99	119

Proportion Normal Detail (Viability)

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Upstream Control	0.5517	0.5333	0.8	0.9
30		0.7586	0.6786	0.7667	0.75
44		0.75	0.6667	0.871	0.7742
67		0.7586	0.7667	0.9	0.7
100		0.7333	0.9333	0.8065	0.8571

Proportion Normal Binomials (Viability)

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	24/31	25/31	25/30	22/29
0	Upstream Contr	16/29	16/30	24/30	27/30
30		22/29	19/28	23/30	21/28
44		21/28	20/30	27/31	24/31
67		22/29	23/30	27/30	21/30
100		22/30	28/30	25/31	24/28

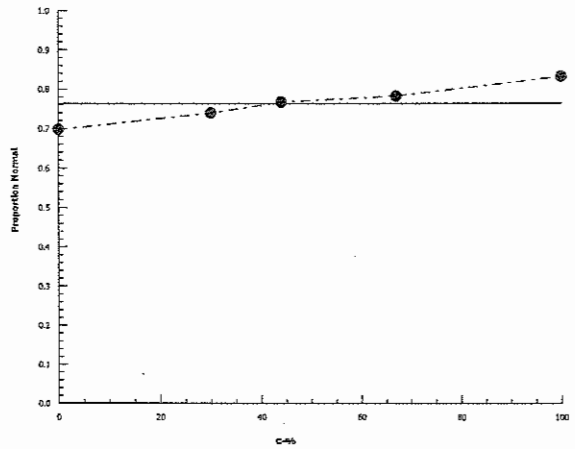
Sample GH_ER2 is the upstream control.

Analyst:_____ QA: JGL Jan. 27/16

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID:	16-1178-4381	**Endpoint:**	Proportion Normal (viability)	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Jan-16 12:21	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA: JGH Jan. 27/16

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	16-2847-5358	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Jan-16 12:21	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	15-8223-9884	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 15:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(amended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 8h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	Passes proportion normal

Fisher Exact Test

Control	vs	C-%	Test Stat	P-Value	P-Type	Decision(α:5%)
Upstream Control		100	1	1.0000	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Upstream Contr	83	36	119	0.6975	0.3025	0.0%
100		99	20	119	0.8319	0.1681	-19.28%

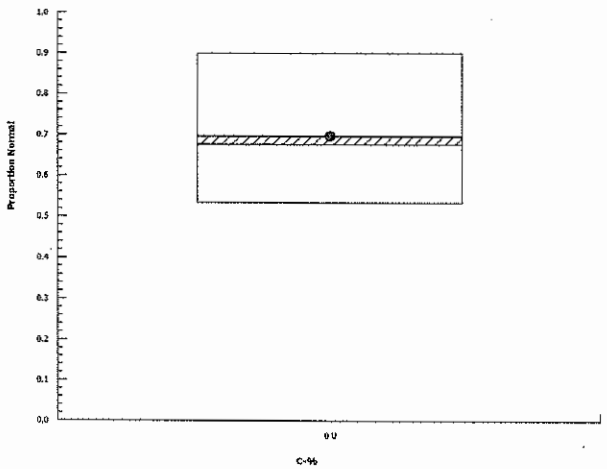
Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Upstream Contr	0.5517	0.5333	0.8	0.9
100		0.7333	0.9333	0.8065	0.8571

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	24/31	25/31	25/30	22/29
0	Upstream Contr	16/29	16/30	24/30	27/30
100		22/30	28/30	25/31	24/28

Graphics



Sample GH_ER2 is the upstream control

CETIS Analytical Report

Test Code: 15998b1 | 01-7483-7263

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	12-9510-2237	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Mar-16 7:53	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	15-8223-9884	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 15:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 8h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	Passes proportion normal

Fisher Exact Test

Control	vs	Control	Test Stat	P-Value	P-Type	Decision(α:5%)
Negative Control		Upstream Control	0.05945	0.0594	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Negative Contr	96	25	121	0.7934	0.2066	0.0%
0	Upstream Contr	83	36	119	0.6975	0.3025	12.09%

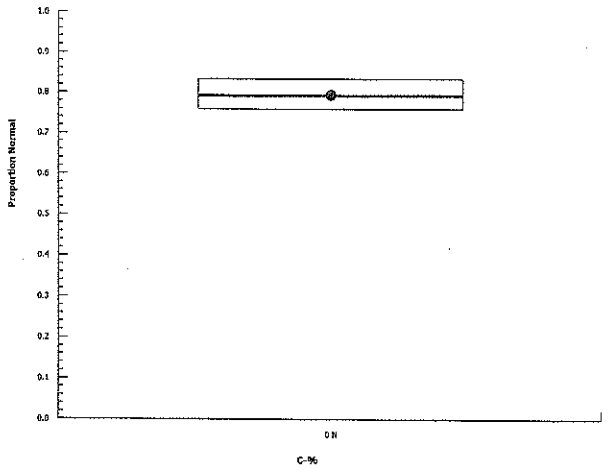
Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.7742	0.8065	0.8333	0.7586
0	Upstream Contr	0.5517	0.5333	0.8	0.9

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	24/31	25/31	25/30	22/29
0	Upstream Contr	16/29	16/30	24/30	27/30

Graphics



Analyst:_____ QA: March 4/16

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Batch ID:	08-6193-1404	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 15:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(amended)	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 8h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
09-1332-9288	Length-mm	100	>100	NA	2.97%	1	Equal Variance t Two-Sample Test
11-2711-0095	Mean ~~Dry~~ Weight-mg	100	>100	NA	6.09%	1	Equal Variance t Two-Sample Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
10-4367-3197	Length-mm	IC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		IC10	>100	N/A	N/A	<1	
		IC15	>100	N/A	N/A	<1	
		IC20	>100	N/A	N/A	<1	
		IC25	>100	N/A	N/A	<1	
		IC40	>100	N/A	N/A	<1	
		IC50	>100	N/A	N/A	<1	
09-0203-6675	Mean ~~Dry~~ Weight-mg	IC5	>100	N/A	N/A	<1	Linear Interpolation (ICPIN)
		IC10	>100	N/A	N/A	<1	
		IC15	>100	N/A	N/A	<1	
		IC20	>100	N/A	N/A	<1	
		IC25	>100	N/A	N/A	<1	
		IC40	>100	N/A	N/A	<1	
		IC50	>100	N/A	N/A	<1	

Length-mm Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	18.15	17.46	18.84	17.9	18.8	0.2179	0.4359	2.4%	0.0%
0	Upstream Contr	4	18.07	17.64	18.51	17.8	18.4	0.1377	0.2754	1.52%	0.41%
30		4	18.22	17.31	19.14	17.4	18.7	0.2869	0.5737	3.15%	-0.41%
44		4	18.95	18.41	19.49	18.5	19.3	0.1708	0.3416	1.8%	-4.41%
67		4	19.13	18.37	19.88	18.7	19.8	0.2358	0.4717	2.47%	-5.37%
100		4	19.03	18.26	19.79	18.5	19.6	0.2394	0.4787	2.52%	-4.82%

Mean ~~Dry~~ Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	87.3	73.04	101.6	77.6	99.2	4.481	8.963	10.27%	0.0%
0	Upstream Contr	4	81.49	79.54	83.44	80	82.92	0.6125	1.225	1.5%	6.66%
30		4	91.59	75.83	107.3	81.43	105	4.951	9.902	10.81%	-4.91%
44		4	89.7	75.82	103.6	84.4	102.7	4.363	8.726	9.73%	-2.75%
67		4	97.25	92.05	102.4	94.17	100.9	1.633	3.267	3.36%	-11.39%
100		4	97	89.1	104.9	91.3	102.6	2.48	4.959	5.11%	-11.1%

Sample GH_ER2 is the ~~Site~~ upstream control

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Length-mm Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	18.8	17.9	17.9	18
0	Upstream Contr	17.9	18.4	18.2	17.8
30		18.3	17.4	18.5	18.7
44		19.3	18.9	19.1	18.5
67		18.7	19.8	19	19
100		18.5	19.2	19.6	18.8

Mean Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	99.2	87.41	77.6	85
0	Upstream Contr	81.18	81.88	82.92	80
30		88.26	81.43	91.67	105
44		102.7	86.5	85.19	84.4
67		94.17	100.9	94.83	99.13
100		91.3	99.29	102.6	94.8

CETIS Analytical Report

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	10-4367-3197	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Jan-16 12:24	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	08-6193-1404	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 15:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(amended)	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 8h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	403900	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>100	N/A	N/A	<1	NA	NA
IC10	>100	N/A	N/A	<1	NA	NA
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

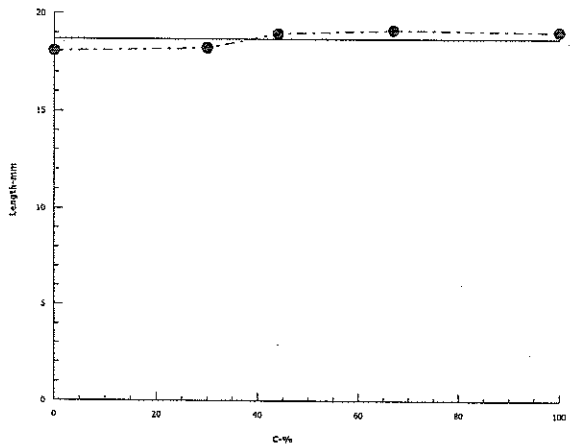
Length-mm Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Upstream Contro	4	18.07	17.8	18.4	0.1377	0.2754	1.52%	0.0%
30		4	18.22	17.4	18.7	0.2869	0.5737	3.15%	-0.83%
44		4	18.95	18.5	19.3	0.1708	0.3416	1.8%	-4.84%
67		4	19.13	18.7	19.8	0.2359	0.4717	2.47%	-5.81%
100		4	19.03	18.5	19.6	0.2394	0.4787	2.52%	-5.26%

Length-mm Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Upstream Control	17.9	18.4	18.2	17.8
30		18.3	17.4	18.5	18.7
44		19.3	18.9	19.1	18.5
67		18.7	19.8	19	19
100		18.5	19.2	19.6	18.8

Graphics



Sample GH_ER2 is the upstream control.

CETIS Analytical Report

Salmonid Embryo-Alevin~~-Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	09-1332-9288	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Jan-16 12:24	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	08-6193-1404	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 15:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(amended)	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 8h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	2.97%	Passes length-mm

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Upstream Control		100	-3.44	1.943	0.537	6	0.9931	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.805001	1.805001	1	11.84	0.0138	Significant Effect
Error	0.9150016	0.1525003	6			
Total	2.720003		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.022	47.47	0.3880	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9705	0.6451	0.9018	Normal Distribution

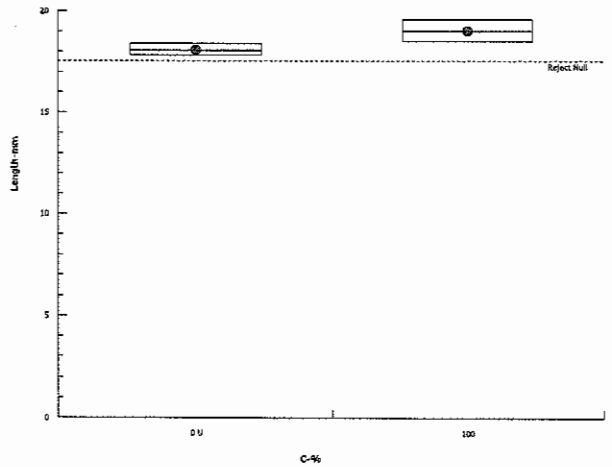
Length-mm Summary

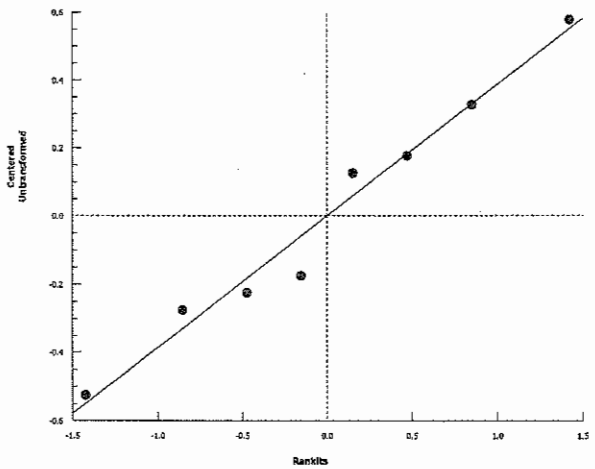
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Upstream Contr	4	18.07	17.64	18.51	18.05	17.8	18.4	0.1377	1.52%	0.0%
100		4	19.03	18.26	19.79	19	18.5	19.6	0.2394	2.52%	-5.26%

Length-mm Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Upstream Contr	17.9	18.4	18.2	17.8
100		18.5	19.2	19.6	18.8

Graphics





Sample GH_ER2 is the upstream control.

CETIS Analytical Report

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	07-1558-6276	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Mar-16 8:43	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	08-6193-1404	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 15:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 8h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	2.76%	Passes length-mm

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		Upstream Control	0.2909	1.94	0.501	6	0.3905	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01124994	0.01124994	1	0.08464	0.7809	Non-Significant Effect
Error	0.7974999	0.1329166	6			
Total	0.8087499		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.505	47.5	0.4705	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8199	0.645	0.0466	Normal Distribution

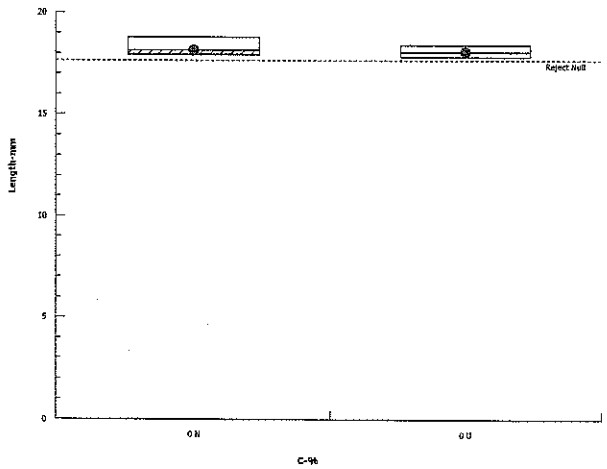
Length-mm Summary

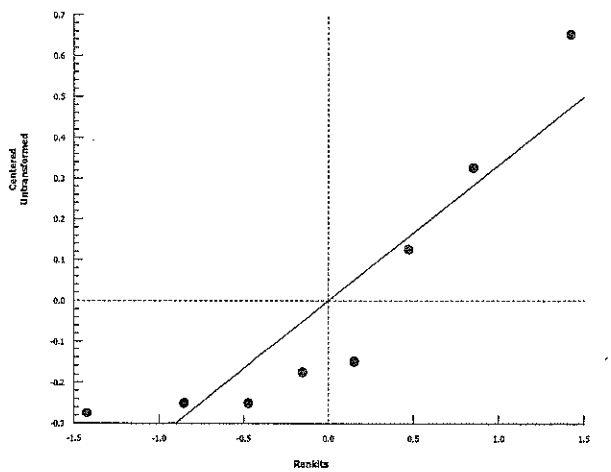
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Upstream Contr	4	18.07	17.64	18.51	18.05	17.8	18.4	0.1377	1.52%	0.0%
0	Negative Control	4	18.15	17.46	18.84	17.95	17.9	18.8	0.2179	2.4%	-0.42%

Length-mm Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	18.8	17.9	17.9	18
0	Upstream Contr	17.9	18.4	18.2	17.8

Graphics





CETIS Analytical Report

Report Date: 27 Jan-16 12:24 (p 1 of 1)
Test Code: 15998b2 | 04-2827-9369

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — Nautilus Environmental

Analysis ID:	09-0203-6675	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Jan-16 12:24	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	08-6193-1404	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 15:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 8h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	83732	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>100	N/A	N/A	<1	NA	NA
IC10	>100	N/A	N/A	<1	NA	NA
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

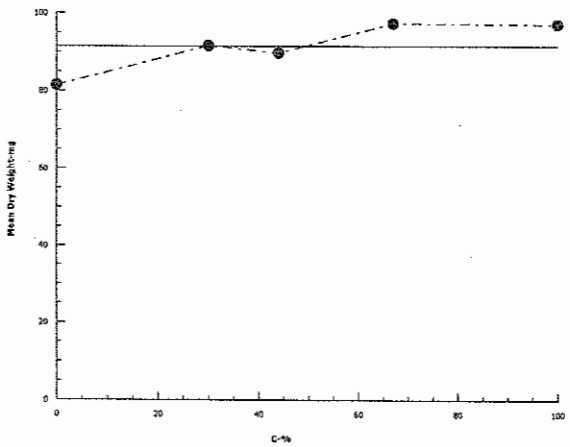
Mean ~~Dry~~ Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Upstream Contro	4	81.49	80	82.92	0.6125	1.225	1.5%	0.0%
30		4	91.59	81.43	105	4.951	9.902	10.81%	-12.39%
44		4	89.7	84.4	102.7	4.363	8.726	9.73%	-10.08%
67		4	97.25	94.17	100.9	1.633	3.267	3.36%	-19.34%
100		4	97	91.3	102.6	2.48	4.959	5.11%	-19.02%

Mean ~~Dry~~ Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Upstream Control	81.18	81.88	82.92	80
30		88.26	81.43	91.67	105
44		102.7	86.5	85.19	84.4
67		94.17	100.9	94.83	99.13
100		91.3	99.29	102.6	94.8

Graphics



Sample GH_ER2 is the upstream control.

Analyst:_____ QA: Jan-27/16

CETIS Analytical Report

Report Date: 27 Jan-16 12:24 (p 1 of 1)
Test Code: 15998b2 | 04-2827-9369

Salmonid Embryo-Alevin ~~Fry~~ wet Survival Development and Growth Test — Nautilus Environmental

Analysis ID:	11-2711-0095	**Endpoint:**	Mean ~~Dry~~ wet Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Jan-16 12:24	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	08-6193-1404	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 15:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 8h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	6.09%	Passes mean dry weight-mg

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Upstream Control		100	-6.07	1.943	4.963	6	0.9995	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	480.7251	480.7251	1	36.84	0.0009	Significant Effect
Error	78.28394	13.04732	6			
Total	559.009		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	16.39	47.47	0.0460	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.989	0.6451	0.9934	Normal Distribution

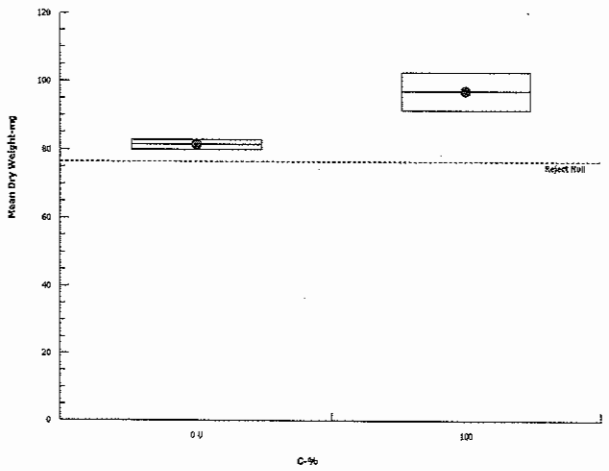
Mean ~~Dry~~ wet Weight-mg Summary

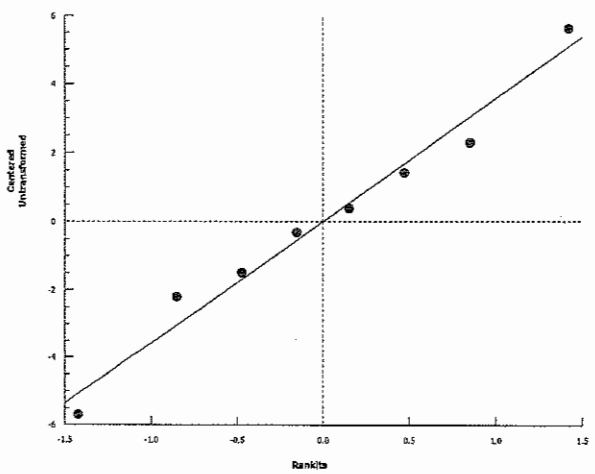
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Upstream Contr	4	81.49	79.54	83.44	81.53	80	82.92	0.6125	1.5%	0.0%
100		4	97	89.1	104.9	97.04	91.3	102.6	2.48	5.11%	-19.02%

Mean ~~Dry~~ wet Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Upstream Contr	81.18	81.88	82.92	80
100		91.3	99.29	102.6	94.8

Graphics





Sample GH_ER2 is the upstream control.

Analyst:_____ QA: JGH Jan. 27/16

CETIS Analytical Report

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	10-0432-7077	**Endpoint:**	Mean ~~Dry~~ wet Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Mar-16 7:54	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	08-6193-1404	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 15:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	03-0241-6687	**Code:**	EV_ER4(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15 08:45	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 8h (-1.3 °C)	**Station:**	EV_ER4_WS_2015-11-30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.2%	Passes mean dry weight-mg

Unequal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		Upstream Control	1.284	2.353	10.64	3	0.1446	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	67.50798	67.50798	1	1.65	0.2463	Non-Significant Effect
Error	245.5035	40.91724	6			
Total	313.0114		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	53.53	47.47	0.0084	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8683	0.6451	0.1450	Normal Distribution

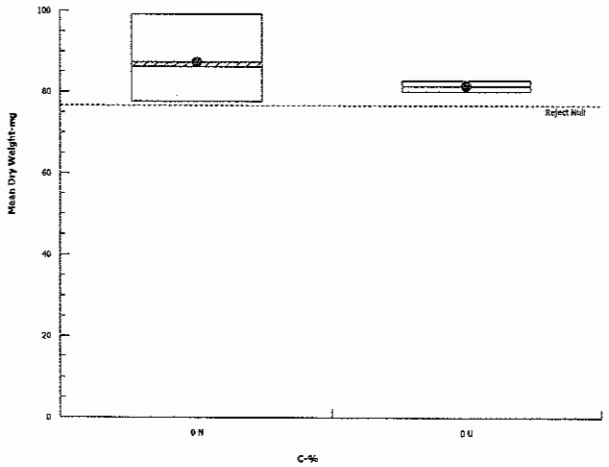
Mean ~~Dry~~ wet Weight-mg Summary

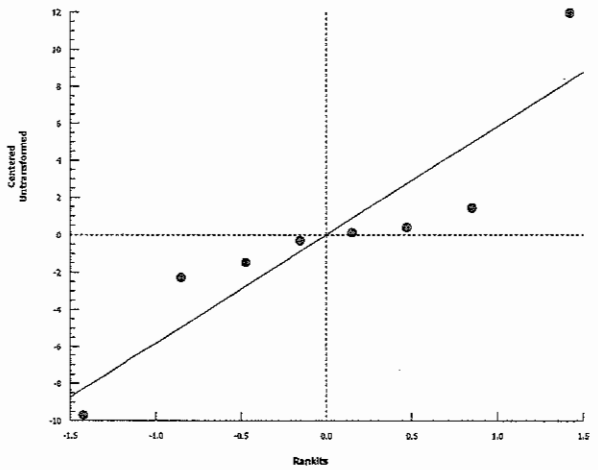
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Upstream Contr	4	81.49	79.54	83.44	81.53	80	82.92	0.6125	1.5%	0.0%
0	Negative Control	4	87.3	73.04	101.6	86.2	77.6	99.2	4.481	10.27%	-7.13%

Mean ~~Dry~~ wet Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	99.2	87.41	77.6	85
0	Upstream Contr	81.18	81.88	82.92	80

Graphics





Client: Teck

W.O.#: 15998

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Dechlor (Lab Control)	Dec. 8/15	50	0.6	0.7	10		50	0.5	10	YML
GH_ER2 (Site Control)	↓	↓	9.9	10.1	194		50	9.3	186	JS
EV_ER4 (Amended)	↓	↓	8.9	9.1	174		10①	7.1	710	JS
Dechlor (Lab Control)	Dec. 15/15	50	0.6	0.7	10		50	0.5	10	YML
GH_ER2 (Site Control)	↓	↓	7.5	7.7	146		50	8.7	174	KL
EV_ER4 (Amended)	↓	↓	8.5	8.7	166		10①	6.7	670	KL
Dechlor (Lab Control)	Dec. 22/15	50	0.5	0.6	8		50	0.6	12	YML
GH_ER2 (Site Control)	↓	↓	7.6	7.8	148		50	9.4	188	YML
EV_ER4 (Amended)	↓	↓	8.6	*& 8.7	170		10①	6.9	690	KL
Dechlor (Lab Control)	Dec. 29/15	50	0.4	0.5	6		50	0.4	8	YML
GH_ER2 (Site Control)	↓	↓	7.6	7.8	148		50	8.9	178	KL
EV_ER4 (Amended)	↓	↓	8.8	8.9	174		10①	8.2	820	KL

Notes: ① Diluted to 100 mL w/ DI water

Reviewed by: JOn

Date Reviewed: Jan - 21/16

Embryo-Alevin Test Summary Sheet

Client: Teck
Work Order No.: 15998a

Test Date: December 8, 2015 - January 6, 2016
Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: GH_FR1 (Amended in-house)
Sample Date: November 30, December 7, December 14 & December 21, 2015
Date Received: December 1, December 8, December 15 & December 22, 2015
Sample Volume: (10 - 15) x 20 L per refresh

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L CaCO3): 8 - 12
Alkalinity (mg/L CaCO3): 6 - 10

Test Organism Information:

Batch No: 120815
Source: Vancouver Island Trout Hatchery, Duncan, BC
Loading Density: 0.92 g / L
Number male broodstock used: 4
Number female broodstock used: 4

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE83
Stock Solution ID: 15S03
Date Initiated: December 8, 2015
7-d EC50 (95% CL): 7.3 (7.1 - 7.5) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.2 - 7.3) mg/L SDS
Reference Toxicant CV (%): 36

Test Results:

Sample ID: **GH_FR1 (Amended)**	Survival	Viability	Length	Wet weight
EC25 (%) (v/v)	>100	>100		
EC50 (%) (v/v)	>100	>100		
IC25 (%) (v/v)			>100	>100
IC50 (%) (v/v)			>100	>100

Reviewed by: JGH
Date reviewed: Jan. 27/16

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: GH-FR1 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @ 1635h
Stop Date & Time: January 6, 2016 @ 1230h
Test Species: *Oncorhynchus mykiss*

Lab control Concentration (% v/v)	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	14.5	14.0	14.5	14.5	15.0	14.5	15.0	14.5	15.0	14.5	14.5
DO (mg/L)	9.8	9.8	9.8	9.9	10.0	9.6	9.8	9.8	9.9	9.8	9.7	9.8	9.4
pH	6.7	6.7	6.8	6.8	6.8	6.7	6.8	7.0	7.1	7.0	7.0	6.7	6.9
Cond. (µS/cm)	29	29		28		28		26		26		25	
Initials	YML	SSD		YML		SSD		A		A		YML	

Site Control Concentration FR_VFR1-100	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.5	14.0	14.5	13.5	15.0	14.0	15.0	14.0	15.0	13.0	14.5
DO (mg/L)	9.7	9.8	9.8	10.0	9.9	9.8	9.8	9.9	9.8	9.8	9.8	9.9	9.4
pH	8.1	8.3	7.9	8.3	8.0	8.3	8.0	8.2	8.2	8.2	8.1	8.1	8.0
Cond. (µS/cm)	357	364		363		358		360		361		355	
Initials	YML	SSD		YML		SSD		A		A		YML	

30 Concentration Amended GH-FR1	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.0	14.5	14.0	14.5	13.5	15.0	14.0	15.0	14.0	15.0	13.0	14.5
DO (mg/L)	9.7	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.7	9.9	9.7	9.9	9.6
pH	8.1	8.4	8.0	8.4	8.0	8.3	8.1	8.2	8.3	8.2	8.1	8.1	8.0
Cond. (µS/cm)	632	672		641		630		628		630		621	
Initials	YML	SSD		YML		SSD		A		A		YML	

44 Concentration Amended GH-FR1	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.0	14.5	14.0	14.5	13.5	15.0	14.0	15.0	14.0	15.0	13.0	14.5
DO (mg/L)	9.8	9.9	9.9	10.0	10.0	9.9	9.9	9.9	9.9	9.9	9.8	9.9	9.6
pH	8.2	8.4	8.0	8.4	8.0	8.3	8.2	8.1	8.2	8.2	8.2	8.1	8.1
Cond. (µS/cm)	741	817		759		763		758		756		749	
Initials	YML	SSD		YML		SSD		A		A		YML	

Thermometer: temp-7 **DO meter:** DO-2/3 **pH meter:** pH-1/3 **Conductivity meter:** C-2/3

	Lab Control	Site Control FR_VFR1	Amended GH-FR1	
Hardness*	10	190	720	
Alkalinity*	10	194	200	

* mg/L as CaCO3

Analysts: SSD, AWD, YML

Reviewed by: JBL
Date reviewed: Jan. 25/16

Sample Description: clear, colourless, no particulates, no odour

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: GH-FR1 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @ 1635h
Stop Date & Time: January 6, 2016 @ 1230h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v) YML 67 Amended GHFR1	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.0	14.5	14.0	14.5	13.5	15.0	14.5	15.0	14.5	15.0	14.0 YML	14.5
DO (mg/L)	9.8	9.9	9.9	10.0	9.8	10.0	9.9	9.8	9.8	9.7	9.8	10.0	9.5
pH	8.2	8.4	8.0	8.4	8.1	8.3	8.2	8.2	8.3	8.2	8.2	8.1	8.1
Cond. (µS/cm)	920	923		937		945		930		927		922	
Initials	YML	SSD		YML		SSD		A		A		YML	

@13.0

Concentration (Amended) 100 GH-FR1	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.0	14.5	14.0	14.5	13.5	15.0	14.5	15.0	14.5	15.0	13.0	14.5
DO (mg/L)	9.8	9.8	9.9	10.1	9.8	9.9	9.9	9.9	9.8	9.9	9.7	10.1	9.6
pH	8.2	8.4	8.1	8.3	8.1	8.3	8.2	8.3	8.3	8.3	8.2	8.1	8.1
Cond. (µS/cm)	1183	1204		1202		1174		1173		1172		1149	
Initials	YML	SSD		YML		SSD		A		A		YML	

Concentration	Days												
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)													
DO (mg/L)													
pH													
Cond. (µS/cm)													
Initials													

Concentration	Days												
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)													
DO (mg/L)													
pH													
Cond. (µS/cm)													
Initials													

Thermometer: temp-7 **DO meter:** DO-2/3 **pH meter:** pH-1/3 **Conductivity meter:** C-2/3

	Lab Control	Site Control FR-UFR1	Amended GHFR1	
Hardness*	10	190	720	
Alkalinity*	10	194	200	

* mg/L as CaCO3

Analysts: SSD, AWD, YML

Reviewed by: JGL
Date reviewed: Jan. 25/16

Sample Description: clear, colourless, no particulates, no odour.

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: GH-FR1 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @ 1635h
Stop Date & Time: January 6, 2016 @ 1230h
Test Species: *Oncorhynchus mykiss*

Lab Control Concentration (% v/v)	Days 7 new	7 old	8 new	8 old	9 new	9 old	10 new	10 old	11 new	11 old	12 new	12 old	13 new	13 old
Temperature (°C)	14.5	14.5	14.5	14.5	14.0	14.5	14.0	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.7	9.7	9.8	9.9	9.8	9.9	10.0	9.8	9.8	9.5	9.9	9.7	10.0	9.7
pH	6.7	6.9	7.1	7.2	7.0	7.1	6.8	7.0	6.8	7.0	6.8	7.0	6.8	6.9
Cond. (µS/cm)	27		26		26		25		26		26		25	
Initials	YML		A		A		YML		A		A		YML	

Site Control Concentration FR_UFR1 -100	Days 7 new	7 old	8 new	8 old	9 new	9 old	10 new	10 old	11 new	11 old	12 new	12 old	13 new	13 old
Temperature (°C)	13.0	14.5	13.0	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.2	9.8	10.1	9.8	9.9	9.8	9.8	9.5	9.8	9.7	9.8	9.8	10.0	9.7
pH	8.0	7.9	8.1	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.1	7.9	7.9
Cond. (µS/cm)	350		351		352		347		350		352		343	
Initials	YML		A		A		A		A		A		YML	

30 Concentration Amended GH-FR1	Days 7 new	7 old	8 new	8 old	9 new	9 old	10 new	10 old	11 new	11 old	12 new	12 old	13 new	13 old
Temperature (°C)	13.0	14.5	13.0	14.5	14.0	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.1	9.8	10.2	9.9	9.9	9.8	9.9	9.6	9.9	9.8	9.9	9.7	9.9	9.8
pH	7.9	7.9	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.0	8.0	8.0
Cond. (µS/cm)	634		631		638		660		645		652		632	
Initials	YML		A		A		A		A		A		YML	

44 Concentration Amended GH-FR1	Days 7 new	7 old	8 new	8 old	9 new	9 old	10 new	10 old	11 new	11 old	12 new	12 old	13 new	13 old
Temperature (°C)	13.0	14.5	13.0	14.5	14.0	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.2	9.8	10.2	9.8	9.8	9.8	9.8	9.5	9.9	9.8	9.8	9.7	9.9	9.6
pH	7.9	7.9	8.0	8.0	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.0	8.0	8.0
Cond. (µS/cm)	787		776		784		765		772		760		750	
Initials	YML		A		A		A		A		A		YML	

Thermometer: temp-7 DO meter: DO-213 pH meter: pH-113 Conductivity meter: C-213

	Lab Control	Site Control FR_UFR1	Amended GH-FR1	
Hardness*	10	198	810	
Alkalinity*	10	146	190	

* mg/L as CaCO3

Analysts: AWD, YML
Reviewed by: JOL
Date reviewed: Jan. 25/16

Sample Description: clear, colourless, no particulates, no odour.

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: GH-FR1 (Amended)
Work Order #: 15993

Start Date & Time: December 8, 2015 @ 1635h
Stop Date & Time: January 6, 2016 @ 1230h
Test Species: *Oncorhynchus mykiss*

Amended GH-FR1 — 67 %

Concentration (% v/v)	Days 7 new	7 old	8 new	8 old	9 new	9 old	10 new	10 old	11 new	11 old	12 new	12 old	13 new	13 old
Temperature (°C)	14.5	14.5	13.0	14.5	14.0	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.2	9.7	10.2	9.9	9.3	9.8	9.8	9.6	9.8	9.8	9.9	9.7	9.9	9.7
pH	7.9	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Cond. (µS/cm)	946		960		972		959		962		955		941	
Initials	YHL		A		A		A		A		A		YHL	

(Amended) 100 %

Concentration GH-FR1	Days 7 new	7 old	8 new	8 old	9 new	9 old	10 new	10 old	11 new	11 old	12 new	12 old	13 new	13 old
Temperature (°C)	14.5	14.5	13.0	14.5	14.0	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.2	9.8	10.2	10.0	9.8	9.9	9.7	9.7	9.9	9.9	9.9	9.7	9.9	9.7
pH	7.9	7.9	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.1	8.1	8.1	8.1
Cond. (µS/cm)	1217		1208		1213		1208		1210		1208		1182	
Initials	YHL		A		A		A		A		A		YHL	

Concentration	Days new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: temp-7 DO meter: DO-213 pH meter: pH-113 Conductivity meter: C-213

	Lab Control	Site Control FR-UFR1	Amended GH-FR1	
Hardness*	10	198	810	
Alkalinity*	10	146	190	

*mg/L as CaCO3

Analysts: AWD, YHL
Reviewed by: JOH
Date reviewed: Jan-25/16

Sample Description: clear, colourless, no particulates, no odour.

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: GH-FR1 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @ 1635h
Stop Date & Time: January 6, 2016 @ 1230h
Test Species: *Oncorhynchus mykiss*

Lab Control (% v/v)	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.0	15.0	14.5	14.5	14.5	14.5	14.0	14.5
DO (mg/L)	9.8	9.7	9.9	9.8	9.9	9.7	9.8	10.0	9.9	9.5	10.0	9.6	10.0	9.7
pH	6.7	6.8	6.8	6.7	6.8	6.8	6.3	6.2	6.2	6.2	6.7	6.8	6.3	6.8
Cond. (µS/cm)	24		24		26		25		25		26		24	
Initials	YML		SSD		YML		JW		JW		YML		KLP	

Site Control FR_UFR1-100	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	14.5	13.5	14.5	13.0	14.5	13.0	15.0	14.0	14.5	13.0	14.5	13.0 13.0	14.5
DO (mg/L)	10.3	9.7	9.9	9.8	10.1	9.6	10.2	10.1	10.1	9.6	10.2	9.5	10.3 13.5	9.7
pH	7.9	7.8	8.1	7.8	8.1	7.9	8.0	7.7	8.0	7.8	7.9	8.0	7.8	8.0
Cond. (µS/cm)	336		327		338		336		330		337		308	
Initials	YML		SSD		YML		JW		JW		YML		KLP	

30 Amended GH-FR1	Days													
Concentration	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	14.5	13.5	14.5	13.0	14.5	13.0	15.0	14.0	14.5	13.0	14.5	13.0	14.5
DO (mg/L)	10.2	9.7	10.0	9.9	10.2	9.6	10.2	10.1	10.2	9.7	10.2	9.6	10.3	9.8
pH	7.9	7.8	8.2	8.1	8.0	7.9	8.0	7.8	8.0	7.8	8.0	7.9	7.8	8.1
Cond. (µS/cm)	617		605		614		611		609		612		601	
Initials	YML		SSD		YML		JW		JW		YML		KLP	

44 Amended GH-FR1	Days													
Concentration	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	14.5	13.5	14.5	13.0	14.5	13.0	15.0	14.0	14.5	13.0	14.5	13.0	14.5
DO (mg/L)	10.2	9.8	10.0	9.9	10.2	9.7	10.2	10.0	10.2	9.7	10.3	9.7	10.3	9.8
pH	8.0	7.9	8.2	8.1	8.0	7.9	8.0	7.8	8.0	7.9	8.0	7.9	7.9	8.1
Cond. (µS/cm)	761		752		762		746		751		757		710	
Initials	YML		SSD		YML		JW		JW		YML		KLP	

Thermometer: temp-7 **DO meter:** DO-2/3 **pH meter:** pH-1/3 **Conductivity meter:** C-2/3

	Lab Control	Site Control FR_UFR1	Amended GH-FR1	
Hardness*	12	192	830	
Alkalinity*	8	146	190	

* mg/L as CaCO3

Analysts: SSD, JW, KLP, YML
Reviewed by: JCH
Date reviewed: Jan. 25/16

Sample Description: clear, colourless, no particulates, no odour

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: GH-FR1 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @ 1635h
Stop Date & Time: January 6, 2016 @ 1230h
Test Species: *Oncorhynchus mykiss*

67 Amended GH-FR1 Concentration (% v/v)	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	14.5	13.5	14.5	13.0	14.5	13.0	15.0	14.0	14.5	13.0	14.5	13.0	14.5
DO (mg/L)	10.3	9.7	10.0	9.9	10.2	9.6	10.2	10.0	10.2	9.8	10.3	9.6	10.3	9.7
pH	8.0	7.9	8.2	8.2	8.0	8.0	8.0	7.9	8.0	7.9	8.0	7.9	7.9	8.1
Cond. (µS/cm)	923		887		940		906		918		911		864	
Initials	YML		SSD		YML		JW		JW		YML		KLP	

100 (Amended) GH-FR1 Concentration	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	14.5	13.5	14.5	13.0	14.5	13.0	15.0	14.0	14.5	13.0	14.5	13.0	14.5
DO (mg/L)	10.3	9.8	10.0	9.8	10.2	9.7	10.2	10.0	10.2	9.7	10.3	9.7	10.3	9.8
pH	8.1	7.9	8.2	8.2	8.1	8.0	8.0	7.9	8.1	8.0	8.1	7.9	7.9	8.1
Cond. (µS/cm)	1186		1152		1189		1168		1185		1186		1118	
Initials	YML		SSD		YML		JW		JW		YML		KLP	

Concentration	Days													
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: temp-7 **DO meter:** DO-213 **pH meter:** pH-113 **Conductivity meter:** C-213

	Lab Control	Site Control FR_UFR1	Amended GHLFR1	
Hardness*	12	192	830	
Alkalinity*	8	146	190	

* mg/L as CaCO3

Analysts: SSD, JW, KLP, YML
Reviewed by: JW
Date reviewed: Jan-25/16

Sample Description: clear, colourless, no particulates, no odour.

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: GH_FR1 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @ 1635h
Stop Date & Time: January 6, 2016 @ 1230h
Test Species: *Oncorhynchus mykiss*

Lab Control Concentration (9.0 v/v)	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.0	14.5	15.0	14.0	14.5	14.0	14.5	14.0	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.9	9.8	9.8	9.9	10.0	9.8	9.9	9.4	~~8.30~~ @10.0	9.6	9.8	9.7	9.7	9.8
pH	6.7	6.8	6.8	6.7	6.7	6.7	6.7	7.2	6.7	7.1	6.9	7.0	6.7	6.8
Cond. (µS/cm)	25		24		25		24		25		25		25	
Initials	YML		SSD		YML		KLP		EMM		YML		YML	

Site Control Concentration FR_UFR1 -100	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.0	14.0	13.0	15.0	13.0	14.5	14.0	14.5	14.0	14.5	13.5	14.5	13.5	14.5
DO (mg/L)	10.3	9.9	10.2	10.0	10.3	9.8	10.3	9.5	10.3	9.6	10.3	9.8	10.2	9.8
pH	7.9	7.7	7.9	7.9	7.9	7.7	8.2	8.1	8.1	8.0	8.0	8.0	7.9	7.8
Cond. (µS/cm)	341		329		339		328		329		338		341	
Initials	YML		SSD		YML		KLP		EMM		YML		YML	

30 Concentration Amended GH_FR1	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.0	14.0	13.0	15.0	13.0	14.5	13.5	14.5	14.0	14.5	13.5	14.5	13.5	14.5
DO (mg/L)	10.3	9.8	10.2	10.0	10.3	9.9	10.3	9.4	10.3	9.7	10.3	9.7	10.3	9.8
pH	7.9	7.7	8.1	8.1	7.9	7.7	8.3	8.1	8.2	8.0	8.1	8.0	7.9	7.8
Cond. (µS/cm)	636		617		628		605		609		624		616	
Initials	YML		SSD		YML		KLP		EMM		YML		YML	

44 Concentration Amended GH_FR1	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.0	14.0	13.0	15.0	13.0	14.5	14.0	14.5	14.0	14.5	13.5	14.5	13.5	14.5
DO (mg/L)	10.2	9.8	10.2	10.0	10.3	9.8	10.3	9.4	10.3	9.7	10.3	9.9	10.3	9.7
pH	8.0	7.8	8.1	8.0	7.9	7.8	8.3	8.1	8.2	8.0	8.1	8.0	7.9	7.9
Cond. (µS/cm)	787		730		776		724		762		784		768	
Initials	YML		SSD		YML		KLP		EMM		YML		YML	

Thermometer: temp-1 **DO meter:** DO-2/3 **pH meter:** pH 1/2/3 **Conductivity meter:** C-2/3

	Lab Control	Site control FR_UFR1	Amended GH_FR1	
Hardness*	8	198	720	
Alkalinity*	6	140	202	

* mg/L as CaCO3

Analysts: SSD, KLP, EMM, YML
Reviewed by: [illegible]
Date reviewed: Jan. 25/16

Sample Description: clear, colourless, no particulates, no odour.

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: GH_FR1 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @ 1635h
Stop Date & Time: January 6, 2016 @ 1230h
Test Species: *Oncorhynchus mykiss*

100 Amended GH-FR1 Concentration (% v/v)	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.0	14.0	13.0	15.0	13.0	14.5	14.0	14.5	14.0	14.5	13.5	14.5	13.5	14.5
DO (mg/L)	10.3	9.9	10.3	10.0	10.3	9.9	10.3	9.3	10.3	9.6	10.3	9.8	10.2	9.8
pH	8.0	7.8	8.2	8.0	8.0	7.8	8.3	8.1	8.2	8.0	8.1	8.0	7.9	8.0
Cond. (µS/cm)	990		906		956		921		946		956		940	
Initials	YML		SSD		YML		KLP		EMM		YML		YML	

(Amended) 100 Concentration GH-FR1	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.0	14.0	13.0	15.0	13.0	14.5	14.0	14.5	14.0	14.5	13.5	14.5	13.0	14.5
DO (mg/L)	10.3	9.9	10.3	10.0	10.3	9.9	10.3	9.3	10.3	9.6	10.3	9.8	10.3	9.7
pH	8.0	7.8	8.2	8.0	8.1	7.8	8.3	8.2	8.2	8.1	8.1	8.0	8.0	8.0
Cond. (µS/cm)	1222		1183		1225		1177		1182		1218		1205	
Initials	YML		SSD		YML		KLP		EMM		YML		YML	

Concentration	Days													
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: temp-7 **DO meter:** DO-213 **pH meter:** pH-11213 **Conductivity meter:** C-213

	Lab Control	Site Control FR_UFR1	Amended GH_FR1	
Hardness*	8	198	720	
Alkalinity*	6	140	202	

* mg/L as CaCO3

Analysts: SSD, KLP, EMM, YML

Reviewed by: JCL

Date reviewed: Jan. 25/16

Sample Description: clear, colourless, no particulates, no odour

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: GH-FR1 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @ 1635h
Stop Date & Time: January 6, 2016 @ 1230h
Test Species: *Oncorhynchus mykiss*

Lab Control Concentration (% v/v)	Days													
	28		29 Final											
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.5	\	14.5										
DO (mg/L)	9.9	9.8	\	9.8										
pH	6.7	6.8	\	6.7										
Cond. (µS/cm)	24		30											
Initials	YML		YML											

Site Control Concentration FR-UFR1 -100	Days													
	28		29 Final											
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	14.5	\	14.5										
DO (mg/L)	10.3	9.6	\	9.9										
pH	7.9	7.9	\	7.7										
Cond. (µS/cm)	329		345											
Initials	YML		YML											

30 Concentration Amended GH-FR1	Days													
	28		29 Final											
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	14.5	\	14.5										
DO (mg/L)	10.3	9.6	\	9.8										
pH	7.9	8.0	\	7.7										
Cond. (µS/cm)	603		630											
Initials	YML		YML											

44 Concentration Amended GH-FR1	Days													
	28		29 Final											
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	14.5	\	14.5										
DO (mg/L)	10.3	9.7	\	9.8										
pH	7.9	8.0	\	7.7										
Cond. (µS/cm)	753		787											
Initials	YML		YML											

Thermometer: temp-7 **DO meter:** DO-213 **pH meter:** pH-113 **Conductivity meter:** C-213

	Lab Control	Site Control FR-UFR1	Amended GH-FR1	
Hardness*	YML 12 8	198	720	
Alkalinity*	YML 8 6	140	202	

* mg/L as CaCO3

Analysts: YML

Reviewed by: JOL
Date reviewed: Jan. 25/16

Sample Description: clear, colourless, no particulates, no odour

Comments:

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: GH-FR1 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @ 1635h
Stop Date & Time: January 6, 2016 @ 1230h
Test Species: *Oncorhynchus mykiss*

6.67 Amended GH-FR1 Concentration (% v/v)	Days													
	28		29 final											
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	14.5	\	14.5										
DO (mg/L)	10.3	9.6	\	9.8										
pH	8.0	8.0	\	7.8										
Cond. (µS/cm)	915		947											
Initials	YML		YML											

100 Concentration GH-FR1	Days													
	28		29 final											
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.0	14.5	\	14.5										
DO (mg/L)	10.3	9.7	\	9.9										
pH	8.0	8.0	\	7.8										
Cond. (µS/cm)	1166		1210											
Initials	YML		YML											

Concentration	Days													
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: temp-7 **DO meter:** DO-213 **pH meter:** pH-113 **Conductivity meter:** C-243

	Lab Control	Site Control FR-UFR1	Amended GH-FR1	
Hardness*	178	198	720	
Alkalinity*	96	140	202	

* mg/L as CaCO3

Analysts: YML
Reviewed by: JGL
Date reviewed: Jan. 25/16

Sample Description: clear, colourless, no particulates, no odour.

Comments:

Embryo-Alevin Toxicity Test
Daily Mortality

Client: Teck
Sample ID: GH-FR1 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @ 1635h
Stop Date & Time: January 6, 2016 @ 1230h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities												Total Dead Eggs/Embryos/ Alevins
		1	2	3	4	5	6	7	8	9	10	11	12	
Lab Control	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	2						1		0	0	1			1
	3								0	1	1			2
	4						↓	↓	1	0	0			1
Site Control-	1					↓	1	1	0					2
FR_UFR1	2					2	0	0	0					2
100	3					0	0		2					2
	4					2	0		0					2
30	1					0	1							1
Amended GH-FR1	2					0	0							0
	3					1	1	↓						2
	4					0	0	1			↓	↓		1
44	1					0	0	0			1	1		2
Amended GH-FR1	2					2	0				0	0		2
	3					0	0			↓		0	↓	0
	4					2	1			2		0	1	6
867	1					0	0			0		0	0	0
Amended GH-FR1	2					2	0				↓	1		3
	3					3	0	↓			1	0		3
	4					0	0	1	↓		1			2
Amended-	1					0	1	0	0		0			1
GH-FR1	2						0	0	1		0			1
100	3						0	0	0		1			1
	4	↓	↓	↓	↓	↓	0	0	0	↓	0	↓	↓	0
	1													
	2													
	3													
	4													
	1													
	2													
	3													
	4													
Tech Initials		SSD		SSD										

Comments:

Reviewed by: JOL **Date reviewed:** Jan. 25/16

Embryo-Alevin Toxicity Test
Daily Mortality

Client: Teck
Sample ID: GH_FR1 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @ 1635h
Stop Date & Time: January 6, 2016 @ 1230h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities												Total Dead Eggs/Embryos/ Alevins
		13 ①	14	15	16	17	18	19	20	21	22 ③	23	24	
Lab Control	1	0	0	0	0	0	0	0	0	0 ②	0	0	0	0
	2	↓	↓	↓	↓	↓	0	0	0	0 ②	1	0	0	1
	3						0	0	0	0 ②	0	1	0	1
	4						0	MW 2	0	0 ②	0	1	0	3
Site Control	1	1					1	3 ②	0	1	0	0	0	6
FR-VFR1	2	0					0	0	1	0 ②	0	1	0	2
100	3			↓	↓		1	2 ②	1	0	0	0	0	4
	4			2	1		1	0	0 ②	1	0	0	0	5
30	1			0	0		0	2	0 ②	4	0	0	0	6
Amended GH-FR1	2			0	1		0	0	1 ②	0	0	MW 1	1	4
	3			0	0		0	1	0 ②	0	1	MW 2	0	4
	4			0	0		0	0	1 ②	1	0	0	1	3
44	1			1	0		0	0	0	0 ②	0	MW 1	0	2
Amended GH-FR1	2			0	1		1	1	1	3 ②	0	0	0	7
	3			0	0		0	0 ②	0	2	0	0	0	2
	4			0	1		2	0 ②	1	0	0	0	0	4
67	1			2	0		0	0	1 ②	1	1	0	0	5
Amended GH-FR1	2			1			1	1 ②	0	0	0	0	0	3
	3			0			0	2	0	1 ②	2	1	0	6
	4	↓		0			0	0	0	0 ②	2	0	0	2
Amended-	1	1		1			2	MW 2 ②	0	2	0	1	0	9
GH-FR1	2	0		SSD 0			1	0	1 ②	2	0	1	0	5
100	3	0	↓	0	↓		2	0 ②	1		0	0	0	4
	4	0	2	1	1	↓	1	1	0	2 ②	2	0	0	10
	1													
	2													
	3													
	4													
	1													
	2													
	3													
	4													
Tech Initials		MW	MW	SSD	MW	JW	JW	MW	KP	MW	SSD	MW	KP	MW

Comments: ① at awed stage (all) ② starting to hatch ③ >50% hatched (all)

Reviewed by: JW **Date reviewed:** Jan. 25/16

Embryo-Alevin Toxicity Test
Daily Mortality

Client: Teck
Sample ID: GH_FR1 (Amended)
Work Order #: 15998

Start Date & Time: December 8, 2015 @ 1635h
Stop Date & Time: January 6, 2016 @ 1230h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities 25	26	27	28	29			Total Dead Embryos/ Alevins	Total Alevins Undeveloped/ Unhatched (Abnormal)	Total No. Alevins (Normal)	Total Exposed Eggs
Lab Control	1	3	0	0	0	1			4	0	26	30
	2	0	0	0	↓	1			1	1	26	30
	3	2	1	1	↓	0			4	2	20	29
	4	0	2	0	↓	0			2	1	23	30
STR Control	1	0	0	0	↓	0			0	1	21	30
FR_UFR1	2	0	0	0	0	↓			0	0	25	29
100	3	1	0	1	0	↓			2	4	18	30
	4	2	1	↓	0	↓			4	0	20	31
30	1	0	0	0	0	↓			0	1	22	30
Amended GH-FR1	2	0	↓	0	1	↓			1	2	23	30
	3	0	↓	1	0	↓			1	1	22	30
	4	0	↓	0	↓	↓			1	2	22	29
44	1	0	↓	↓	0	↓			0	1	26	31
Amended GH-FR1	2	0	↓	↓	↓	↓			0	1	19	29
	3	0	↓	↓	↓	↓			0	0	28	30
	4	0	↓	↓	↓	↓			0	0	20	30
167	1	0	↓	↓	↓	↓			0	2	24	31
Amended GH-FR1	2	0	2	↓	↓	↓			2	1	22	31
	3	0	1	1	↓	↓			2	0	17	28
	4	0	0	0	↓	↓			0	1	24	29
Amended -	1	1	1	↓	↓	↓			2	0	17	29
GH_FR1	2	1	1	↓	↓	↓			2	2	20	30
100	3	1	0	↓	↓	↓			1	1	25	32
	4	0	0	↓	↓	↓			0	0	20	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		MM	MM	MM	MM	MM			MM	MM	MM	MM

Comments: See Alevin Test Datasheets for details on normality assessments lengths + wet weights.

Reviewed by: JCM **Date reviewed:** Jan 25/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Start Date: **December 8, 2015**

Sample ID: **GH_FR1 (Amended)**

Termination Date: **January 6, 2016**

Work Order No.: **15998**

Treatment and Replicate (% v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
Lab control A	1	20.0	✓		
	2	19.0	✓		
	3	19.5	✓		
	4	18.0	✓		
	5	19.0	✓		
	6	19.5	✓		
	7	19.0	✓		
	8	18.5	✓		
	9	19.0	✓		
	10	17.5	✓		
	11	18.0	✓		
	12	19.0	✓		
	13	18.0	✓		
	14	19.5	✓		
	15	18.0	✓		
	16	19.0	✓		
	17	19.0	✓		
	18	19.0	✓		
	19	19.0	✓		
	20	19.0	✓		
	21	20.0	✓		
	22	17.0	✓		
	23	19.0	✓		
	24	18.0	✓		
	25	19.5	✓		
	26	20.0	✓		
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.20

Number of survivors: 26

Number of deformed/have difficulty swimming: 0 / 0

Initials: YY LI KSL

Reviewed by: JBh

Date Reviewed: Jan. 25/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Start Date: **December 8, 2015**

Sample ID: **GH_FR1 (Amended)**

Termination Date: **January 6, 2016**

Work Order No.: **15998**

Treatment and Replicate (% v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
Lab control B	1	19.0	✓		
	2	19.0	✓		
	3	20.0	✓		
	4	19.0	✓		
	5	18.0	✓		
	6	19.0	✓		
	7	18.5	✓		
	8	18.0	✓		
	9	18.5	✓		
	10	19.0	✓		
	11	20.0	✓		
	12	19.0	✓		
	13	19.0	✓		
	14	17.5	✓		
	15	18.0	✓		
	16	19.0	✓		
	17	19.0	✓		
	18	19.0	✓		
	19	18.5	✓		
	20	19.0	✓		
	21	20.0	✓		
	22	20.0	✓		
	23	20.5	✓		
	24	19.5	✓		
	25	19.0	✓		
	26	19.0	✓		
	27	11.0		✓	bent tail, shortened body
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.36

Number of survivors: 27

Number of deformed/have difficulty swimming: 1 / 0

Initials: KSL/YG

Reviewed by: JCL

Date Reviewed: Jan-25/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Start Date: **December 8, 2015**

Sample ID: **GH_FR1 (Amended)**

Termination Date: **January 6, 2016**

Work Order No.: **15998**

Treatment and Replicate (Control)	Fish	Length (mm)	Normal	Abnormal	Comments
Lab control C	1	19.0	✓		
	2	20.0	✓		
	3	19.0	✓		
	4	18.5	✓		
	5	19.0	✓		
	6	18.0	✓		
	7	19.0	✓		
	8	19.0	✓		
	9	18.0	✓		
	10	19.5	✓		
	11	18.5	✓		
	12	16.5	✓		
	13	18.5	✓		
	14	18.5	✓		
	15	18.0	✓		
	16	18.0	✓		
	17	19.0	✓		
	18	19.0	✓		
	19	18.5	✓		
	20	18.0	✓		
	21	12.0	~~✓~~	✓	2 tails, tail bent into body, erratic swimming
	22	15.0		✓	tail bent into body
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 1.67

Number of survivors: 22

Number of deformed/have difficulty swimming: 2 1 1

Initials: KSL/YYC

Reviewed by: JGR

Date Reviewed: Jan. 25/16

Alevin Test Data Sheet

Length, Wet weight, Deformities

Client: **Teck**

Start Date: **December 8, 2015**

Sample ID: **GH_FR1 (Amended)**

Termination Date: **January 6, 2016**

Work Order No.: **15998**

Treatment and Replicate (~~% v/v~~)	Fish	Length (mm)	Normal	Abnormal	Comments
Lab Control D	1	20.0	✓		
	2	20.0	✓		
	3	20.0	✓		
	4	19.0	✓		
	5	19.5	✓		
	6	17.0	✓		
	7	19.0	✓		
	8	17.5	✓		
	9	20.0	✓		
	10	16.5	✓		
	11	19.0	✓		
	12	19.0	✓		
	13	20.0	✓		
	14	21.0	✓		
	15	20.0	✓		
	16	18.5	✓		
	17	19.0	✓		
	18	18.0	✓		
	19	20.0	✓		
	20	20.0	✓		
	21	19.5	✓		
	22	17.0	✓		
	23	21.0	✓		
	24	17.0		✓	missing most of tail fin, erratic swimming
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.05

Number of survivors: 24

Number of deformed/have difficulty swimming: 1/1

Initials: KSL/YNL

Reviewed by: JCh

Date Reviewed: Jan. 25/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **GH_FR1 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate (% v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
Site Control FR_UFR1 100 A	1	20.0	✓		
	2	19.5	✓		
	3	19.0	✓		
	4	19.5	✓		
	5	19.0	✓		
	6	19.0	✓		
	7	20.0	✓		
	8	18.0	✓		
	9	18.0	✓		
	10	20.0	✓		
	11	16.5	✓		
	12	18.0	✓		
	13	20.0	✓		
	14	21.0	✓		
	15	18.5	✓		
	16	20.0	✓		
	17	17.0	✓		
	18	19.5	✓		
	19	20.0	✓		
	20	20.0	✓		
	21	20.0	✓		
	22	15.0		✓	tail fin bent
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 1.89

Number of survivors: 22

Number of deformed/have difficulty swimming: 1 10

Initials: KSL/YML

Reviewed by: JGh

Date Reviewed: Jan. 25/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**
Start Date: **December 8, 2015**
Sample ID: **GH_FR1 (Amended)**
Termination Date: **January 6, 2016**
Work Order No.: **15998**

Treatment and Replicate (0%, 1%)	Fish	Length (mm)	Normal	Abnormal	Comments
SITE CONTROL FR_VFR1 100 B	1	19.5	✓		
	2	19.5	✓		
	3	19.5	✓		
	4	16.0	✓		
	5	19.0	✓		
	6	19.0	✓		
	7	18.5	✓		
	8	18.0	✓		
	9	18.0	✓		
	10	19.0	✓		
	11	18.0	✓		
	12	19.0	✓		
	13	18.0	✓		
	14	19.0	✓		
	15	16.5	✓		
	16	19.5	✓		
	17	19.0	✓		
	18	20.0	✓		
	19	18.5	✓		
	20	19.0	✓		
	21	19.0	✓		
	22	19.0	✓		
	23	18.5	✓		
	24	17.0	✓		
	25	20.0	✓		
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.01
Number of survivors: 25
Number of deformed/have difficulty swimming: 0 | 0
Initials: KSL/YHL

Reviewed by: JOH
Date Reviewed: Jan. 25/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Start Date: **December 8, 2015**

Sample ID: **GH_FR1 (Amended)**

Termination Date: **January 6, 2016**

Work Order No.: **15998**

Treatment and Replicate (%/v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
Site Control FR_UFR1 100 C	1	18.0	✓		
	2	18.5	✓		
	3	20.0	✓		
	4	19.0	✓		
	5	16.0	✓		
	6	18.5	✓		
	7	21.0	✓		
	8	20.0	✓		
	9	19.0	✓		
	10	19.0	✓		
	11	18.5	✓		
	12	20.5	✓		
	13	19.0	✓		
	14	21.0	✓		
	15	19.5	✓		
	16	17.0	✓		
	17	18.5	✓		
	18	19.5	✓		
	19	13.0	~~E~~	✓	bent tail
	20	13.5	~~E~~	✓	bent tail
	21	15.0		✓	Scoliosis, erratic swimming
	22	12.5		✓	yolk sac edema
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 1.92

Number of survivors: 22

Number of deformed/have difficulty swimming: 4 / 1

Initials: KSHYC

Reviewed by: JCL

Date Reviewed: Jan. 25/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Start Date: **December 8, 2015**

Sample ID: **GH_FR1 (Amended)**

Termination Date: **January 6, 2016**

Work Order No.: **15998**

Treatment and Replicate (%, v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
STPE Control FR_UFR1 100 & D	1	18.0	✓		
	2	19.5	✓		
	3	17.5	✓		
	4	19.0	✓		
	5	19.0	✓		
	6	17.0	✓		
	7	19.0	✓		
	8	18.5	✓		
	9	19.5	✓		
	10	20.0	✓		
	11	17.5	✓		
	12	19.0	✓		
	13	17.5	✓		
	14	19.5	✓		
	15	19.5	✓		
	16	20.0	✓		
	17	19.0	✓		
	18	17.0	✓		
	19	18.0	✓		
	20	17.5	✓		
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 1.60 g

Number of survivors: 20

Number of deformed/have difficulty swimming: 0 | 0

Initials: YNL | KSL

Reviewed by: JOL

Date Reviewed: Jan. 25/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **GH_FR1 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate (%v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
GH_FR1 Amended 30 A	1	18.0	✓		
	2	19.0	✓		
	3	18.0	✓		
	4	18.0	✓		
	5	17.5	✓		
	6	18.0	✓		
	7	18.5	✓		
	8	18.0	✓		
	9	19.5	✓		
	10	19.5	✓		
	11	16.0	✓		
	12	17.0	✓		
	13	17.5	✓		
	14	17.5	✓		
	15	19.0	✓		
	16	18.0	✓		
	17	19.5	✓		
	18	19.0	✓		
	19	17.0	✓		
	20	18.0	✓		
	21	17.5	✓		
	22	18.5	✓		~~stuck~~
	23	15.0		✓	bent tail
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 1.75g

Number of survivors: 23

Number of deformed/have difficulty swimming: 1 1 0

Initials: NL/KSL

Reviewed by: JOL

Date Reviewed: Jan. 25/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **GH_FR1 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate (% v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
GH-FR1 Amended 30 B	1	19.0	✓		
	2	20.5	✓		
	3	19.5	✓		
	4	19.0	✓		
	5	17.5	✓		
	6	20.0	✓		
	7	18.0	✓		
	8	18.5	✓		
	9	20.0	✓		
	10	18.0	✓		
	11	20.0	✓		
	12	16.0	✓		
	13	18.5	✓		
	14	19.5	✓		
	15	18.0	✓		
	16	18.0	✓		
	17	20.0	✓		
	18	19.0	✓		
	19	19.0	✓		
	20	18.5	✓		
	21	17.5	✓		
	22	18.5	✓		
	23	18.5	✓		
	24	11.5		✓	missing tail
	25	12.5		✓	missing tail
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.06

Number of survivors: 25

Number of deformed/have difficulty swimming: 2/0

Initials: YNL/KSL

Reviewed by: JOh

Date Reviewed: Jan. 25/16

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **GH_FR1 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
(0.0 v/v) GH-FR1 Amended 30 C	1	17.0	✓		
	2	16.5	✓		
	3	17.5	✓		
	4	18.0	✓		
	5	17.0	✓		
	6	20.0	✓		
	7	17.5	✓		
	8	16.0	✓		
	9	17.5	✓		
	10	17.5	✓		
	11	19.0	✓		
	12	19.5	✓		
	13	16.5	✓		
	14	18.0	✓		
	15	18.5	✓		
	16	17.5	✓		
	17	19.0	✓		
	18	18.5	✓		
	19	18.0	✓		
	20	20.5	✓		
	21	19.0	✓		
	22	20.0	✓		
	23	10.0		✓	bent tail
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 1.91

Number of survivors: 23

Number of deformed/have difficulty swimming: 1 | 0

Initials: YHL/KSL

Reviewed by: JOL

Date Reviewed: Jan. 25/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **GH_FR1 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate (%, v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
GH_FR1 Amended 30 D	1	19.5	✓		
	2	19.0	✓		
	3	17.5	✓		
	4	20.0	✓		
	5	18.5	✓		
	6	17.5	✓		
	7	18.0	✓		
	8	19.0	✓		
	9	17.0	✓		
	10	20.5	✓		
	11	18.0	✓		
	12	17.5	✓		
	13	18.0	✓		
	14	18.5	✓		
	15	19.0	✓		
	16	18.0	✓		
	17	19.0	✓		
	18	19.5	✓		
	19	19.0	✓		
	20	17.0	✓		
	21	16.5	✓		
	22	17.0	✓		
	23	18.0	~~✓~~	✓	bent tail
	24	15.0		✓	lordosis
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 1.95

Number of survivors: 24

Number of deformed/have difficulty swimming: 2 | 0

Initials: YHL | KSL

Reviewed by: JGL

Date Reviewed: Jan. 25/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **GH_FR1 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate (% v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
GH_FR1 Amended	1	18.0	✓		
44	2	17.5	✓		
	3	18.0	✓		
A	4	19.0	✓		
	5	19.0	✓		
	6	17.5	✓		
	7	17.0	✓		
	8	15.5	✓		
	9	18.0	✓		
	10	17.0	✓		
	11	20.0	✓		
	12	18.0	✓		
	13	18.5	✓		
	14	17.5	✓		
	15	19.5	✓		
	16	18.0	✓		
	17	19.0	✓		
	18	18.5	✓		
	19	18.0	✓		
	20	19.5	✓		
	21	17.0	✓		
	22	18.0	✓		
	23	17.0	✓		
	24	19.0	✓		
	25	19.0	✓		
	26	15.5	✓		
	27	14.0		✓	bent tail
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.11

Number of survivors: 27

Number of deformed/have difficulty swimming: 1 | 0

Initials: YYL/KJL

Reviewed by: JOh

Date Reviewed: Jan. 25/16

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **GH_FR1 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate (% v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
GH-FR1 Amended	1	19.0	✓		
44	2	18.5	✓		
	3	17.5	✓		
B	4	17.0	✓		
	5	18.5	✓		
	6	18.5	✓		
	7	16.0	✓		
	8	17.5	✓		
	9	17.0	✓		
	10	19.5	✓		
	11	19.0	✓		
	12	18.5	✓		
	13	18.5	✓		
	14	19.0	✓		
	15	19.0	✓		
	16	19.0	✓		
	17	19.0	✓		
	18	18.0	✓		
	19	19.0	✓		
	20	13.5		✓	No tail fin, erratic swimming
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 1.79

Number of survivors: 20

Number of deformed/have difficulty swimming: 1 / 1

Initials: NL/KJL

Reviewed by: JGh

Date Reviewed: Jan. 25/16

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

Alevin Test Data Sheet

Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **GH_FR1 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate (C or W)	Fish	Length (mm)	Normal	Abnormal	Comments
GH_FR1 Amended	1	17.0	✓		
44	2	19.0	✓		
C	3	18.0	✓		
	4	19.0	✓		
	5	17.0	✓		
	6	18.0	✓		
	7	18.0	✓		
	8	17.5	✓		
	9	15.0	✓		
	10	15.0	✓		
	11	18.5	✓		
	12	18.0	✓		
	13	17.0	✓		
	14	18.0	✓		
	15	17.5	✓		
	16	18.0	✓		
	17	19.0	✓		
	18	17.0	✓		
	19	17.0	✓		
	20	17.0	✓		
	21	18.5	✓		
	22	19.0	✓		
	23	17.0	✓		
	24	17.0	✓		
	25	17.5	✓		
	26	19.0	✓		
	27	18.0	✓		
	28	15.5	✓		
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.07 g

Number of survivors: 28

Number of deformed/have difficulty swimming: 0 | 0

Initials: YHL | KSL

Reviewed by: JGL

Date Reviewed: Jan. 25/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **GH_FR1 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate (% v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
GH-FR1 Amended	1	20.0	✓		
44	2	18.5	✓		
D	3	19.0	✓		
	4	18.5	✓		
	5	18.5	✓		
	6	19.0	✓		
	7	19.0	✓		
	8	17.5	✓		
	9	19.5	✓		
	10	19.0	✓		
	11	19.0	✓		
	12	18.0	✓		
	13	18.0	✓		
	14	18.5	✓		
	15	19.0	✓		
	16	20.0	✓		
	17	18.0	✓		
	18	18.0	✓		
	19	18.5	✓		
	20	18.0	✓		
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 1.62

Number of survivors: 20

Number of deformed/have difficulty swimming: 0/0

Initials: YHL/KSL

Reviewed by: JGH

Date Reviewed: Jan. 25/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **GH_FR1 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate (% v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
GH_FR1 Amended	1	16.0	✓		
	2	16.0	✓		
YYL 667	3	18.0	✓		
A	4	16.5	✓		
	5	17.5	✓		
	6	17.0	✓		
	7	16.5	✓		
	8	18.0	✓		
	9	14.5	✓		
	10	17.5	✓		
	11	17.5	✓		
	12	17.0	✓		
	13	15.5	✓		
	14	16.0	✓		
	15	17.5	✓		
	16	14.5	✓		
	17	15.5	✓		
	18	18.5	✓		
	19	16.0	✓		
	20	18.0	✓		
	21	16.5	✓		
	22	15.5	✓		
	23	17.0	✓		
	24	16.0	✓		
	25	12.0		✓	bent tail
	26	12.0		✓	bent tail
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 2.03 g

Number of survivors: 26

Number of deformed/have difficulty swimming: 2 / 0

Initials: YYL/KJL

Reviewed by: JGM

Date Reviewed: Jan. 25/16

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **GH_FR1 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate (%v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
GH-FR1 Amended	1	18.0	✓		
	2	16.5	✓		
Yul 667	3	16.0	✓		
B	4	19.0	✓		
	5	18.0	✓		
	6	18.5	✓		
	7	17.0	✓		
	8	19.5	✓		
	9	17.0	✓		
	10	16.5	✓		
	11	17.0	✓		
	12	17.5	✓		
	13	18.0	✓		
	14	18.5	✓		
	15	16.5	✓		
	16	18.0	✓		
	17	18.0	✓		
	18	18.0	✓		
	19	18.0	✓		
	20	17.0	✓		
	21	16.5	✓		
	22	18.0	✓		
	23	~~16.5~~ 18.0		✓	Lordosis
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 1.90 g

Number of survivors: 23

Number of deformed/have difficulty swimming: 1/0

Initials: YHL/KSL

Reviewed by: JGh

Date Reviewed: Jan. 25/16

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **GH_FR1 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate (Rep)	Fish	Length (mm)	Normal	Abnormal	Comments
GH_FR1 Amended 667 4mL C	1	16.0	✓		
	2	15.0	✓		
	3	16.0	✓		
	4	15.0	✓		
	5	14.5	✓		
	6	14.0	✓		
	7	14.0	✓		
	8	14.0	✓		
	9	15.0	✓		
	10	16.5	✓		
	11	15.0	✓		
	12	17.0	✓		
	13	16.0	✓		
	14	17.0	✓		
	15	17.0	✓		
	16	15.0	✓		
	17	16.0	✓		
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): ~~1.09~~ 4mL 1.24 g

Number of survivors: 17 4mL

Number of deformed/have difficulty swimming: 0/0

Initials: YHL/KJL

Reviewed by: JGL

Date Reviewed: Jan-25/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Start Date: **December 8, 2015**

Sample ID: **GH_FR1 (Amended)**

Termination Date: **January 6, 2016**

Work Order No.: **15998**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
GH_FR1 (Amended) 067 D	1	16.0	✓		
	2	15.0	✓		
	3	16.5	✓		
	4	15.5	✓		
	5	17.0	✓		
	6	17.5	✓		
	7	18.0	✓		
	8	17.0	✓		
	9	17.5	✓		
	10	16.0	✓		
	11	16.5	✓		
	12	18.5	✓		
	13	17.0	✓		
	14	18.0	✓		
	15	17.5	✓		
	16	15.5	✓		
	17	17.0	✓		
	18	14.0	✓		
	19	16.5	✓		
	20	17.0	✓		
	21	18.0	✓		
	22	18.0	✓		
	23	17.0	✓		
	24	18.0	✓		
	25	17.5		✓	Lordosis
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 1.89 g

Number of survivors: 25

Number of deformed/have difficulty swimming: 1/0

Initials: WC/KSL

Reviewed by: Jake

Date Reviewed: Jan. 25/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **GH_FR1 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate (% v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
GH_FR1 Amended 100 A	1	17.0	✓		
	2	16.5	✓		
	3	15.5	✓		
	4	17.0	✓		
	5	17.0	✓		
	6	17.0	✓		
	7	16.0	✓		
	8	17.5	✓		
	9	17.0	✓		
	10	16.5	✓		
	11	17.5	✓		
	12	16.0	✓		
	13	15.0	✓		
	14	16.0	✓		
	15	15.5	✓		
	16	17.0	✓		
	17	16.5	✓		
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 1.27 g

Number of survivors: 17

Number of deformed/have difficulty swimming: 0 | 0

Initials: YYC | KSL

Reviewed by: JOK

Date Reviewed: Jan-25/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **GH_FR1 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate (A, B, C)	Fish	Length (mm)	Normal	Abnormal	Comments
GH_FR1 Amended 100 B	1	18.0	✓		
	2	18.0	✓		
	3	18.0	✓		
	4	19.5	✓		
	5	20.0	✓		
	6	18.5	✓		
	7	17.0	✓		
	8	19.0	✓		
	9	15.5	✓		
	10	17.0	✓		
	11	18.0	✓		
	12	19.0	✓		
	13	19.0	✓		
	14	17.0	✓		
	15	19.0	✓		
	16	17.5	✓		
	17	16.0	✓		
	18	17.0	✓		
	19	17.0	✓		
	20	16.5	✓		
	21	15.0		✓	Bent tail
	22	15.0		✓	Yolk Sac Stuck to head.
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 1.799

Number of survivors: 22

Number of deformed/have difficulty swimming: 2 10

Initials: YHC|KSL

Reviewed by: JCM

Date Reviewed: Jan. 25/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**
Start Date: **December 8, 2015**
Sample ID: **EV_ER4 (Amended)**
Termination Date: **January 6, 2016**
Work Order No.: **15998**

Treatment and Replicate (% v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
GH_FR1 Amended 100 C	1	17.0	✓		
	2	17.5	✓		
	3	16.5	✓		
	4	17.0	✓		
	5	17.0	✓		
	6	17.0	✓		
	7	17.0	✓		
	8	17.0	✓		
	9	18.0	✓		
	10	17.0	✓		
	11	16.5	✓		
	12	17.0	✓		
	13	17.0	✓		
	14	17.0	✓		
	15	18.0	✓		
	16	19.0	✓		
	17	17.5	✓		
	18	17.5	✓		
	19	16.5	✓		
	20	18.0	✓		
	21	17.0	✓		
	22	17.0	✓		
	23	18.0	✓		
	24	16.0	✓		
	25	16.5	✓		
	26	17.0		✓	Missing tail fin
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 1.71 g
Number of survivors: 26
Number of deformed/have difficulty swimming: 1 | 0
Initials: YYC | KSL

Reviewed by: JOL
Date Reviewed: Jan. 25/16

Alevin Test Data Sheet
Length, Wet weight, Deformities

Client: **Teck**

Sample ID: **GH_FR1 (Amended)**

Work Order No.: **15998**

Start Date: **December 8, 2015**

Termination Date: **January 6, 2016**

Treatment and Replicate (% v/v)	Fish	Length (mm)	Normal	Abnormal	Comments
GH_FR1 Amended 100 D	1	17.0	✓		
	2	17.0	✓		
	3	17.5	✓		
	4	15.0	✓		
	5	18.0	✓		
	6	17.0	✓		
	7	16.5	✓		
	8	17.0	✓		
	9	19.0	✓		
	10	16.5	✓		
	11	17.5	✓		
	12	18.0	✓		
	13	18.0	✓		
	14	19.0	✓		
	15	18.0	✓		
	16	17.0	✓		
	17	15.5	✓		
	18	16.5	✓		
	19	19.0	✓		
	20	EL 14.0	✓		
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total wet weight (pooled): 1.53g

Number of survivors: 20

Number of deformed/have difficulty swimming: 0/0

Initials: YHL/KJL

Reviewed by: JGL

Date Reviewed: Jan. 25/16

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

CETIS Summary Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Batch ID:	02-4780-2807	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 12:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(amended)	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 17h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
06-9791-6255	Proportion Normal (Viability)	100	>100	NA	NA	1	Fisher Exact Test
14-4041-3327	Survival Rate	100	>100	NA	NA	1	Fisher Exact Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
17-8654-2271	Proportion Normal (Viability)	EC5	82.16	8.671	N/A	1.217	Linear Interpolation (ICPIN)
		EC10	>100	N/A	N/A	<1	
		EC15	>100	N/A	N/A	<1	
		EC20	>100	N/A	N/A	<1	
		EC25	>100	N/A	N/A	<1	
		EC40	>100	N/A	N/A	<1	
		EC50	>100	N/A	N/A	<1	
07-7375-7295	Survival Rate	EC5	79.4	15.54	N/A	1.259	Linear Interpolation (ICPIN)
		EC10	>100	N/A	N/A	<1	
		EC15	>100	N/A	N/A	<1	
		EC20	>100	N/A	N/A	<1	
		EC25	>100	N/A	N/A	<1	
		EC40	>100	N/A	N/A	<1	
		EC50	>100	N/A	N/A	<1	

Proportion Normal Summary (Viability)

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.7974	0.6607	0.9341	0.6897	0.8667	0.04296	0.08592	10.78%	0.0%
0	Upstream Contr	4	0.7018	0.5198	0.8838	0.6	0.8621	0.0572	0.1144	16.3%	11.99%
30		4	0.748	0.7206	0.7754	0.7333	0.7667	0.008619	0.01724	2.31%	6.2%
44		4	0.7735	0.5576	0.9893	0.6552	0.9333	0.06783	0.1357	17.54%	3.0%
67		4	0.7297	0.5787	0.8806	0.6071	0.8276	0.04742	0.09484	13.0%	8.5%
100		4	0.6752	0.5475	0.8029	0.5862	0.7813	0.04012	0.08023	11.88%	15.33%

Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.8313	0.7297	0.9329	0.7586	0.9	0.03193	0.06386	7.68%	0.0%
0	Upstream Contr	4	0.7435	0.6013	0.8856	0.6452	0.8621	0.04466	0.08932	12.01%	10.57%
30		4	0.7986	0.7398	0.8573	0.7667	0.8333	0.01845	0.03691	4.62%	3.94%
44		4	0.7902	0.5799	1	0.6667	0.9333	0.06607	0.1321	16.72%	4.95%
67		4	0.7625	0.5781	0.9468	0.6071	0.8621	0.05794	0.1159	15.2%	8.28%
100		4	0.6997	0.5464	0.8529	0.5862	0.8125	0.04816	0.09631	13.76%	15.84%

Sample FR_UFR1 is the ~~st~~ 1st upstream control

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Proportion Normal Detail (Viability)

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.8667	0.8667	0.6897	0.7667
0	Upstream Contr	0.7	0.8621	0.6	0.6452
30		0.7333	0.7667	0.7333	0.7586
44		0.8387	0.6552	0.9333	0.6667
67		0.7742	0.7097	0.6071	0.8276
100		0.5862	0.6667	0.7813	0.6667

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.8667	0.9	0.7586	0.8
0	Upstream Contr	0.7333	0.8621	0.7333	0.6452
30		0.7667	0.8333	0.7667	0.8276
44		0.871	0.6897	0.9333	0.6667
67		0.8387	0.7419	0.6071	0.8621
100		0.5862	0.7333	0.8125	0.6667

Proportion Normal Binomials (Viability)

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	26/30	26/30	20/29	23/30
0	Upstream Contr	21/30	25/29	18/30	20/31
30		22/30	23/30	22/30	22/29
44		26/31	19/29	28/30	20/30
67		24/31	22/31	17/28	24/29
100		17/29	20/30	25/32	20/30

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	26/30	27/30	22/29	24/30
0	Upstream Contr	22/30	25/29	22/30	20/31
30		23/30	25/30	23/30	24/29
44		27/31	20/29	28/30	20/30
67		26/31	23/31	17/28	25/29
100		17/29	22/30	26/32	20/30

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	07-7375-7295	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Jan-16 11:38	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	02-4780-2807	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 12:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(amended)	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 17h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1174758	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	79.4	15.54	N/A	1.259	NA	6.435
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Upstream Contro	4	0.7435	0.6452	0.8621	0.04466	0.08932	12.01%	0.0%	89	120
30		4	0.7986	0.7667	0.8333	0.01845	0.03691	4.62%	-7.41%	95	119
44		4	0.7902	0.6667	0.9333	0.06607	0.1321	16.72%	-6.28%	95	120
67		4	0.7625	0.6071	0.8621	0.05794	0.1159	15.2%	-2.55%	91	119
100		4	0.6997	0.5862	0.8125	0.04816	0.09631	13.76%	5.89%	85	121

Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Upstream Control	0.7333	0.8621	0.7333	0.6452
30		0.7667	0.8333	0.7667	0.8276
44		0.871	0.6897	0.9333	0.6667
67		0.8387	0.7419	0.6071	0.8621
100		0.5862	0.7333	0.8125	0.6667

Survival Rate Binomials

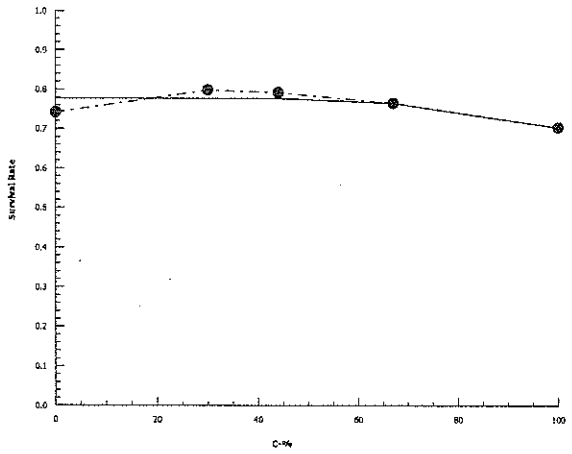
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	26/30	27/30	22/29	24/30
0	Upstream Contr	22/30	25/29	22/30	20/31
30		23/30	25/30	23/30	24/29
44		27/31	20/29	28/30	20/30
67		26/31	23/31	17/28	25/29
100		17/29	22/30	26/32	20/30

Sample FR_UFR1 is the upstream control

Salmonid Embryo-Alevin Survival and Development Test | **Nautilus Environmental**

Analysis ID:	07-7375-7295	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Jan-16 11:38	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA: JGu Jan-27/16

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	14-4041-3327	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Jan-16 11:38	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	02-4780-2807	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 12:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(amended)	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 17h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	Passes survival rate

Fisher Exact Test

Control	vs	C-%	Test Stat	P-Value	P-Type	Decision(α:5%)
Upstream Control		100	0.2964	0.2964	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Upstream Contr	89	31	120	0.7417	0.2583	0.0%
100		85	36	121	0.7025	0.2975	5.28%

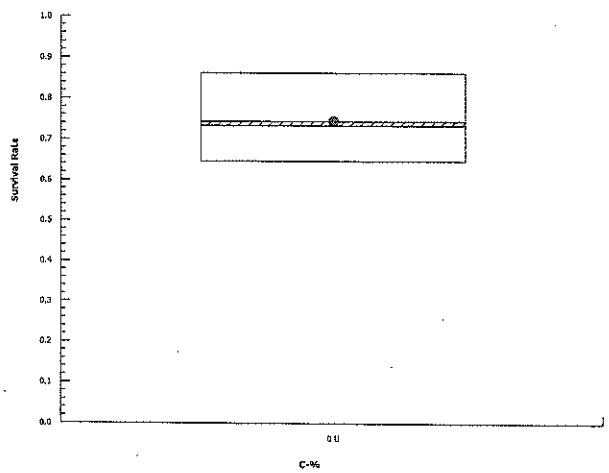
Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Upstream Contr	0.7333	0.8621	0.7333	0.6452
100		0.5862	0.7333	0.8125	0.6667

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	26/30	27/30	22/29	24/30
0	Upstream Contr	22/30	25/29	22/30	20/31
100		17/29	22/30	26/32	20/30

Graphics



Sample FR_UFR1 is the upstream control

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	02-8384-1893	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Mar-16 7:55	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	02-4780-2807	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 12:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 17h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	Passes survival rate

Fisher Exact Test

Control	vs	Control	Test Stat	P-Value	P-Type	Decision(α:5%)
Negative Control		Upstream Control	0.06087	0.0609	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Negative Contr	99	20	119	0.8319	0.1681	0.0%
0	Upstream Contr	89	31	120	0.7417	0.2583	10.85%

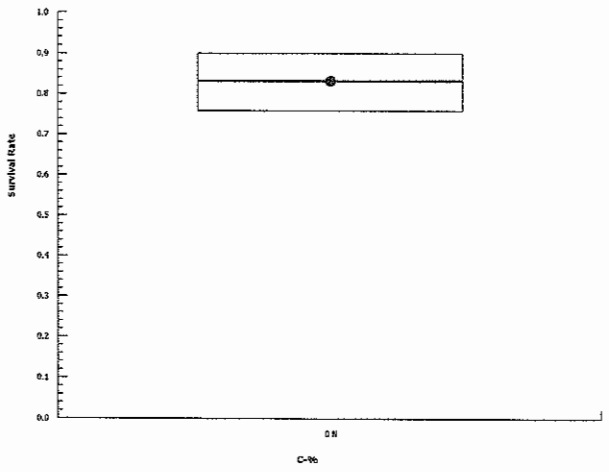
Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.8667	0.9	0.7586	0.8
0	Upstream Contr	0.7333	0.8621	0.7333	0.6452

Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	26/30	27/30	22/29	24/30
0	Upstream Contr	22/30	25/29	22/30	20/31

Graphics



Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	17-8654-2271	**Endpoint:**	Proportion Normal (Viability)	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Jan-16 11:38	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	02-4780-2807	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 12:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(amended)	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 17h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	924504	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	82.16	8.671	N/A	1.217	NA	11.53
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary (Viability) — Calculated Variate(A/B)

C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Upstream Contro	4	0.7018	0.6	0.8621	0.0572	0.1144	16.3%	0.0%	84	120
30		4	0.748	0.7333	0.7667	0.008619	0.01724	2.31%	-6.58%	89	119
44		4	0.7735	0.6552	0.9333	0.06783	0.1357	17.54%	-10.21%	93	120
67		4	0.7297	0.6071	0.8276	0.04742	0.09484	13.0%	-3.97%	87	119
100		4	0.6752	0.5862	0.7813	0.04012	0.08023	11.88%	3.79%	82	121

Proportion Normal Detail (Viability)

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Upstream Control	0.7	0.8621	0.6	0.6452
30		0.7333	0.7667	0.7333	0.7586
44		0.8387	0.6552	0.9333	0.6667
67		0.7742	0.7097	0.6071	0.8276
100		0.5862	0.6667	0.7813	0.6667

Proportion Normal Binomials (Viability)

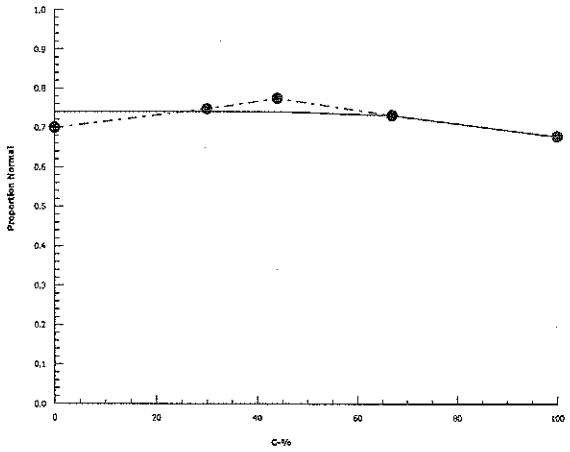
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	26/30	26/30	20/29	23/30
0	Upstream Contr	21/30	25/29	18/30	20/31
30		22/30	23/30	22/30	22/29
44		26/31	19/29	28/30	20/30
67		24/31	22/31	17/28	24/29
100		17/29	20/30	25/32	20/30

Sample FR_UFR1 is the upstream control

Salmonid Embryo-Alevin Survival and Development Test | **Nautilus Environmental**

Analysis ID:	17-8654-2271	**Endpoint:**	Proportion Normal (viability)	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Jan-16 11:38	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	06-9791-6255	**Endpoint:**	Proportion Normal (viability)	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Jan-16 11:38	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	02-4780-2807	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 12:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 17h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	Passes proportion normal

Fisher Exact Test

Control	vs	C-%	Test Stat	P-Value	P-Type	Decision(α:5%)
Upstream Control		100	0.4072	0.4072	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Upstream Contr	84	36	120	0.7	0.3	0.0%
100		82	39	121	0.6777	0.3223	3.19%

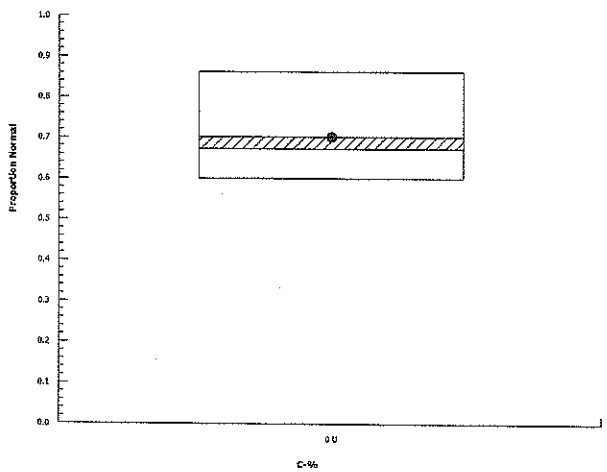
Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Upstream Contr	0.7	0.8621	0.6	0.6452
100		0.5862	0.6667	0.7813	0.6667

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	26/30	26/30	20/29	23/30
0	Upstream Contr	21/30	25/29	18/30	20/31
100		17/29	20/30	25/32	20/30

Graphics



Sample FR_UFR1 is the upstream control

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	11-2429-1054	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Mar-16 7:55	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	02-4780-2807	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 12:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 17h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	Passes proportion normal

Fisher Exact Test

Control	vs	Control	Test Stat	P-Value	P-Type	Decision(α:5%)
Negative Control		Upstream Control	0.05417	0.0542	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Negative Contr	95	24	119	0.7983	0.2017	0.0%
0	Upstream Contr	84	36	120	0.7	0.3	12.32%

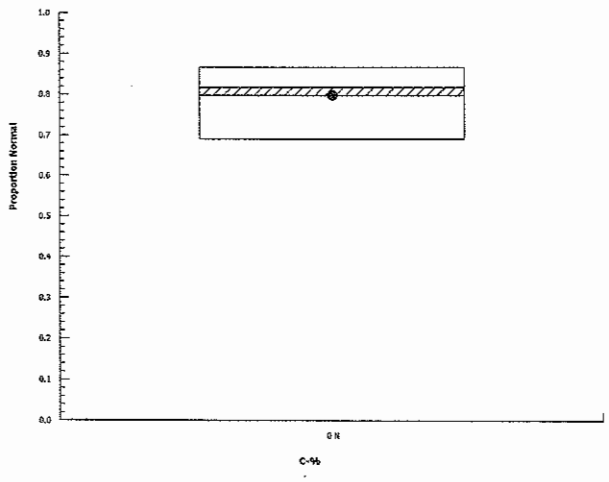
Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.8667	0.8667	0.6897	0.7667
0	Upstream Contr	0.7	0.8621	0.6	0.6452

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	26/30	26/30	20/29	23/30
0	Upstream Contr	21/30	25/29	18/30	20/31

Graphics



CETIS Summary Report

Salmonid Embryo-Alevin ~~Fry~~ wet Survival Development and Growth Test — **Nautilus Environmental**

Batch ID:	18-2475-9236	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 12:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(amwet ended)	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 17h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
20-7039-9010	Length-mm	<100	100	NA	3.23%	>1	Equal Variance t Two-Sample Test
04-7755-4058	Mean ~~Dry~~ wet Weight-mg	<100	100	NA	8.75%	>1	Equal Variance t Two-Sample Test

Point Estimate Summary

Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
19-0294-2578	Length-mm	IC5	51.05	34.31	66.72	1.959	Linear Interpolation (ICPIN)
		IC10	>100	N/A	N/A	<1	
		IC15	>100	N/A	N/A	<1	
		IC20	>100	N/A	N/A	<1	
		IC25	>100	N/A	N/A	<1	
		IC40	>100	N/A	N/A	<1	
		IC50	>100	N/A	N/A	<1	
06-4202-0434	Mean ~~Dry~~ wet Weight-mg	IC5	52.63	N/A	102.9	1.9	Linear Interpolation (ICPIN)
		IC10	93.31	26.49	N/A	1.072	
		IC15	>100	N/A	N/A	<1	
		IC20	>100	N/A	N/A	<1	
		IC25	>100	N/A	N/A	<1	
		IC40	>100	N/A	N/A	<1	
		IC50	>100	N/A	N/A	<1	

Length-mm Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	18.65	17.98	19.32	18.1	19.1	0.2102	0.4203	2.25%	0.0%
0	Upstream Contr	4	18.55	17.89	19.21	18	19	0.2062	0.4123	2.22%	0.54%
30		4	18.03	17.75	18.3	17.8	18.2	0.08539	0.1708	0.95%	3.35%
44		4	18.08	17.34	18.81	17.6	18.7	0.2323	0.4646	2.57%	3.08%
67		4	16.55	15.11	17.99	15.5	17.6	0.4518	0.9037	5.46%	11.26%
100		4	17.13	16.4	17.85	16.5	17.6	0.2287	0.4573	2.67%	8.18%

Mean ~~Dry~~ wet Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	83.34	75.24	91.44	75.91	87.41	2.545	5.089	6.11%	0.0%
0	Upstream Contr	4	83.4	77.45	89.34	80	87.27	1.868	3.735	4.48%	-0.07%
30		4	80.7	75.67	85.72	76.09	83.04	1.58	3.16	3.92%	3.17%
44		4	80.64	70.17	91.11	73.93	89.5	3.29	6.58	8.16%	3.23%
67		4	77.31	70.77	83.85	72.94	82.61	2.055	4.11	5.32%	7.24%
100		4	74.58	64.22	84.95	65.77	81.36	3.258	6.515	8.74%	10.5%

Sample GH_FR_UFR1 is the upstream control

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test **Nautilus Environmental**

Length-mm Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	18.8	18.6	18.1	19.1
0	Upstream Contr	19	18.6	18	18.6
30		18	18.2	17.8	18.1
44		17.9	18.1	17.6	18.7
67		16.2	17.6	15.5	16.9
100		16.5	17.6	17.2	17.2

Mean ~~Dry~~ Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	84.62	87.41	75.91	85.42
0	Upstream Contr	85.91	80.4	87.27	80
30		76.09	82.4	83.04	81.25
44		78.15	89.5	73.93	81
67		78.08	82.61	72.94	75.6
100		74.71	81.36	65.77	76.5

CETIS Analytical Report

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	19-0294-2578	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Jan-16 11:49	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-2475-9236	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 12:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended)	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 17h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	427913	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	51.05	34.31	66.72	1.959	1.499	2.915
IC10	>100	N/A	N/A	<1	NA	NA
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

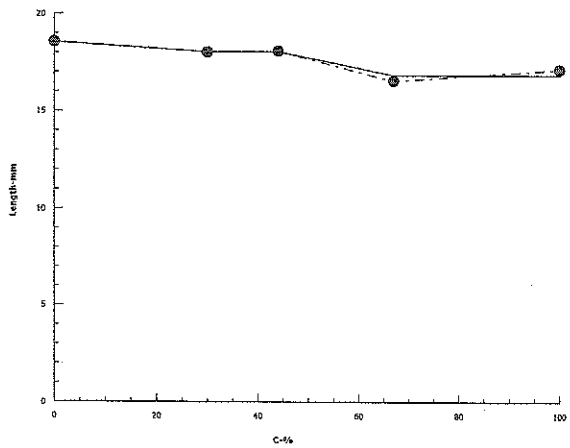
Length-mm Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Upstream Contro	4	18.55	18	19	0.2062	0.4123	2.22%	0.0%
30		4	18.03	17.8	18.2	0.08539	0.1708	0.95%	2.83%
44		4	18.08	17.6	18.7	0.2323	0.4646	2.57%	2.56%
67		4	16.55	15.5	17.6	0.4518	0.9037	5.46%	10.78%
100		4	17.13	16.5	17.6	0.2287	0.4573	2.67%	7.68%

Length-mm Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Upstream Control	19	18.6	18	18.6
30		18	18.2	17.8	18.1
44		17.9	18.1	17.6	18.7
67		16.2	17.6	15.5	16.9
100		16.5	17.6	17.2	17.2

Graphics



Sample FR_UFR1 is the upstream control

Analyst:_____ QA: JCL Jan-27/16

CETIS Analytical Report

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	20-7039-9010	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Jan-16 11:49	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	18-2475-9236	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 12:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(amended)	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 17h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	3.23%	Fails length-mm

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Upstream Control		100*	4.628	1.943	0.598	6	0.0018	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.061248	4.061248	1	21.42	0.0036	Significant Effect
Error	1.137501	0.1895835	6			
Total	5.198749		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.23	47.47	0.8687	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8576	0.6451	0.1135	Normal Distribution

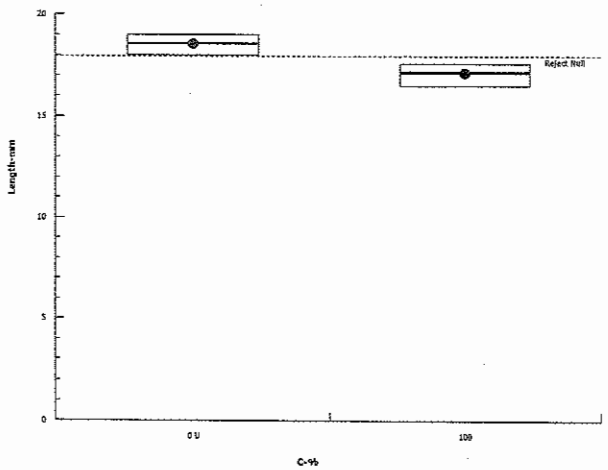
Length-mm Summary

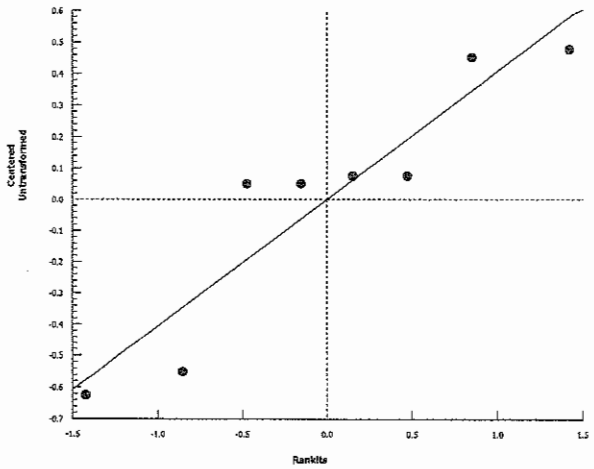
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Upstream Contr	4	18.55	17.89	19.21	18.6	18	19	0.2062	2.22%	0.0%
100		4	17.13	16.4	17.85	17.2	16.5	17.6	0.2287	2.67%	7.68%

Length-mm Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Upstream Contr	19	18.6	18	18.6
100		16.5	17.6	17.2	17.2

Graphics





Sample FR_UFR1 is the upstream control

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	18-5079-3144	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Mar-16 8:40	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	18-2475-9236	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 12:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 17h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	3.07%	Passes length-mm

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		Upstream Control	0.3397	1.943	0.572	6	0.3728	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01999996	0.01999996	1	0.1154	0.7457	Non-Significant Effect
Error	1.04	0.1733333	6			
Total	1.06		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.039	47.47	0.9755	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8795	0.6451	0.1862	Normal Distribution

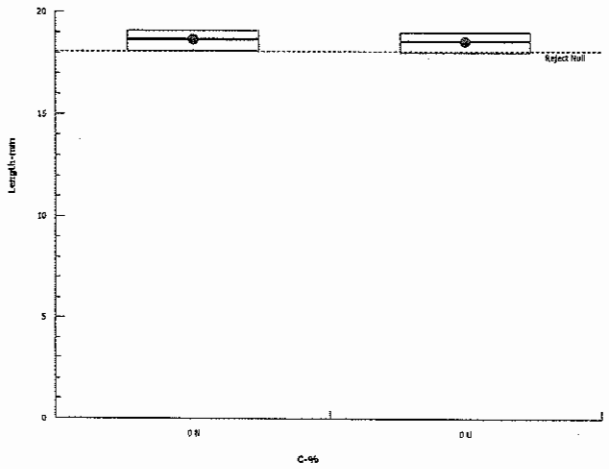
Length-mm Summary

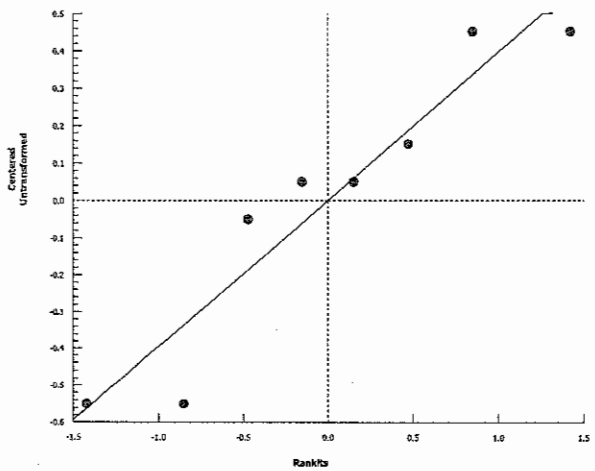
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Upstream Contr	4	18.55	17.89	19.21	18.6	18	19	0.2062	2.22%	0.0%
0	Negative Control	4	18.65	17.98	19.32	18.7	18.1	19.1	0.2102	2.25%	-0.54%

Length-mm Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	18.8	18.6	18.1	19.1
0	Upstream Contr	19	18.6	18	18.6

Graphics





CETIS Analytical Report

Report Date: 27 Jan-16 11:50 (p 1 of 1)
Test Code: 15998a2 | 06-7816-3724

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	06-4202-0434	**Endpoint:**	Mean ~~Dry~~ Wet Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Jan-16 11:49	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-2475-9236	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 12:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(amended)	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 17h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	200275	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	52.63	N/A	102.9	1.9	0.972	NA
IC10	93.31	26.49	N/A	1.072	NA	3.775
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

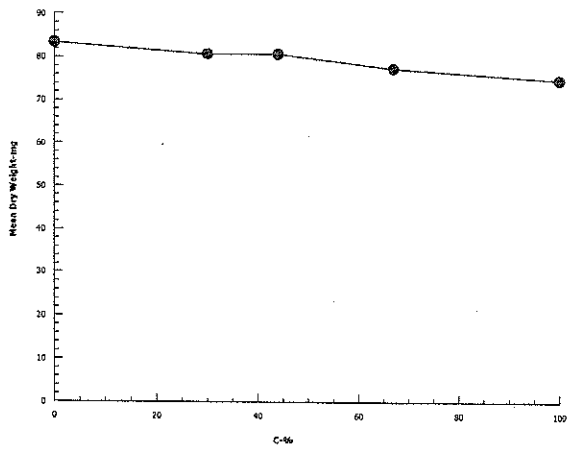
Mean ~~Dry~~ Wet Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Upstream Contro	4	83.4	80	87.27	1.868	3.735	4.48%	0.0%
30		4	80.7	76.09	83.04	1.58	3.16	3.92%	3.24%
44		4	80.64	73.93	89.5	3.29	6.58	8.16%	3.3%
67		4	77.31	72.94	82.61	2.055	4.11	5.32%	7.3%
100		4	74.58	65.77	81.36	3.258	6.515	8.74%	10.57%

Mean ~~Dry~~ Wet Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Upstream Control	85.91	80.4	87.27	80
30		76.09	82.4	83.04	81.25
44		78.15	89.5	73.93	81
67		78.08	82.61	72.94	75.6
100		74.71	81.36	65.77	76.5

Graphics



Sample FR_UFR1 is the upstream control

Analyst:_____ QA: JGL Jan-27/16

CETIS Analytical Report

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	04-7755-4058	**Endpoint:**	Mean ~~Dry~~ Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Jan-16 11:49	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	18-2475-9236	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 12:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(amended)	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 17h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	8.75%	Fails mean dry weight-mg

Equal Variance t Two-Sample Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Upstream Control		100*	2.346	1.943	7.297	6	0.0287	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	155.2592	155.2592	1	5.506	0.0573	Non-Significant Effect
Error	169.203	28.2005	6			
Total	324.4622		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.043	47.47	0.3852	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9686	0.6451	0.8868	Normal Distribution

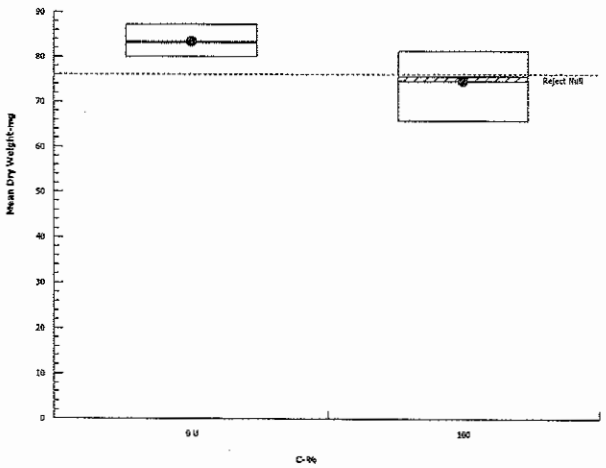
Mean ~~Dry~~ Weight-mg Summary

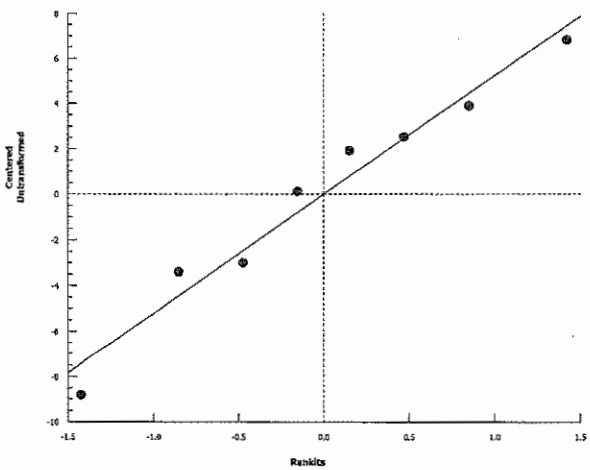
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Upstream Contr	4	83.4	77.45	89.34	83.15	80	87.27	1.868	4.48%	0.0%
100		4	74.58	64.22	84.95	75.6	65.77	81.36	3.258	8.74%	10.57%

Mean ~~Dry~~ Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Upstream Contr	85.91	80.4	87.27	80
100		74.71	81.36	65.77	76.5

Graphics





Sample FR_UFR1 is the upstream control.

CETIS Analytical Report

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	17-2587-2388	**Endpoint:**	Mean ~~Dry~~ Wet Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	04 Mar-16 8:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	18-2475-9236	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 Dec-15 16:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Site Water
Ending Date:	06 Jan-16 12:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	28d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	09-6772-9661	**Code:**	GH_FR1(ammended	**Client:**	Teck Coal
Sample Date:	30 Nov-15	**Material:**	Water Sample	**Project:**	
Receive Date:	01 Dec-15 11:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	8d 17h (2 °C)	**Station:**	GH_FR1_WS_2015_11_30_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	7.36%	Passes mean dry weight-mg

Equal Variance t Two-Sample Test

Control	vs	Control	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		Upstream Control	-0.01848	1.943	6.133	6	0.5071	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.006801788	0.006801788	1	0.000341	0.9859	Non-Significant Effect
Error	119.5548	19.92581	6			
Total	119.5616		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.857	47.47	0.6240	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8818	0.6451	0.1959	Normal Distribution

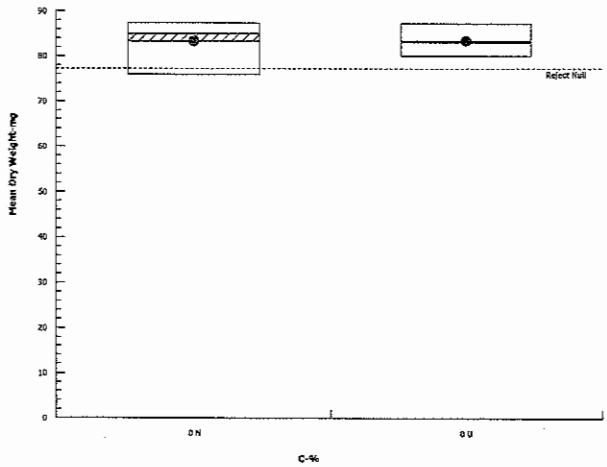
Mean ~~Dry~~ Wet Weight-mg Summary

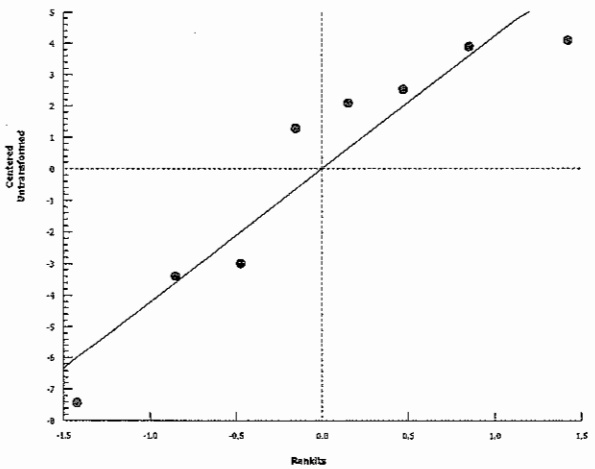
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Upstream Contr	4	83.4	77.45	89.34	83.15	80	87.27	1.868	4.48%	0.0%
0	Negative Control	4	83.34	75.24	91.44	85.02	75.91	87.41	2.545	6.11%	0.07%

Mean ~~Dry~~ Wet Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	84.62	87.41	75.91	85.42
0	Upstream Contr	85.91	80.4	87.27	80

Graphics





Client: Teck

W.O.#: 15998

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Dechlor (Lab Control)	Dec. 8/15	50	0.6	0.7	10		50	0.5	10	YML
FR_UFR1 (Site Control)	↓	↓	9.9	10.1	194		50	9.5	190	JS
GH_FR1 (Amended)	↓	↓	10.1	10.2	200		10①	7.2	720	JS
Dechlor (Lab Control)	Dec. 15/15	50	0.6	0.7	10		50	0.5	10	YML
FR_UFR1 (Site Control)	↓	↓	7.5	7.7	146		50	9.9	198	KL
GH_FR1 (Amended)	↓	↓	9.7	9.9	190		10①	8.1	810	KL
Dechlor (Lab Control)	Dec. 22/15	50	0.5	0.6	8		50	0.6	12	YML
FR_UFR1 (Site Control)	↓	↓	7.4	7.5	146		50	9.6	192	YML
GH_FR1 (Amended)	↓	↓	9.7	9.9	190		10①	8.3	830	YML
Dechlor (Lab Control)	Dec. 29/15	50	0.4	0.5	6		50	0.4	8	YML
FR_UFR1 (Site Control)	↓	↓	7.2	7.4	140		50	9.9	198	KL
GH_FR1 (Amended)	↓	↓	10.3	10.5	202		10①	7.2	720	↓

Notes: ① Diluted to 100 mL w/ DI water

Reviewed by: JGL

Date Reviewed: Jan. 25/16

APPENDIX F – Analytical Chemistry

Week 1 Un-amended

NAUTILUS ENVIRONMENTAL
ATTN: Krysta Pearcy
8664 Commerce Court
Imperial Square Lake City
Burnaby BC V5A 4N7

Date Received: 01-DEC-15
Report Date: 04-DEC-15 13:53 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1709077

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1709077-1	L1709077-2	L1709077-3	L1709077-4	
	Description	Water	Water	Water	Water	
	Sampled Date	30-NOV-15	30-NOV-15	30-NOV-15	30-NOV-15	
	Sampled Time					
	Client ID	FR_UFR1-WS-201511301215	EV_ER4_WS_2015-11-30_N	GH_FR1_WS_2015_11_30_N	GH_ER2_WS_2015_11_30_N	
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Nitrate (as N) (mg/L)	0.162	3.23	10.7	0.115	
	Sulfate (SO4) (mg/L)	47.5	86.3	234	23.1	
Total Metals	Cadmium (Cd)-Total (mg/L)	<0.0000050	0.0000189	0.0000206	<0.0000050	
	Calcium (Ca)-Total (mg/L)	58.3	75.3	113	54.3	
	Magnesium (Mg)-Total (mg/L)	14.5	22.3	50.1	12.2	
	Selenium (Se)-Total (mg/L)	0.000893	0.00873	0.0434	0.000940	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
LPML	Lab-Preserved for Total Metals. Sample received with pH > 2 and preserved at the lab. Total Metals results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Total	MS-B	L1709077-1, -2, -3, -4

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Week 1 Amended

NAUTILUS ENVIRONMENTAL
ATTN: Krysta Pearcy
8664 Commerce Court
Imperial Square Lake City
Burnabv BC V5A 4N7

Date Received: 11-DEC-15
Report Date: 21-DEC-15 14:28 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1713817

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1713817-1	L1713817-2	L1713817-3	L1713817-4	
	Description	Water	Water	Water	Water	
	Sampled Date	07-DEC-15	07-DEC-15	07-DEC-15	07-DEC-15	
	Sampled Time					
	Client ID	GH_FR1_WS_2015_11_30_N (AMENDED BURNABY)	EV_ER4_WS_2015-11_30_N (AMENDED BURNABY)	GH_FR1_WS_2015_11_30_N (AMENDED CALGARY)	EV_EV4_WS_2015-11_30_N (AMENDED CALGARY)	
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Nitrate (as N) (mg/L)	20.8	3.34	21.1	3.47	
	Sulfate (SO4) (mg/L)	422	452	524	595	
Total Metals	Cadmium (Cd)-Total (mg/L)	0.000619	0.000619	0.00103	0.000995	
	Calcium (Ca)-Total (mg/L)	157	166	155	160	
	Magnesium (Mg)-Total (mg/L)	67.3	57.4	87.2	92.0	
	Selenium (Se)-Total (mg/L)	0.0621	0.0243	0.0547	0.0200	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Numbe	Client Sample ID	Qualifier	Description
L1713817-1	GH_FR1_WS_2015_11_30_I	LPMB	Lab-Preserved for Total Metals. Sample received with pH > 2 and preserved at the lab. Total Metals results may be biased low.
L1713817-2	EV_ER4_WS_2015-11_30_N	LPMB	Lab-Preserved for Total Metals. Sample received with pH > 2 and preserved at the lab. Total Metals results may be biased low.
L1713817-3	GH_FR1_WS_2015_11_30_I	LPMB	Lab-Preserved for Total Metals. Sample received with pH > 2 and preserved at the lab. Total Metals results may be biased low.
L1713817-4	EV_EV4_WS_2015-11_30_N	LPMB	Lab-Preserved for Total Metals. Sample received with pH > 2 and preserved at the lab. Total Metals results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Nitrate (as N)	MS-B	L1713817-1, -2, -3, -4

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Week 2 Un-amended

NAUTILUS ENVIRONMENTAL
ATTN: Krysta Pearcy
8664 Commerce Court
Imperial Square Lake City
Burnaby BC V5A 4N7

Date Received: 08-DEC-15
Report Date: 10-DEC-15 14:54 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1712061

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1712061-1	L1712061-2	L1712061-3	L1712061-4	
	Description	Water	Water	Water	Water	
	Sampled Date	07-DEC-15	07-DEC-15	07-DEC-15	07-DEC-15	
	Sampled Time					
	Client ID	FR_UFR1+M_0712 2015_N	GH_FR1_WS_201 5_12_07_NP	GH_ER2_WS_201 5_12_07_NP	EV_ER4_WS_2015 -12-07_N	
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Nitrate (as N) (mg/L)	0.182	10.8	0.119	3.66	
	Sulfate (SO4) (mg/L)	46.7	217	23.2	89.2	
Total Metals	Cadmium (Cd)-Total (mg/L)	0.0000102	0.0000169	0.0000064	0.0000131	
	Calcium (Ca)-Total (mg/L)	58.4	110	55.1	76.1	
	Magnesium (Mg)-Total (mg/L)	14.4	46.3	12.1	22.6	
	Selenium (Se)-Total (mg/L)	0.000698	0.0410	0.000856	0.0116	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
LPML	Lab-Preserved for Total Metals. Sample received with pH > 2 and preserved at the lab. Total Metals results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Sulfate (SO4)	MS-B	L1712061-1, -2, -3, -4

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
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Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Week 2 Amended

NAUTILUS ENVIRONMENTAL
ATTN: Krysta Pearcy
8664 Commerce Court
Imperial Square Lake City
Burnabv BC V5A 4N7

Date Received: 21-DEC-15
Report Date: 24-DEC-15 13:49 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1717009

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1717009-1 Water 11-DEC-15 GH_FR1_WS_2015_12_07_NP (AMENDED BURNABY)	L1717009-2 Water 11-DEC-15 EV_ER4_WS_2015_12_07_N (AMENDED BURNABY)	L1717009-3 Water 11-DEC-15 GH_FR1_WS_2015_12_07_NP (AMENDED CALGARY)	L1717009-4 Water 11-DEC-15 EV_ER4_WS_2015_12_07_N (AMENDED CALGARY)	
WATER						
Anions and Nutrients	Nitrate (as N) (mg/L)	21.9	3.74	21.4	3.75	
	Sulfate (SO4) (mg/L)	452	449	529	473	
Total Metals	Cadmium (Cd)-Total (mg/L)	0.000535	0.000589	0.000967	0.00107	
	Calcium (Ca)-Total (mg/L)	129	155	153	125	
	Copper (Cu)-Total (mg/L)			0.0174	0.0184	
	Magnesium (Mg)-Total (mg/L)	53.9	54.2	84.8	79.3	
	Selenium (Se)-Total (mg/L)	0.0518	0.0245	0.0560	0.0188	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
LPML	Lab-Preserved for Total Metals. Sample received with pH > 2 and preserved at the lab. Total Metals results may be biased low.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
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mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Week 3 Un-amended

NAUTILUS ENVIRONMENTAL
ATTN: Krysta Pearcy
8664 Commerce Court
Imperial Square Lake City
Burnaby BC V5A 4N7

Date Received: 15-DEC-15
Report Date: 21-DEC-15 12:19 (MT)
Version: FINAL REV. 2

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1714927

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:

Comments: 21-DEC-2015 This report replaces and supersedes previously sent report. This report includes low level Selenium and Cadmium results for ALS identified samples L1714927-1 and -2.

Jamie Lo, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1714927-1	L1714927-2	L1714927-3	L1714927-4	
	Description	Water	Water	Water	Water	
	Sampled Date	14-DEC-15	14-DEC-15	14-DEC-15	14-DEC-15	
	Sampled Time					
	Client ID	FR_UFR1-WS-201512141046	GH_FR1_WS_2015_12_14_NP	GH_ER2_WS_2015_12_14_NP	EV_ER4_WS_2015-12-14_N	
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Nitrate (as N) (mg/L)	0.181	11.8	0.112	3.75	
	Sulfate (SO4) (mg/L)	47.7	202	23.6	89.7	
Total Metals	Cadmium (Cd)-Total (mg/L)	0.0000087	0.0000178	0.0000082	0.0000095	
	Calcium (Ca)-Total (mg/L)	53.1	103	49.7	71.8	
	Magnesium (Mg)-Total (mg/L)	13.8	45.4	11.5	22.4	
	Selenium (Se)-Total (mg/L)	0.000716	0.0439	0.000907	0.0123	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
LPML	Lab-Preserved for Total Metals. Sample received with pH > 2 and preserved at the lab. Total Metals results may be biased low.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Week 3 Amended

NAUTILUS ENVIRONMENTAL
ATTN: Krysta Pearcy
8664 Commerce Court
Imperial Square Lake City
Burnaby BC V5A 4N7

Date Received: 24-DEC-15
Report Date: 07-JAN-16 12:08 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1718306

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1718306-1 Water 21-DEC-15 GH_FR1_WS_2015_12_14_NP(AMENDED BURNABY)	L1718306-2 Water 21-DEC-15 EV_ER4_WS_2015_12_07_N(AMENDED BURNABY)	L1718306-3 Water 21-DEC-15 GH_FR1_WS_2015_12_14_NP(AMENDED CALGARY)	L1718306-4 Water 21-DEC-15 EV_ER4_WS_2015_12_07_N(AMENDED CALGARY)	
WATER						
Anions and Nutrients	Nitrate (as N) (mg/L)	21.5	3.88	20.7	3.66	
	Sulfate (SO4) (mg/L)	453	499	525	546	
Total Metals	Cadmium (Cd)-Total (mg/L)	0.000519	0.000622	0.00103	0.00101	
	Calcium (Ca)-Total (mg/L)	153	154	146	145	
	Copper (Cu)-Total (mg/L)			0.0163	0.0189	
	Magnesium (Mg)-Total (mg/L)	66.7	58.2	85.5	85.7	
	Selenium (Se)-Total (mg/L)	0.0591	0.0213	0.0545	0.0178	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Sulfate (SO4)	DLDS	L1718306-1, -2, -3, -4
Duplicate	Cadmium (Cd)-Total	DLM	L1718306-1, -2, -3, -4
Matrix Spike	Nitrate (as N)	MS-B	L1718306-1, -2, -3, -4

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLM	Detection Limit Adjusted due to sample matrix effects.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
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Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Week 4 Un-amended

NAUTILUS ENVIRONMENTAL
ATTN: Krysta Pearcy
8664 Commerce Court
Imperial Square Lake City
Burnabv BC V5A 4N7

Date Received: 22-DEC-15
Report Date: 24-DEC-15 13:52 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1717802

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1717802-1	L1717802-2	L1717802-3	L1717802-4	
	Description	Water	Water	Water	Water	
	Sampled Date	21-DEC-15	21-DEC-15	21-DEC-15	21-DEC-15	
	Sampled Time					
	Client ID	FR_UFR1-WS_201512211151	GH_FR1_WS_2015_12_21_NP	GH_ER2_WS_2015_12_21_NP	EV_ER4_WS_2015-12-21_N	
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Nitrate (as N) (mg/L)	0.191	11.1	0.114	3.78	
	Sulfate (SO4) (mg/L)	48.0	238	23.7	94.2	
Total Metals	Cadmium (Cd)-Total (mg/L)	0.0000104	0.0000212	<0.0000050	0.0000129	
	Calcium (Ca)-Total (mg/L)	51.9	107	47.1	73.1	
	Magnesium (Mg)-Total (mg/L)	14.9	51.7	11.9	24.9	
	Selenium (Se)-Total (mg/L)	0.000741	0.0472	0.000855	0.0131	

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			
NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Week 4 Amended

NAUTILUS ENVIRONMENTAL
ATTN: Krysta Pearcy
8664 Commerce Court
Imperial Square Lake City
Burnabv BC V5A 4N7

Date Received: 07-JAN-16
Report Date: 14-JAN-16 11:49 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1721399

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1721399-1	L1721399-2	L1721399-3	L1721399-4	
	Description	Water	Water	Water	Water	
	Sampled Date	28-DEC-15	28-DEC-15	28-DEC-15	28-DEC-15	
	Sampled Time					
	Client ID	GH_FR1_WS_2015_12_21_NP(AMENDED BURNABY)	GH_ER4_WS_2015_12_21_N(AMENDED BURNABY)	GH_FR1_WS_2015_12_21_NP(AMENDED CALGARY)	GH_ER4_WS_2015_12_21_N(AMENDED CALGARY)	
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Nitrate (as N) (mg/L)	22.4	3.95	20.8	3.98	
	Sulfate (SO4) (mg/L)	479	465	429	454	
Total Metals	Cadmium (Cd)-Total (mg/L)	0.000572	0.000564	0.000839	0.00100	
	Calcium (Ca)-Total (mg/L)	160	161	156	154	
	Copper (Cu)-Total (mg/L)			0.0169	0.0172	
	Magnesium (Mg)-Total (mg/L)	72.9	58.4	68.6	55.0	
	Selenium (Se)-Total (mg/L)	0.0560	0.0185	0.0514	0.0157	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Sample Submission Listed:

Qualifier	Description
LPML	Lab-Preserved for Total Metals. Sample received with pH > 2 and preserved at the lab. Total Metals results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Total	MS-B	L1721399-1, -2, -3, -4
Matrix Spike	Magnesium (Mg)-Total	MS-B	L1721399-1, -2, -3, -4
Matrix Spike	Sulfate (SO4)	MS-B	L1721399-1, -2, -3, -4

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

APPENDIX G – Chain-of-Custody Forms

WO# 15998 - RST EA Test
15999 - 28d Hyallela
16000 - 32d FHM - test conducted in Calgary Hydro Qu
16001 - 7d cerio
16002 - 72 H P. Subcapitata

Nautilus Environmental
8664 Commerce Court
Imperial Square Lake City
Burnaby BC, V5A 4N7

COC # 30112015
Page 1 of 1

Report to:		Report Format / Distribution		Service Requested: (rush - subject to availability)
Company:	TECK COAL LTD (ELKVIEW)	☑Standard ☐Other		◉Regular (Default)
Contact:	Michael Moore	☑PDF ☑Excel ☑Digital ☐Fax		○Priority (2-3 Business Days) - 50% Surcharge
Address:	RR1 HWY 3	Email 1:	michael.moore@teck.com	○Emergency (1 Business Day) - 100% Surcharge
Sparwood, BC, V0B 2G1, Canada		Email 2:	james.boldt@teck.com	○For Emergency < 1 Day, ASAP or Weekend - Contact ALS
Phone:	250-425-8868 Fax:	Email 3:	casandra.knooihuizen@teck.com	**Analysis Request**
Invoice To:	Same as Report ? ◉Yes ○No	Email 4:	cait.good@teck.com	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:	Send all invoices to: diteckcoalaccountspayable@teck.com	**Client / Project Information:**		
Contact:	Attn: Accounting	Job #:	SPO Mixture Toxicity Sampling	
Address:	Same as above	PO / AFE:	107517	
		Legal Site Description:		
Phone:	Fax:	Quote #:		
Lab Work Order # (lab use only)		**Nautilus Contact:** Krysta Pearcy	**Sampler:** JB, MW	

Sample	Sample Identification	Date (mmm-dd-yy)	Time (hh:mm)	Matrix	TECKCOAL-MONTHLY-VA	Toxcitity 7day/72 hr	T-Se (CCMS)	T-Metal(TECKCOAL-MET-T-VA)	D-Metal(TECKCOAL-MET-D-VA)	EPH	TSS	TURBIDITY	PAH - low level detection	True Color	Toxicity- SPO Mixture Testing	BOD	Number of Containers
	EV_ER4_WS_2015-11-30_N	30-Nov-15	8:45	WS											X		10
	sample description: clear, no presipitate/particulate, odourless, colourless																
																	10

Special Instructions / Regulations / Hazardous Details

Toxicity 30-Day= Rainbow trout embyro-alevin

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)					SHIPMENT VERIFICATION (lab use only)		
Released by: Madison Wassick	Date & Time: 30-Nov-15 12:00	Received by: Nautilus NY-Nair Yamamoto	Date: Dec01/15	Time: 11:10		Temperature: -1.3°C	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY GENF 18.00 Front

10 x 20L carboys.
Sample arrived parcially frozen.

Hydroqual Calgary
6125 12 St SE
Calgary Alberta, T2H 2K1

COC # 30112015

Page 1 of 1

Report to:		Report Format / Distribution		Service Requested: (rush - subject to availability)
Company:	TECK COAL LTD (ELKVIEW)	☑ Standard ☐ Other		◉ Regular (Default)
Contact:	Michael Moore	☑ PDF ☑ Excel ☑ Digital ☐ Fax		○ Priority (2-3 Business Days) - 50% Surcharge
Address:	RR1 HWY 3	Email 1:	michael.moore@teck.com	○ Emergency (1 Business Day) - 100% Surcharge
Sparwood, BC, V0B 2G1, Canada		Email 2:	james.boldt@teck.com	○ For Emergency <-1 Day, ASAP or Weekend - Contact ALS
Phone:	250-425-8868 Fax:	Email 3:	casandra.knooihuizen@teck.com	**Analysis Request**
Invoice To:	Same as Report ? ◉ Yes ○ No	Email 4:	cait.good@teck.com	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:	Send all invoices to: diteckcoalaccountspayable@teck.com	Client / Project Information:		
Contact:	Attn: Accounting	Job #:	~~SPO Mixture Toxicity Testing~~	
Address:	Same as above	PO / AFE:	107517	
		Legal Site Description:		
Phone:	Fax:	Quote #:		
Lab Work Order # (lab use only)		~~Nautilus Contact: Kayla Beamy~~	Sampler: MW/JB	

Sample	Sample Identification	Date (mmm-dd-yy)	Time (hh:mm)	Matrix	TECKCOAL-MONTHLY-VA	Toxcitity 7day/72 hr	T-Se (CCMS)	T-Metal(TECKCOAL-MET-T-VA)	D-Metal(TECKCOAL-MET-D-VA)	EPH	TSS	TURBIDITY	PAH - low level detection	True Color	Toxicity- SPO Mixture Testing	~~[illegible]~~ TOXICITY FAT HEAD MINNOW	Number of Containers
	EV_EH4_WS_2015-11-30_N	30-Nov-15	8:45	WS											[illegible]	X	5
	15 1640																
																	5

Special Instructions / Regulations / Hazardous Details

2015/12/01 5x20 L Carboy
1145 6°C drop off
NO S/S Good Condition

~~Toxicity 30 Days Rainbow trout embyro alevin~~
TOXICITY = FAT HEAD MINNOW

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)					SHIPMENT VERIFICATION (lab use only)		
Released by: Madison Wassick	Date & Time: 30-Nov-15 12:00	Received by:	Date:	Time:		Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

GENF 18.00 Front

COC ID:	20151130-1337	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / **ANALYSIS REQUESTED**

	Sample ID	Sample Location	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	28 Day H. azteca wo15994	30 Day Rainbow Trout embryo alevin wo15998	7 Day C. Dubia wo16001	72 hr P. subcapitata wo16002	32d FHM - Test conducted in Calgary wo16000 Hydrofluo						
1)	~~FR_FRCP1-WS-201511300953~~	~~FR_FRCP1~~	~~WS~~	~~2015/11/30~~	~~09:53~~	~~G~~		X	X	X	X							
2)	FR_UFR1-WS-201511301215	FR_UFR1	WS	2015/11/30	12:15	G		X	X	X	X	X						
	Sample description: clear, odourless, colourless, non particulate, precipitate																	

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
2) Sample arrived partially frozen NY.	TekPro Ate Bezzola	Nov30 2015 13:30	Nautilus NY - Nan Yamamoto	Dec01/15 @ 11:10.
1) FR-~~FRCP1~~ NY - Lab did not receive this sample.				Temp. -1.0°C
			7x20L + 4x10L	

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Ate Bezzola	Mobile #	
	Sampler's Signature		Date/Time	Nov 30 2015 13:30

COC ID:	20151130-1338	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Bording River Operation			Lab Name	Hydroqual			Email Invoice To	
Project Number				Lab Contact	Elisabeth Henson			Invoice Reports	
Department				Email	elisabeth_henson@golder.com			Email Report To	
Address	PO Box 100			Address				Email Reports	
								Shipping Company	
City	Elkford	State	BC	City		State		Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code		Country		Cooler Count	
Phone Number	1-250-865-5289			Phone Number	403-253-7121			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID	Sample Location	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30 Day Fathead Minnow	
FR_FRCP1-WS-201511300953	FR_FRCP1	WS	2015/11/30	09:53	G		x	~~15-1638~~ 15-1475 (refresh)
FR_UFR1-WS-201511301215	FR_UFR1	WS	2015/11/30	12:15	G		x	15-1639 + 15-1476 (refresh)

2015/12/1 5.3°C
1150
FR_FRCP1 - 6 - 20L Cubing
FR_UFR1 - 10 - 20L Cubing
2 - 10L Cubing
no s/t
~~drop~~ Condition
drop off

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Tech FRO Ante Bezzola	Nov 30 2015 13:30		

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Ante Bezzola	Mobile #	
	Sampler's Signature	[signature]	Date/Time	Nov 30 2015 13:30

Chain Of Custody Record

COC ID:

Page: 1 of 1

Turnaround Time: Rush:

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	Greenhills Operation	Lab Name	Nautilus Environmental Laboratories Lt	Send Invoice To	
Project Number		Contact Name	Kryst Pearcy	Address	
Contact Name	Leigh Stickney	Address	8664 Commerce Court		
Address	P.O. BOX 5000			City	State
		City	Burnaby State BC	Postal Code	Country
City	Elkford State BC	Postal Code	V5A 4N7 Country Canada	Task Code	
Postal Code	V0B1H0 Country Canada	Phone Number		Shipping Company	
Phone Number	250-865-3274	Email Address		Tracking Number	
Email EDD To	Leigh.Stickney@Teck.com	Quote Number		CC Hardcopy To	
Email Report To	Leigh.Stickney@Teck.com			CC Hardcopy To	

SAMPLE DETAILS / ANALYSIS REQUESTED / ADDITIONAL INFORMATION

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS / PRESERV	30 d early life stage, fathead minnow ~~Pass/Fail~~ Test conducted in Calgary	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail	30 Day rainbow trout Early Life stage ~~Pass/Fail~~	Teck Chronic tox program			Initial - PASS/FAIL sample description:
GH_FR1_WS_2015_11_30_N	WS	11/30/2015		G	11	WO #	X 16000	X 15999	X 16002	X 16001			X 15998	X			clear, colourless, odourless, no particulate, presipitate present

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
				Nautilus	Dec01/15	11:10	2.0	Y / N	Y / N	Y / N
				NY - Nari Yamamoto				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				11 x 20L				Y / N	Y / N	Y / N
							Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Sampler's Name	Leigh Stickney	Mobile #	250 910 0627
Sampler's Signature		Date/Time	

Chain Of Custody Record

COC ID:

Page: 1 of 1

Turnaround Time:

Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	HydroQual Laboratories Ltd.			Send Invoice To			
Project Number				Contact Name	Jacklyn Pool			Address			
Contact Name	Leigh Stickney			Address	#4, 6125 - 12th Street S.E						
Address	P.O. BOX 5000							City		State	
				City	Calgary	State	AB	Postal Code		Country	
City	Elkford	State	BC	Postal Code	T2H2K1	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number	403.253.7121			Shipping Company			
Phone Number	250-865-3274			Email Address				Tracking Number			
Email EDD To	Leigh.Stickney@Teck.com			Quote Number				CC Hardcopy To			
Email Report To	Leigh.Stickney@Teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow Pass/Fail	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail	Teck Chronic Tox Program			
GH_FRI_WS_2015_11_30_N	WS	11/30/2015	10:00	G	11								X			
15-1642																
15-1473 (Refresh)																

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions
2015/12/01 1245 5.5°C 11 x 20L Carboy Good condition drop off 105/1							Y / N Y / N Y / N
							Y / N Y / N Y / N
							Y / N Y / N Y / N
							Y / N Y / N Y / N

Sampler's Name	Leigh Stickney	Mobile #	250 910 0627
Sampler's Signature			

Temp in °C | Samples on ice? | Sample intact? | Trip Blank?

Chain Of Custody Record

COC ID:

Page: 1 of 1

Turnaround Time:

Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental Laboratories Lt			Send Invoice To			
Project Number				Contact Name	Kryst Pearcy			Address			
Contact Name	Leigh Stickney			Address	8664 Commerce Court						
Address	P.O. BOX 5000							City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number				Shipping Company			
Phone Number	250-865-3274			Email Address				Tracking Number			
Email EDD To	Leigh.Stickney@Teck.com			Quote Number				CC Hardcopy To			
Email Report To	Leigh.Stickney@Teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow ~~Pass/Fail~~ TAT conducted in Calgary	28 d Hyallella ~~Pass Fail~~	72 h P. subcapitata ~~Pass fail~~	7 d C. dubia ~~Pass fail~~	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail	30 Day rainbow trout Early Life stage ~~Pass Fail~~	7 day Rainbow trout Pass Fail	Lemna minor Pass /Fail	Teck chronic tox program	
GH_ER2_WS_2015_11_30_N	WS	11/30/2015		G	10	WO #	X 16000	X 15999	X 16002	X 16001			X 15998			X	clear, no particulate/precipitate, odourless, colourless

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
				Nautilus	Dec 01/15	11:10	0.5	Y / N	Y / N	Y / N
				NY - Nan Yamamoto				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				10 x 20L				Y / N	Y / N	Y / N

Sampler's Name	Leigh Stickney	Mobile #	250 910 0627	Temp in °C	Samples on ice?
Sampler's Signature		Date/Time		Sample intact?	Trip Blank?

Chain Of Custody Record

COC ID:

Page: 1 of 1

Turnaround Time:

Rush:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	HydroQual Laboratories Ltd.			Send Invoice To			
Project Number				Contact Name	Jacklyn Pool			Address			
Contact Name	Leigh Stickney			Address	#4, 6125 - 12th Street S.E						
Address	P.O. BOX 5000							City		State	
				City	Calgary	State	AB	Postal Code		Country	
City	Elkford	State	BC	Postal Code	T2H2K1	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number	403.253.7121			Shipping Company			
Phone Number	250-865-3274			Email Address				Tracking Number			
Email EDD To	Leigh.Stickney@Teck.com			Quote Number				CC Hardcopy To			
Email Report To	Leigh.Stickney@Teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS 30 d early life stage, fathead minnow Pass/Fail	28 d Hyallella	72 h P. subcapitata	7 d C. dubia	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail	Teck Chronic Tox Program				
GH_ER2_WS_2015_11_30_N	WS	11/30/2015	10:00	G	5							X				
15-1641																

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
2015/12/1 1150 5.4°C drop off 5x 20 L Carboys no S/I Good Condition								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Leigh Stickney	Mobile #	250 910 0627	Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Signature		Date/Time					

wo # 15998 - 30d Rbt EA
15999 - 28d Hyallela,
16000 - 32d FHM - test conducted in Calgary - Hydro

Nautilus Environmental
8664 Commerce Court
Imperial Square Lake City
Burnaby BC, V5A 4N7

COC # 7122015

Page 1 of 1

Report to:		Report Format / Distribution		Service Requested: (rush - subject to availability)
Company:	TECK COAL LTD (ELKVIEW)	☑Standard ☐Other		◉Regular (Default)
Contact:	Michael Moore	☑PDF ☑Excel ☑Digital ☐Fax		○Priority (2-3 Business Days) - 50% Surcharge
Address:	RR1 HWY 3	Email 1:	michael.moore@teck.com	○Emergency (1 Business Day) - 100% Surcharge
Sparwood, BC, V0B 2G1, Canada		Email 2:	james.boldt@teck.com	○For Emergency < 1 Day, ASAP or Weekend - Contact ALS
Phone:	250-425-8868 Fax:	Email 3:	casandra.knooihuizen@teck.com	**Analysis Request**
Invoice To:	Same as Report ? ◉Yes ○No	Email 4:	cait.good@teck.com	Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:	Send all invoices to: dlteckcoalaccountspayable@teck.com	Client / Project Information:		
Contact:	Attn: Accounting	Job #:	SPO Mixture Toxicity Sampling	
Address:	Same as above	PO / AFE:	107517	
		Legal Site Description:		
Phone:	Fax:	Quote #:		
Lab Work Order # (lab use only)		Nautilus Contact: Krysta Pearcy	Sampler:	

Sample	Sample Identification	Date (mmm-dd-yy)	Time (hh:mm)	Matrix	TECKCOAL-MONTHLY-VA	Toxcitity 7day/72 hr	T-Se (CCMS)	T-Metal(TECKCOAL-MET-T-VA)	D-Metal(TECKCOAL-MET-D-VA)	EPH	TSS	TURBIDITY	PAH - low level detection	True Color	Toxicity- SPO Mixture Testing	BOD	Number of Containers
	EV_ER4_WS_2015-12-07_N	7-Dec-15	915	WS											X		10
																	10

Special Instructions / Regulations / Hazardous Details

Toxicity = SPO Mixture Testing

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
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SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)					SHIPMENT VERIFICATION (lab use only)		
Released by: Madison Wassick	Date & Time: 7-Dec-15	Received by: Nautilus NY - Nan Yamamoto	Date: Dec 08/15	Time: 11:00		Temperature: 1.5°C	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY GENF 18.00 Front

10x20L

= rehearsal sample -

Hydroqual Calgary
6125 12 St SE
Calgary Alberta, T2H 2K1

COC # 7122015

Page 1 of 1

Report to:		Report Format / Distribution				Service Requested: (rush - subject to availability)
Company:	TECK COAL LTD (ELKVIEW)	☑Standard	☐Other			◉Regular (Default)
Contact:	Michael Moore	☑PDF	☑Excel	☑Digital	☐Fax	○Priority (2-3 Business Days) - 50% Surcharge
Address:	RR1 HWY 3	Email 1:	michael.moore@teck.com			○Emergency (1 Business Day) - 100% Surcharge
Sparwood, BC, V0B 2G1, Canada		Email 2:	james.boldt@teck.com			○For Emergency < 1 Day, ASAP or Weekend - Contact ALS
Phone:	250-425-8868 Fax:	Email 3:	casandra.knoolhuizen@teck.com			Analysis Request
Invoice To:	Same as Report ? ◉Yes ○No	Email 4:	cait.good@teck.com			Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:	Send all invoices to: dlteckcoalaccountspayable@teck.com	Client / Project Information:				
Contact:	Attn: Accounting	Job #:	SPO Mixture Toxicity Testing			
Address:	Same as above	PO / AFE:	107517			
		Legal Site Description:				
Phone:	Fax:	Quote #:				
Lab Work Order # (lab use only)		Nautilus Contact: Jacklyn Poole		Sampler:		

Sample	Sample Identification	Date (mmm-dd-yy)	Time (hh:mm)	Matrix	TECKCOAL-MONTHLY-VA	Toxicity 7day/72 hr	T-Se (CCMS)	T-Metal(TECKCOAL-MET-T-VA)	D-Metal(TECKCOAL-MET-D-VA)	EPH	TSS	TURBIDITY	PAH - low level detection	True Color	Toxicity- Fathead minnow	BOD	Number of Containers
	EV_ER4_WS_2015-12-07_N	7-Dec-15	9:15	WS											X		5
																	5

Special Instructions / Regulations / Hazardous Details

Toxicity = Fathead Minnow

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)					SHIPMENT VERIFICATION (lab use only)		
Released by:	Date & Time:	Received by:	Date:	Time:		Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF
Madison Wassick	07-Dec-15								

Teck

COC ID:	Dec Monthly East	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			EDD delivery:				
Project Manager	Leigh Stickney			Lab Contact	Krysta Pearcy			Site:	leigh.stickney@teck.com	EQuIS:	GHO	
Email	leigh.stickney@teck.com			Email				Report Format / Distribution				
Address	PO Box 5000			Address	8664 Commence Court				Yes PDF	Yes Excel		
					Imperial Square Lake City			Email 1:	leigh.stickney@teck.com			
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 2:	jim.thorner@teck.com			
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 3:	Zahir.jina@teck.com			
Phone Number	250 865 3274			Phone Number				PO number	359182			

SAMPLE DETAILS

ANALYSIS REQUESTED

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 96 hr Rainbow trout (pass/fail)	48 hr daphnia (pass/fail)	48 hr daphnia @ 10 deg C (pass/fail)	TECK Chronic Toxicity program (Q4)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temp °C
											P	32d RbT EA	28d Hyalella	32d FHM - test conducted in Calgary (Applied Lab)						
GH_ER2_WS_2015_12_07_NP	GH_ER2	WS	N	7-Dec		G	9				X	X	X	X					2.0	9x2
GH_FR1_WS_2015_12_07_NP	GH_FR1	WS	N	7-Dec		G	~~11~~ 12				X	X	X	X					0	12x2
											WO #	15998	15999	16000						

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
= refresh sample =				Nautilus NY - Nan Yamamoto	Dec08/15	11:00

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	
Sampler's Signature		Date/Time	

Teck

COC ID:	Dec Monthly East	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Hydroqual Labs			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Jaquelin Pool			Site: leigh.stickney@teck.com	EQuIS:	GHO	
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	#4 , 6125 - 12th st SE				Yes PDF	Yes Excel	
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 2:	jim.thorner@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2K 2K1	Country	Can	Email 3:	Zahir.jina@teck.com		
Phone Number	250 865 3274			Phone Number				PO number	35918		

SAMPLE DETAILS								ANALYSIS REQUESTED											
								Please indicate below Filtered, Preserved or both (F, P, F/P)											
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	#N/A	#N/A	#N/A	P	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
								ANALYSIS	96 hr Rainbow trout (pass/fail)	48 hr daphnia (pass/fail)	48 hr daphnia @ 10 deg C (pass/fail)	TECK Chronic Toxicity program (48							
15-1641																			
GH_ER2_WS_2015_12_07_NP	GH_ER2	WS	N	7-Dec		G	5				X								
GH_FR1_WS_2015_12_07_NP	GH_FR1	WS	N	7-Dec		G	11				X								
15-1642																			

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted by/Affiliation	Date	Time
2015/12/08 11:10 drop off 15 x 20 L Carboy NO S/C 6°C						

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

COC ID:	20151207-1315	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS							ANALYSIS REQUESTED				
Sample ID	Sa,mple Location	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	28 Day H. azteca	30 Day Rainbow Trout embryo alevin	32d. FHM - Test conducted in Calgary Hydrotech		
FR_UFR1_M_07122015_N	FR_UFR1	WS	2015/12/07	11:44	G	1	X	X	X		

WO # 159998 159998 160080

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
= refresh sample =	Tech PRO Arte Bezzola	Dec 7 2015 13:30	Nautilus NY - Nan Yamamoto Temp - 0°C 9x20L (one carboy leaked but 2/3 full)	Dec 08/15 @ 11:00

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Arte Bezzola	Mobile #	
	Sampler's Signature		Date/Time	Dec 7 2015 13:30

COC ID:	20151207-1318	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Hydroqual			Email Invoice To	
Project Number				Lab Contact	Elisabeth Henson			Invoice Reports	
Department				Email	elisabeth_henson@golder.com			Email Report To	
Address	PO Box 100			Address				Email Reports	
								Shipping Company	
City	Elkford	State	BC	City		State		Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code		Country		Cooler Count	
Phone Number	1-250-865-5289			Phone Number	403-253-7121			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID	Sample Location	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30 Day Fathead Minnow
FR_FRCP1_M_07122015_N	FR_FRCP1	WS	2015/12/07	9:49	G	4	4
FR_UFR1_M_07122015_N	FR_UFR1	WS	2015/12/07	11:44	G	4	4
15-1639							

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
2015/12/08 1140 drop off 18x 20 L Carboys no s/s 62	Teck FRO Arte Bezzola	Dec 7 2015 13:30		

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Arte Bezzola	Mobile #	
	Sampler's Signature	[signature]	Date/Time	Dec 7 2015 13:30

Nautilus Environmental
8664 Commerce Court
Imperial Square Lake City
Burnaby BC, V5A 4N7

COC # 14122015

Page 1 of 1

Report to:		Report Format / Distribution					Service Requested: (rush - subject to availability)
Company:	TECK COAL LTD (ELKVIEW)	☑ Standard	☐ Other				◉ Regular (Default)
Contact:	Michael Moore	☑ PDF	☑ Excel	☑ Digital	☐ Fax		○ Priority (2-3 Business Days) - 50% Surcharge
Address:	RR1 HWY 3	Email 1:	michael.moore@teck.com				○ Emergency (1 Business Day) - 100% Surcharge
Sparwood, BC, V0B 2G1, Canada		Email 2:	james.boldt@teck.com				○ For Emergency < 1 Day, ASAP or Weekend - Contact ALS
Phone:	250-425-8868 Fax:	Email 3:	casandra.knoothuizen@teck.com				**Analysis Request**
Invoice To:	Same as Report ? ◉ Yes ○ No	Email 4:	cait.good@teck.com				Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:	Send all invoices to: dlteckcoalaccountspayable@teck.com	**Client / Project Information:**					
Contact:	Attn: Accounting	Job #:	SPO Mixture Toxicity Sampling				
Address:	Same as above	PO / AFE:	107517				
		Legal Site Description:					
Phone:	Fax:	Quote #:					
Lab Work Order # (lab use only)		**Nautilus Contact:** Krysta Pearcy		**Sampler:**	MW/SB		

Sample	Sample Identification	Date (mmm-dd-yy)	Time (hh:mm)	Matrix	TECKCOAL-MONTHLY-VA	Toxicity 7day/72 hr	T-Se (CCMS)	T-Metal(TECKCOAL-MET-T-VA)	D-Metal(TECKCOAL-MET-D-VA)	EPH	TSS	TURBIDITY	PAH - low level detection	True Color	Toxicity- SPO Mixture Testing	BOD	Number of Containers
	EV_ER4_WS_2015-12-14_N	14-Dec-15	11:15	WS											X		10
																	10

Special Instructions / Regulations / Hazardous Details

Toxicity = SPO Mixture Testing WO# 15998 - 30d RBT EA Test
15999 - 28d Hyalella
16000 - 32d FHM - test conducted in Calgary - HydroQual

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)					SHIPMENT VERIFICATION (lab use only)		
Released by:	Date & Time:	Received by:	Date:	Time:		Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF
Madison Wassick	14-Dec-15 14:00	Nautilus NY - Nari Yamamoto	Dec 15/15	09:50		0.0 °C			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION — WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY — GENF 18.00 Front

10 x 20L
1 carboy leaked but still ½ full

Hydroqual Calgary
6125 12 St SE
Calgary Alberta, T2H 2K1

COC # 14122015

Page 1 of 1

Report to:		Report Format / Distribution				Service Requested: (rush - subject to availability)
Company:	TECK COAL LTD (ELKVIEW)	☑ Standard	☐ Other			◉ Regular (Default)
Contact:	Michael Moore	☑ PDF	☑ Excel	☑ Digital	☐ Fax	○ Priority (2-3 Business Days) - 50% Surcharge
Address:	RR1 HWY 3	Email 1:	michael.moore@teck.com			○ Emergency (1 Business Day) - 100% Surcharge
	Sparwood, BC, V0B 2G1, Canada	Email 2:	james.boldt@teck.com			○ For Emergency < 1 Day, ASAP or Weekend - Contact ALS
Phone:	250-425-8868 Fax:	Email 3:	casandra.knoolhuizen@teck.com			Analysis Request
Invoice To:	Same as Report ? ◉ Yes ○ No	Email 4:	cait.good@teck.com			Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:	Send all invoices to: dlteckcoalaccountspayable@teck.com	Client / Project Information:				
Contact:	Attn: Accounting	Job #:	SPO Mixture Toxicity Testing			
Address:	Same as above	PO / AFE:	107517			
		Legal Site Description:				
Phone:	Fax:	Quote #:				
Lab Work Order # (lab use only)		Nautilus Contact: Jacklyn Poole	Sampler: MW/SB			

Sample	Sample Identification	Date (mmm-dd-yy)	Time (hh:mm)	Matrix	TECKCOAL-MONTHLY-VA	Toxicity 7day/72 hr	T-Se (CCMS)	T-Metal(TECKCOAL-MET-T-VA)	D-Metal(TECKCOAL-MET-D-VA)	EPH	TSS	TURBIDITY	PAH - low level detection	True Color	Toxicity - Fathead minnow	BOD	Number of Containers
	EV_ER4_WS_2015-12-14_N	14-Dec-15	11:15	WS											X		5
																	5

Special Instructions / Regulations / Hazardous Details

Toxicity = Fathead Minnow

2015/12/15 1130 5x20L Calgary
Dkg off 6°C Good Condition

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. No S/I MC
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)					SHIPMENT VERIFICATION (lab use only)		
Released by:	Date & Time:	Received by:	Date:	Time:		Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF
Madison Wassick	14-Dec-15 19:00								

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY

GENF 18.00 Front

Teck

COC ID:	Dec Monthly East	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			EDD delivery:				
Project Manager	Leigh Stickney			Lab Contact	Krysta Pearcy			Site:	leigh.stickney@teck.com	EQuIS:	GHO	
Email	leigh.stickney@teck.com			Email				Report Format / Distribution				
Address	PO Box 5000			Address	8664 Commence Court				Yes PDF	Yes	Excel	
					Imperial Square Lake City			Email 1:	leigh.stickney@teck.com			
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 2:	jim.thorner@teck.com			
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 3:	Zahir.jina@teck.com			
Phone Number	250 865 3274			Phone Number				PO number	359182			

SAMPLE DETAILS

ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	#N/A 96 hr Rainbow trout (pass/fail)	#N/A 48 hr daphnia (pass/fial)	#N/A 48 hr daphnia @ 10 deg C (pass/fial)	#N/A P TECK Chronic Toxicity program (Q4)	#N/A 30d Rbt EA Test	#N/A 28d Hyalella	#N/A 32d FHM - test conducted in Calgary Hydrology	#N/A	#N/A	#N/A	#N/A	#N/A Temp °C
GH_ER2_WS_2015_12_14_NP	GH_ER2	WS	N	14-Dec		G	8 + NP					X	x	x	x					-0.3
												WO #	15998	15999	16000					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
arrived slightly frozen - NY				Nautilus NY - Nan Yamamoto	Dec 15/15	09:50
				7 x 20L		

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	Dec Monthly East	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Hydroqual Labs			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Jaquelin Pool			Site:	leigh.stickney@teck.com	BQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	#1 , 6125 - 12th st SE				*Yes* PDF	*Yes* Excel	
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 2:	jim.thurner@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2K 2K1	Country	Can	Email 3:	zahra.jina@teck.com		
Phone Number	250 865 3274			Phone Number				PO number	359182		

SAMPLE DETAILS

ANALYSIS REQUESTED

Please indicate below Filtered, Preserved or both (F, P, FP)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 96 hr Rainbow trout (pass/fail)	48 hr daphnia (pass/fail)	48 hr daphnia @ 10 deg C (pass/fial)	TECK Chronic Toxicity program (Q4)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
											P								
GH_ER2_WS_2015_12_14_NP	GH_ER2	WS	N	14-Dec		G	5				X								
15-1641																			

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
2015/12/15 1130 drop off Good Condition no S/E 6°C 5 x 20 L Cubays						

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	Dec Monthly East	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Krysta Pearcy			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	8664 Commence Court				Yes PDF	Yes Excel	
					Imperial Square Lake City			Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 2:	jim.thorner@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 3:	Zahir.Jina@teck.com		
Phone Number	250 865 3274			Phone Number				PO number	359182		

SAMPLE DETAILS								ANALYSIS REQUESTED											
								Please indicate below Filtered, Perserved or both (F, P, F/P)											
								#N/A	#N/A	#N/A	P	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	96 hr Rainbow trout (pass/fail)	48 hr daphnia (pass/fail)	48 hr daphnia @ 10 deg C (pass/fial)	TECK Chronic Toxicity program (Q4)	30d RBT EA Test	28d Hyallela	32d FHM - test conducted in Calgary Nautilus					Temp °C
GH_FR1_WS_2015_12_14_NP	GH_FR1	WS	N	14-Dec	1057	G	10				X	X	X	X					0.2
											WO#	15998	15999	16000					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
arrived slightly frozen - NY				Nautilus NY - Nan Yamamoto	Dec 15/15	09:50
				10x 20L		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	Dec Monthly East	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO					
Facility Name	Greenhills Operations			Lab Name	Hydroqual Labs			EDD delivery:					
Project Manager	Leigh Stickney			Lab Contact	Jaquelin Pool			Site:	leigh.stickney@teck.com	EQuIS:	GHO		
Email	leigh.stickney@teck.com			Email				Report Format / Distribution					
Address	PO Box 5000			Address	#4 , 6125 - 12th st SE					*Yes*	PDF	*Yes*	Excel
								Email 1:	leigh.stickney@teck.com				
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 2:	jim.thorner@teck.com				
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2K 2K1	Country	Can	Email 3:	Zahurjina@teck.com				
Phone Number	250 865 3274			Phone Number				PO number	359182				

SAMPLE DETAILS								ANALYSIS REQUESTED											
								Please indicate below Filtered, Perserved or both (F, P, F/P)											
								#N/A	#N/A	#N/A	P	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	96 hr Rainbow trout (pass/fail)	48 hr daphnia (pass/fail)	48 hr daphnia @ 10 deg C (pass/fial)	TECK Chronic Toxicity program (Q4)							
GH_FR1_WS_2015_12_14_NP	GH_FR1	WS	N	14-Dec	1057	G	5					X							

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
2015/12/15 1130 drop off 7C Good Condition, no S/I 5 x 20 L Carboys						

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

COC ID:	20151214-1328	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID	Sa,mple Location	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	28 Day H. azteca	30 Day Rainbow Trout embryo alevin	32d FHM - Test conducted in Calgary - Hydrolab									Temp °C
FR_UFR1-WS-201512141046	FR_UFR1	WS	2015/12/14	10:46	G		WO #	x	x	X									1.5
								15999	15998	16000									

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
arrived slightly frozen - NY	Tek FRC Ate Bezzola	Dec 14 2015 13:30	Nautilus	Dec 15/15 @ 09:50
			NY - Nair Yamamoto	
			8x20L	

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Ate Bezzola	Mobile #	
	Sampler's Signature	[signature]	Date/Time	Dec 14 2015 13:30

COC ID:	20151214-1332	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Hydroqual			Email Invoice To	
Project Number				Lab Contact	Elisabeth Henson			Invoice Reports	
Department				Email	elisabeth_henson@golder.com			Email Report To	
Address	PO Box 100			Address				Email Reports	
								Shipping Company	
City	Elkford	State	BC	City		State		Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code		Country		Cooler Count	
Phone Number	1-250-865-5289			Phone Number	403-253-7121			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS							ANALYSIS REQUESTED											
Sample ID	Sample Location	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 Day Fathead Minnow										
FR_UFR1-WS-201512141046	FR_UFR1	WS	2015/12/14	10:46	G			x										

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
2015/12/15 1130 drop off Good Condition. 10S/I 6°C 6 x 20 L Carboys	Ash FRO Ash Bezzds	Dec 14 2015 13:30		

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Ash Bezzds	Mobile #	
	Sampler's Signature		Date/Time	Dec 14 2015 13:30

Teck

COC ID:	Dec Monthly East	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Krysta Pearcy			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	8664 Commence Court				Yes PDF	Yes Excel	
					Imperial Square Lake City			Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 2:	jim.thorner@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 3:	2ahlr.jina@teck.com		
Phone Number	250 865 3274			Phone Number				PO number	359182		

SAMPLE DETAILS								ANALYSIS REQUESTED											
								Please indicate below Filtered, Perserved or both (F, P, F/P)											
								#N/A	#N/A	#N/A	P	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	96 hr Rainbow trout (pass/fail)	48 hr daphnia (pass/fial)	48 hr daphnia @ 10 deg C (pass/fial)	TECK Chronic Toxicity program (Q4)	33 @ Temp	30d RBT Ex Test	28d Hyalella	32d FHM- test conducted in Calgary HydroQual				Temp °C
																			7.9
GH_ER2_WS_2015_12_17_NP	GH_ER2	WS	N	17-Dec		G	2				X	7.9	X	X	X				
												WO #	16998	16999	16000				

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
				JS Jill Senes	Dec 21/15	@ 0845
				Received 2x 20L		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Nautilus Environmental
8664 Commerce Court
Imperial Square Lake City
Burnaby BC, V5A 4N7

COC # 21122015

Page 1 of 1

Report to:		**Report Format / Distribution**					**Service Requested:** (rush - subject to availability)
Company:	TECK COAL LTD (ELKVIEW)	☑Standard	☐Other				◉Regular (Default)
Contact:	Michael Moore	☑PDF	☑Excel	☑Digital	☐Fax		○Priority (2-3 Business Days) - 50% Surcharge
Address:	RR1 HWY 3	Email 1:	michael.moore@teck.com				○Emergency (1 Business Day) - 100% Surcharge
Sparwood, BC, V0B 2G1, Canada		Email 2:	james.boldt@teck.com				○For Emergency < 1 Day, ASAP or Weekend - Contact ALS
Phone:	250-425-8868 Fax:	Email 3:	casandra.knooihuizen@teck.com				**Analysis Request**
Invoice To:	Same as Report ? ◉Yes ○No	Email 4:	cait.good@teck.com				Please indicate below Filtered, Preserved or both (F, P, F/P)
Company:	Send all invoices to: dlteckcoalaccountspayable@teck.com	**Client / Project Information:**					
Contact:	Attn: Accounting	Job #:	SPO Mixture Toxicity Sampling				
Address:	Same as above	PO / AFE:	107517				
		Legal Site Description:					
Phone:	Fax:	Quote #:					
Lab Work Order # (lab use only)		**Nautilus Contact:** Krysta Pearcy		**Sampler:**			

Sample	Sample Identification	Date (mmm-dd-yy)	Time (hh:mm)	Matrix	TECKCOAL-MONTHLY-VA	Toxicity 7day/72 hr	T-Se (CCMS)	T-Metal(TECKCOAL-MET-T-VA)	D-Metal(TECKCOAL-MET-D-VA)	EPH	TSS	TURBIDITY	PAH - low level detection	True Color	Toxicity- SPO Mixture Testing	BOD	Number of Containers
	EV_ER4_WS_2015-12-21_N	21-Dec-15	930	WS											X		15
																	15

Special Instructions / Regulations / Hazardous Details

Toxicity = SPO Mixture Testing

Rec'd 15 x 2L (Refresh) WO# 15998 RBT EA
15999 28-d Hyal
15000 32-d FHM (Culsom)

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)					SHIPMENT VERIFICATION (lab use only)		
Released by:	Date & Time:	Received by:	Date:	Time:		Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF
James Boldt	21-Dec-15	Krysta Pearcy	Dec 22 15	1100h		0.5°C			

Hydroqual Calgary
6125 12 St SE
Calgary Alberta, T2H 2K1

COC # 21/12/2015

Page 1 of 1

Report to:		Report Format / Distribution				Service Requested: (rush - subject to availability)
Company:	TECK COAL LTD (ELKVIEW)	☑ Standard	☐ Other			◉ Regular (Default)
Contact:	Michael Moore	☑ PDF	☑ Excel	☑ Digital	☐ Fax	○ Priority (2-3 Business Days) - 50% Surcharge
Address:	RR1 HWY 3	Email 1:	michael.moore@teck.com			○ Emergency (1 Business Day) - 100% Surcharge
	Sparwood, BC, V0B 2G1, Canada	Email 2:	james.boldt@teck.com			○ For Emergency < 1 Day, ASAP or Weekend - Contact ALS
Phone:	250-425-8868 Fax:	Email 3:	cassandra.knoolhuizen@teck.com			**Analysis Request**
Invoice To:	Same as Report? ◉ Yes ○ No	Email 4:	carl.noack@teck.com			Please Indicate below Filtered, Preserved or both (F, P, F/P)
Company:	Send all invoices to: dlteckcoalaccountspayable@teck.com	**Client / Project Information:**				
Contact:	Attn: Accounting	Job #:	SPO Mixture Toxicity Testing			
Address:	Same as above	PO / AFE:	107517			
		Legal Site Description:				
Phone:	Fax:	Quote #:				
	Lab Work Order # (lab use only)	**Nautilus Contact:** Jacklyn Poole		Sampler:		

Sample	Sample Identification	Date (dd-mmm-yy)	Time (hh:mm)	Matrix	TECKCOAL-MONTHLY-VA	Toxicity 7day/72 hr	T-Se (CCMS)	T-Metal(TECKCOAL-MET-T-VA)	D-Metal(TECKCOAL-MET-D-VA)	EPH	TSS	TURBIDITY	PAH - low level detection	True Color	Toxicity- Fathead minnow	BOD	Number of Containers
	EV_ER4-WS_2015-12-21_N	21-Dec-15	13:0	WS											X		8
	15-1640.																
																	8

Special Instructions / Regulations / Hazardous Details

2015/12/22 1000 9°C
no s/I 8x 20L Cubey drop off ... Good condition

Toxicity = Fathead Minnow

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY.
By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

SHIPMENT RELEASE (client use)		SHIPMENT RECEPTION (lab use only)				SHIPMENT VERIFICATION (lab use only)		
Released by:	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:	Observations: Yes / No ? If Yes attach SIF
James Boldt	21-Dec-15							

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION — WHITE - REPORT COPY, PINK - FILE COPY, YELLOW - CLIENT COPY — GENF 18.00 Front

Teck

COC ID:	Dec Monthly East	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Krysta Pearcy			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	8664 Commence Court				*Yes* PDF	*Yes* Excel	
					Imperial Square Lake City			Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 2:	jim.thorner@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 3:	Zahir.jina@teck.com		
Phone Number	250 865 3274			Phone Number				PO number	359182		

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	#N/A 96 hr Rainbow trout (pass/fail)	#N/A 48 hr daphnia (pass/fial)	#N/A 48 hr daphnia @ 10 deg C (pass/fial)	P TECK Chronic Toxicity program (Q4)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
GH_ER2_WS_2015_12_21_NP	GH_ER2	WS	N	21-Dec		G	15					X								

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

WO#15998 RBT EA
15999 28-d Hyal
16000 32-d FHM (Calgary)
[illegible]

Rec'd 18 X 20L 1.3C
Krysta Pearcy Dec22/15 @1100h

Teck

COC ID:	Dec Monthly East	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Hydroqual Labs			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Jaquelin Pool			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	#4 , 6125 - 12th st SE				Yes	PDF	Yes Excel
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 2:	jim.thorner@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2K 2K1	Country	Can	Email 3:	zahir.jina@teck.com		
Phone Number	250 865 3274			Phone Number				PO number	359182		

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 96 hr Rainbow trout (pass/fail)	48 hr daphnia (pass/fial)	48 hr daphnia @ 10 deg C (pass/fial)	TECK Chronic Toxicity program (Q4)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
GH_ER2_WS_2015_12_21_NP	GH_ER2	WS	N	21-Dec		G	8				X								

15-1641
8x 20 L Cabbags
2015/12/22
1000
no S/I 11°C
drop off Good Condition
MC

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:		TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO					
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			EDD delivery:					
Project Manager	Leigh Stickney			Lab Contact	Krysta Pearcy			Site:	leigh.stickney@teck.com	EQuIS:	GHO		
Email	leigh.stickney@teck.com			Email				Report Format / Distribution					
Address	PO Box 5000			Address	8664 Commence Court					Yes	PDF	Yes	Excel
					Imperial Square Lake City			Email 1:	leigh.stickney@teck.com				
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 2:	jim.thorner@teck.com				
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 3:	Zahir.jina@teck.com				
Phone Number	250 865 3274			Phone Number				PO number	359182				

SAMPLE DETAILS								ANALYSIS REQUESTED									
								Please indicate below Filtered, Perserved or both (F, P, F/P)									
								#N/A	#N/A	#N/A	P	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	96 hr Rainbow trout (pass/fail)	48 hr daphnia (pass/fail)	48 hr daphnia @ 10 deg C (pass/fail)	TECK Chronic Toxicity program (Q4)						
GH_FR1_WS_2015_12_21_NP	GH_FR1	WS	N	21-Dec	934	G	15				X						

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Rec'd 15 x 20L 1.0°C WO# 15998 LBTEA
Krysta Pearcy Dec 22/15 @ 1100h 15999 28-d Hyal
Refresh 16000 32-d FHM (Calgary)

Teck

COC ID:	Dec Monthly East	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Hydroqual Labs			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Jaquelin Pool			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	#4 , 6125 - 12th st SE				Yes PDF	Yes Excel	
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 2:	jim.thorner@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2K 2K1	Country	Can	Email 3:	Zahir.jina@teck.com		
Phone Number	250 865 3274			Phone Number				PO number	359182		

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 96 hr Rainbow trout (pass/fail) #N/A	48 hr daphnia (pass/fial) #N/A	48 hr daphnia @ 10 deg C (pass/fial) #N/A	TECK Chronic Toxicity program (Q4) P	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
GH_FR1_WS_2015_12_21_NP	GH_FR1	WS	N	21-Dec	9:34	G	8				X								
15-1639																			

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
2015/12/22 1000 8.3°C 8 x 20 L Cubay Good Condition drop off no S/I MC						

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

COC ID:	20151221-1304	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS							ANALYSIS REQUESTED											
Sample ID	Sa,mple Location	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.		28 Day H. azteca	30 Day Rainbow Trout embryo alevin									
FR_UFR1-WS-201512211151	FR_UFR1	WS	2015/12/21	11:51	G			X	X									

WO# 15998 RBT EA
15999 28-d Hyal
16000 32-d FHM (Labsey)
Refresh

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	A.h Bezzola Tetra Tech FRB	Dec 21 2015 13:00	Krysta Pearcy / Nautilus Recd 12 X 20Z 1.1°C	Dec 22/15 @ 1100h

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	A.h Bezzola	Mobile #	
	Sampler's Signature		Date/Time	Dec 21 2015 13:00

COC ID:	20151221-1305	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Hydroqual			Email Invoice To	
Project Number				Lab Contact	Elisabeth Henson			Invoice Reports	
Department				Email	elisabeth_henson@golder.com			Email Report To	
Address	PO Box 100			Address				Email Reports	
								Shipping Company	
City	Elkford	State	BC	City		State		Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code		Country		Cooler Count	
Phone Number	1-250-865-5289			Phone Number	403-253-7121			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS							ANALYSIS REQUESTED											
Sample ID	Sample Location	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30 Day Fathead Minnow											
FR_UFR1-WS-201512211151	FR_UFR1	WS	2015/12/21	11:51	G		x											
15-1634																		

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
2015/12/22 1000 Good Condition Drop off 9.2°C No's E to Jo L Cooley MC				

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name		Mobile #	
	Sampler's Signature		Date/Time	

APPENDIX F

Fording River Westslope Cutthroat Trout Gamete Study

Nautilus Environmental

Fording River Westslope Cutthroat Trout Gamete Study

Final Report

Report date:
March 31, 2015

Submitted to:

Teck Coal Ltd.
Sparwood, BC

8664 Commerce Court
Burnaby, BC
V5A 4N7

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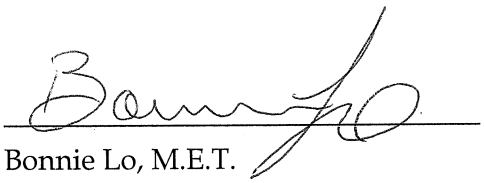
SIGNATURE PAGE



Bonnie Lo, M.E.T.
Project Manager

James Elphick, R.P.Bio.
Senior Reviewer

This report has been prepared based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

1.0 INTRODUCTION

The BC Ministry of Environment (BCMoE) issued Permit 107517 to Teck Coal Ltd. in November 2014, under the provisions of the Environmental Management Act. The permit includes requirements for chronic toxicity testing for receiving environments throughout the Elk Valley.

Section 9.8, (i) of Permit 107517 requires the following: "Once every three years beginning in 2015, bioassays to evaluate the survival and development (incidence of deformities) of westslope cutthroat trout using gametes obtained from fish utilizing habitats in the Fording River, tributaries, and associated lentic habitats (e.g., Fording River oxbow). The concentrations of Se in the eggs of each female spawned must be measured". This report describes the results of a westslope cutthroat trout gamete program that was implemented in 2015 to meet this requirement.

In addition, Section 9.8.2 of Permit 107517 requires that "The Permittee must develop with input from the EMC, and implement a sublethal toxicity study to confirm that surface waters meeting the Site Performance Objectives for the order stations are not toxic to sensitive aquatic receptors". In support of this requirement, the results described in this report include data for westslope cutthroat trout that were reared in water collected from the Fording River that was supplemented with sulphate, nitrate, cadmium and selenium to produce water concentrations approximately equal to the long term Site Performance Objectives (SPO) for Order Station FR4 (EMS 200378) in the upper Fording River (Section 3.1 of Permit 107517) (Golder 2015).

In the study reported here, eggs and milt from ripe adult westslope cutthroat trout were collected from various sites in the Fording River, and eggs were fertilized and reared to the swim-up fry stage at the Nautilus Environmental laboratory (Burnaby, BC). Fertilized eggs were reared in dechlorinated municipal tap water (i.e., laboratory control water), as well as in water collected from the Fording River and amended with nitrate, sulphate, cadmium and selenium at concentrations corresponding to the SPOs for Order Station FR4 (EMS 200378).

2.0 METHODS

2.1 Site Water Collection and Preparation

Water was collected from the Upper Fording River (approximately 3.4km upstream of Order Station FR4 – EMS 200378 near the highway bridge) by Teck Coal Ltd. on eight occasions at approximately weekly intervals during the study (late-spring / early-summer) and used for the site water exposures. The water was collected in 200-L plastic drums, and delivered to the laboratory by courier. Upon receipt, a subsample was collected and analyzed by ALS Environmental (Burnaby, BC) for concentrations of calcium, magnesium, nitrate, sulphate, selenium and cadmium. The water was then amended using $NaNO_3$, $CaSO_4.2H_2O$, $MgSO_4.7H_2O$, Na_2SeO_4 and $CdCl_2$ in order to increase the concentrations to the long-term FR4 SPO levels of 20 mg/L NO_3-N, 429 mg/L SO_4, 57 µg/L Se, and 0.64 µg/L Cd. The two sulphate salts were added in manner that maintained a Ca:Mg ratio (on a mass basis) of 2.6:1, which is the approximate ratio of these cations in the Elk Valley. In the case of NO_3-N and Cd, the target concentrations were calculated using the hardness-based equations provided in Permit 107517, after taking into account the hardness of the mixture following addition of calcium and magnesium sulphate salts (approximately 650 mg/L as $CaCO_3$). The amended waters were measured for the same analytes after addition of these constituents to confirm that the target concentrations were achieved.

2.2 Fish Capture and Gamete Collection

Fish capture was performed by Lotic Environmental and took place from May 25 to June 29, 2015, during the time in which fish were actively migrating to spawn. Capture locations included U/S Concrete Arch (Fording River), Greenhills Creek (near confluence with Fording River), Multiplate (Fording River) and Fish Pond Creek (near confluence with Fording River). These locations were selected on the basis of being representative of fish from the Fording River, since the fish were undergoing active migration to spawning habitat, and was based on previous experience of Lotic Environmental in successfully capturing ripe fish. It was not possible to collect fish in lentic locations because fish would have already migrated into lotic habitats to spawn. The fish that were collected would be expected to reflect fish that use habitats in the Upper Fording River as a whole.

Box traps, electrofishing and angling were used to capture adult westslope cutthroat trout. Fish were either spawned the same day as capture, or were held in a containment area built into Fish

Pond Creek and checked periodically until they were ready to spawn. Spawning condition was determined by the ease of expression of gametes following gentle pressure to the abdomen or based on morphological characteristics (i.e., swelling of the abdomen indicative of the presence of developed eggs). The maximum number of days fish were held was 32, however the mean (± standard deviation) holding time was 5.3 ± 8.9 days. During collection of gametes, captured adult fish were also measured for length (mm). Adult female collection data is provided in Appendix A.

Methods for spawning and transporting gametes followed procedures summarized in Environment Canada (1998). Fish were live-spawned in a shaded area where eggs and milt were collected into small plastic containers and individual Whirl-Pak bags, respectively. Care was taken to exclude water. Oxygen was added to the milt samples using a compressed oxygen tank, and the bags were sealed. The sample containers were placed in a cooler containing ice-packs and bubble wrap to prevent direct contact of the eggs and milt with the ice-packs. For each spawning event, the cooler containing the samples was driven to Cranbrook and transported to Vancouver by Pacific Coastal Airlines. The cooler was received at the airport by Nautilus Environmental staff and driven to the laboratory in Burnaby, BC, and the exposures were initiated that evening (i.e., the same day as collection of the gametes). Successful spawning events occurred on June 1, 3, 5, 11, 18 and 29, and eggs from 33 females were delivered to the laboratory.

Upon arrival at the laboratory, eggs and milt were transferred to an environment chamber at 12°C. The egg samples were subsampled for measurements of Se and percent moisture, and the remainder were fertilized as described in Section 2.3. Subsamples of eggs from all 33 fish, plus three duplicates for a total of 36 samples, were frozen and subsequently shipped by courier to Brooks Applied Labs (Bothell, WA, USA), which was formerly called Applied Speciation. Two of the samples were too small to be used for the rearing study (F7 and F11), and were only measured for selenium concentration, and one of the samples was terminated shortly after test initiation since the eggs were not viable (F10).

2.3 Laboratory Fertilization and Culture of Developing Fish

Milt was assessed for sperm motility under a microscope through addition of a drop of water to milt on a slide. Milt from males with good motility, exhibiting vigorous activity of sperm cells after mixing with water (Environment Canada, 1998), was pooled. Where possible, milt was pooled from a minimum of three males; however, milt from fewer males was used in some

cases due to poor sperm motility in some samples. Of the seven fertilization events, two were conducted with milt from one male, two with milt from two males and the other three fertilization events used milt pooled from three or four males. Egg quality was inspected under a dissecting scope for presence of blood and indicators of ripeness, such as the distribution of lipid droplets, which has been shown to be indicative of egg ripeness in salmonids (Mansour et al. 2007).

Egg batches were fertilized separately by addition of sperm to the eggs, and the eggs and sperm were gently mixed using a glass rod to ensure contact. After 20 minutes, eggs were gently divided into replicate pre-labeled weigh boats containing either laboratory water or amended site water. Four replicates were tested for each adult female, each consisting of 30 eggs. Two females did not produce a sufficient number of eggs, requiring a reduction in replication. For one female (F14), this resulted in three replicates for laboratory water and none for amended site water, and for a second female (F16), three replicates were used for laboratory water and two for amended site water. Fertilized eggs were transferred to rearing containers (labeled with the identity of the female fish, replicate and water type) where they were left to develop.

Culturing methods for westslope cutthroat trout were adapted from methodology described by Environment Canada (1998) for conducting early life-stage tests with salmonids. Rearing was conducted in the dark (with low-light during solution renewals) at 12±1°C under static renewal conditions, with 80% renewal of culture water three times per week. The development chambers were 4-L plastic containers with approximately 3 L of water, which was gently aerated throughout exposure. Water in the development chambers was monitored daily for temperature, dissolved oxygen, conductivity and pH. Containers were randomly distributed within the environmental chamber.

Two water types were used for rearing. The first was laboratory control water, consisting of municipal drinking water treated with activated carbon and filtration to remove chlorine and residual contaminants. The second type of water consisted of site water collected from the Upper Fording River (approximately 3.4km upstream of Order Station FR4 – EMS 200378 near the highway bridge) amended with nitrate, sulphate, cadmium and selenium at concentrations corresponding to SPOs, as described in Section 2.1. Developing larvae were inspected daily and mortalities removed and recorded. Once the fish reached swim-up (i.e., the point at which they had completely absorbed the yolk sac), lengths and wet weights were recorded and fish were evaluated for deformities.

2.4 Deformity Assessment

Fry were sacrificed at the swim-up stage for deformity assessment. Fish were considered to have reached swim-up when no yolk-sac bulge was evident when viewed from above. Clove oil was used to euthanize fry and, following cessation of breathing, total lengths were measured to the nearest 0.5 mm, deformities were assessed using a Graduated Severity Index (GSI), as described and used by Holm et al. (2003) and Rudolph et al. (2006, 2008) and replicate (pooled) wet weight was measured. Deformity assessment involved assigning a score to deformities of 0, 1, 2 or 3 based on the severity of deformity in each of four categories: skeletal, craniofacial, finfold and edema. Scoring criteria are described in Table 1.

Table 1. Deformity index from Rudolph et al. (2006; 2008).

Score	Skeletal	Craniofacial	Finfold	Edema
0	Normal backbone	Normal eyes, jaw and head	All fins present, normal size and shape	No fluid accumulation in head or pericardial cavity.
1	Slight scoliosis, lordosis or kyphosis. Unlikely to significantly impair fish movement.	Slightly reduced or malformed eye or jaw. Unlikely to significantly reduce feeding ability or sight.	One or two fins slightly reduced in size or slightly malformed. Unlikely to significantly impair fish movement.	Slight fluid accumulation in eyes or pericardial cavity. Unlikely to significantly impair fish sight, movement or feeding.
2	Moderate scoliosis, lordosis or kyphosis. Likely to impair fish movement.	Moderately reduced or malformed jaw or eyes. Likely to reduce feeding ability and sight.	More than 2 fins slightly reduced or malformed, or 1 or 2 moderately deformed fins. Likely to impair fish movement.	Moderate fluid accumulation in eyes or pericardial cavity. Likely to impair fish sight, movement or feeding.
3	Severe scoliosis, lordosis or kyphosis. Fish movement likely to cease or be greatly impaired.	Missing or severely malformed eyes or jaws. Sight and feeding severely impaired.	One or more missing fins or more than 2 deformed fins. Severely reduced swimming capacity.	Severe fluid accumulation in eyes or pericardial cavity. Greatly reduced fish sight, movement or feeding.

2.5 Statistical Analyses

Linear regression was used to evaluate the relationship between egg selenium concentration and toxicological endpoints (i.e., survival, length, weight and deformities). For deformities, the data were analyzed on the basis of the proportion of fish in each replicate that exhibited deformities (i.e., fish that were scored a 1 or higher for any of the four categories, resulting in a GSI score of ≥ 1). Linear regression was also used to assess whether fry length was correlated to adult female fish length. Statistical analyses were conducted using the statistical program JMP 12 (SAS Institute, 2015).

2.6 QA/QC

Quality Assurance and Quality Control (QA/QC) measures were implemented throughout the study in order to provide a sufficient degree of rigour and with appropriate documentation of performance measures to ensure that the data were scientifically defensible. These measures included ensuring that personnel involved in the project were qualified to conduct the tasks to which they were assigned and that appropriate procedures were used. The laboratory technicians were not aware of the location of capture of the fish while conducting rearing and deformity analyses on the fish.

QA/QC associated with the rearing of fish included: following standardized procedures; incorporating the use of sufficient replication and numbers of organisms per replicate in order to meet the study objectives; detailed documentation of rearing conditions and fish performance; and recording of measurements of water quality conditions such as dissolved oxygen, pH, temperature, and metals and metalloids at specified intervals throughout the rearing period. Water quality measurements were conducted using instruments which had been appropriately maintained and calibrated. The temperature range in the constant environment room was monitored continuously and recorded daily using a maximum/minimum thermometer in order to provide a measure of the temperature range throughout the rearing period. Deformity analyses were conducted on all fish by a single individual who was blind to the identity of the fish with respect to capture location. In addition, a second observer also conducted deformity analyses on a subset of fish (15%), and the results from the paired assessments were compared to confirm that the two observers provided similar scores to the fish. QA/QC measures associated with data analysis included validation of entries into spreadsheets and tables, and review of statistical printouts to ensure that methods have been applied appropriately.

QA/QC associated with analytical chemistry included evaluation of duplicate samples for approximately 10% of the samples and evaluation of a certified reference material.

3.0 RESULTS

Length of field-captured adult females ranged from 240 to 402 mm with a mean (± standard deviation) of 308 ± 41 mm. The eggs appeared normal with even distribution of oil droplets throughout the surface of the eggs.

Measured egg Se concentrations in the thirty batches of eggs that were reared ranged from 7.1 to 17.4 µg/g dry weight (dw). Eggs from one additional female (F10) were non-viable following addition to water, since the majority of the eggs ruptured immediately following exposure to water, and the exposures using these eggs were terminated. This female was not used further and eggs from an additional female were collected for the study. The results for this fish are not presented in the data summary below; however, the eggs from this female contained the highest selenium concentration (38.2 µg/g dw), and the failure of these eggs to develop is consistent with the findings from Nautilus Environmental (2011), in which the vast majority of eggs did not survive at egg selenium concentrations exceeding 30 µg/g dw. Exposures were not initiated using eggs from two females (F7 and F11), since an insufficient number of eggs were provided. The selenium concentration in eggs from these fish was 8.8 and 9.3 µg/g dw, respectively.

Mean (± standard deviation) concentrations of NO_3-N, SO_4 Se, and Cd in the SPO amended site water were 21.0 ± 1.3 mg/L, 433 ± 33 mg/L, 65 ± 16.6 µg/L, and 0.77 ± 0.45 µg/L, respectively. These values were in good agreement with the target SPO values.

3.1 Survival

To determine whether milt quality and fertilization rate varied between spawning events, survival of fry reared in laboratory water was plotted against egg Se concentration and presented by spawning date (Figure 1). There was no obvious pattern between survival and spawning date, with the exception that the three females that produced the lowest rate of survival were all fertilized on the same date (June 11, 2015). Eggs from each of the fertilization dates produced >70% surviving fry from eggs from at least some of the adults that were fertilized on that date, indicating that the milt used to fertilize the eggs was viable on all seven dates.

Survival of the eggs through to hatch, and through to the swim-up fry stage are shown in Table 2. Of the 30 batches of eggs that were reared in the laboratory control water, 21 of them

produced survival to the swim-up fry stage of ≥ 70%, which is the acceptance criterion for control performance in the salmonid early life-stage test (Environment Canada, 1998), indicating acceptable performance. The selenium concentrations in the nine batches of eggs that did not meet the control performance criterion contained an average (and SD) of 9.9 ± 1.9 µg Se/g dw, which is lower than that for the fish that did meet the performance criterion, which contained 11.4 ± 2.6 µg Se/g dw. Thus, it does not appear that selenium was responsible for the lower survival rate of eggs from these nine fish. The two batches of eggs that were too small to initiate a full number of replicates (i.e., F14 and F16), produced the lowest rates of survival in laboratory control water (0 and 22%, respectively); it is possible that these eggs were residual eggs from fish that had already spawned, and this might explain their low rate of development, since the eggs may have been undergoing re-sorption. Surviving eggs from F16 exhibited a high frequency of deformities.

There was no relationship between survival and selenium concentration in the eggs reared in lab water or amended site water (Figure 2), since the slope of the relationship between selenium concentration and survival was positive (i.e., there was no evidence of increasing mortality with increasing selenium concentration). This finding is consistent with the results from Nautilus Environmental (2011), since all of the eggs that were reared contained less selenium than the EC10 of 24.8 µg Se/g dw.

Of the 29 batches of eggs that were reared in site water adjusted to the SPOs, 17 produced survival to the swim-up fry stage of ≥ 70%. The selenium concentrations in the twelve batches of eggs that did not meet the control performance criterion contained an average (and SD) of 10.6 ± 2.7 µg Se/g dw, which is lower than that for the fish that did meet the performance criterion, which contained 11.3 ± 2.3 µg Se/g dw. Thus, it does not appear that selenium was responsible for the lower survival rate of eggs from these twelve fish. Eighteen of the 29 batches of eggs produced survival in the SPO amended site water that was within 20% of that observed in laboratory control water. When considered as a whole, eggs that were reared in the SPO mixture produced an average of a 21.7% lower survival rate than the fish that were reared in laboratory control water.

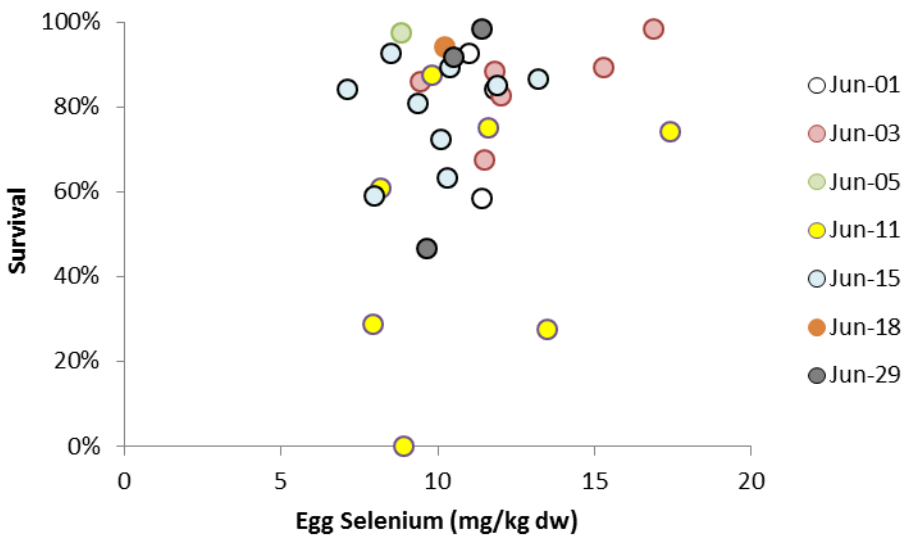


Figure 1. Survival of fry reared in laboratory water by spawning date.

Table 2. Survival of westslope cutthroat trout.

Spawning date	Fish ID	Egg Se (µg/g dw)	Laboratory water		Site water amended to SPOs	
			% survival at hatch	% survival at test end	% survival at hatch	% survival at test end
1 June 2015	F1	11.4	100.0 ± 0.0	58.3 ± 12.3	90.8 ± 12.6	61.7 ± 19.7
1 June 2015	F2	11.8	99.2 ± 1.7	84.2 ± 8.8	20.8 ± 10.3	17.5 ± 11.3
1 June 2015	F3	11.0	93.3 ± 6.1	92.5 ± 5.0	87.5 ± 5.0	79.2 ± 8.8
3 June 2015	F4	11.5	93.3 ± 0.0	67.5 ± 11.7	89.2 ± 7.4	75.0 ± 13.5
3 June 2015	F5	12.0	96.7 ± 4.7	82.5 ± 10.0	98.3 ± 3.3	85.8 ± 5.7
3 June 2015	F6	16.9	100.0 ± 0.0	96.7 ± 4.7	95.0 ± 5.8	90.8 ± 8.8
3 June 2015	F8	15.3	99.2 ± 1.7	89.2 ± 3.2	82.5 ± 22.3	72.5 ± 11.0
3 June 2015	F9	9.44	98.3 ± 1.9	85.8 ± 7.4	97.5 ± 3.2	90.8 ± 5.7
3 June 2015	F12	11.8	98.3 ± 1.9	88.3 ± 6.9	98.3 ± 1.9	85.0 ± 4.3
5 June 2015	F13	8.83	97.5 ± 5.0	96.7 ± 6.7	97.5 ± 1.7	95.8 ± 3.2
11 June 2015	F14	8.91	66.7 ± 23.1	0.0 ± 0.0	NT	NT
11 June 2015	F15	11.6	92.5 ± 6.9	75.0 ± 6.4	88.3 ± 7.9	70.0 ± 11.5
11 June 2015	F16	7.93	72.2 ± 15.0	28.9 ± 17.3	26.7 ± 33.0	13.3 ± 14.1
11 June 2015	F17	17.4	88.3 ± 8.4	74.2 ± 14.2	60.8 ± 12.0	35.78 ± 8.3
11 June 2015	F18	8.16	90.8 ± 5.0	60.8 ± 6.9	47.5 ± 28.3	34.2 ± 17.9
11 June 2015	F19	9.83	95.0 ± 4.3	87.5 ± 4.2	73.3 ± 29.9	58.3 ± 36.3
11 June 2015	F20	13.5	59.2 ± 12.3	27.5 ± 4.2	8.3 ± 6.9	4.2 ± 5.0
15 June 2015	F21	10.3	97.5 ± 3.2	63.3 ± 17.4	96.7 ± 3.8	70.8 ± 21.3
15 June 2015	F22	7.96	87.5 ±7.9	59.2 ± 4.2	40.0 ± 18.1	21.7 ± 16.0
15 June 2015	F23	8.52	97.5 ± 3.2	92.5 ± 6.9	92.5 ± 3.2	65.8 ± 35.1
15 June 2015	F24	13.2	99.2 ± 1.7	86.7 ± 4.7	95.8 ± 1.7	84.2 ± 1.7
15 June 2015	F25	10.4	100.0 ± 0.0	89.2 ± 7.4	94.2 ± 5.7	36.7 ± 33.4
15 June 2015	F26	11.9	96.7 ± 6.7	85.0 ± 8.8	95.8 ± 4.2	80.0 ± 24.5
15 June 2015	F27	7.13	97.5 ± 5.0	84.2 ± 5.7	88.3 ± 7.9	71.7 ± 6.4
15 June 2015	F28	10.1	100.0 ± 0.0	72.5 ± 12.9	91.7 ± 1.9	80.0 ± 9.0
18 June 2015	F29	9.37	96.7 ± 3.8	80.8 ± 3.2	98.3 ± 1.9	81.7 ± 8.4
18 June 2015	F30	10.2	98.3 ± 1.9	94.2 ± 5.7	98.3 ± 1.9	93.3 ± 2.7
29 June 2015	F31	10.5	96.7 ± 2.7	91.7 ± 6.9	82.5 ± 10.0	60.0 ± 16.6
29 June 2015	F32	11.4	100.0 ± 0.0	98.3 ± 1.9	95.0 ± 4.3	94.2 ± 5.0
29 June 2015	F33	9.66	68.3 ± 10.4	46.7 ± 7.2	30.0 ± 14.1	15.0 ± 6.4

3.2 Growth and Deformities

A total of 2682 and 2182 fry, reared in laboratory and SPO amended site water, respectively, were assessed for length, weight and deformities. Deformities of any type (i.e., GSI ≥ 1) were present in 120 and 108 fry in laboratory water and SPO amended site water exposures, respectively, indicating an overall rate of deformities in these water types of 4.5 and 4.9%, respectively. Presented on the basis of percentage of deformed fry per female, the rates of deformities were 7.1 ± 15.2% of fry reared in laboratory water and 11.1 ± 18.0% for fry reared in SPO amended site water. These values are higher than the overall average as a result of a high frequency of deformities in a small number of surviving fish for some adults. Presence of significant or multiple deformities (i.e., GSI ≥ 2) occurred in 2.3 and 2.7% of assessed fry in the laboratory water and SPO amended site water, respectively. The frequency of deformities was not correlated to egg selenium concentration (**Figure 2**).

A high rate of deformities was observed in the small number of fish that survived from fish F16 (which had an egg selenium concentration of 7.9 µg/g Se dw); as discussed in Section 3.1, the sample of eggs provided for this fish was small, and it is possible that these were residual eggs from a female that had already spawned. A rate of deformities exceeding 10% of the surviving fry was also observed for F17, F20 and F33, which contained 17.4, 13.5 and 9.7 µg/g Se dw, respectively.

Statistically significant positive relationships between fry weight and length and increasing egg Se were observed (regression, p-values 0.003 and <0.0001, respectively) (Figure 2). However, when adult female fish length was compared against fry length, a statistically significant relationship was also found (regression, p-value <0.0001), suggesting that the increase in fry growth endpoints may be in part related to adult female size. The relationships between endpoints and egg selenium concentration were consistent for fry reared in both water types.

Table 3. Deformities of westslope cutthroat trout.

Spawning date	Fish ID	Egg Se	Laboratory water		Site water amended to SPOs	
		(µg/g dw)	GSI ≥ 1	GSI ≥ 2	GSI ≥ 1	GSI ≥ 2
1 June 2015	F1	11.4	1.5 ± 2.9	1.5 ± 2.9	7.4 ± 3.4	6.0 ± 2.7
1 June 2015	F2	11.8	2.9 ± 2.0	0.0 ± 0.0	23.8 ± 17.0	11.3 ± 13.1
1 June 2015	F3	11	0.9 ± 1.7	0.0 ± 0.0	3.0 ± 3.8	1.0 ± 2.1
3 June 2015	F4	11.5	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
3 June 2015	F5	12	1.0 ± 2.1	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
3 June 2015	F6	16.9	0.0 ± 0.0	0.0 ± 0.0	12.3 ± 13.2	8.0 ± 7.1
3 June 2015	F8	15.3	1.9 ± 2.2	1.0 ± 1.9	1.5 ± 2.9	0.0 ± 0.0
3 June 2015	F9	9.44	1.0 ± 2.0	1.0 ± 2.0	0.9 ± 1.9	0.0 ± 0.0
3 June 2015	F12	11.8	1.0 ± 1.9	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
5 June 2015	F13	8.83	0.0 ± 0.0	0.0 ± 0.0	2.5 ± 5.0	2.5 ± 5.0
11 June 2015	F14	8.91	N/A	N/A	N/A	N/A
11 June 2015	F15	11.6	3.5 ± 4.5	2.4 ± 4.8	3.2 ± 4.0	1.1 ± 2.3
11 June 2015	F16	7.93	74.1 ± 23.1	66.7 ± 33.3	85.7 ± 20.2	21.4 ± 30.3
11 June 2015	F17	17.4	40.5 ± 24.3	18.3 ± 12. 6	42.3 ± 18.8	24.5 ± 14.4
11 June 2015	F18	8.16	9.5 ± 5.1	5.5 ± 0.6	18.3 ± 10.7	0.0 ± 0.0
11 June 2015	F19	9.83	7.6 ± 5.3	0.9 ± 1.8	20.8 ± 21.0	3.5 ± 4.2
11 June 2015	F20	13.5	12.3 ± 10.4	8.8 ± 11.8	25.0 ± 35.4	25.0 ± 35.4
15 June 2015	F21	10.3	0.0 ± 0.0	0.0 ± 0.0	1.8 ± 3.6	1.8 ± 3.6
15 June 2015	F22	7.96	5.7 ± 4.5	2.8 ± 5.6	17.2 ± 16.7	14.1 ± 17.2
15 June 2015	F23	8.52	3.5 ± 4.9	0.9 ± 1.7	0.0 ± 0.0	0.0 ± 0.0
15 June 2015	F24	13.2	0.0 ± 0.0	0.0 ± 0.0	1.0 ± 2.0	0.0 ± 0.0
15 June 2015	F25	10.4	1.8 ± 2.0	0.9 ± 1.7	9.5 ± 16.1	9.5 ± 16.1
15 June 2015	F26	11.9	3.2 ± 4.3	0.0 ± 0.0	0.9 ± 1.9	0.9 ± 1.9
15 June 2015	F27	7.13	5.9 ± 2.1	4.0 ± 3.3	14.0 ± 6.5	6.7 ± 5.7
15 June 2015	F28	10.1	1.4 ± 2.8	1.4 ± 2.8	1.0 ± 2.0	0.0 ± 0.0
18 June 2015	F29	9.37	4.1 ± 3.3	1.0 ± 2.0	1.2 ± 2.4	1.2 ± 2.4
18 June 2015	F30	10.2	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0
29 June 2015	F31	10.5	2.7 ± 3.5	1.8 ± 2.1	1.0 ± 2.1	0.0 ± 0.0
29 June 2015	F32	11.4	0.0 ± 0.0	0.0 ± 0.0	1.7 ± 2.0	1.7 ± 2.0
29 June 2015	F33	9.66	18.5 ± 13.9	10.6 ± 6.4	26.9 ± 25.9	26.9 ± 25.9

4.0 QA/QC

Upon receipt at the laboratory, gametes appeared normal with no indications of damage during handling and transport (e.g., no broken or frozen eggs). A small amount of blood was observed in the ovarian fluid of a small number of fish, however this was not expected to have negatively affected embryo viability. Temperature, dissolved oxygen, pH, remained within acceptable ranges throughout the rearing period (Environment Canada, 1998). Eight different batches of site water was amended throughout the study, however one of the amended waters ("Batch 3") was not subsampled for chemistry after amending and, therefore, mean concentrations of analytes (Se, Cd, NO_3-N and SO_4) were based on seven measurements instead of eight. Conductivity of "Batch 3" water was similar to measurements throughout the study suggesting that concentrations of the analytes of interest in this batch was likely reflective of concentrations measured in other amended batches of site water. Replicate subsamples of egg selenium concentrations were within 10% of secondary measurements.

With respect to the deformity assessment, although there were some differences between the individual scores provided by the two analysts, the overall findings were largely consistent. Out of 740 fry that were assessed as part of deformity QA/QC, the first analyst identified deformities in 35 fry (4.7%) and the second analyst identified deformities in 33 fry (4.5%). Thus, both analysts reported a consistent overall frequency of deformities in the fry that were evaluated.

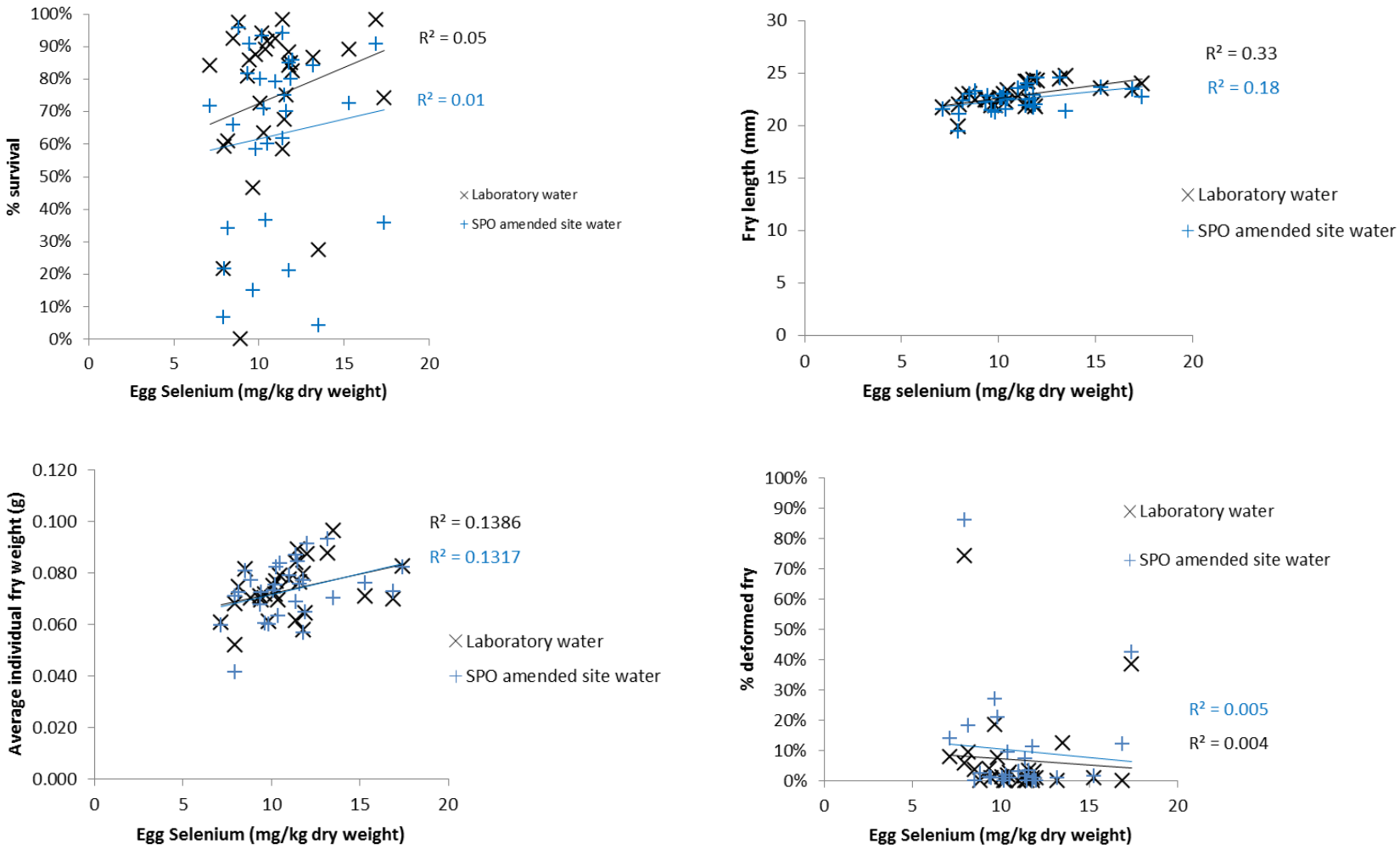


Figure 2. Toxicological endpoints for westslope cutthroat trout presented as a function of egg selenium concentration.

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APPENDIX A – Adult fish collection data

Fish ID	Length (mm)	Date Captured	# days held	Location Captured	Spawning 2015-06-01	Spawning 2015-06-03	Spawning 2015-06-05	Spawning 2015-06-11	Spawning 2015-06-15	Spawning 2015-06-18	Spawning 2015-06-29	Capture Method
1	286	01/06/2015	0	U/S Concrete Arch	Spawned	-	-	-	-	-	-	Box Trap
2	348	01/06/2015	0	U/S Concrete Arch	Spawned	-	-	-	-	-	-	Box Trap
3	324	01/06/2015	0	U/S Concrete Arch	Spawned	-	-	-	-	-	-	Box Trap
4	303	03/06/2015	0	U/S Concrete Arch	-	Spawned	-	-	-	-	-	Box Trap
5	402	02/06/2015	1	Greenhills Creek	-	Spawned	-	-	-	-	-	Electrofishing
6	323	03/06/2015	0	U/S Concrete Arch	-	Spawned	-	-	-	-	-	Box Trap
7	283	02/06/2015	1	Greenhills Creek	-	Spawned	-	-	-	-	-	Electrofishing
8	354	27/06/2015	6	U/S Concrete Arch	Not Ripe	Spawned	-	-	-	-	-	Box Trap
9	297	02/06/2015	1	Greenhills Creek	-	Spawned	-	-	-	-	-	Electrofishing
10	357	31/05/2015	3	U/S Concrete Arch	Not Ripe	Spawned	-	-	-	-	-	Electrofishing
11	293	03/06/2015	0	Greenhills Creek	-	Spawned	-	-	-	-	-	Electrofishing
12	279	03/06/2015	0	Greenhills Creek	-	Spawned	-	-	-	-	-	Electrofishing
13	316	04/06/2015	1	Greenhills Creek	-	-	Spawned	-	-	-	-	Electrofishing
14	258	11/06/2015	0	Greenhills Creek	-	-	-	Spawned	-	-	-	Box Trap
15	309	11/06/2015	0	Greenhills Creek	-	-	-	Spawned	-	-	-	Box Trap
16	241	11/06/2015	0	Greenhills Creek	-	-	-	Spawned	-	-	-	Box Trap
17	350	31/05/2015	11	U/S Concrete Arch	Not Ripe	Not Ripe	Not Ripe	Spawned	-	-	-	Box Trap
18	367	01/06/2015	10	U/S Concrete Arch	Not Ripe	Not Ripe	-	Spawned	-	-	-	Box Trap
19	321	09/06/2015	2	Multiplate	-	-	-	Spawned	-	-	-	Angling
20	391	09/06/2015	2	U/S Concrete Arch	-	-	-	Spawned	-	-	-	Box Trap
21	305	13/06/2015	2	Greenhills Creek	-	-	-	-	Spawned	-	-	Box Trap
22	280	14/06/2015	1	Greenhills Creek	-	-	-	-	Spawned	-	-	Box Trap
23	296	14/06/2015	1	Greenhills Creek	-	-	-	-	Spawned	-	-	Box Trap
24	312	09/06/2015	6	U/S Concrete Arch	-	-	-	Not Ripe	Spawned	-	-	Box Trap
25	276	13/06/2015	2	Greenhills Creek	-	-	-	-	Spawned	-	-	Box Trap
26	256	11/06/2015	4	Greenhills Creek	-	-	-	Not Ripe	Spawned	-	-	Box Trap
27	240	08/06/2015	7	Fish Pond Creek	-	-	-	Not Ripe	Spawned	-	-	Box Trap
28	336	13/06/2015	2	Greenhills Creek	-	-	-	-	Spawned	-	-	Box Trap
29	273	17/06/2015	1	Greenhills Creek	-	-	-	-	-	Spawned	-	Box Trap
30	333	07/06/2015	11	U/S Concrete Arch	-	-	-	Not Ripe	Not Ripe	Spawned	-	Box Trap
31	320	28/05/2015	32	Multiplate	Not Ripe	Not Ripe	Not Ripe	Not Ripe	Not Ripe	Not Ripe	Spawned	Angling
32	268	31/05/2015	29	U/S Concrete Arch	Not Ripe	Not Ripe	Not Ripe	Not Ripe	Not Ripe	Not Ripe	Spawned	Box Trap
33	276	01/06/2015	28	Greenhills Creek	-	Not Ripe	Not Ripe	Not Ripe	Not Ripe	Not Ripe	Spawned	Electrofishing

APPENDIX B - Exposure datasheets

Female	Fert date	Water Type	Rep	Se dry wt	Survivors	Surival rate	Avg Length (mm)	# fish deformed	# fish deformed with GSI >1	pooled weight
1	01/06/2015	Dechlor	A	11.4	22	0.73	24.4	0	0	1.83
1	01/06/2015	Dechlor	B	11.4	17	0.57	23.3	1	1	1.38
1	01/06/2015	Dechlor	C	11.4	13	0.43	24.7	0	0	1.13
1	01/06/2015	Dechlor	D	11.4	18	0.60	24.3	0	0	1.52
1	01/06/2015	Site	A	11.4	22	0.73	24.3	1	0	2.01
1	01/06/2015	Site	B	11.4	10	0.33	22.2	1	1	0.82
1	01/06/2015	Site	C	11.4	19	0.63	24.2	2	1	1.62
1	01/06/2015	Site	D	11.4	23	0.77	24.1	1	1	2.03
2	01/06/2015	Dechlor	A	11.8	23	0.77	24.5	0	0	1.84
2	01/06/2015	Dechlor	B	11.8	29	0.97	23.8	0	1	2.15
2	01/06/2015	Dechlor	C	11.8	25	0.83	24.7	0	0	2.09
2	01/06/2015	Dechlor	D	11.8	24	0.80	24.3	0	0	1.94
2	01/06/2015	Site	A	11.8	10	0.33	23.7	0	0	0.82
2	01/06/2015	Site	B	11.8	4	0.13	22.9	1	1	0.29
2	01/06/2015	Site	C	11.8	5	0.17	22.1	1	0	0.37
2	01/06/2015	Site	D	11.8	2	0.07	23.3	0	0	0.16
3	01/06/2015	Dechlor	A	11	27	0.90	22.7	0	0	1.98
3	01/06/2015	Dechlor	B	11	29	0.97	22.8	0	0	2.27
3	01/06/2015	Dechlor	C	11	29	0.97	22.4	0	0	2.28
3	01/06/2015	Dechlor	D	11	26	0.87	23.2	0	0	2.06
3	01/06/2015	Site	A	11	24	0.80	23.6	1	0	1.95
3	01/06/2015	Site	B	11	20	0.67	23.8	0	0	1.61
3	01/06/2015	Site	C	11	25	0.83	23.1	2	0	1.96
3	01/06/2015	Site	D	11	26	0.87	23.4	0	0	1.94
4	03/06/2015	Dechlor	A	11.5	15	0.50	24.6	0	0	1.65
4	03/06/2015	Dechlor	B	11.5	22	0.73	24.0	0	0	1.79
4	03/06/2015	Dechlor	C	11.5	22	0.73	23.8	0	0	1.8
4	03/06/2015	Dechlor	D	11.5	22	0.73	24.0	0	0	1.81
4	03/06/2015	Site	A	11.5	25	0.83	24.3	0	0	2.22
4	03/06/2015	Site	B	11.5	22	0.73	23.8	0	0	1.79
4	03/06/2015	Site	C	11.5	26	0.87	23.9	0	0	2.26
4	03/06/2015	Site	D	11.5	17	0.57	23.7	0	0	1.37

Female	Fert date	Water Type	Rep	Se dry wt	Survivors	Surival rate	Avg Length (mm)	# fish deformed	# fish deformed with GSI >1	pooled weight
5	03/06/2015	Dechlor	A	12	24	0.80	24.5	0	0	2.15
5	03/06/2015	Dechlor	B	12	24	0.80	24.3	1	0	2.03
5	03/06/2015	Dechlor	C	12	22	0.73	24.3	0	0	1.9
5	03/06/2015	Dechlor	D	12	29	0.97	24.1	0	0	2.55
5	03/06/2015	Site	A	12	25	0.83	24.6	0	0	2.34
5	03/06/2015	Site	B	12	24	0.80	24.3	0	0	2.12
5	03/06/2015	Site	C	12	26	0.87	24.5	0	0	2.39
5	03/06/2015	Site	D	12	28	0.93	24.6	0	0	2.54
6	03/06/2015	Dechlor	A	16.9	30	1.00	23.1	0	0	1.95
6	03/06/2015	Dechlor	B	16.9	32	1.07	23.3	0	0	2.18
6	03/06/2015	Dechlor	C	16.9	29	0.97	23.5	0	0	2.01
6	03/06/2015	Dechlor	D	16.9	27	0.90	23.4	0	0	2.06
6	03/06/2015	Site	A	16.9	29	0.97	23.7	9	5	2.08
6	03/06/2015	Site	B	16.9	30	1.00	23.2	3	2	2.13
6	03/06/2015	Site	C	16.9	25	0.83	23.3	2	2	1.83
6	03/06/2015	Site	D	16.9	25	0.83	23.4	0	0	1.86
8	03/06/2015	Dechlor	A	15.3	26	0.87	23.5	0	0	1.85
8	03/06/2015	Dechlor	B	15.3	26	0.87	23.4	1	1	1.82
8	03/06/2015	Dechlor	C	15.3	27	0.90	23.8	0	0	1.9
8	03/06/2015	Dechlor	D	15.3	28	0.93	23.4	0	0	2.0
8	03/06/2015	Site	A	15.3	17	0.57	24.0	1	0	1.33
8	03/06/2015	Site	B	15.3	24	0.80	23.1	0	0	1.75
8	03/06/2015	Site	C	15.3	22	0.73	23.4	0	0	1.66
8	03/06/2015	Site	D	15.3	24	0.80	24.0	0	0	1.84
9	03/06/2015	Dechlor	A	9.44	28	0.93	22.6	0	0	1.82
9	03/06/2015	Dechlor	B	9.44	25	0.83	22.0	1	1	1.8
9	03/06/2015	Dechlor	C	9.44	27	0.90	22.9	0	0	2.06
9	03/06/2015	Dechlor	D	9.44	23	0.77	22.4	0	0	1.48
9	03/06/2015	Site	A	9.44	28	0.93	22.9	0	0	2.08
9	03/06/2015	Site	B	9.44	25	0.83	22.6	0	0	1.85
9	03/06/2015	Site	C	9.44	27	0.90	22.2	1	0	1.84
9	03/06/2015	Site	D	9.44	29	0.97	23.4	0	0	2.12

Female	Fert date	Water Type	Rep	Se dry wt	Survivors	Surival rate	Avg Length (mm)	# fish deformed	# fish deformed with GSI >1	pooled weight
12	03/06/2015	Dechlor	A	11.8	27	0.90	22.2	0	0	1.55
12	03/06/2015	Dechlor	B	11.8	24	0.80	22.1	0	0	1.37
12	03/06/2015	Dechlor	C	11.8	29	0.97	22.2	0	0	1.85
12	03/06/2015	Dechlor	D	11.8	26	0.87	21.9	1	0	1.38
12	03/06/2015	Site	A	11.8	26	0.87	22.0	0	0	1.47
12	03/06/2015	Site	B	11.8	27	0.90	21.9	0	0	1.52
12	03/06/2015	Site	C	11.8	24	0.80	21.6	0	0	1.36
12	03/06/2015	Site	D	11.8	25	0.83	21.4	0	0	1.43
13	05/06/2015	Dechlor	A	8.83	30	1.00	22.8	0	0	2.10
13	05/06/2015	Dechlor	B	8.83	26	0.87	22.5	0	0	1.79
13	05/06/2015	Dechlor	C	8.83	31	1.03	22.2	0	0	2.2
13	05/06/2015	Dechlor	D	8.83	30	1.00	22.4	0	0	2.2
13	05/06/2015	Site	A	8.83	30	1.00	23.2	3	3	2.29
13	05/06/2015	Site	B	8.83	28	0.93	23.1	0	0	2.13
13	05/06/2015	Site	C	8.83	29	0.97	23.3	0	0	2.23
13	05/06/2015	Site	D	8.83	28	0.93	23.2	0	0	2.19
14	11/06/2015	Dechlor	A	8.91	0	0.00				
14	11/06/2015	Dechlor	B	8.91	0	0.00				
14	11/06/2015	Dechlor	C	8.91	0	0.00				
15	11/06/2015	Dechlor	A	11.6	25	0.83	22.6	0	0	1.87
15	11/06/2015	Dechlor	B	11.6	21	0.70	22.2	0	0	1.61
15	11/06/2015	Dechlor	C	11.6	21	0.70	21.9	2	2	1.68
15	11/06/2015	Dechlor	D	11.6	23	0.77	22.6	1	0	1.71
15	11/06/2015	Site	A	11.6	16	0.53	21.8	0	0	1.13
15	11/06/2015	Site	B	11.6	22	0.73	22.9	1	1	1.82
15	11/06/2015	Site	C	11.6	24	0.80	22.1	2	0	1.74
15	11/06/2015	Site	D	11.6	22	0.73	22.8	0	0	1.67
16	11/06/2015	Dechlor	A	7.93	9	0.30	20.8	5	3	0.43
16	11/06/2015	Dechlor	B	7.93	12	0.40	19.3	8	8	0.7
16	11/06/2015	Dechlor	C	7.93	5	0.17	19.7	5	5	0.25
16	11/06/2015	Dechlor	D	7.93	0	0.00				
16	11/06/2015	Site	A	7.93	7	0.23	18.8	5	3	0.3

Female	Fert date	Water Type	Rep	Se dry wt	Survivors	Surival rate	Avg Length (mm)	# fish deformed	# fish deformed with GSI >1	pooled weight
16	11/06/2015	Site	B	7.93	1	0.03	20.0	1	0	0.04
16	11/06/2015	Site	C	7.93	0	0.00				
16	11/06/2015	Site	D	7.93	0	0.00				
17	11/06/2015	Dechlor	A	17.4	25	0.83	24.4	5	1	1.72
17	11/06/2015	Dechlor	B	17.4	25	0.83	23.8	5	3	2.02
17	11/06/2015	Dechlor	C	17.4	23	0.77	23.5	9	6	2.10
17	11/06/2015	Dechlor	D	17.4	16	0.53	24.2	12	5	1.42
17	11/06/2015	Site	A	17.4	8	0.27	23.3	4	3	0.82
17	11/06/2015	Site	B	17.4	11	0.37	23.3	7	3	0.86
17	11/06/2015	Site	C	17.4	10	0.33	22.6	2	1	0.73
17	11/06/2015	Site	D	17.4	14	0.47	21.8	5	2	1.05
18	11/06/2015	Dechlor	A	8.16	21	0.70	22.9	2	1	1.56
18	11/06/2015	Dechlor	B	8.16	16	0.53	23.6	1	1	1.24
18	11/06/2015	Dechlor	C	8.16	18	0.60	22.9	3	1	1.29
18	11/06/2015	Dechlor	D	8.16	18	0.60	22.4	1	1	1.34
18	11/06/2015	Site	A	8.16	16	0.53	23.1	2	0	1.24
18	11/06/2015	Site	B	8.16	11	0.37	22.3	1	0	0.79
18	11/06/2015	Site	C	8.16	3	0.10	22.0	1	0	0.21
18	11/06/2015	Site	D	8.16	11	0.37	22.0	2	0	0.77
19	11/06/2015	Dechlor	A	9.83	25	0.83	22.0	2	0	1.57
19	11/06/2015	Dechlor	B	9.83	26	0.87	21.4	0	0	1.63
19	11/06/2015	Dechlor	C	9.83	26	0.87	22.1	3	0	1.61
19	11/06/2015	Dechlor	D	9.83	28	0.93	21.9	3	1	1.58
19	11/06/2015	Site	A	9.83	2	0.07	20.3	1	0	0.09
19	11/06/2015	Site	B	9.83	18	0.60	21.2	3	1	1.19
19	11/06/2015	Site	C	9.83	24	0.80	21.9	4	2	1.57
19	11/06/2015	Site	D	9.83	26	0.87	21.5	0	0	1.66
20	11/06/2015	Dechlor	A	13.5	8	0.27	24.6	2	2	0.71
20	11/06/2015	Dechlor	B	13.5	10	0.33	24.6	1	1	0.97
20	11/06/2015	Dechlor	C	13.5	8	0.27	24.9	0	0	0.81
20	11/06/2015	Dechlor	D	13.5	7	0.23	24.6	1	0	0.69
20	11/06/2015	Site	A	13.5	0	0.00				

Female	Fert date	Water Type	Rep	Se dry wt	Survivors	Surival rate	Avg Length (mm)	# fish deformed	# fish deformed with GSI >1	pooled weight
20	11/06/2015	Site	B	13.5	3	0.10	19.8	0	1	0.18
20	11/06/2015	Site	C	13.5	0	0.00				
20	11/06/2015	Site	D	13.5	2	0.07	22.8	0	1	0.16
21	15/06/2015	Dechlor	A	10.3	14	0.47	22.9	0	0	1.07
21	15/06/2015	Dechlor	B	10.3	24	0.80	22.9	0	0	1.86
21	15/06/2015	Dechlor	C	10.3	15	0.50	23.0	0	0	1.16
21	15/06/2015	Dechlor	D	10.3	23	0.77	23.0	0	0	1.72
21	15/06/2015	Site	A	10.3	20	0.67	23.4	0	0	1.88
21	15/06/2015	Site	B	10.3	13	0.43	22.3	0	0	0.93
21	15/06/2015	Site	C	10.3	28	0.93	23.2	2	2	2.3
21	15/06/2015	Site	D	10.3	24	0.80	22.9	0	0	1.96
22	15/06/2015	Dechlor	A	7.96	19	0.63	22.2	0	0	1.29
22	15/06/2015	Dechlor	B	7.96	16	0.53	21.5	1	0	1.01
22	15/06/2015	Dechlor	C	7.96	18	0.60	22.1	2	2	1.29
22	15/06/2015	Dechlor	D	7.96	18	0.60	22.3	1	0	1.24
22	15/06/2015	Site	A	7.96	0	0.00				
22	15/06/2015	Site	B	7.96	9	0.30	21.2	3	3	0.63
22	15/06/2015	Site	C	7.96	6	0.20	20.2	0	0	0.42
22	15/06/2015	Site	D	7.96	11	0.37	22.0	2	1	0.8
23	15/06/2015	Dechlor	A	8.52	29	0.97	22.8	3	1	2.52
23	15/06/2015	Dechlor	B	8.52	30	1.00	23.1	0	0	2.38
23	15/06/2015	Dechlor	C	8.52	26	0.87	22.9	0	0	2.12
23	15/06/2015	Dechlor	D	8.52	26	0.87	23.1	1	0	2.01
23	15/06/2015	Site	A	8.52	4	0.13	22.5	0	0	0.29
23	15/06/2015	Site	B	8.52	25	0.83	23.2	0	0	2.08
23	15/06/2015	Site	C	8.52	26	0.87	23.3	0	0	2.22
23	15/06/2015	Site	D	8.52	24	0.80	23.0	0	0	1.95
24	15/06/2015	Dechlor	A	13.2	25	0.83	24.2	0	0	2.12
24	15/06/2015	Dechlor	B	13.2	28	0.93	24.1	0	0	2.43
24	15/06/2015	Dechlor	C	13.2	25	0.83	24.5	0	0	2.24
24	15/06/2015	Dechlor	D	13.2	26	0.87	24.9	0	0	2.33
24	15/06/2015	Site	A	13.2	25	0.83	24.5	0	0	2.53

Female	Fert date	Water Type	Rep	Se dry wt	Survivors	Surival rate	Avg Length (mm)	# fish deformed	# fish deformed with GSI >1	pooled weight
24	15/06/2015	Site	B	13.2	26	0.87	24.9	0	0	2.38
24	15/06/2015	Site	C	13.2	25	0.83	24.1	0	0	2.20
24	15/06/2015	Site	D	13.2	25	0.83	24.6	1	0	2.27
25	15/06/2015	Dechlor	A	10.4	29	0.97	22.3	1	1	1.96
25	15/06/2015	Dechlor	B	10.4	28	0.93	21.7	1	0	1.92
25	15/06/2015	Dechlor	C	10.4	24	0.80	22.6	0	0	1.66
25	15/06/2015	Dechlor	D	10.4	26	0.87	22.4	0	0	1.86
25	15/06/2015	Site	A	10.4	2	0.07	21.5	0	0	0.11
25	15/06/2015	Site	B	10.4	22	0.73	22.3	1	1	1.46
25	15/06/2015	Site	C	10.4	17	0.57	22.3	0	0	1.27
25	15/06/2015	Site	D	10.4	3	0.10	19.8	1	1	0.17
26	15/06/2015	Dechlor	A	11.9	28	0.93	21.6	0	0	1.64
26	15/06/2015	Dechlor	B	11.9	27	0.90	21.5	1	0	1.85
26	15/06/2015	Dechlor	C	11.9	22	0.73	21.7	2	0	1.42
26	15/06/2015	Dechlor	D	11.9	25	0.83	22.3	0	0	1.64
26	15/06/2015	Site	A	11.9	28	0.93	22.1	0	0	1.82
26	15/06/2015	Site	B	11.9	28	0.93	22.1	0	0	1.89
26	15/06/2015	Site	C	11.9	13	0.43	21.7	0	0	0.79
26	15/06/2015	Site	D	11.9	27	0.90	22.0	1	1	1.78
27	15/06/2015	Dechlor	A	7.13	27	0.90	21.5	3	1	1.61
27	15/06/2015	Dechlor	B	7.13	26	0.87	22.3	2	0	1.62
27	15/06/2015	Dechlor	C	7.13	23	0.77	21.7	1	1	1.38
27	15/06/2015	Dechlor	D	7.13	25	0.83	21.2	2	2	1.51
27	15/06/2015	Site	A	7.13	24	0.80	21.4	2	2	1.43
27	15/06/2015	Site	B	7.13	22	0.73	21.7	5	3	1.36
27	15/06/2015	Site	C	7.13	20	0.67	21.8	3	1	1.22
27	15/06/2015	Site	D	7.13	20	0.67	21.2	2	0	1.11
28	15/06/2015	Dechlor	A	10.1	24	0.80	22.5	0	0	1.85
28	15/06/2015	Dechlor	B	10.1	19	0.63	22.9	0	0	1.47
28	15/06/2015	Dechlor	C	10.1	26	0.87	22.4	0	0	1.72
28	15/06/2015	Dechlor	D	10.1	18	0.60	22.8	1	1	1.42
28	15/06/2015	Site	A	10.1	25	0.83	22.7	1	0	1.79

Female	Fert date	Water Type	Rep	Se dry wt	Survivors	Surival rate	Avg Length (mm)	# fish deformed	# fish deformed with GSI >1	pooled weight
28	15/06/2015	Site	B	10.1	25	0.83	22.6	0	0	1.95
28	15/06/2015	Site	C	10.1	26	0.87	22.3	0	0	1.78
28	15/06/2015	Site	D	10.1	20	0.67	22.8	0	0	1.49
29	15/06/2015	Dechlor	A	9.37	24	0.80	22.5	0	0	1.58
29	15/06/2015	Dechlor	B	9.37	25	0.83	22.6	2	0	1.90
29	15/06/2015	Dechlor	C	9.37	25	0.83	22.2	1	1	1.73
29	15/06/2015	Dechlor	D	9.37	23	0.77	22.6	1	0	1.65
29	15/06/2015	Site	A	9.37	25	0.83	22.1	0	0	1.60
29	15/06/2015	Site	B	9.37	27	0.90	22.5	0	0	1.88
29	15/06/2015	Site	C	9.37	21	0.70	21.6	1	1	1.36
29	15/06/2015	Site	D	9.37	25	0.83	22.7	0	0	1.80
30	18/06/2015	Dechlor	A	10.2	30	1.00	22.8	0	0	2.18
30	18/06/2015	Dechlor	B	10.2	28	0.93	22.4	0	0	2.06
30	18/06/2015	Dechlor	C	10.2	29	0.97	22.6	0	0	2
30	18/06/2015	Dechlor	D	10.2	26	0.87	22.3	0	0	1.84
30	18/06/2015	Site	A	10.2	27	0.90	22.3	0	0	1.96
30	18/06/2015	Site	B	10.2	29	0.97	22.9	0	0	2.20
30	18/06/2015	Site	C	10.2	28	0.93	22.9	0	0	2.16
30	18/06/2015	Site	D	10.2	28	0.93	22.5	0	0	2.11
31	29/06/2015	Dechlor	A	10.5	28	0.93	23.2	1	1	2.15
31	29/06/2015	Dechlor	B	10.5	25	0.83	23.2	0	0	1.92
31	29/06/2015	Dechlor	C	10.5	30	1.00	23.7	0	0	2.48
31	29/06/2015	Dechlor	D	10.5	27	0.90	23.3	2	1	2.12
31	29/06/2015	Site	A	10.5	13	0.43	22.3	0	0	0.99
31	29/06/2015	Site	B	10.5	15	0.50	23.2	0	0	1.15
31	29/06/2015	Site	C	10.5	24	0.80	22.0	1	0	1.88
31	29/06/2015	Site	D	10.5	20	0.67	22.7	0	0	2.07
32	29/06/2015	Dechlor	A	11.4	30	1.00	21.8	0	0	1.83
32	29/06/2015	Dechlor	B	11.4	29	0.97	21.6	0	0	1.77
32	29/06/2015	Dechlor	C	11.4	29	0.97	21.8	0	0	1.73
32	29/06/2015	Dechlor	D	11.4	30	1.00	21.9	0	0	1.92
32	29/06/2015	Site	A	11.4	27	0.90	21.9	0	0	1.8

Female	Fert date	Water Type	Rep	Se dry wt	Survivors	Surival rate	Avg Length (mm)	# fish deformed	# fish deformed with GSI >1	pooled weight
32	29/06/2015	Site	B	11.4	30	1.00	21.9	1	1	2.07
32	29/06/2015	Site	C	11.4	29	0.97	22.0	1	1	2.1
32	29/06/2015	Site	D	11.4	27	0.90	21.7	0	0	1.8
33	29/06/2015	Dechlor	A	9.66	15	0.50	20.3	5	3	1.2
33	29/06/2015	Dechlor	B	9.66	14	0.47	22.6	1	1	1.07
33	29/06/2015	Dechlor	C	9.66	11	0.37	21.7	3	1	0.7
33	29/06/2015	Dechlor	D	9.66	16	0.53	23.0	1	1	1.07
33	29/06/2015	Site	A	9.66	3	0.10	21.8	0	0	0.16
33	29/06/2015	Site	B	9.66	3	0.10	21.5	1	1	0.19
33	29/06/2015	Site	C	9.66	7	0.23	21.4	1	1	0.4
33	29/06/2015	Site	D	9.66	5	0.17	21.0	3	3	0.34

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR-FRB&RG
Work Order #: 15426

Start Date & Time: June 1, 2015 @ 1935h
Stop Date & Time: July 15, 2015 @ 1400h
Test Species: C. dubia

Dechlor

Concentration	0	1		2		3		4		5		6		7
	Days													
	init.	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	12.5		12.5	12.5	13.0		12.5	13.0	12.5		12.2		12.0	12.5
DO (mg/L)	10.4		10.5	10.4	10.5		10.4	10.5	10.6		10.2		10.5	10.5
pH	6.9		6.8	7.0	7.0		10.8	6.9	7.0		7.1		7.1	7.2
Cond. (µS/cm)	29			29				30						29
Initials	YML	YML		KS		YML		YML		A		~		KS

Fording Site

Concentration	0	1		2		3		4		5		6		7
	Days													
	init.	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	13.0		12.5	12.5	13.0		12.5	13.0	12.5		12.0		12.0	12.5
DO (mg/L)	10.3		10.5	10.6	10.7		10.5	10.5	10.3		10.7		10.4	10.6
pH	7.9		7.9	8.2	8.2		7.9	7.9	8.0		8.1		8.1	8.3
Cond. (µS/cm)	1151			1165				1164						1171
Initials	YML	YML		KS		YML		YML		~		~		KS

Concentration	0	1		2		3		4		5		6		7
	Days													
	init.	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	0	1		2		3		4		5		6		7
	Days													
	init.	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 per: 2/3 Conductivity meter: 2/3

	Control	Site
Hardness*	8	608
Alkalinity*	6	—

* mg/L as CaCO3

Analysts: YML, AWD, KS

Reviewed by:

Date reviewed:

Sample Description: Slightly yellowish particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR-FRBGRG
Work Order #: 15426

Start Date & Time: June 1, 2015 @ 1935h
Stop Date & Time: July 15, 2015 @ 1400h
Test Species: O. clarkii

Dechlor Concentration	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	12.5		12.0	12.5	12.5		12.0	13.0	12.0		12.5		12.5	12.0
DO (mg/L)	10.8		10.4	10.6	10.5		10.5	10.5	10.3		10.6		10.6	10.5
pH	7.1		7.0	7.1	7.0		7.1	7.1	7.0		7.1		7.1	7.1
Cond. (µS/cm)	–			31				34						31
Initials	KS	KS		YWL		KS		KS		m		^		KS

Fording Concentration Site	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	13.0		12.0	12.5	12.5		12.0	13.0	12.5		12.5		12.5	12.0
DO (mg/L)	10.9		10.4	10.3	10.6		10.6	10.4	10.3		10.5		10.6	10.46 KS
pH	8.3		8.2	8.10	8.3		8.2	8.1	8.0		8.1		8.1	8.3
Cond. (µS/cm)	–			1117				1185						1154
Initials	KS	KS		YWL		KS		KS		~		^		KS

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Concentration	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site		
Hardness*	8	~~618~~ 617		
Alkalinity*	6	–		

* mg/L as CaCO3

Analysts: YWL, AWD, KS
Reviewed by:
Date reviewed:

Sample Description: Slightly yellow with particulat

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR-FRBGRG
Work Order #: 15426

Start Date & Time: June 1, 2015 @ 19 30
Stop Date & Time: July 15, 2015 @ 1400 h
Test Species: O. clarkii

Dechlor Concentration

	Days														
	14	15		16		17		18		19		20		21	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)	13.0		12.0	12.5	11.5		12.5	12.0	12.0		12.0		12.0	12.5	
DO (mg/L)	10.0		10.4	10.4	10.6		10.5	10.4	10.4		10.4		10.6	10.5	
pH	7.2		7.0	7.1	7.0		7.1	7.1	7.1		7.2		7.1	7.1	
Cond. (µS/cm)	—			31				30						30	
Initials	KS	YYL		YYL		KS		KS		A		A		KS	

Fording Site Concentration

	Days														
	14	15		16		17		18		19		20		21	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)	12.0		12.0	12.5	11.5		12.5	12.0	12.0		12.0		12.0	12.5	
DO (mg/L)	10.6		10.3	10.5	10.6		10.5	10.6	10.7		10.5		10.5	10.6	
pH	8.3		8.2 8.10	8.0	8.0		8.2	8.1	8.0		8.1		8.3	8.3	
Cond. (µS/cm)	—			1141				1160						1168	
Initials	KS	YYL		YYL		KS		KS		A		A		KS	

Concentration

	Days														
	14	15		16		17		18		19		20		21	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

Concentration

	Days														
	14	15		16		17		18		19		20		21	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site		
Hardness*	10	n/a		
Alkalinity*	8	—		

* mg/L as CaCO3

Analysts: YYL, AWD, KS

Reviewed by:

Date reviewed:

Sample Description: Slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR- FRB/RG
Work Order #: 15426

Start Date & Time: June 1, 2015 @ 1935 h
Stop Date & Time: July 15, 2015 @ 1400 h
Test Species: O. clarkii

Dechlor Concentration	Days														
	21	22		23		24		25		26		27		28	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	new
Temperature (°C)	12.0		12.0	12.5	11.5		12.5	12.0	11.5		12.0		12.0		13.0
DO (mg/L)	10.5		10.5	10.6	10.5		10.7	10.4	10.6		10.6		10.7		10.6
pH	7.2		7.2	7.0	7.2		7.2	7.1	7.0		7.1		7.2		7.2
Cond. (µS/cm)	~			31				30							33
Initials	KS	KS		YNL		KS		KS		AD		AD			KS

Fording Concentration Site	Days														
	21	22		23		24		25		26		27		28	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	new
Temperature (°C)	12.0		12.0	12.0	11.5		11.5	12.5	11.5		12.0		12.0		12.0
DO (mg/L)	10.8		10.6	10.4	10.5		10.7	10.5	10.7		10.7		10.8		10.5
pH	8.2		8.2	8.1	8.1		8.2	8.2	8.2		8.4		8.4		8.4
Cond. (µS/cm)	~			1153				1093							1176
Initials	KS	KS		YNL		KS		KS		AD		AD			KS

Concentration	Days														
	21	22		23		24		25		26		27		28	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	new
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

Concentration	Days														
	21	22		23		24		25		26		27		28	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	new
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

DO meter: 213 pH meter: 213 Conductivity meter: 213

	Control	Site		
Hardness*	10	575		
Alkalinity*	8	—		

* mg/L as CaCO3

Analysts: YYL, AWD, KS

Reviewed by:

Date reviewed:

Sample Description: Slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR- FRBGRG
Work Order #: 15426

Start Date & Time: June 1, 2015 @ 1935h
Stop Date & Time: July 15, 2015 @ 1400 h
Test Species: O. clarkii

Dechlor Concentration	Days															
	28	29		30		31		32		33		34		35		
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5		12.0	13.0	12.0		12.5	13.0	11.5		12.0		12.0	12.5		
DO (mg/L)	10.5		10.7	10.5	10.4		10.6	10.2	10.6		10.5		10.6	10.5		
pH	7.3		7.1	7.0	7.3		7.2	7.0	6.9		7.0		7.0	7.1		
Cond. (µS/cm)	-			32				32						31		
Initials	KS	KS		KP		KS		YML		A		A		KS		

Feeding Concentration Site	Days															
	28	29		30		31		32		33		34		35		
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5		11.5	13.0	11.5		11.5	12.0	11.5		12.0		12.0	12.0		
DO (mg/L)	10.5		10.8	10.5	10.7		10.7	10.5	10.5		10.10		10.7	10.4		
pH	8.3		8.1	8.3	8.2		8.2	8.2	8.2		8.1		8.2	8.2		
Cond. (µS/cm)	-			1160				1161						1171		
Initials	KS	KS		KP		KS		YML		A		A		KS		

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Concentration	Days															
	28	29		30		31		32		33		34		35		
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)																
DO (mg/L)																
pH																
Cond. (µS/cm)																
Initials																

Concentration	Days															
	28	29		30		31		32		33		34		35		
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)																
DO (mg/L)																
pH																
Cond. (µS/cm)																
Initials																

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site		
Hardness*	10	595		
Alkalinity*	8	—		

* mg/L as CaCO3

Analysts: YYL, AWD, KS, KLP
Reviewed by:
Date reviewed:

Sample Description: slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR-FRB@RG
Work Order #: 15426

Start Date & Time: June 1, 2015 @ 1935h.
Stop Date & Time: July 15, 2015 @ 1400 h
Test Species: O. clarkii

Dechlor Concentration

	Days															
	35	36		37		38		39		40		41		42		
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5		12.0	12.5	12.0		12.0	13.0	11.5		12.0		12.0	12.5		
DO (mg/L)	10.6		10.5	10.7	10.4		10.4	10.4	10.4		10.2		10.3	10.7		
pH	7.2		6.9	7.1	7.1		7.0	7.2	7.1		7.2		7.1	7.2		
Cond. (µS/cm)	–			32				32						32		
Initials	KS	KS		YML		KS		YML		JW		YML		YML		

Forcling Concentration site

	Days															
	35	36		37		38		39		40		41		42		
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.0		11.5	12.0	12.0		11.0	12.0	11.5		12.0		12.0	12.5		
DO (mg/L)	10.4		10.3	10.2	10.5		10.4	10.6	10.4		10.2		10.3	10.6		
pH	8.3		8.2	8.2	8.2		8.2	8.3	8.2		8.3		8.2	8.2		
Cond. (µS/cm)	–			1166				1176						1191		
Initials	KS	KS		YML		KS		YML		JW		YML		YML		

Concentration	Days															
	35	36		37		38		39		40		41		42		
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)																
DO (mg/L)																
pH																
Cond. (µS/cm)																
Initials																

Concentration	Days															
	35	36		37		38		39		40		41		42		
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)																
DO (mg/L)																
pH																
Cond. (µS/cm)																
Initials																

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site		
Hardness*	10	595		
Alkalinity*	8	—		

* mg/L as CaCO3

Analysts: KS, YYL, JW
Reviewed by:
Date reviewed:

Sample Description: Slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR- FRB & RG
Work Order #: 15426

Start Date & Time: June 1, 2015 @ 1935h
Stop Date & Time: July 15, 2015 @ 1400h
Test Species: O. clarkii

Dechlor

Concentration	Days														
	42	43		44 Final		45		46		47		48		49	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)	11.5		12.0		11.5										
DO (mg/L)	10.3		10.4		10.5										
pH	7.1		7.0		7.0										
Cond. (µS/cm)	–				36										
Initials	YYL	KS			YYL										

Fording

Concentration STte	Days														
	42	43		44 Final		45		46		47		48		49	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)	11.5		12.0		11.5										
DO (mg/L)	10.4		10.4		10.6										
pH	8.2		8.1		8.2										
Cond. (µS/cm)	–				1192										
Initials	YYL	KS			YYL										

Concentration	Days														
	42	43		44		45		46		47		48		49	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

Concentration	Days														
	42	43		44		45		46		47		48		49	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	STte		
Hardness*	8	595		
Alkalinity*	8	–		

* mg/L as CaCO3

Analysts: YYL, KS
Reviewed by:
Date reviewed:

Sample Description: Slightly yellow with particulate

Comments:

Chronic
~~Embryo-Alevin~~ Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR- FRBGRG
Work Order #: 15426

Start Date & Time: June 3, 2015 @ 2 (KS) 19351
Stop Date & Time: July 15, 2015 @ 1115h (F4-F8)
July 16, 2015 @ 1130 (F9-F1
Test Species: → O. clarkii

Dechlor

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	12.5		12.5	13.0	12.5		12.0		12.0	12.5	12.0		12.0	12.5
DO (mg/L)	10.6		10.5	10.5	10.5		10.6		10.6	10.5	10.6		10.4	10.6
pH	6.9		6.9	6.9	7.1		7.1		7.0	7.2	7.0		7.2	7.1
Cond. (µS/cm)	29			30						29				31
Initials	YML	YML		YML		m		m		KS		KS		YML

Fording Site

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	12.5		12.5	13.0	12.5		12.0		12.0	12.5	12.0		12.5	12.5
DO (mg/L)	10.7		10.7	10.5	10.4		10.6		10.6	10.6	10.8		10.3	10.3
pH	7.7		7.9	7.9	8.0		8.1		8.1	8.3	8.3		8.1	8.1
Cond. (µS/cm)	1150			1165						1171				1117
Initials	YML	YML		YML		m		m		KS		KS		YML

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site
Hardness*	8	608
Alkalinity*	6	—

* mg/L as CaCO3

Analysts: AWD, YML, KS
Reviewed by:
Date reviewed:

Sample Description: Slightly yellow with particulate

Comments:

F9-F12

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR- FRBGRG
Work Order #: 15426

Start Date & Time: June 3 2015 @ 1.
Stop Date & Time: July 15, 2015 @ 1115 h (F4-F8)
Test Species: July 16, 2015 @ 1130 h (F9-F12)
→ O. clarkii

Rechlor Concentration

	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	12.5		12.5	13.0	12.5		12.5		12.5	12.0	13.0		12.0	12.5
DO (mg/L)	10.5		10.5	10.5	10.4		10.5		10.7	10.5	10.2		10.5	10.4
pH	7.0		7.0	7.01	7.0		7.0		6.9	7.1	7.12		7.0	7.1
Cond. (µS/cm)	–			34						31				31
Initials	YML	KS		KS		A		A		KS		YML		YML

Fording Concentration Site

	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	12.5		12.5	13.0	12.5		12.5		12.5	12.0	12.5		12.0	12.5
DO (mg/L)	10.4		10.4	10.4	10.5		10.7		12.6	10.6	10.6		10.4	10.5
pH	8.3		8.2	8.1	8.1		8.2		8.3	8.3	8.3		7.9	8.0
Cond. (µS/cm)	–			1185						1154				1141
Initials	YML	KS		KS		A		A		KS		YML		YML

Concentration	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 213 pH meter: 213 Conductivity meter: 213

	Control	site		
Hardness*	8	617		
Alkalinity*	6	—		

* mg/L as CaCO3

Analysts: AWD, VYL, KS
Reviewed by:
Date reviewed:

Sample Description: Slightly yellow with particulate

Comments:

F4-F12

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR-FR BG RG
Work Order #: 15426

Start Date & Time: June 3 2015 @ 1935h
Stop Date & Time: July 15, 2015 @ 1115h (F4-F8)
Test Species: July 16, 2015 @ 1130h (F9-F12)
→ O. clarkii

Rechlor Concentration

	Days														
	14	15		16		17		18		19		20		21	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)	11.5		12.0	12.0	12.0		12.0		12.0	12.5	12.0		12.0	12.5	
DO (mg/L)	10.7		10.4	10.4	10.4		10.4		10.5	10.5	10.6		10.5	10.6	
pH	7.0		7.2	7.1	7.2		7.0		7.1	7.1	7.2		7.2	7.0	
Cond. (µS/cm)	–			30						30				31	
Initials	YWL	KS		KS		AD		AD		KS		KS		YWL	

Fording Coal Site Concentration

	Days														
	14	15		16		17		18		19		20		21	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)	11.5		12.0	12.0	12.0		12.0		12.0	12.5	12.0		12.0	11.5	
DO (mg/L)	10.6		10.6	10.6	10.7		10.5		10.6	10.6	10.8		10.7	10.4	
pH	8.1		8.1	8.1	8.1		8.1		8.2	8.3	8.3		8.2	8.1	
Cond. (µS/cm)	–			1160						1168				1153	
Initials	YWL	KS		KS		AD		AD		KS		KS		YWL	

Concentration	Days														
	14	15		16		17		18		19		20		21	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

Concentration	Days														
	14	15		16		17		18		19		20		21	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site		
Hardness*	18	n/a		
Alkalinity*	8	–		

* mg/L as CaCO3

Analysts: YWL, AWD, KS
Reviewed by:
Date reviewed:

Sample Description: slightly yellow with particulat

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder KS
Sample ID: FR-FRB/RG
Work Order #: 15426

Start Date & Time: June 3, 2015 @ 1935h
Stop Date & Time: July 15, 2015 @ 1115h (F4-F8)
Test Species: July 16, 2015 @ 1130h (F9-F12) → O. clarkii

Rechlor Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5		11.5	12.0	11.5		12.0		12.0	13.0	11.5		11.5	13.0
DO (mg/L)	10.4		10.6	10.4	10.6		10.4		10.6	10.6	10.7		10.6	10.5
pH	7.2		7.1	7.1	7.2		7.1		7.2	7.2	7.2		7.1	7.0
Cond. (µS/cm)	—			30						33				32
Initials	YWL	KS		KS						KS		KS		KLP

Fording Concentration STHE	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5		11.5	12.5	11.5		12.0		12.0	12.0	11.5		11.5	13.0
DO (mg/L)	10.5		10.7	10.5	10.7		10.5		10.7	10.5	10.7		10.7	10.5
pH	8.1		~~8.1~~ 8.2	8.2	8.3		8.4		8.5	8.4	8.3		8.2	8.3
Cond. (µS/cm)	—			1093						1176				1160
Initials	YWL	KS		KS						KS		KS		KLP

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 213 **pH meter:** 213 **Conductivity meter:** 213

	Control	STHE		
Hardness*	10	575		
Alkalinity*	8	—	2	

* mg/L as CaCO3

Analysts: YWL, AWD, KS, KLP
Reviewed by:
Date reviewed:

Sample Description: Slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR-FRBGRG
Work Order #: 15426

Start Date & Time: June 3, 2015 @ 1935h
Stop Date & Time: July 15, 2015 @ 1115h (F4-F8)
Test Species: July 16, 2015 @ 1130h (F9-F12)
↳ D. clarkii

Dechlor

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	12.0		12.0	13.0	11.5		12.0		12.0	12.5	11.5		11.5	12.5
DO (mg/L)	10.4		10.6	10.2	10.5		10.4		10.6	10.5	10.7		10.6	10.7
pH	7.3		7.2	7.0	7.1		7.0		7.1	7.1	7.2		7.0	7.1
Cond. (µS/cm)	–			32						31				32
Initials	KLP	KS		YYL		A		A		KS		KS		YYL

Fording

Concentration Site	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	12.0		11.5	12.0	11.5		12.0		12.0	12.0	11.5		11.5	12.0
DO (mg/L)	10.9		10.6	10.5	10.7		10.6		10.8	10.4	10.6		10.5	10.2
pH	8.3		8.2	8.1	8.1		8.2		8.3	8.2	8.2		8.2	8.2
Cond. (µS/cm)	–			1161						1171				1166
Initials	KLP	KS		YYL		A		A		KS		KS		KS

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 **pH meter:** 2/3 **Conductivity meter:** 2/3

	Control	SITE		
Hardness*	10	595		
Alkalinity*	8	–		

* mg/L as CaCO3

Analysts: KLP, KS, YYL, AWD
Reviewed by:
Date reviewed:

Sample Description: Slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR-FRBGRG
Work Order #: 15426

Start Date & Time: June 3, 2015 @
Stop Date & Time: July 15, 2015 @ 11 15h (F4-
Test Species: July 16, 2015 @ 11 30h (F9-F1a
→ O. clarkii

Dechlor Concentration	Days													
	35	36		37		38		39		40		41		42
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	12.0		11.5	13.0	11.5		12.0		12.0	12.5	11.5		11.5	12.0
DO (mg/L)	10.4		10.6	10.4	10.3		10.2		10.4	10.7	10.5		10.5	10.4
pH	7.1		7.1	7.2	7.1		7.2		7.0	7.2	7.1		7.0	6.9
Cond. (µS/cm)	–			32						32				32
Initials	YYL	KS		YYL		JW		YYL		YYL		KS		KS

Fording Concentration Site	Days													
	35	36		37		38		39		40		41		42
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	12.0		11.5	12.0	11.5		12.0		12.0	12.5	11.5		11.5	12.0
DO (mg/L)	10.6		10.7	10.6	10.4		10.2		10.2	10.6	10.5		10.7	10.5
pH	8.2		8.3	8.3	8.2		8.3		8.2	8.2	8.2		8.1	8.2
Cond. (µS/cm)	–			1176						1191				1192
Initials	YYL	KS		YYL		JW		YYL		YYL		KS		KS

Concentration	Days													
	35	36		37		38		39		40		41		42
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	35	36		37		38		39		40		41		42
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site		
Hardness*	10	595		
Alkalinity*	8	–		

* mg/L as CaCO3

Analysts: YYL, KS, JW

Reviewed by:

Date reviewed:

Sample Description: Slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR- FRBG, RG
Work Order #: 15426

Start Date & Time: June 3 2015 @ 1935h
Stop Date & Time: July 15, 2015 @ 1115h (F1-F8)
Test Species: July 16, 2015 @ 1130h (F9-F12)
→ C. dubia

Dechlor

Concentration	Days														
	42 (1)	43 Rinse (2)		44		45		46		47		48		49	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)	11.5		11.5												
DO (mg/L)	10.4		10.4												
pH	7.0		7.0												
Cond. (µS/cm)	39	37													
Initials	YYL	YYL													

Fording

Concentration STHE	Days														
	42 (1)	43 (2)		44		45		46		47		48		49	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)	11.5		11.5												
DO (mg/L)	10.1		10.7												
pH	8.2		8.1												
Cond. (µS/cm)	1197	1197													
Initials	YYL	YYL													

Concentration	Days														
	42	43		44		45		46		47		48		49	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

Concentration	Days														
	42	43		44		45		46		47		48		49	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	STHE		
Hardness*	8	595		
Alkalinity*	8			

* mg/L as CaCO3

Analysts: YYL
Reviewed by:
Date reviewed:

Sample Description: slightly yellow with particulate

Comments: ① F1-F8 terminated, F9-F12 ongoing ② F9-F12 terminated

FT3

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR- FRBG/RG
Work Order #: 15426

Start Date & Time: June 5, 2015 @ 2015h
Stop Date & Time: July 16/2015 @ 1130h
Test Species: O. clarkii

Dechlor Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	12.5		12.0		12.0	12.5	12.5		13.0	12.5	12.5		12.0	13.0
DO (mg/L)	10.5		10.6		10.5	10.5	10.8		10.4	10.6	10.4		10.5	10.5
pH	6.9		7.0		7.1	7.2	6.9		7.1	7.1	7.0		7.0	7.1
Cond. (µS/cm)	30					29				31				34
Initials	YWL					KS			KS	YWL		KS		KS

Fording Concentration Site	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	12.5		12.0		12.0	12.5	12.5		13.0	12.5	12.5		13.0	13.0
DO (mg/L)	10.5		10.6		10.5	10.6	10.9		10.5	10.3	10.5		10.5	10.4
pH	7.9		8.0		8.1	8.3	8.3		8.2	8.1	8.3		8.3	8.1
Cond. (µS/cm)	1164					1171				1117				1185
Initials	MWL					KS			KS	YWL		KS		KS

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site		
Hardness*	8	616		
Alkalinity*	6			

* mg/L as CaCO3

Analysts: YWL, AWD, KS

Reviewed by:

Date reviewed:

Sample Description: slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR- FRB6R6
Work Order #: 15426

Start Date & Time: June 5/15 @ 20 15h
Stop Date & Time: July 16, 15 @ 1130 h
Test Species: O. clarkii

Dechlor

Concentration	Days 7 old	8 new	8 old	9 new	9 old	10 new	10 old	11 new	11 old	12 new	12 old	13 new	13 old	14 new
Temperature (°C)	12.5		12.5		12.5	12.0	12.5		12.0	12.5	11.5		12.0	12.0
DO (mg/L)	10.5		10.6		10.4	10.5	10.2		10.4	10.4	10.6		10.5	10.4
pH	7.1		7.0		7.1	7.1	7.52		7.0	7.0	6.9		7.2	7.1
Cond. (µS/cm)	—					31				31				30
Initials	KS					KS		YYL		YYL		KS		KS

Fording

Concentration Site	Days 7 old	8 new	8 old	9 new	9 old	10 new	10 old	11 new	11 old	12 new	12 old	13 new	13 old	14 new
Temperature (°C)	12.5		12.5		12.5	12.0	13.0		12.0	12.5	11.5		12.5	12.0
DO (mg/L)	10.6		10.6		12.4	10.46	10.6		10.2	10.5	10.7		10.6	10.6
pH	8.1		8.1		8.3	8.3	8.3		8.0	8.0	8.1		8.2	8.1
Cond. (µS/cm)	—					1154				1141				~~1160~~ KS 1160
Initials	KS					KS		YYL		YYL		KS		~~KS~~ KS

Concentration	Days 7 old	8 new	8 old	9 new	9 old	10 new	10 old	11 new	11 old	12 new	12 old	13 new	13 old	14 new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days 7 old	8 new	8 old	9 new	9 old	10 new	10 old	11 new	11 old	12 new	12 old	13 new	13 old	14 new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 **pH meter:** 2/3 **Conductivity meter:** 2/3

	Control	Site		
Hardness*	8	n/a		
Alkalinity*	6	—		

* mg/L as CaCO3

Analysts: YYL, AWD, KS
Reviewed by:
Date reviewed:

Sample Description: Slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR- FRBGRG
Work Order #: 15426

Start Date & Time: June 5, 2015 @ 2015h
Stop Date & Time: July 16, 2015 @ 1130 h
Test Species: O. clarkii

Dechlor

Concentration	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	12.0		12.0		12.0	12.5	12.0		12.5	12.5	11.5		11.5	12.5
DO (mg/L)	10.4		10.3		10.5	10.5	10.6		10.6	10.6	10.7		10.5	10.4
pH	7.2		7.0		7.1	7.1	7.3		7.2	7.0	7.2		7.1	7.1
Cond. (µS/cm)	-					30				31				30
Initials	KS					KS		KS		YYL		KS		KS

Fording site

Concentration	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	13.0		12.0		12.0	12.5	11.5		11.5	12.0	11.5		11.5	12.5
DO (mg/L)	10.7		10.4		10.5	10.6	10.8		10.6	10.4	10.6		10.5	10.7
pH	8.1		8.2		8.3	8.3	8.3		8.2	8.1	8.1		8.2	8.2
Cond. (µS/cm)	-					1168				1158				1093
Initials	KS					KS		KS		YYL		KS		KS

Concentration	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 **pH meter:** 2/3 **Conductivity meter:** 2/3

	Control	Site		
Hardness*	10	575		
Alkalinity*	8	-		

* mg/L as CaCO3

Analysts: YYL, AWD, KS
Reviewed by:
Date reviewed:

Sample Description: slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR - FRBK RS RG
Work Order #: 15426

Start Date & Time: June 5, 2015 @ 20 h
Stop Date & Time: July 16, 2015 @ 11 30h
Test Species: O. clarkii

Dechlor Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5		12.0		12.0	13.0	11.5		11.5	13.0	11.5		11.5	13.0
DO (mg/L)	10.6		10.6		10.7	10.6	10.7		10.6	10.5	10.6		10.7	10.2
pH	7.3		7.1		7.2	7.2	7.3		7.1	7.0	7.4		7.3	7.0
Cond. (µS/cm)	–					33				32				32
Initials	KS		AD		AD	KS		KS		KLP		KS		YYL

Fording Concentration Site	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5		12.0		12.0	12.0	11.5		11.5	13.0	11.5		11.5	12.0
DO (mg/L)	10.8		10.6		10.7	10.5	10.7		10.8	10.5	10.7		10.6	10.5
pH	8.3		8.4		8.5	8.4	8.3		8.1	8.3	8.3		8.3	8.1
Cond. (µS/cm)	–					1176				1160				1161
Initials	KS		AD		AD	KS		KS		KLP		KS		YYL

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 **pH meter:** 2/3 **Conductivity meter:** 2/3

	Control	Site		
Hardness*	10	595		
Alkalinity*	8	–		

* mg/L as CaCO3

Analysts: YYL, AWD, KS, KLP
Reviewed by:
Date reviewed:

Sample Description: Slightly yellow with particulat

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR- FRB&RG
Work Order #: 15426

Start Date & Time: June 5, 2015 @ 2015h
Stop Date & Time: July 16, 2015 @ 1130h
Test Species: O. clarkii

Rechlor Concentration	Days														
	28	29		30		31		32		33		34		35	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	new
Temperature (°C)	11.5		12.0		12.0	12.5	11.5		11.5	12.5	12.0		11.5	13.0	
DO (mg/L)	10.5		10.6		10.7	10.5	10.8		10.7	10.1	10.5		10.8	10.4	
pH	7.1		7.0		7.0	7.1	7.2		7.2	7.1	7.1		7.2	7.2	
Cond. (µS/cm)	-					31				32				32	
Initials	YYL					KS		KS		YYL		KS		YYL	

Fording Concentration Site	Days														
	28	29		30		31		32		33		34		35	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	new
Temperature (°C)	11.5		12.0		12.0	12.0	11.5		11.5	12.0	12.0		11.5	12.0	
DO (mg/L)	10.6		10.7		10.6	10.4	10.6		10.6	10.2	10.5		10.7	10.6	
pH	8.1		8.2		8.3	8.2	8.3		8.2	8.2	8.2		8.2	8.3	
Cond. (µS/cm)	-					1171				1166				1176	
Initials	YYL					KS		KS		YYL		KS		YYL	

Concentration	Days														
	28	29		30		31		32		33		34		35	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	new
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

Concentration	Days														
	28	29		30		31		32		33		34		35	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	new
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

DO meter: 2/3 **pH meter:** 2/3 **Conductivity meter:** 2/3

	Control	Site		
Hardness*	10	595		
Alkalinity*	8	-		

* mg/L as CaCO3

Analysts: KS, YYL, AWD

Reviewed by:

Date reviewed:

Sample Description: slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR-FRBØRG
Work Order #: 15426

Start Date & Time: June 5, 2015 @ 2015h
Stop Date & Time: July 16, 2015 @ 1130h
Test Species: O. clarkii

Dechlor Concentration	Days													
	35	36		37		38		39		40		41 final		42
	old	new	old	new	old	new	old	new	old	new	old	new	~~old~~	new
Temperature (°C)	11.5		12.0		12.0	12.5	11.5		11.5	12.0	11.5		11.5	
DO (mg/L)	10.4		10.2		10.4	10.7	10.5		10.6	10.4	10.6		10.5	
pH	7.1		7.0		7.1	7.2	7.1		7.0	6.9	7.2		6.9	
Cond. (µS/cm)	–					32				32		35		
Initials	YYL	JW		YYL		YYL		KS		KS		YYL		

Fording Concentration Site	Days													
	35	36		37		38		39		40		41 final		42
	old	new	old	new	old	new	old	new	old	new	old	new	~~old~~	new
Temperature (°C)	11.5		12.0		12.0	12.5	11.5		11.5	12.0	11.0		11.5	
DO (mg/L)	10.3		10.2		10.5	10.6	10.3		10.5	10.5	10.5		10.7	
pH	8.2		8.1		8.2	8.2	8.2		8.1	8.2	8.2		8.1	
Cond. (µS/cm)	–					1191				1192		1196		
Initials	YYL	JW		YYL		YYL		KS		KS		YYL		

Concentration	Days													
	35	36		37		38		39		40		41		42
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	35	36		37		38		39		40		41		42
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site		
Hardness*	10	654		
Alkalinity*	8	–		

* mg/L as CaCO3

Analysts: YYL, KS, JW

Reviewed by:

Date reviewed:

Sample Description: Slightly yellow with particulate

Comments:

F14-F20

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR- FRB@R6
Work Order #: 15486

Start Date & Time: June 11, 2015 @ 2150h
Stop Date & Time: July 24, 2015 @ 1000h
Test Species: O. clarkii

Dechlor

Concentration	Days 0 init.	1 new	1 old	2 new	2 old	3 new	3 old	4 new	4 old	5 new	5 old	6 new	6 old	7 new
Temperature (°C)	11.5	13.0	13.0		12.5		12.5	12.0	12.5		12.0	12.5	11.5	
DO (mg/L)	10.5	10.5	10.2		10.2		10.6	10.5	10.5		10.3	10.4	10.7	
pH	6.9	7.1	7.1		7.0		7.0	7.1	7.1		7.0	7.0	6.9	
Cond. (µS/cm)	32	34										31		
Initials	YML	KS		AWD		AWD		KS		YML		YML		

Fording Site

Concentration	Days 0 init.	1 new	1 old	2 new	2 old	3 new	3 old	4 new	4 old	5 new	5 old	6 new	6 old	7 new
Temperature (°C)	11.5	13.0	12.5		12.5		12.5	12.0	12.5		12.0	12.5	11.5	
DO (mg/L)	10.6	10.4	10.6		10.4		10.5	10.46	10.6		10.4	10.5	10.5	
pH	7.9	8.1	8.0		8.5		8.4	8.3	8.3		7.9	8.0	8.0	
Cond. (µS/cm)	1148	1185										1141		
Initials	YML	KS		AWD		AWD		KS		YML		YML		

Concentration	Days 0 init.	1 new	1 old	2 new	2 old	3 new	3 old	4 new	4 old	5 new	5 old	6 new	6 old	7 new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days 0 init.	1 new	1 old	2 new	2 old	3 new	3 old	4 new	4 old	5 new	5 old	6 new	6 old	7 new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 213 pH meter: 213 Conductivity meter: 213

	Control	Site		
Hardness*	8	119		
Alkalinity*	6	—		

* mg/L as CaCO3

Analysts: YML, KS, AWD

Reviewed by:

Date reviewed:

Sample Description: Slightly yellow with pulp

Comments:

F14-F20

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR- FRBGRG
Work Order #: 15426

Start Date & Time: June 11, 2015 @ 2150h
Stop Date & Time: July 24, 2015 @ 1000 h
Test Species: O. clarkii

Dechlor

Concentration	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	12.5	12.0	11.5		12.0		12.0	12.5	12.0		11.5	12.5	11.5	
DO (mg/L)	10.5	10.4	10.5		10.4		10.5	10.5	10.5		10.5	10.6	10.4	
pH	7.3	7.1	7.1		7.0		7.1	7.1	7.3		7.1	7.0	7.2	
Cond. (µS/cm)	–	30						30				31		
Initials	KS	KS		A		A		KS		KS		YMC		

Fording

Concentration	Days													
Site	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	12.0	12.0	12.0		12.0		12.0	12.5 KS	12.0		12.0	12.0	11.5	
DO (mg/L)	10.6	10.6	10.7		10.5		10.6	10.76	10.6		10.7	10.4	10.6	
pH	8.2	8.1	8.1		8.1		8.3	8.3	8.3		8.3	8.1	8.2	
Cond. (µS/cm)	–	1160						1168				1158		
Initials	KS	KS		A		A		KS		KS		YMC		

Concentration	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site		
Hardness*	10	n/a		
Alkalinity*	8	–		

* mg/L as CaCO3

Analysts: YML, KS, AWD
Reviewed by:
Date reviewed:

Sample Description: Slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR-FROGRG
Work Order #: 15426

Start Date & Time: June 11, 2015 @ 21 50h
Stop Date & Time: Jul 24, 2015 @ 10 00 h
Test Species: C. dubia

Dechlor — Concentration

	Days 14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5	12.0	11.5		12.3		12.0	13.0	11.5		11.5	13.0	12.0	
DO (mg/L)	10.6	10.4	10.5		10.5		10.6	10.6	10.8		10.6	10.5	10.6	
pH	7.2	7.1	7.2		7.1		7.2	7.2	7.3		7.2	7.0	7.4	
Cond. (µS/cm)	—	30						33				32		
Initials	KS	KS						KS		KS		KLP		—

Fording Site — Concentration

	Days 14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5	12.5	11.5		12.0		12.3	12.0	11.5		11.5	13.0	12.0	
DO (mg/L)	10.6	10.5	10.8		10.6		10.8	10.5	10.8		10.6	10.5	10.6	
pH	8.1	8.2	8.1		8.3		8.4	8.4	8.3		8.2	8.3	8.2	
Cond. (µS/cm)	—	1093						1176				1160		
Initials	KS	KS						KS		KS		KLP		—

Concentration — Days

	14	15		16		17		18		19		20		21
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration — Days

	14		15		16		17		18		19		20		21
	old	new	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

DO meter: 2/3

Conductivity meter: 2/3

	Control	Site
Hardness*	10	575
Alkalinity*	8	—

* mg/L as CaCO3

Analysts: ~~KLP~~ KS, AWD, KLP

Reviewed by:

Date reviewed:

Sample Description: Slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR- FRBKRG
Work Order #: 15426

Start Date & Time: June 11, 2015 @ 21:
Stop Date & Time: July 24, 2015 @ 10:00 h
Test Species: C. dubia

Dechlor Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5	13.0	11.5		12.0		12.0	12.5	11.5		11.5	13.5	12.0	
DO (mg/L)	10.5	10.2	10.6		10.6		10.5	10.5	10.8		10.8	10.7	10.6	
pH	7.2	7.0	7.1		7.0		7.0	7.1	7.2		7.2	7.1	7.1	
Cond. (µS/cm)	-	32						31				32		
Initials	KS	YML		A		A		KS		KS		YML		

Forelyne Concentration Site	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5	12.0	11.5		12.0		12.0	12.0	11.5		11.5	12.0	12.0	
DO (mg/L)	10.6	10.5	10.7		10.6		10.6	10.4	10.6		10.7	10.2	10.6	
pH	8.2	8.1	8.2		8.2		8.3	8.2	8.3		8.1	8.2	8.1	
Cond. (µS/cm)	-	1161						1171				1166		
Initials	KS	YML		A		A		KS		KS		YML		

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 **pH meter:** 2/3 **Conductivity meter:** 2/3

	Control	Site		
Hardness*	10	595		
Alkalinity*	8	~		

* mg/L as CaCO3

Analysts: KS, YL, AWD
Reviewed by:
Date reviewed:

Sample Description: slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR-FRBGRG
Work Order #: 15426

Start Date & Time: June 11, 2015 @ 21 5c
Stop Date & Time: July 24, 2015 @ 10 00 h
Test Species: O clarkii

Concentration: Dechlor	Days 28 old	29 new	29 old	30 new	30 old	31 new	31 old	32 new	32 old	33 new	33 old	34 new	34 old	35 new
Temperature (°C)	11.5	13.0	11.5	\	12.0	\	12.0	12.5	11.5	\	11.5	12.0	11.5	\
DO (mg/L)	10.7	10.4	10.3	\	10.3	\	10.4	10.7	10.5	\	10.6	10.4	10.5	\
pH	7.2	7.2	7.1	\	7.1	\	7.1	7.2	7.1	\	7.0	6.9	7.2	\
Cond. (µS/cm)	–	32		\		\		32		\		32		\
Initials	KS	YYL		JW		YYL		YYL		KS		KS		

Concentration: Fording Site	Days 28 old	29 new	29 old	30 new	30 old	31 new	31 old	32 new	32 old	33 new	33 old	34 new	34 old	35 new
Temperature (°C)	11.5	12.0	11.5	\	12.0	\	12.0	12.5	11.5	\	11.5	12.0	11.0	\
DO (mg/L)	10.8	10.6	10.3	\	10.4	\	10.5	10.6	10.5	\	10.7	10.5	10.8	\
pH	8.3	8.3	8.2	\	8.3	\	8.2	8.2	8.2	\	8.2	8.2	8.3	\
Cond. (µS/cm)	–	1176		\		\		1191		\		1192		\
Initials	KS	YYL		JW		YYL		YYL		KS		KS		

Concentration	Days 28 old	29 new	29 old	30 new	30 old	31 new	31 old	32 new	32 old	33 new	33 old	34 new	34 old	35 new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days 28 old	29 new	29 old	30 new	30 old	31 new	31 old	32 new	32 old	33 new	33 old	34 new	34 old	35 new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site		
Hardness*	10	659		
Alkalinity*	8	–		

* mg/L as CaCO3

Analysts: KS, JW, YYL
Reviewed by:
Date reviewed:

Sample Description: slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR- FRBGRG
Work Order #: 15426

Start Date & Time: June 11, 2015 @ 2150h
Stop Date & Time: July 24, 2015 @ 1000h
Test Species: O. clarkii

Dechlor

Concentration	Days													
	35	36		37		38		39		40		41		42
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	12.0	13.0	11.5		12.0		12.0	12.0	11.5		11.5	12.5	11.5	
DO (mg/L)	10.5	10.3	10.5		10.6		10.5	10.3	10.5		10.3	10.4	10.6	
pH	6.9	6.9	7.1		7.1		7.0	6.9	7.0		6.8	7.0	7.1	
Cond. (µS/cm)	–	32						33				31		
Initials	KS	YML						YML		BPL		KS		–

Fording

Concentration Site	Days													
	35	36		37		38		39		40		41		42
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5	12.0	11.5		12.0		12.0	12.0	11.5		11.5	12.0	11.5	
DO (mg/L)	10.3	10.7	10.6		10.2		10.6	10.4	10.5		10.2	10.4	10.5	
pH	8.1	8.2	8.2		8.2		8.2	8.2	8.2		8.0	8.2	8.1	
Cond. (µS/cm)	–	1185						1190				1196		
Initials	KS	YML						YML		BPL		KS		–

Concentration	Days													
	35	36		37		38		39		40		41		42
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	35	36		37		38		39		40		41		42
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site		
Hardness*	8	65f		
Alkalinity*	8	–		

* mg/L as CaCO3

Analysts: KS, YML, AWD, BPL
Reviewed by:
Date reviewed:

Sample Description: slightly yellow with particulat

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR – FRBG, RG
Work Order #: 15426

Start Date & Time: June 11, 2015 @ 2150h
Stop Date & Time: July 24, 2015 @ 10 00
Test Species: O. clarkii

Concentration: Dechlor	Days													
	42	43 (2nd)		44		45		46		47		48		49
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	12.0		11.5											
DO (mg/L)	10.6		10.5											
pH	6.9		6.9											
Cond. (µS/cm)	–		38											
Initials	KS		KS											

Concentration: Fording Site	Days													
	42	43 (2nd)		44		45		46		47		48		49
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	12.5		11.5											
DO (mg/L)	10.3		10.3											
pH	8.0		8.3											
Cond. (µS/cm)	–	1199												
Initials	KS	KS												

Concentration	Days													
	42	43		44		45		46		47		48		49
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	42	43		44		45		46		47		48		49
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 213 **pH meter:** 213 **Conductivity meter:** 213

	Control	Site		
Hardness*	8	654		
Alkalinity*	8	–		

* mg/L as CaCO3

Analysts: KS

Reviewed by:

Date reviewed:

Sample Description: slightly yellow with particulate

Comments:

F28

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR- FRBG RG
Work Order #: 15426

Start Date & Time: June 15, 2015 @ 26 40h
Stop Date & Time: July 27, 2015 @ 09 30h
Test Species: O. clarkii

Dechlor

Concentration	Days 0 init.	1 new	1 old	2 new	2 old	3 new	3 old	4 new	4 old	5 new	5 old	6 new	6 old	7 new
Temperature (°C)	12.0		12.0	12.5	11.5		12.5	12.0	12.0		12.0		12.0	12.5
DO (mg/L)	10.5		10.5	10.4	10.7		10.5	10.4	10.5		10.5		10.6	10.5
pH	6.9		7.0	7.0	6.9		7.1	7.1	7.1		7.0		7.1	7.1
Cond. (µS/cm)	32			31				30						30
Initials	YYL	YYL		YYL		KS		KS		A		A		KS

Fording Site

Concentration	Days 0 init.	1 new	1 old	2 new	2 old	3 new	3 old	4 new	4 old	5 new	5 old	6 new	6 old	7 new
Temperature (°C)	12.0		12.0	12.5	11.3		11.5	12.0	12.0		12.0		12.0	12.5
DO (mg/L)	10.6		10.3	10.5	10.3		10.6	10.6	10.7		10.5		10.6	10.6
pH	7.9		8.0	8.0	8.1		8.2	8.1	8.1		8.2		8.3	8.3
Cond. (µS/cm)	1167			1141				1160						1168
Initials	YYL	YYL		YYL		KS		KS		A		A		KS

Concentration	Days 0 init.	1 new	1 old	2 new	2 old	3 new	3 old	4 new	4 old	5 new	5 old	6 new	6 old	7 new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days 0 init.	1 new	1 old	2 new	2 old	3 new	3 old	4 new	4 old	5 new	5 old	6 new	6 old	7 new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 213 pH meter: 213 Conductivity meter: 213

	Control	Site
Hardness*	10	~~10~~ 11 9
Alkalinity*	8	—

* mg/L as CaCO3

Analysts: YYL, AWD, KS
Reviewed by:
Date reviewed:

Sample Description: Slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR- FRB~~6~~ RG
Work Order #: 15426

Start Date & Time: June 15, 2015 @ 20 40h
Stop Date & Time: July 27, 2015 @09 30h
Test Species: O. clarkii

Dechlor Concentration	Days 7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5		12.5	12.5	11.5		11.5	12.0	11.5		12.0		12.0	13.0
DO (mg/L)	10.6		10.5	10.6	10.5		10.7	10.4	10.6		10.4		10.5	10.6
pH	7.3		7.2	7.0	7.2		7.2	7.1	7.3		7.1		7.2	7.2
Cond. (µS/cm)	–			31				30						33
Initials	KS	KS		[illegible]		KS		KS		[illegible]		[illegible]		KS

Fonding Concentration Site	Days 7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5		12.5	12.0	11.5		11.5	12.5	11.5		12.0		12.0	11.5
DO (mg/L)	10.8		10.7	10.4	10.7		10.7	10.5	10.7		10.5		10.7	~~8~~ 10.5
pH	8.3		8.2	8.1	8.1		8.2	8.2	8.2		8.3		8.4	8.4
Cond. (µS/cm)	–			1158				1093						1176
Initials	KS	KS		[illegible] ~~1158~~ [illegible]		KS		KS		[illegible]		[illegible]		KS

Concentration	Days 7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days 7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site		
Hardness*	10	575		
Alkalinity*	8	–		

* mg/L as CaCO3

Analysts: YYL, AWD, KS

Reviewed by:
Date reviewed:

Sample Description: slightly yellow with particulate

Comments:

Version 1.0 Issued June 26, 2006

Nautilus Environmental

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR- FRBG RG
Work Order #: 154726

Start Date & Time: June 15, 2015 @ 2040h
Stop Date & Time: June 27, 2015 @ 0930h
Test Species: O. clarkii

Dechlor Concentration

	Days															
	14	15		16		17		18		19		20		21		
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5		11.5	13.0	12.0		11.5	13.0	11.5		12.0		12.0		12.5	
DO (mg/L)	10.8		10.7	10.5	10.6		10.7	10.2	10.4		12.6		10.7		10.5	
pH	7.3		7.2	7.0	7.4		7.2	7.0	7.1		7.0		7.0		7.1	
Cond. (µS/cm)	–			32				32							31	
Initials	KS	KS		KLP		KS		YNL		A		A			KS	

Fording Concentration Site

	Days															
	14	15		16		17		18		19		20		21		
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5		11.5	13.0	12.0		11.5	12.0	11.5		12.0		12.0		12.0	
DO (mg/L)	10.8		10.7	10.5	10.6		10.8	10.5	10.6		10.8		10.7		10.4	
pH	8.3		8.2	8.3	8.3		8.2	8.1	8.2		8.1		8.3		8.2	
Cond. (µS/cm)	–			1160				1161							1171	
Initials	KS	KS		KLP		KS		YNL		A		A			KS	

	Days															
Concentration	14	15		16		17		18		19		20		21		
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)																
DO (mg/L)																
pH																
Cond. (µS/cm)																
Initials																

	Days															
Concentration	14	15		16		17		18		19		20		21		
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)																
DO (mg/L)																
pH																
Cond. (µS/cm)																
Initials																

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site		
Hardness*	10	595		
Alkalinity*	8	–		

* mg/L as CaCO3

Analysts: YNL, KS, AWD, KLP

Reviewed by:

Date reviewed:

Sample Description: slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder ES
Sample ID: FR-FR BG RG
Work Order #: 15426

Start Date & Time: June 15, 2015 @ 2040h
Stop Date & Time: June 27, 2015 @ 0930h
Test Species: O. clarkii

Dechlor Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5		11.5	12.0	12.0		11.5	13.0	11.5		12.0		12.0	12.5
DO (mg/L)	10.7		10.8	10.7	10.6		10.8	10.4	10.4		10.3		10.4	10.7
pH	7.3		7.2	7.1	7.2		7.2	7.2	7.1		7.2		7.1	7.2
Cond. (µS/cm)	—			32				32						32
Initials	KS	KS		YVL		KS		YVL		JW		YVL		YVL

Fording Concentration site	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5		11.5	12.0	12.0		12.0	12.0	11.5		12.0		12.0	12.5
DO (mg/L)	10.6		10.7	10.2	10.3		10.5	10.6	10.5		10.2		10.5	10.7
pH	8.4		8.2	8.2	8.2		8.3	8.3	8.3		8.2		8.2	8.2
Cond. (µS/cm)	—			1166				1176						1191
Initials	KS	KS		YVL		KS		YVL		JW		YVL		YVL

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 **pH meter:** 2/3 **Conductivity meter:** 2/3

	Control	Site		
Hardness*	10	595		
Alkalinity*	8			

* mg/L as CaCO3

Analysts: KS, YVL, JW
Reviewed by:
Date reviewed:

Sample Description: Slight yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR-FRBGRG
Work Order #: 15426

Start Date & Time: June 15, 2015 @ 2040h
Stop Date & Time: July 27th, 2015 @ 0930h
Test Species: O. clarkii

Concentration: Dechlor	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5		11.0	12.0	11.5		11.5	13.0	11.5		12.0		12.0	12.0
DO (mg/L)	10.5		10.7	10.4	10.6		10.6	10.3	10.6		10.7		10.6	10.3
pH	7.1		7.0	6.9	7.2		6.9	6.9	7.0		7.1		7.0	6.9
Cond. (µS/cm)	-			32				32						33
Initials	YYL	KS		KS		KS		YYL		A		A		YYL

Fording Concentration: site	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5		11.5	12.0	11.5		12.0	12.0	11.5		12.0		12.0	12.0
DO (mg/L)	10.6		10.8	10.5	10.8		10.6	10.7	10.6		10.8		10.7	10.4
pH	8.2		8.2	8.2	8.3		8.2	8.2	8.1		8.3		8.2	8.2
Cond. (µS/cm)	-			1192				1185						1190
Initials	YYL	KS		KS		KS		YYL		A		A		YYL

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	28	29		30		31		32		33		34		35
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site		
Hardness*	8	654		
Alkalinity*	8	-		

* mg/L as CaCO3

Analysts: YYL, KS, AND
Reviewed by:
Date reviewed:

Sample Description: slightly yellow with particulat

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR-FRBGRG
Work Order #: 15-426

Start Date & Time: June 15, 2015 @ 2040h
Stop Date & Time: July 27, 2015 @ 0930
Test Species: O. clarkii

Dechlor

Concentration	Days														
	35	36		37		38		39		40		41		42	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	Final
Temperature (°C)	11.5		11.5	11.5	11.5		12.0	12.0	11.5		12.0		12.0	11.5	
DO (mg/L)	10.5		10.1	10.4	10.4		10.6	10.4	10.6		10.4		10.5	10.5	
pH	7.0		6.8	7.0	7.1		7.0	6.8	6.8		7.0		7.2	7.2	
Cond. (µS/cm)	—			31				32						38	
Initials	YML	BPL		KS		KS		KS		A		M		KS	

Fording

Concentration	Days														
site	35	36		37		38		39		40		41		42	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	Final
Temperature (°C)	11.5		11.5	12.0	11.5		11.5	12.0	11.5		12.0		12.0	11.5	
DO (mg/L)	10.6		10.2	10.4	10.7		10.6	10.3	10.5		10.5		10.5	10.0	
pH	8.1		8.0	8.2	8.0		8.1	8.2	8.3		8.1		8.2	8.3	
Cond. (µS/cm)	—			1196				1188						1216	
Initials	YML	BPL		KS		KS		KS		A		M		KS	

Concentration	Days														
	35	36		37		38		39		40		41		42	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

Concentration	Days														
	35	36		37		38		39		40		41		42	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site		
Hardness*	8	654		
Alkalinity*	8	—		

* mg/L as CaCO3

Analysts: YML, BPL, KS, AWD

Reviewed by:

Date reviewed:

Sample Description: Slightly yellow with particulate

Comments:

F29-T350

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR- FRRGRG
Work Order #: 15426

Start Date & Time: June 18, 2015 @ 20 h
Stop Date & Time: July 30, 2015 @ 09 00h
Test Species: O. clarkii

Dechlor — Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	12.5	12.0	12.0		12.0		12.0	12.5	12.0		12.0	12.5	11.5	
DO (mg/L)	10.5	10.4	10.6		10.5		10.6	10.5	10.5		10.5	10.6	10.6	
pH	6.9	7.1	7.1		7.0		7.1	7.1	7.2		7.2	7.0	7.2	
Cond. (µS/cm)	31	30						30				31		
Initials	YYL	KS						KS		KS		YYL		

Fording — Concentration: Site

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	12.5	12.0	12.5		12.0		12.2	12.5	12.0		11.5	12.0	11.5	
DO (mg/L)	10.4	10.6	10.7		10.5		10.2	10.6	10.8		10.7	10.4	10.7	
pH	7.9	8.1	8.1		8.1		8.2	8.3	8.3		8.3	8.1	8.2	
Cond. (µS/cm)	1259	1160						1168				1158		
Initials	YYL	KS						KS		KS		YYL		

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3
pH meter: 2/3
Conductivity meter: 2/3 ~~YYL, AWD, KS~~ KS

	Control	Site		
Hardness*	10	n19		
Alkalinity*	8	—		

* mg/L as CaCO3

Analysts: YYL, AWD, KS
Reviewed by:
Date reviewed:

Sample Description: Slightly yellow with particulate
Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR- FRBG RG
Work Order #: 15426

Start Date & Time: June 18, 2015 @ 20 15h
Stop Date & Time: July 30, 2015 @ 0900h
Test Species: O. clarkii

Concentration Dechlor.	Days 7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5	12.0	11.5		12.0		12.0	13.0	11.5		11.5	13.0	12.5	
DO (mg/L)	10.7	10.4	10.5		10.5		10.6	10.6	10.8		10.5	10.5	10.5	
pH	7.2	7.1	7.2		7.1		7.2	7.2	7.3		7.2	7.0	7.2	
Cond. (µS/cm)	–	30						33				32		
Initials	KS	KS						KS		KS		KLP		–

Fording Site Concentration	Days 7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.6	12.5	12.0		12.0		12.0	12.0	11.5		11.5	13.0	12.5	
DO (mg/L)	10.7	10.5	10.6		10.6		10.7	10.5	10.8		10.6	10.5	10.6	
pH	8.2	8.2	8.3		F.6		8.4	8.4	8.4		8.2	8.3	8.3	
Cond. (µS/cm)	–	1093						1176				1160		
Initials	KS	KS						KS		KS		KLP		–

Concentration	Days 7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days 7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site		
Hardness*	10	575		
Alkalinity*	8			

* mg/L as CaCO3

Analysts: VHL, AWD, KS, KLP

Reviewed by:

Date reviewed:

Sample Description: Slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR-FRB@RG
Work Order #: 15426

Start Date & Time: June 18, 2015 @ 2015h
Stop Date & Time: June 30, 2015 @ 09 00h
Test Species: O. clarkii

Dechlor Concentration

	Days														
	14	15		16		17		18		19		20		21	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)	11.5	13.0	11.5		12.0		12.0	13.5	11.5		11.5	12.5	12.0		
DO (mg/L)	10.6	10.2	10.5		10.7		10.6	10.5	10.8		10.8	10.7	10.5		
pH	7.2	7.0	7.0		7.0		7.0	7.1	7.3		7.2	7.1	7.2		
Cond. (µS/cm)	—	32						31				32			
Initials	KS	YYL		A		A		KS		KS		YYL			

Fording Concentration Site

	Days														
	14	15		16		17		18		19		20		21	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)	11.5	12.0	11.5		12.0		12.0	12.0	11.5		11.5	12.0	12.0		
DO (mg/L)	10.5	10.5	10.7		10.6		10.7	10.4	10.6		10.8	10.2	10.5		
pH	8.3	8.1	8.1		8.1		8.3	8.2	8.4		8.3	8.2	8.3		
Cond. (µS/cm)	—	1161						1171				1166			
Initials	KS	YYL		A		A		KS		KS		YYL			

Concentration	Days														
	14	15		16		17		18		19		20		21	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

Concentration	Days														
	14	15		16		17		18		19		20		21	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

DO meter: 213 pH meter: 213 Conductivity meter: 213

	Control	Site		
Hardness*	10	595		
Alkalinity*	9	—		

* mg/L as CaCO3

Analysts: KS, YYL, AWD

Reviewed by:

Date reviewed:

Sample Description: slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR-FRB6 RG
Work Order #: 15426

Start Date & Time: June 18, 2015 @ 2015h
Stop Date & Time: July 30, 2015 @ 0900h
Test Species: O. clarkii

Dechlor

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5	13.0	11.5		12.0		12.0	12.5	11.5		11.0	12.0	11.0	
DO (mg/L)	10.6	10.4	10.3		10.2		10.6	10.7	10.4		10.8	10.4	10.7	
pH	7.2	7.2	7.2		7.1		7.1	7.2	7.2		7.0	6.9	7.2	
Cond. (µS/cm)	–	32						32				39		
Initials	KS	YVL		JW		YVL		YVL		KS		KS		

Feeding

Concentration site	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5	12.0	11.5		12.0		12.0	12.5	11.5		11.5	12.0	12.5	
DO (mg/L)	10.8	10.6	10.5		10.3		10.4	10.6	10.4		10.5	10.5	10.6	
pH	8.3	8.3	8.3		8.2		8.3	8.2	8.2		8.2	8.2	8.1	
Cond. (µS/cm)	–	1176						1191				1192		
Initials	KS	YVL		JW		YVL		YVL		KS		KS		

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site		
Hardness*	10	654		
Alkalinity*	8	–		

* mg/L as CaCO3

Analysts: KS, JW, YVL
Reviewed by:
Date reviewed:

Sample Description: Slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR-FRBG RG
Work Order #: 15426

Start Date & Time: June 18, 2015 @ 20 15h
Stop Date & Time: July 30, 2015 @ 09 00h
Test Species: O. clarkii

Dechlor

Concentration	Days														
	28	29		30		31		32		33		34		35	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)	11.5	13.0	11.5		12.0		12.0	12.0	11.5		11.5	12.5	11.5		
DO (mg/L)	10.6	10.3	10.5		10.7		10.5	10.3	10.4		10.0	10.4	10.3		
pH	6.9	6.9	7.0		7.0		7.1	6.9	7.0		6.8	7.0	7.0		
Cond. (µS/cm)	–	32						33				31			
Initials	KS	YYL		A		A		YYL		BPL		KS			

Fording

Concentration Site	Days														
	28	29		30		31		32		33		34		35	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)	11.5	12.0	11.5		12.0		12.0	12.0	11.5		11.5	12.0	11.5		
DO (mg/L)	10.6	10.7	10.7		10.6		10.6	10.4	10.6		10.1	10.4	10.5		
pH	8.3	8.2	8.0		8.2		8.3	8.2	8.1		8.0	8.2	8.2		
Cond. (µS/cm)	–	1185						1190				1196			
Initials	KS	YYL		A		A		YYL		BPL		KS			

Concentration	Days														
	28	29		30		31		32		33		34		35	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

Concentration	Days														
	28	29		30		31		32		33		34		35	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site		
Hardness*	8	654		
Alkalinity*	9	–		

* mg/L as CaCO3

Analysts: KS, YYL, AWD, BPL
Reviewed by:
Date reviewed:

Sample Description: slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR-FRBGRG
Work Order #: 15426

Start Date & Time: June 18, 2015 @ 2015h
Stop Date & Time: July 30, 2015 @ 0900h
Test Species: C. dubia

Dechlor

Concentration	Days														
	35	36		37		38		39		40		41		42	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)	11.5	12.0	11.5		12.0		12.0	12.0	11.0		12.0	12.0	11.5	11.5	final
DO (mg/L)	10.7	10.4	10.8		10.5		10.4	10.4	10.6		10.5	10.2	10.1	10.5	
pH	7.0	6.8	6.8		7.0		7.2	7.1	7.2		7.3	7.0	7.0	7.1	
Cond. (µS/cm)	—	32						32				32		36	
Initials	KS	KS						KS		KS		YYL		YYL	

Fording

Concentration (Site)	Days														
	35	36		37		38		39		40		41		42	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)	11.5	12.0	11.5		12.0		12.0	12.0	11.5		12.0	12.0	11.5	11.5	final
DO (mg/L)	10.7	10.3	10.5		10.5		10.4	10.4	10.7		10.6	10.2	9.9	10.5	
pH	8.1	8.2	8.2		8.1		8.2	8.3	8.3		8.2	8.2	8.0	8.1	
Cond. (µS/cm)	—	1188						1184				1155		1182	
Initials	KS	KS						KS		KS		YYL		YYL	

Concentration	Days														
	35	36		37		38		39		40		41		42	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

Concentration	Days														
	35	36		37		38		39		40		41		42	
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	
Temperature (°C)															
DO (mg/L)															
pH															
Cond. (µS/cm)															
Initials															

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site		
Hardness*	8	668		
Alkalinity*	8	—		

* mg/L as CaCO3

Analysts: KS, AND, YYL
Reviewed by:
Date reviewed:

Sample Description: slightly yellow with particulate

Comments:

F31-F33

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR-FRBS
Work Order #: 15426

Start Date & Time: June 29 2015 @ 20/25
Stop Date & Time: August 10, 2015 @ 1130 KS
Test Species: O. clarkii

Dechlor

Concentration	Days 0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	12.0		11.5	13.0	12.5		11.5	13.0	11.5		12.0		12.0	12.5
DO (mg/L)	10.3		10.5	10.5	10.6		10.6	10.2	10.5		10.6		10.5	10.5
pH	6.9		7.2	7.0	7.2		7.3	7.0	7.1		7.0		7.0	7.1
Cond. (µS/cm)	31			32				32						31
Initials	YML	KS		KLP		KS		YML		A		A		KS

Floating

Concentration Site	Days 0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	12.0		11.0	13.0	12.5		11.5	12.0	11.5		12.0		12.0	12.0
DO (mg/L)	10.4		10.7	10.5	10.6		10.5	10.5	10.5		10.7		10.6	10.4
pH	7.9		8.2	8.3	8.3		8.3	8.1	8.1		8.2		8.3	8.2
Cond. (µS/cm)	1177			1160				1161						1171
Initials	YML	KS		KLP		KS		YML		A		A		KS

Concentration	Days 0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days 0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 213 pH meter: 213 Conductivity meter: 213

	Control	Site		
Hardness*	10	595		
Alkalinity*	8	—		

* mg/L as CaCO3

Analysts: MWD, KS, YML, KLP

Reviewed by:

Date reviewed:

Sample Description: slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR-FRBBG
Work Order #: 154426

Start Date & Time: June 29, 2015 @ 20 25h
Stop Date & Time: August 10, 2015 @ 1130h
Test Species: C. dubia

Dechlor

Concentration	Days 7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5		11.5	12.5	12.0		11.5	13.0	11.5		12.0		12.0	12.5
DO (mg/L)	10.8		10.8	10.7	10.5		10.8	10.4	10.4		10.2		10.3	10.7
pH	7.3		7.2	7.1	7.2		7.1	7.2	7.2		7.1		7.1	7.2
Cond. (µS/cm)	-			32				32						32
Initials	KS	KS		YYL		KS		YYL		JW		YYL		YYL

Fording

Concentration Site	Days 7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5		11.5	12.0	12.0		11.5	12.0	11.5		12.0		12.0	12.5
DO (mg/L)	10.5		10.8	10.2	10.4		10.6	10.6	10.5		10.2		10.5	10.6
pH	8.4		8.3	8.2	8.3		8.3	8.3	8.3		8.2		8.3	8.2
Cond. (µS/cm)	-			1166				1176						1191
Initials	KS	KS		YYL		KS		YYL		JW		YYL		YYL

Concentration	Days 7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days 7	8		9		10		11		12		13		14
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 213 pH meter: 213 Conductivity meter: 213

	Control	Site		
Hardness*	10	595		
Alkalinity*	8			

* mg/L as CaCO3

Analysts: KS, YYL, JW

Reviewed by:

Date reviewed:

Sample Description: Slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR-FRBRG
Work Order #: 15426

Start Date & Time: June 29, 2015 @ 2025h
Stop Date & Time: August 10, 2015 @ 1130h
Test Species: O. clarkii

Dechlor

Concentration	Days 14 old	15 new	15 old	16 new	16 old	17 new	17 old	18 new	18 old	19 new	19 old	20 new	20 old	21 new
Temperature (°C)	11.5		11.5	12.0	11.5		11.5	13.0	11.5		12.0		12.0	12.0
DO (mg/L)	10.4		10.7	10.4	10.5		10.7	10.3	10.6		10.2		10.5	10.3
pH	7.1		7.0	6.9	7.1		7.1	6.9	7.0		7.0		7.1	6.9
Cond. (µS/cm)	–			32				32						33
Initials	YML	KS		KS		KS		YML		A		A		YML

Fording

Concentration Site	Days 14 old	15 new	15 old	16 new	16 old	17 new	17 old	18 new	18 old	19 new	19 old	20 new	20 old	21 new
Temperature (°C)	11.5		11.5	12.0	11.0		11.5	12.0	11.5		12.0		12.0	12.0
DO (mg/L)	10.3		10.5	10.5	10.6		10.7	10.9	10.7		10.8		10.6	10.4
pH	8.2		8.3	8.2	8.2		8.4	8.2	8.1		8.2		8.3	8.2
Cond. (µS/cm)	–			1192				1185						1190
Initials	YML	KS		KS		KS		YML		A		A		YML

Concentration	Days 14 old	15 new	15 old	16 new	16 old	17 new	17 old	18 new	18 old	19 new	19 old	20 new	20 old	21 new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days 14 old	15 new	15 old	16 new	16 old	17 new	17 old	18 new	18 old	19 new	19 old	20 new	20 old	21 new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 213 pH meter: 213 Conductivity meter: 213

	Control	Site		
Hardness*	8	654		
Alkalinity*	8	–		

* mg/L as CaCO3

Analysts: YML, KS, AWD
Reviewed by:
Date reviewed:

Sample Description: Slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR- FRBRG
Work Order #: 15426

Start Date & Time: June 29, 2015 @ 2025h
Stop Date & Time: August 10, 2015 @ 1130h
Test Species: O. clarkii

Decnbr

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5		11.5	12.5	11.5		11.5	12.0	11.5		12.0		12.0	12.0
DO (mg/L)	10.6		10.4	10.4	10.4		10.7	10.4	10.7		10.6		10.5	10.4
pH	7.0		6.7	7.0	7.1		7.0	6.8	6.8		7.0		7.2	7.2
Cond. (µS/cm)	–			31				32						32
Initials	YYL	BPL		KS		KS		KS						KS

Fording

Concentration Site	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)	11.5		11.5	12.0	11.5		12.0	12.0	11.5		12.0		12.0	12.0
DO (mg/L)	10.7		10.3	10.4	10.5		10.7	10.3	10.6		10.5		10.5	10.4
pH	8.2		8.2	8.2	8.1		8.0	8.2	8.2		8.1		8.2	8.3
Cond. (µS/cm)	–			1196				1188						1184
Initials	YYL	BPL		KS		KS		KS						KS

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	21	22		23		24		25		26		27		28
	old	new	old	new	old	new	old	new	old	new	old	new	old	new
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site		
Hardness*	8	668		
Alkalinity*	8	–		

* mg/L as CaCO3

Analysts: YYL, BPL, KS, AW
Reviewed by:
Date reviewed:

Sample Description: slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR- FRBG RG
Work Order #: 15426

Start Date & Time: June 29, 2015 @ 20 25h
Stop Date & Time: August 10, 2015 @ 1130h
Test Species: O. clarkii

Dechlor.

Concentration	Days															
	28	29		30		31		32		33		34		35		
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	old	
Temperature (°C)	11.5		11.5	12.0	11.5		11.5	12.0	12.0		12.0		12.0	12.0	12.0	12.0
DO (mg/L)	10.6		10.5	10.2	10.4		10.5	10.5	10.4		10.3		10.4	10.5	10.5	10.5
pH	7.3		7.3	7.0	7.1		7.0	7.1	7.1		7.2		7.1	7.3	7.6	7.6
Cond. (µS/cm)	–			32				31						33	–	–
Initials	KS	KS		YYL		YYL		KS						KLP	KLP	KLP

Fording

Concentration Site	Days															
	28	29		30		31		32		33		34		35		
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	old	
Temperature (°C)	11.5		11.5	12.0	11.5		11.5	12.0	11.5		12.0		12.0	12.0	12.0	12.0
DO (mg/L)	10.5		10.7	10.2	10.3		10.4	10.5	10.7		10.4		10.4	10.5	10.5	10.5
pH	8.3		8.2	8.2	8.2		8.2	8.3	8.0		8.3		8.3	8.4	8.4	8.4
Cond. (µS/cm)	–			1155				1171						1167	–	–
Initials	KS	KS		YYL		YYL		KS						KLP	KLP	KLP

Concentration	Days															
	28	29		30		31		32		33		34		35		
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	old	
Temperature (°C)																
DO (mg/L)																
pH																
Cond. (µS/cm)																
Initials																

Concentration	Days															
	28	29		30		31		32		33		34		35		
	old	new	old	new	old	new	old	new	old	new	old	new	old	new	old	
Temperature (°C)																
DO (mg/L)																
pH																
Cond. (µS/cm)																
Initials																

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site		
Hardness*	8	668		
Alkalinity*	10	–		

* mg/L as CaCO3

Analysts: KS, YYL, AWD, KLP
Reviewed by:
Date reviewed:

Sample Description: slightly yellow with particulate

Comments:

Chronic Freshwater Toxicity Test
Water Quality Measurements

Client: Golder
Sample ID: FR_FRBRG
Work Order #: 15426

Start Date & Time: June 29, 2015 @ 20 25h
Stop Date & Time: August 10, 2015 @ 1130h
Test Species: O. clarkii

Dechlor Concentration

	Days															
	35	36		37		38		39		40		41		42		
	old	new	old	new	old	new	old	new	old	new	old	new	old	new		
Temperature (°C)			12.5	12.0	12.0		11.5	12.5	11.5		12.0		12.0	11.5		final
DO (mg/L)			10.2	10.3	10.5		10.3	10.3	10.2		10.4		10.5	10.3		
pH			7.1	7.1	7.2		7.1	7.2	7.3		7.3		7.0	7.2		
Cond. (µS/cm)				32				35						40		
Initials		KS		KS		KS		YML		AS		YML		YML		

Fording Concentration Site

	Days															
	35	36		37		38		39		40		41		42		
	old	new	old	new	old	new	old	new	old	new	old	new	old	new		
Temperature (°C)			12.0	12.0	11.5		11.5	12.3	11.5		12.0		12.0	11.5		final
DO (mg/L)			10.3	10.4	10.7		10.4	10.4	10.2		10.5		10.5	10.4		
pH			8.2	8.3	8.2		8.2	8.3	8.1		8.3		8.2	8.2		
Cond. (µS/cm)				1149				1156						1173		
Initials		KS		KS		KS		YML		AS		YML		YML		

Concentration	Days															
	35	36		37		38		39		40		41		42		
	old	new	old	new	old	new	old	new	old	new	old	new	old	new		
Temperature (°C)																
DO (mg/L)																
pH																
Cond. (µS/cm)																
Initials																

Concentration	Days															
	35	36		37		38		39		40		41		42		
	old	new	old	new	old	new	old	new	old	new	old	new	old	new		
Temperature (°C)																
DO (mg/L)																
pH																
Cond. (µS/cm)																
Initials																

DO meter: 2/3 pH meter: 2/3 Conductivity meter: 2/3

	Control	Site		
Hardness*	8	669		
Alkalinity*	10	—		

* mg/L as CaCO3

Analysts: KS, YYL, AWD
Reviewed by:
Date reviewed:

Sample Description: Slightly yellow with particulate

Comments:

APPENDIX C – Deformity assessment datasheets

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15486

Start Date: June 1, 2015 @ 1935h

Termination Date: July 5/15 @ 1400h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F1	1	24.5	0	0	0	0	
A	2	24.0					
Leachor	3	24.5					
	4	25.0					
	5	23.0					
	6	24.5					
	7	25.0					
	8	23.5					
	9	25.0					
	10	24.5					
	11	24.5					
	12	25.0					
	13	25.0					
	14	24.5					
	15	24.0					
	16	25.0					
	17	24.0					
	18	24.5					
	19	23.5					
	20	24.5					
	21	24.0					
	22	24.5					
	23	—					
	24	—					
	25	—					
	26	—					
	27	—					
	28	—					
	29	—					
	30	—					

Total Weight (pooled): 1.83g

Number of survivors: 22

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 1/15 @1935h

Termination Date: July 15/15 @1400h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F1	1	24.0	0	0	0	0	
B	2	24.0					
declov	3	23.5					
	4	24.0					
	5	25.0					
	6	21.0					
	7	24.0					
	8	24.0					
	9	22.5					
	10	24.5					
	11	23.6					
	12	23.5					
	13	23.5					
	14	24.0					
	15	24.5					
	16	24.0					
	17	17.0	3	0	0	0	kyphosis/lordosis/scoliosis
	18	—					
	19	—					
	20	—					
	21	—					
	22	—					
	23	—					
	24	—					
	25	—					
	26	—					
	27	—					
	28	—					
	29	—					
	30	—					

Total Weight (pooled): 1.38g

Number of survivors: 17

Number of deformed/have difficulty swimming: 1 / I unable to swim

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 1/15 @1935h

Termination Date: July 15/15 @1400h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FI	1	24.5	0	0	0	0	
C	2	24.0	↓	↓	↓	↓	
declor	3	24.5					
	4	25.0					
	5	25.0					
	6	25.0					
	7	25.0					
	8	25.0					
	9	25.0					
	10	25.0					
	11	24.5					
	12	~~24.5~~					
	13	24.0					
	14	—					
	15	—					
	16	—					
	17	—					
	18	—					
	19	—					
	20	—					
	21	—					
	22	—					
	23	—					
	24	—					
	25	—					
	26	—					
	27	—					
	28	—					
	29	—					
	30	—					

Total Weight (pooled): 1.13g

Number of survivors: 13

Number of deformed/have difficulty swimming: 0/0

Initials: BPL / YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 1 15 @1935h

Termination Date: July 15/15 @1400h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F1	1	24.0	0	0	0	0	
D	2	25.0	↓	↓	↓	↓	
dector	3	25.5					
	4	23.0					
	5	25.0					
	6	23.0					
	7	24.0					
	8	24.5					
	9	23.0					
	10	25.5					
	11	24.0					
	12	25.0					
	13	25.0					
	14	25.0					
	15	24.5					
	16	24.0					
	17	23.5					
	18	24.0	↓	↓	↓	↓	
	19	—					
	20	—					
	21	—					
	22	—					
	23	—					
	24	—					
	25	—					
	26	—					
	27	—					
	28	—					
	29	—					
	30	—					

Total Weight (pooled): 1.52g

Number of survivors: 18

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL / YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 1/15 @ 1935h

Termination Date: July 15/15 @ 1400h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F1	1	25.0	0	0	0	0	
A	2	24.5	↓	↓	↓	↓	
site	3	23.0	↓	↓	↓	↓	
	4	24.0	↓	↓	↓	↓	
	5	24.0	↓	↓	↓	↓	
	6	25.0	↓	↓	↓	↓	
	7	23.0	0	0	2	0	Extra dorsal fin, finlike growth on abdomen
	8	25.0	0	0	0	0	
	9	25.0	↓	↓	↓	↓	
	10	24.0	↓	↓	↓	↓	
	11	25.0	↓	↓	↓	↓	
	12	24.5	↓	↓	↓	↓	
	13	25.0	↓	↓	↓	↓	
	14	23.5	↓	↓	↓	↓	
	15	24.0	↓	↓	↓	↓	
	16	24.0	↓	↓	↓	↓	
	17	24.5	↓	↓	↓	↓	
	18	24.0	↓	↓	↓	↓	
	19	23.5	↓	↓	↓	↓	
	20	24.0	↓	↓	↓	↓	
	21	25.0	↓	↓	↓	↓	
	22	25.0	↓	↓	↓	↓	
	23	—					
	24	—					
	25	—					
	26	—					
	27	—					
	28	—					
	29	—					
	30	—					

Total Weight (pooled): 2.01g

Number of survivors: 22

Number of deformed/have difficulty swimming: 1/0

Initials: BPL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 1/15 @1935
Termination Date: July 15/15 @1400

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FI	1	23.5	0	0	0	0	
B	2	21.5	↓	↓	↓	↓	
site	3	24.5					
	4	24.5					
	5	22.0					
	6	24.5					
	7	21.0					
	8	24.5					
	9	25.0	↓	↓	↓	↓	
	10	11.0	3	3	3	0	①
	11	—					
	12	—					
	13	—					
	14	—					
	15	—					
	16	—					
	17	—					
	18	—					
	19	—					
	20	—					
	21	—					
	22	—					
	23	—					
	24	—					
	25	—					
	26	—					
	27	—					
	28	—					
	29	—					
	30	—					

Total Weight (pooled): 0.82 g.
Number of survivors: 10
Number of deformed/have difficulty swimming: 1 1 unable to swim

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

① scoliosis/kyphosis/lordosis, spine separates two extra heart tail fin malformed, dorsal fin malformed, extra pectoral fin

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 1/15 @1935h
Termination Date: July 15/15 @1400h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F1	1	24.5	0	0	0	0	
C	2	25.0	↓	↓	↓	↓	
site	3	24.5	↓	↓	↓	↓	
	4	25.0	↓	↓	↓	↓	
	5	25.0	↓	↓	↓	↓	
	6	25.0	1	0	0	0	kyphosis
	7	25.6	0	0	0	0	
	8	23.5	↓	↓	↓	↓	
	9	24.0	↓	↓	↓	↓	
	10	25.0	↓	↓	↓	↓	
	11	24.0	↓	↓	↓	↓	
	12	24.0	↓	↓	↓	↓	
	13	25.0	↓	↓	↓	↓	
	14	25.0	↓	↓	↓	↓	
	15	24.5	↓	↓	↓	↓	
	16	24.0	↓	↓	↓	↓	
	17	25.0	↓	↓	↓	↓	
	18	25.0	↓	↓	↓	↓	kyphosis/scoliosis/lordosis shortened nose
	19	16.0	3	1	0	0	
	20	—					
	21	—					
	22	—					
	23	—					
	24	—					
	25	—					
	26	—					
	27	—					
	28	—					
	29	—					
	30	—					

Total Weight (pooled): 1.62g
Number of survivors: 19
Number of deformed/have difficulty swimming: 2/ I had difficulty swimming

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 1/15 @1935h

Termination Date: July 15/15 @1400h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F1	1	25.0	0	0	0	0	
D	2	24.5					
site	3	25.0					
	4	24.0					
	5	25.0					
	6	25.0					
	7	25.0					
	8	24.5					
	9	25.0					
	10	24.0					
	11	24.5					
	12	24.0					
	13	24.0					
	14	24.0					
	15	24.0					
	16	24.0					
	17	24.0					
	18	24.5					
	19	25.0					
	20	24.0					
	21	25.0					
	22	25.0					
	23	16.0	3	2	0	0	scoliosis/kyphosis/lordosis malformed lower jaw/shortened nose
	24	—					
	25	—					
	26	—					
	27	—					
	28	—					
	29	—					
	30	—					

Total Weight (pooled): 2.03g

Number of survivors: 23 ~~1 unable to swim~~ 4nl

Number of deformed/have difficulty swimming: 1/1 - unable to swim

Initials: BPL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 1/15 @1935h

Termination Date: July 15, 2015 @1400h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F2	1	24.0	0	0	0	0	
A	2	24.0	↓	↓	↓	↓	
Dechlor	3	25.0					
	4	23.5					
	5	25.0					
	6	25.0					
	7	25.0					
	8	25.0					
	9	25.0					
	10	24.0					
	11	25.5					
	12	25.0					
	13	24.5					
	14	24.5					
	15	24.0					
	16	25.0					
	17	24.0					
	18	23.0					
	19	23.5					
	20	24.5					
	21	25.0					
	22	24.0					
	23	24.5					
	24	—					
	25	—					
	26	—					
	27	—					
	28	—					
	29	—					
	30	—					

Total Weight (pooled): 1.84g

Number of survivors: 23

Number of deformed/have difficulty swimming: 0/0

Initials: BRL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 1/15 @1935h

Termination Date: July 15/15 @1400h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F2	1	24.0	0	0	0	0	
B	2	24.0	↓	↓	↓	↓	
Declor	3	23.0	↓	↓	↓	↓	
	4	23.0	0	0	1	0	1 malformed fin
	5	24.0	0	0	0	0	
	6	24.0	↓	↓	↓	↓	
	7	24.0	↓	↓	↓	↓	
	8	23.5	↓	↓	↓	↓	
	9	23.5	↓	↓	↓	↓	
	10	24.0	↓	↓	↓	↓	
	11	23.0	↓	↓	↓	↓	
	12	24.0	↓	↓	↓	↓	
	13	24.5	↓	↓	↓	↓	
	14	24.5	↓	↓	↓	↓	
	15	25.0	↓	↓	↓	↓	
	16	24.0	↓	↓	↓	↓	
	17	24.0	↓	↓	↓	↓	
	18	23.0	↓	↓	↓	↓	
	19	24.0	↓	↓	↓	↓	
	20	23.5	↓	↓	↓	↓	
	21	24.0	↓	↓	↓	↓	
	22	24.0	↓	↓	↓	↓	
	23	23.5	↓	↓	↓	↓	
	24	22.5	↓	↓	↓	↓	
	25	23.5	↓	↓	↓	↓	
	26	24.0	↓	↓	↓	↓	
	27	23.5	↓	↓	↓	↓	
	28	24.0	↓	↓	↓	↓	
	29	24.5	↓	↓	↓	↓	
	30	—					

Total Weight (pooled): 2.159

Number of survivors: 29

Number of deformed/have difficulty swimming: 1/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 1/15 @ 1935

Termination Date: July 15/15 @ 1400h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F2	1	25.0	0	0	0	0	
C	2	25.0					
Declor	3	25.5					
	4	24.5					
	5	25.6					
	6	23.5					
	7	24.0					
	8	25.0					
	9	25.0					
	10	23.5					
	11	25.0					
	12	24.5					
	13	25.0	0	0	1	0	malformed lower fin
	14	25.0	0	0	0	0	
	15	22.5					
	16	25.0					
	17	25.0					
	18	24.0					
	19	25.0					
	20	25.0					
	21	25.0					
	22	25.0					
	23	24.5					
	24	25.0					
	25	25.0					
	26	—					
	27	—					
	28	—					
	29	—					
	30	—					

Total Weight (pooled): 2.09 g

Number of survivors: 25

Number of deformed/have difficulty swimming: 1 / 0

Initials: BPL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: ~~KS20~~ 15426

Start Date: June 1/15 @1935h

Termination Date: July 15/15 @1400h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F2	1	24.5	0	0	0	0	
D	2	25.0					
Dellov	3	24.5					
	4	25.0					
	5	25.0					
	6	25.0					
	7	24.0					
	8	25.0					
	9	24.5					
	10	22.0					
	11	23.0					
	12	25.0					
	13	24.5					
	14	24.5					
	15	23.5					
	16	24.0					
	17	24.5	↓	↓	↓	↓	
	18	24.5	0	1	0	0	malformed nose
	19	24.0	0	0	0	0	
	20	24.0					
	21	23.5					
	22	24.0					
	23	24.0					
	24	24.5	↓	↓	↓	↓	
	25	—					
	26	—					
	27	—					
	28	—					
	29	—					
	30	—					

Total Weight (pooled): 1.94g

Number of survivors: 24

Number of deformed/have difficulty swimming: 1/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 1/15 @ 1935h

Termination Date: July 15/15 @ 1400h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F2	1	23.5	0	0	0	0	
A	2	23.5	↓	↓	↓	↓	
site	3	24.0	↓	↓	↓	↓	
	4	23.0	↓	↓	↓	↓	
	5	23.0	0	0	1	0	malformed lower fin
	6	24.0	0	0	II	0	malformed lower fin
	7	23.5	↓	↓	↓	↓	
	8	24.0	↓	↓	↓	↓	
	9	24.0	0	0	1	0	~~malformed~~ malformed lower fin
	10	24.5	↓	↓	↓	↓	
	11	—					
	12	—					
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.82g

Number of survivors: 10

Number of deformed/have difficulty swimming: 3/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 1/15 @1935h

Termination Date: July 15/15 @1400h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F2	1	22.5	0	0	0	0	
B	2	23.0	0	0	0	0	
site	3	23.0	~~3~~ 0	0	0	0	~~lordosis~~
	4 ~~23.0~~ 22.5		~~2~~ 3	0	0	0	lordosis
	5	—					
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.29g

Number of survivors: 4

Number of deformed/have difficulty swimming: 1/1 - swimming erratically, sideways

Initials: BDL NYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 1/15 @ 1935h

Termination Date: July 15/15 @ 1400h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F2	1	22.5	0	0	0	0	
C	2	21.0	0	0	0	0	
Site	3	22.5	II	0	I	0	malformed lower fin/scoliosis
	4	22.5	0	0	I	0	malformed lower fin
	5	22.0	0	0	0	0	
	6	—					
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.37g

Number of survivors: 5

Number of deformed/have difficulty swimming: 2/1 - swimming sideways

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 1/15 @1935h

Termination Date: July 15/15 @1400h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
~~F2-F2~~	1	22.5	0	0	0	0	
D	2	24.0	0	0	0	0	
side	3	—					
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.16g

Number of survivors: 2

Number of deformed/have difficulty swimming: 0 / 0

Initials: BDL / WL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 1/15 @1935

Termination Date: July 15/15 @1400h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F3	1	23.0	0	0	0	0	
A	2	22.5					
Dechlor	3	23.0					
	4	23.5					
	5	23.5					
	6	22.0					
	7	22.5					
	8	22.0					
	9	22.0					
	10	22.5					
	11	22.5					
	12	23.0					
	13	23.0					
	14	22.5					
	15	23.0					
	16	22.0					
	17	22.5					
	18	22.0					
	19	23.0					
	20	23.0					
	21	22.5					
	22	22.0					
	23	23.0					
	24	24.0					
	25	23.5					
	26	22.0					
	27	22.0	✓	✓	✓	✓	
	28						
	29						
	30						

Total Weight (pooled): 1.98

Number of survivors: 27

Number of deformed/have difficulty swimming: 0

Initials: BR / YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 1/15 @1935h

Termination Date: July 15/15 @1400h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F3	1	22.5	0	0	0	0	
B	2	20.0					
Dechlor	3	24.0					
	4	23.0					
	5	23.0					
	6	23.0					
	7	23.0					
	8	22.0					
	9	23.5					
	10	23.0					
	11	23.0					
	12	24.0					
	13	23.0					
	14	23.5					
	15	23.0					
	16	22.5					
	17	23.0					
	18	20.0	0	1	0	0	Malformed lower jaw
	19	23.5		0			
	20	23.5					
	21	22.5					
	22	23.5					
	23	22.0					
	24	23.0					
	25	23.0					
	26	23.0					
	27	23.0					
	28	22.5					
	29	21.5					
	30						

Total Weight (pooled): 2.27g

Number of survivors: 29

Number of deformed/have difficulty swimming: 1/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 1/15 @1935h

Termination Date: July 15/15 @1400h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F3	1	23.0	0	0	0	0	
C	2	22.5	↓	↓	↓	↓	
Dechlor	3	22.0					
	4	22.5					
	5	22.0					
	6	22.5					
	7	22.5					
	8	23.0					
	9	21.0					
	10	22.0					
	11	22.0					
	12	22.0					
	13	22.5					
	14	22.0					
	15	22.5					
	16	23.5					
	17	22.5					
	18	23.5					
	19	22.5					
	20	23.0					
	21	23.0					
	22	22.0					
	23	23.0					
	24	22.5					
	25	21.5					
	26	22.0					
	27	22.0					
	28	22.0					
	29	22.0	↓	↓	↓	↓	
	30						

Total Weight (pooled): 2.38g

Number of survivors: 29

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 1/15 @1935h

Termination Date: July 15/2015 @1400h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F3	1	23.0	0	0	0	0	
D	2	22.5					
Dechlor	3	23.5					
	4	23.5					
	5	24.0					
	6	22.0					
	7	23.0					
	8	23.0					
	9	23.5					
	10	22.0					
	11	22.5					
	12	23.0					
	13	24.0					
	14	23.5					
	15	22.5					
	16	24.0					
	17	23.0					
	18	24.0					
	19	23.0					
	20	23.0					
	21	24.0					
	22	24.0					
	23	24.0					
	24	23.0					
	25	22.5					
	26	23.0					
	27						
	28						
	29						
	30						

Total Weight (pooled): 2.06

Number of survivors: 26

Number of deformed/have difficulty swimming: 0 / 0

Initials: BBL / YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 1/15 @1935h

Termination Date: July 15, 2015 @1400

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F3	1	24.0	0	0	0	0	
A	2	23.5					
Site	3	23.0					
	4	25.0					
	5	23.5					
	6	24.0					
	7	24.5					
	8	24.0					
	9	23.5					
	10	23.5					
	11	21.5	1	1	1	0	scoliosis, malformed tailfin, malformed lower jaw
	12	23.5	0	0	0	0	
	13	22.5					
	14	23.0					
	15	23.0					
	16	24.0					
	17	24.0					
	18	24.0					
	19	24.5					
	20	22.5					
	21	24.0					
	22	24.0					
	23	24.5					
	24	24.0					
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.95g

Number of survivors: 24

Number of deformed/have difficulty swimming: 1/1 KS

Initials: BBL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 1/15 @1935h

Termination Date: July 15, 2015 @1400h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F3	1	24.0	0	0	0	0	
B	2	23.5	↓	↓	↓	↓	
Site	3	23.5					
	4	24.0					
	5	24.0					
	6	23.0					
	7	24.0					
	8	24.0					
	9	23.5					
	10	23.5					
	11	23.5					
	12	24.0					
	13	23.0					
	14	24.0					
	15	24.0					
	16	24.5					
	17	24.0					
	18	24.0					
	19	24.0					
	20	24.5					
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.61 g

Number of survivors: 20

Number of deformed/have difficulty swimming: 0 10

Initials: BRL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 1/15 @ 1935h

Termination Date: July 15/15 @ 1400h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F3	1	22.5	0	0	0	0	
C	2	23.5	↓	↓	↓	↓	
Site	3	22.5					
	4	23.0					
	5	23.0					
	6	24.0					
	7	22.5					
	8	23.5					
	9	23.0					
	10	22.5					
	11	23.0					
	12	23.5					
	13	23.5					
	14	22.0					
	15	23.5					
	16	23.5					
	17	24.0	↓	↓	↓	↓	
	18	22.0	1	0	0	0	scoliosis
	19	23.0	0	0	1	0	lower fin mal-formed.
	20	24.0	↓	↓	0	↓	
	21	23.0			↓		
	22	24.0					
	23	23.0					
	24	23.5					
	25	23.0	↓	↓	↓	↓	
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.96g

Number of survivors: 25

Number of deformed/have difficulty swimming: 2/0

Initials: BPL / YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 1/15 @1935h

Termination Date: July 15, 2015 @1400h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F3	1	23.0	0	0	0	0	
D	2	23.5					
Site	3	23.0					
	4	24.0					
	5	23.5					
	6	22.5					
	7	24.5					
	8	23.5					
	9	24.0					
	10	24.0					
	11	23.0					
	12	23.0					
	13	24.0					
	14	23.0					
	15	23.5					
	16	22.0					
	17	23.5					
	18	24.0					
	19	24.0					
	20	24.0					
	21	24.0					
	22	23.5					
	23	24.0					
	24	24.0					
	25	22.0					
	26	21.0	↓	↓	↓	↓	
	27						
	28						
	29						
	30						

Total Weight (pooled): 194.5

Number of survivors: 26

Number of deformed/have difficulty swimming: 0 10

Initials: BPL / YVL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935

Termination Date: July 15, 2015 @ ~~1400~~ 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F4	1	24.5	0	0	0	0	
A	2	25.0	↓	↓	↓	↓	
Dechlor	3	25.0					
	4	24.5					
	5	24.5					
	6	22.0					
	7	24.5					
	8	24.0					
	9	25.0					
	10	25.0					
	11	25.0					
	12	25.0					
	13	25.0					
	14	25.5					
	15	25.0					
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.65 g

Number of survivors: 15

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15, 2015 @ ~~1400~~ 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F4	1	24.5	0	0	0	0	
B	2	23.5					
Dechlor	3	25.0					
	4	24.0					
	5	24.0					
	6	24.0					
	7	24.0					
	8	24.0					
	9	23.5					
	10	24.0					
	11	24.0					
	12	25.0					
	13	24.0					
	14	24.0					
	15	23.0					
	16	24.0					
	17	25.0					
	18	24.0					
	19	23.0					
	20	23.5					
	21	24.0					
	22	25.0					
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.79 g

Number of survivors: 22

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935

Termination Date: ~~June~~ July 15, 2015 @ 1400h 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F4	1	23.5	0	0	0	0	
C	2	25.0	↓	↓	↓	↓	
Dechlor	3	24.5					
	4	24.0					
	5	23.5					
	6	23.0					
	7	23.5					
	8	23.0					
	9	23.0					
	10	23.5					
	11	25.0					
	12	24.0					
	13	24.0					
	14	24.0					
	15	23.5					
	16	24.0					
	17	25.0					
	18	24.5					
	19	23.0					
	20	23.5					
	21	24.0					
	22	23.80					
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.80 g

Number of survivors: 22

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15, 2015 @ 1400h KS
1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F4	1	23.0	0	0	0	0	
D	2	23.0					
Dechlor	3	24.5					
	4	24.5					
	5	24.0					
	6	24.0					
	7	24.0					
	8	25.0					
	9	23.0					
	10	24.0					
	11	23.0					
	12	24.0					
	13	24.5					
	14	23.5					
	15	24.0					
	16	24.0					
	17	25.0					
	18	24.5					
	19	24.0					
	20	24.0					
	21	25.0					
	22	23.0					
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.81 g

Number of survivors: ~~23~~ 22

Number of deformed/have difficulty swimming: 0 10

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15, 2015 @ ~~1400h~~ 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F4	1	25.0	0	0	0	0	
~~Site~~ A	2	24.5					
~~A~~ Site	3	24.0					
	4	24.5					
	5	24.0					
	6	24.0					
	7	25.0					
	8	25.0					
	9	25.0					
	10	24.0					
	11	25.0					
	12	24.5					
	13	24.0					
	14	24.5					
	15	23.5					
	16	24.0					
	17	24.5					
	18	25.0					
	19	25.0					
	20	24.5					
	21	23.0					
	22	23.5					
	23	24.0					
	24	24.5					
	25	24.0	↓	↓	↓	↓	
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 2.22g

Number of survivors: 25

Number of deformed/have difficulty swimming: 0 / 3 - unable to swim

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15, 2015 @ 1400h* 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F4	1	24.5	0	0	0	0	
B	2	23.0					
Site	3	23.0					
	4	24.5					
	5	23.0					
	6	23.5					
	7	23.0					
	8	24.0					
	9	24.0					
	10	23.0					
	11	25.0					
	12	23.0					
	13	23.0					
	14	24.0					
	15	25.0					
	16	24.0					
	17	23.5					
	18	24.0					
	19	24.0					
	20	23.0					
	21	25.0					
	22	24.5					
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.79

Number of survivors: 22

Number of deformed/have difficulty swimming: 0 10

Initials: BBL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15, 2015 @ ~~1400h~~ 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F4	1	24.5	0	0	0	0	
C	2	24.5					
Site	3	24.0					
	4	24.0					
	5	23.5					
	6	24.0					
	7	23.5					
	8	24.0					
	9	23.0					
	10	24.0					
	11	22.0					
	12	24.0					
	13	24.0					
	14	23.0					
	15	23.0					
	16	24.0					
	17	25.0					
	18	24.0					
	19	23.0					
	20	24.0					
	21	24.0					
	22	25.0					
	23	24.0					
	24	24.5					
	25	24.5					
	26	25.0	↓	↓	↓	↓	
	27						
	28						
	29						
	30						

Total Weight (pooled): 2.26 g

Number of survivors: 26

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL / NYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15, 2015 @ ~~1400h~~ 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F4	1	24.0	0	0	0	0	
D	2	23.0					
site	3	24.0					
	4	23.0					
	5	24.5					
	6	24.5					
	7	24.5					
	8	23.5					
	9	23.5					
	10	23.5					
	11	24.0					
	12	23.5					
	13	22.5					
	14	24.0					
	15	24.0					
	16	23.0					
	17	24.0					
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.37 g

Number of survivors: 17

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3rd 2015 @ 1935h

Termination Date: July 15/15 @ 1400h 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FS	1	25.0	0	0	0	0	
RA	2	23.0					
Dechlor	3	24.0					
	4	25.0					
	5	25.0					
	6	25.0					
	7	25.0					
	8	24.0					
	9	25.0					
	10	25.0					
	11	25.0					
	12	23.5					
	13	25.0					
	14	24.5					
	15	24.0					
	16	25.0					
	17	24.5					
	18	24.0					
	19	24.0					
	20	25.0					
	21	24.5					
	22	25.0					
	23	23.5					
	24	24.0	↓	↓	↓	↓	
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 2.15 g

Number of survivors: 24

Number of deformed/have difficulty swimming: ϕ 10

Initials: BL/YL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15/15 @ ~~1400h~~ 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FS	1	23.5	0	0	0	0	
B	2	25.0					
Dechlor	3	24.0					
	4	25.0					
	5	25.5					
	6	25.0					
	7	23.0	1				~~XS~~ Lordosis
	8	24.5	0				
	9	24.0					
	10	25.0					
	11	24.0					
	12	24.0					
	13	23.5					
	14	24.0					
	15	25.0					
	16	24.0					
	17	23.5					
	18	24.0					
	19	24.0					
	20	24.5					
	21	24.0					
	22	23.0					
	23	25.0					
	24	25.0					
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 2.03

Number of survivors: 24

Number of deformed/have difficulty swimming: 1/ 1 - not swimming

Initials: BDL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h KS

Termination Date: July 15/15 @ ~~1400h~~ 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
T5	1	25.0	0	0	0	0	
C	2	24.0	↓	↓	↓	↓	
Dechlor	3	25.0					
	4	24.0					
	5	24.5					
	6	24.5					
	7	24.5					
	8	24.0					
	9	24.0					
	10	24.0					
	11	24.0					
	12	24.5					
	13	25.0					
	14	24.5					
	15	25.0					
	16	24.0					
	17	25.0					
	18	25.5					
	19	24.0					
	20	25.0					
	21	24.0					
	22	24.5	↓	↓	↓	↓	
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.90 g

Number of survivors: 22

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15/15 @ ~~14~~ 15h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FS	1	23.5	0	0	0	0	
D	2	24.0					
Dechlor	3	23.5					
	4	24.0					
	5	23.5					
	6	23.5					
	7	24.0					
	8	24.5					
	9	25.0					
	10	24.0					
	11	~~23.5~~ 24.0					
	12	~~24.5~~ 24.0					
	13	~~24.0~~ 24.5					
	14	~~23.5~~ 24.5					
	15	23.5					
	16	26.0					
	17	24.0					
	18	24.5					
	19	25.0					
	20	25.0					
	21	24.0					
	22	24.0					
	23	25.0					
	24	24.5					
	25	24.5					
	26	24.0					
	27	24.0					
	28	23.0					
	29	24.5					
	30	—					

Total Weight (pooled): 2.55 g

Number of survivors: 29

Number of deformed/have difficulty swimming: 0 10

Initials: BPL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935 KS

Termination Date: July 15/15 @ 1400h 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F5	1	25.0	0	0	0	0	
A	2	24.0					
Site	3	25.0					
	4	24.0					
	5	24.5					
	6	24.0					
	7	24.5					
	8	25.0					
	9	25.0					
	10	25.0					
	11	24.5					
	12	25.0					
	13	25.5					
	14	24.5					
	15	25.0					
	16	25.0					
	17	24.0					
	18	24.0					
	19	25.0					
	20	25.0					
	21	24.5					
	22	25.0					
	23	24.5					
	24	23.5					
	25	24.5					
	26	—					
	27	—					
	28	—					
	29	—					
	30	—					

Total Weight (pooled): 2.34g

Number of survivors: 25 J

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/NYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15/15 @ ~~1400h~~ 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F5	1	24.0	0	0	0	0	
B	2	25.0					
site	3	24.0					
	4	24.0					
	5	25.0					
	6	24.0					
	7	25.0					
	8	25.5					
	9	22.0					
	10	25.0					
	11	24.5					
	12	24.5					
	13	24.0					
	14	24.5					
	15	23.5					
	16	24.5					
	17	24.5					
	18	24.0					
	19	~~24~~ 24.5					
	20	23.5					
	21	25.0					
	22	23.5					
	23	25.0					
	24	24.0					
	25	—					
	26	—					
	27	—					
	28	—					
	29	—					
	30	—					

Total Weight (pooled): ~~2.34g~~ 2.12g

Number of survivors: 24

Number of deformed/have difficulty swimming: 0 10

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: ~~July 15/15 @ 1400h~~ KS 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F5	1	24.0	0	0	0	0	
C	2	24.0	↓	↓	↓	↓	
site	3	24.5					
	4	25.5					
	5	24.0					
	6	25.0					
	7	24.0					
	8	24.5					
	9	24.5					
	10	24.5					
	11	25.0					
	12	24.0					
	13	22.0					
	14	25.0					
	15	25.6					
	16	25.0					
	17	25.5					
	18	24.6					
	19	25.0					
	20	24.0					
	21	24.5					
	22	24.5					
	23	25.0					
	24	24.0					
	25	25.0					
	26	24.0	↓	↓	↓	↓	
	27	—					
	28	—					
	29	—					
	30	—					

Total Weight (pooled): ~~23.9g~~ KS 2.39g

Number of survivors: 26

Number of deformed/have difficulty swimming: 0/0

Initials: BPL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @1935h

Termination Date: July 15/15 @ ~~1400h~~ 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FS	1	24.5	0	0	0	0	
D	2	24.0					
site	3	26.0					
	4	24.0					
	5	24.5					
	6	25.0					
	7	24.5					
	8	25.0					
	9	25.0					
	10	24.0					
	11	24.5					
	12	25.0					
	13	25.0					
	14	26.0					
	15	24.5					
	16	24.5					
	17	24.5					
	18	25.0					
	19	24.0					
	20	24.0					
	21	24.5					
	22	24.5					
	23	24.5					
	24	24.0					
	25	25.0					
	26	24.5					
	27	24.0					
	28	25.0					
	29	—					
	30	—					

Total Weight (pooled): 2.54 g

Number of survivors: 28

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15/15 @ ~~1400h~~ 1115h KS

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F6	1	23.5	0	0	0	0	
A	2	23.0					
Declor	3	23.0					
	4	23.0					
	5	23.0					
	6	23.5					
	7	24.0					
	8	23.0					
	9	26.0					
	10	23.5					
	11	23.5					
	12	22.0					
	13	23.0					
	14	23.0					
	15	23.0					
	16	23.0					
	17	22.5					
	18	22.5					
	19	22.5					
	20	23.0					
	21	22.5					
	22	23.0					
	23	23.0					
	24	22.5					
	25	23.5					
	26	21.5					
	27	24.0					
	28	23.5					
	29	23.0					
	30	23.0					

Total Weight (pooled): 1.95g

Number of survivors: 30

Number of deformed/have difficulty swimming: 0/1 swimming slow + sidewise

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15/15 @ ~~1400h~~ 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FG	1	23.5	0	0	0	0	
B	2	22.5					
Declor	3	23.5					
	4	23.5					
	5	23.5					
	6	23.0					
	7	23.0					
	8	24.0					
	9	23.5					
	10	23.0					
	11	23.5					
	12	22.5					
	13	23.5					
	14	23.0					
	15	23.5					
	16	24.0					
	17	23.0					
	18	23.5					
	19	23.5					
	20	23.5					
	21	22.5					
	22	24.0					
	23	23.5					
	24	24.0					
	25	23.0					
	26	24.0					
	27	22.5					
	28	23.0					
	29	23.5					
	30	23.0					
	31	23.0					
	32	23.0					

Total Weight (pooled): 2.18g

Number of survivors: 32

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15/15 @ ~~1400h~~ 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F6	1	24.0	0	0	0	0	
C	2	24.0					
Declor	3	23.5					
	4	23.5					
	5	24.0					
	6	24.5					
	7	24.0					
	8	23.5					
	9	23.0					
	10	23.5					
	11	23.0					
	12	23.0					
	13	23.5					
	14	23.5					
	15	23.0					
	16	24.0					
	17	23.0					
	18	23.5					
	19	24.0					
	20	23.5					
	21	23.5					
	22	23.0					
	23	23.0					
	24	23.0					
	25	23.5					
	26	23.5					
	27	23.5					
	28	24.0					
	29	23.5					
	30	—					

Total Weight (pooled): 2.01 g

Number of survivors: 29

Number of deformed/have difficulty swimming: 0 / 0

Initials: BR / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15/15 @ ~~1400h~~ 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FG	1	24.0	0	0	0	0	
D	2	24.0					
Declan	3	23.5					
	4	24.0					
	5	21.5					
	6	24.0					
	7	23.0					
	8	22.5					
	9	23.0					
	10	23.0					
	11	23.6					
	12	23.0					
	13	24.6					
	14	23.5					
	15	23.0					
	16	24.0					
	17	23.0					
	18	24.0					
	19	23.5					
	20	23.5					
	21	23.5					
	22	23.5					
	23	23.0					
	24	23.5					
	25	24.0					
	26	23.5					
	27	23.0					
	28	—					
	29	—					
	30	—					

Total Weight (pooled): 2.06g

Number of survivors: 27

Number of deformed/have difficulty swimming: 0 1 0

Initials: BPL/YVL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15/15 @ ~~1460h~~ 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FG	1	23.0	0	0	0	0	
4c BA	2	23.5	0	0	0	0	
site	3	23.0	0	0	0	0	
	4	24.5	2	0	0	0	kyphosis
	5	24.5	0	0	0	0	
	6	24.0	0	0	0	0	
	7	24.0	0	0	0	0	
	8	24.5	0	0	0	0	
	9	24.0	1	0	0	0	kyphosis
	10	24.5	2	0	0	0	kyphosis
	11	24.0	0	0	0	0	
	12	23.5	0	0	0	0	~~k~~
	13	24.0	1	0	0	0	kyphosis
	14	23.5	0	0	0	0	
	15	23.5	0	0	0	0	
	16	23.5	0	0	0	0	
	17	23.5	1	0	0	0	kyphosis
	18	24.0	2	0	0	0	scoliosis
	19	23.5	0	0	0	0	
	20	24.0	2	0	0	0	scoliosis
	21	24.0	0	0	0	0	
	22	23.5	0	0	0	0	
	23	23.0	0	0	0	0	
	24	23.0	0	0	0	0	
	25	23.5	2	0	0	0	kyphosis + scoliosis
	26	24.0	0	0	0	0	
	27	23.0	0	0	0	0	~~kyphosis~~
	28	23.0	1	0	0	0	kyphosis
	29	23.0	0	0	0	0	
	30	—	—	—	—	—	

Total Weight (pooled): 2.008g

Number of survivors: 29

Number of deformed/have difficulty swimming: 9/0

Initials: BDL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h
Termination Date: July 15/15 @ 1400h KS
1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F6	1	23.0	0	0	0	0	
B	2	23.5	0	0	0	0	
site	3	23.5	0	0	0	0	
	4	24.0	0	0	0	0	
	5	24.0	0	0	0	0	
	6	14.0	3	0	0	0	kyphosis/scoliosis/lordosis
	7	23.5	0	0	0	0	
	8	23.0	0	0	0	0	
	9	24.0	0	0	0	0	
	10	23.0	0	0	0	0	
	11	24.0	0	0	0	0	
	12	23.0	1	0	0	0	Lordosis
	13	23.5	0	0	0	0	
	14	23.0	0	0	0	0	
	15	24.0	0	0	0	0	
	16	23.5	2	0	0	0	lordosis
	17	23.0	0	0	0	0	
	18	24.0	0	0	0	0	
	19	23.5	0	0	0	0	
	20	23.5	0	0	0	0	
	21	23.5	0	0	0	0	
	22	24.0	0	0	0	0	
	23	23.5	0	0	0	0	
	24	23.5	0	0	0	0	
	25	24.0	0	0	0	0	
	26	23.5	0	0	0	0	
	27	23.5	0	0	0	0	
	28	23.0	0	0	0	0	
	29	23.5	0	0	0	0	
	30	23.0	0	0	0	0	

Total Weight (pooled): 2.139
Number of survivors: 30
Number of deformed/have difficulty swimming: 3 / 1 not able to swim

Initials: BDL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h KS

Termination Date: July 15/15 @ ~~1400h~~ 1115

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F6	1	23.0	0	0	0	0	
C	2	22.5					
Site	3	23.5					
	4	23.0					
	5	23.0					
	6	23.5					
	7	23.5					
	8	24.0					
	9	23.5					
	10	~~23~~ 24.0					
	11	23.0					
	12	23.0					
	13	23.0					
	14	23.~~5~~					
	15	23.5					
	16	23.0					
	17	23.0					
	18	23.0					
	19	23.0					
	20	23.5					
	21	23.0					
	22	23.5	2	0	0	0	scoliosis
	23	24.0	2	0	0	0	scoliosis
	24	24.0	0				
	25	23.0	0				
	26	—					
	27	—					
	28	—					
	29	—					
	30	—					

Total Weight (pooled): 1.839

Number of survivors: 25/

Number of deformed/have difficulty swimming: 2/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h KS

Termination Date: July 15/15 @ 1400h 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FG	1	23.0	0	0	0	0	
D	2	23.5					
site	3	23.5					
	4	23.0					
	5	23.0					
	6	23.0					
	7	23.5					
	8	24.0					
	9	24.0					
	10	23.0					
	11	23.0					
	12	24.0					
	13	24.5					
	14	23.5					
	15	23.0					
	16	23.0					
	17	23.5					
	18	23.5					
	19	24.0					
	20	23.0					
	21	23.5					
	22	23.5					
	23	23.5					
	24	23.0					
	25	23.5					
	26	—					
	27	—					
	28	—					
	29	—					
	30	—					

Total Weight (pooled): 1.86 g

Number of survivors: 25 ✓

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15, 2015 @ ~~1400~~ 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F8	1	23.5	0	0	0	0	
A	2	23.5	1				~~ketosis~~ Kyphosis
Rechlor	3	24.0	0				
	4	24.0					
	5	24.0					
	6	23.0					
	7	24.0					
	8	22.0					
	9	22.5					
	10	23.0					
	11	24.0					
	12	24.0					
	13	24.0					
	14	23.5					
	15	24.0					
	16	23.0					
	17	22.0					
	18	24.5					
	19	24.0					
	20	23.0					
	21	23.5					
	22	24.0					
	23	23.0					
	24	23.0					
	25	24.0					
	26	24.0					
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.85

Number of survivors: 26

Number of deformed/have difficulty swimming: 1/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15/15 @ ~~1400h~~ 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F8	1	23.0	0	0	0	0	
B	2	23.0					
Dechlor	3	24.0					
	4	23.0					
	5	22.0					
	6	23.0					
	7	22.0					
	8	24.0					
	9	22.5					
	10	24.0					
	11	23.0					
	12	23.0					
	13	24.0					
	14	24.0					
	15	24.5					
	16	24.0					
	17	23.5					
	18	23.0					
	19	24.5					
	20	24.5					
	21	24.5					
	22	23.0					
	23	24.0					
	24	24.0					
	25	23.0					
	26	21.5	3	0	0	0	lordosis
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.82 g

Number of survivors: 26

Number of deformed/have difficulty swimming: 1/1 - swimming in circles.

Initials: BPL / YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15, 2015 @ 1400h KS
1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F8	1	23.5	0	0	0	0	
C	2	22.5					
Dechlor	3	24.0					
	4	23.0					
	5	23.5					
	6	25.0					
	7	24.5					
	8	24.0					
	9	24.0					
	10	25.0					
	11	25.0					
	12	23.0					
	13	24.5					
	14	22.5					
	15	24.0					
	16	23.0					
	17	24.0					
	18	24.0					
	19	25.0					
	20	23.0					
	21	23.0					
	22	24.0					
	23	24.0					
	24	24.0					
	25	24.5					
	26	24.0					
	27	23.0					
	28						
	29						
	30						

Total Weight (pooled): 1.93 g

Number of survivors: 27

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL / YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15, 2015 @ ~~1400h~~ 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F8	1	23.5	0	0	0	0	
D	2	23.5					
Dechlor	3	24.0					
	4	24.0					
	5	24.0					
	6	23.5					
	7	24.0					
	8	22.5					
	9	24.0					
	10	24.0					
	11	23.0					
	12	22.5					
	13	24.0					
	14	24.0					
	15	24.0					
	16	23.5					
	17	23.0					
	18	24.0					
	19	21.0					
	20	23.0					
	21	24.0					
	22	24.0					
	23	23.5					
	24	22.5					
	25	23.5					
	26	23.0					
	27	24.0					
	28	21.5					
	29						
	30						

Total Weight (pooled): 1.98 g

Number of survivors: 28

Number of deformed/have difficulty swimming: 0 1 0

Initials: BRL/NYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @1935h KS

Termination Date: July 15/15 @~~1400h~~ 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F8	1	23.0	0	0	0	0	
A	2	23.5		0			
Site	3	22.5		1			shortened jaw
	4	23.0		0			
	5	~~23.5~~ 23					
	6	23.5					
	7	25.0					
	8	24.5					
	9	25.0					
	10	25.0					
	11	24.0					
	12	25.0					
	13	24.5					
	14	24.0					
	15	24.0					
	16	24.0					
	17	24.0					
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.33 g

Number of survivors: 17

Number of deformed/have difficulty swimming: 1/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15/15 @ ~~1400h~~ 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F8	1	24.0	0	0	0	0	
B	2	23.5					
Site	3	23.0					
	4	23.0					
	5	24.0					
	6	23.0					
	7	23.0					
	8	23.0					
	9	22.5					
	10	23.0					
	11	24.0					
	12	21.0					
	13	22.0					
	14	23.0					
	15	23.5					
	16	23.0					
	17	23.0					
	18	24.0					
	19	24.0					
	20	22.5					
	21	23.0					
	22	23.5					
	23	23.5					
	24	23.0					
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.75 g

Number of survivors: 24

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15/15 @ ~~1400h~~ 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F8	1	23.5	0	0	0	0	
C	2	24.0					
Site	3	24.0					
	4	24.0					
	5	24.0					
	6	23.0					
	7	23.5					
	8	24.0					
	9	24.0					
	10	23.5					
	11	23.0					
	12	23.5					
	13	24.0					
	14	24.0					
	15	24.0					
	16	24.0					
	17	23.0					
	18	23.5					
	19	22.0					
	20	24.0					
	21	23.0					
	22	19.0					
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.66g

Number of survivors: 22

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15/15 @ 1400h 1115h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F8	1	24.0	0	0	0	0	
D	2	24.0					
Site	3	24.5					
	4	23.0					
	5	23.5					
	6	24.0					
	7	24.0					
	8	24.5					
	9	24.0					
	10	23.5					
	11	23.0					
	12	24.0					
	13	24.0					
	14	24.5					
	15	24.5					
	16	24.0					
	17	24.0					
	18	23.5					
	19	23.5					
	20	24.0					
	21	23.5					
	22	24.5					
	23	24.0					
	24	25.0	↓	↓	↓	↓	
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.84g

Number of survivors: 24

Number of deformed/have difficulty swimming: 0 10

Initials: BAL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: June 16/15 @ 1130h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F9	1	22.5	0	0	0	0	
A	2	24.5					
Dechlor	3	22.5					
	4	22.5					
	5	22.5					
	6	22.0					
	7	23.0					
	8	22.0					
	9	22.5					
	10	23.0					
	11	23.5					
	12	22.5					
	13	23.5					
	14	22.0					
	15	22.0					
	16	22.0					
	17	23.0					
	18	22.0					
	19	22.5					
	20	23.0					
	21	22.5					
	22	24.0					
	23	22.5					
	24	22.0					
	25	22.0					
	26	23.0					
	27	22.0					
	28	22.5					
	29						
	30						

Total Weight (pooled): 1.823

Number of survivors: 28

Number of deformed/have difficulty swimming: 0 1 0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15/15 @ 1330h

16

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F9	1	22.5	0	0	0	0	
B	2	23.0					
Dechlor	3	22.0					
	4	21.5					
	5	22.0					
	6	21.0					
	7	22.0					
	8	21.0					
	9	22.0					
	10	23.0					
	11	22.0					
	12	23.0					
	13	22.0					
	14	21.0					
	15	22.0					
	16	23.0					
	17	23.0					
	18	22.0					
	19	22.0					
	20	21.5					
	21	22.5					
	22	19.5	0	3	0	0	malformed lower jaw - can't close
	23	22.0		0			
	24	22.0		0			
	25	21.5		0			
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.80 g

Number of survivors: 25

Number of deformed/have difficulty swimming: 1/1 - swimming slowly sideways

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 15/15 @ 1130h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F9	1	23.0	0	0	0	0	
C	2	23.0					
Dechlor	3	23.5					
	4	24.0					
	5	23.5					
	6	23.0					
	7	24.0					
	8	24.0					
	9	23.0					
	10	24.0					
	11	23.5					
	12	23.0					
	13	22.0					
	14	23.5					
	15	22.5					
	16	22.0					
	17	23.0					
	18	~~23.0~~ 24.5					
	19	23.0					
	20	22.0					
	21	23.0					
	22	23.5					
	23	~~24.0~~ ~~22.5~~					
	24	~~21.0~~ 24.0					
	25	21.5					
	26	22.0					
	27	23.0					
	28						
	29						
	30						

Total Weight (pooled): 2.06 g

Number of survivors: 27

Number of deformed/have difficulty swimming: 0 10

Initials: BR

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 16/15 @ 1130h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F9	1	22.5	0	0	0	0	
D	2	21.5					
Dechlor	3	21.5					
	4	22.5					
	5	22.0					
	6	22.5					
	7	22.5					
	8	20.0					
	9	22.5					
	10	23.5					
	11	22.0					
	12	23.0					
	13	22.0					
	14	21.5					
	15	23.0					
	16	24.0					
	17	23.0					
	18	23.0					
	19	23.0					
	20	22.5					
	21	22.5					
	22	23.5					
	23	22.0					
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.489

Number of survivors: 23

Number of deformed/have difficulty swimming: 0/0

Initials: BPL / YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 16/15 @ 1130h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FQ	1	24.0	0	0	0	0	
A	2	23.0					
Site	3	24.0					
	4	23.0					
	5	22.5					
	6	23.0					
	7	23.0					
	8	23.5					
	9	23.0					
	10	22.5					
	11	22.5					
	12	23.5					
	13	23.0					
	14	22.5					
	15	22.5					
	16	23.0					
	17	22.5					
	18	23.5					
	19	23.5					
	20	23.0					
	21	22.5					
	22	22.5					
	23	21.5					
	24	22.5					
	25	23.0					
	26	23.0					
	27	22.5					
	28	22.5	↓	↓	↓	↓	
	29						
	30						

Total Weight (pooled): 2.089

Number of survivors: 28

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: Jun 3, 2015 @ 1935h

Termination Date: Jul 16/15 @ 1130h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FQ	1	22.5	0	0	0	0	
B	2	22.5					
Site	3	23.5					
	4	22.5					
	5	22.5					
	6	23.0					
	7	22.0					
	8	22.5					
	9	22.5					
	10	23.0					
	11	22.0					
	12	22.5					
	13	22.0					
	14	21.5					
	15	22.0					
	16	22.5					
	17	24.0					
	18	23.5					
	19	22.5					
	20	22.0					
	21	23.0					
	22	22.5					
	23	23.5					
	24	22.0					
	25	23.0	↓	↓	↓	↓	
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.859

Number of survivors: 25

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 16/15 @ 1130h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FQ	1	22.0	0	0	0	0	
C	2	22.5					
Site	3	23.0					
	4	23.0					
	5	21.5					
	6	22.0					
	7	22.0					
	8	21.0					
	9	21.5					
	10	23.0					
	11	23.5					
	12	23.0					
	13	22.5					
	14	22.5					
	15	22.0					
	16	22.5					
	17	22.5					
	18	23.0					
	19	21.5					
	20	22.0					
	21	22.0			1		Malformed Lower Fin
	22	22.0			0		
	23	20.0					
	24	22.0					
	25	22.5					
	26	23.5					
	27	22.0					
	28						
	29						
	30						

Total Weight (pooled): 1.84g

Number of survivors: 27

Number of deformed/have difficulty swimming: 1/1 - swimming sideways slowly

Initials: BRL / YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: June 16/15 @ 11 30h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F9	1	23.5	0	0	0	0	
D	2	23.5					
Site	3	23.0					
	4	23.0					
	5	24.0					
	6	23.5					
	7	23.5					
	8	23.5					
	9	23.0					
	10	24.0					
	11	23.5					
	12	23.0					
	13	23.0					
	14	23.0					
	15	22.5					
	16	24.0					
	17	24.5					
	18	23.0					
	19	23.0					
	20	23.5					
	21	23.5					
	22	23.0					
	23	23.0					
	24	24.0					
	25	24.0					
	26	24.0					
	27	23.0					
	28	23.0					
	29	23.0					
	30						

Total Weight (pooled): ~~2.12~~ 2.12g

Number of survivors: 29

Number of deformed/have difficulty swimming: 0/0

Initials: BRL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 16/15 @ 1130h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F1Q	1	21.0	0	0	0	0	
A	2	21.0					
Dechlor	3	21.5					
	4	21.0					
	5	22.0					
	6	22.5					
	7	22.5					
	8	22.0					
	9	22.5					
	10	22.0					
	11	22.0					
	12	22.0					
	13	21.5					
	14	22.0					
	15	22.5					
	16	22.5					
	17	22.5					
	18	22.5					
	19	22.5					
	20	22.5					
	21	22.5					
	22	22.5					
	23	23.0					
	24	23.0					
	25	21.5					
	26	22.5					
	27	23.0					
	28						
	29						
	30						

Total Weight (pooled): 1.55 g

Number of survivors: 27

Number of deformed/have difficulty swimming: 0/0

Initials: BRL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: JUly 6/15 @ 1130h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F12	1	22.0	0	0	0	0	
B	2	22.5					
Dechlor	3	21.5					
	4	23.0					
	5	21.5					
	6	22.0					
	7	22.5					
	8	22.5					
	9	22.0					
	10	22.5					
	11	23.0					
	12	22.0					
	13	22.0					
	14	22.0					
	15	22.0					
	16	22.5					
	17	22.5					
	18	21.5					
	19	22.0					
	20	22.5					
	21	22.0					
	22	20.5					
	23	22.0					
	24	22.0					
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.37 g

Number of survivors: 24

Number of deformed/have difficulty swimming: 0 / 10

Initials: BBL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 6/15 @ 1130h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F12	1	23.0	0	0	0	0	
C	2	21.5					
Dechlor	3	22.5					
	4	23.0					
	5	22.0					
	6	21.0					
	7	23.0					
	8	22.5					
	9	22.0					
	10	21.5					
	11	22.0					
	12	22.5					
	13	22.0					
	14	22.5					
	15	22.0					
	16	22.5					
	17	23.0					
	18	22.0					
	19	23.0					
	20	22.0					
	21	22.0					
	22	22.5					
	23	22.5					
	24	21.5					
	25	21.5					
	26	22.0					
	27	22.5					
	28	22.0					
	29	22.0					
	30						

Total Weight (pooled): 1.85 g

Number of survivors: 29

Number of deformed/have difficulty swimming: ∅ 10

Initials: BPL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935

Termination Date: July 16/15 @ 1130

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F12	1	22.0	0	0	0	0	
D	2	22.5					
Dechlor	3	21.0					
	4	21.5					
	5	22.0					
	6	21.5					
	7	21.0					
	8	21.5					
	9	22.5					
	10	22.0					
	11	22.0					
	12	22.5					
	13	22.0					
	14	22.0					
	15	22.5					
	16	21.5					
	17	21.5					
	18	22.0					
	19	21.5					
	20	22.0					
	21	23.0					
	22	22.0					
	23	22.0					
	24	22.5	0 X4mm				
	25	21.0	1 X4mm				~~lordosis~~ tail lost
	26	21.5	0				lordosis
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.38 g

Number of survivors: 26

Number of deformed/have difficulty swimming: 1/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 16/15 @ 1130h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F12	1	21.0	0	0	0	0	
Mine A	2	22.5					
Site	3	22.5					
	4	22.0					
	5	21.0					
	6	22.0					
	7	23.0					
	8	22.0					
	9	22.0					
	10	22.5					
	11	22.0					
	12	23.0					
	13	22.0					
	14	22.0					
	15	21.5					
	16	22.0					
	17	23.0					
	18	21.5					
	19	21.5					
	20	22.0					
	21	21.5					
	22	22.0					
	23	22.0					
	24	22.0					
	25	21.5					
	26	22.0	↓	↓	↓	↓	
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.47 g

Number of survivors: 26

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 16/15 @ 1130h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F12	1	22.0	0	0	0	0	
B	2	23.0					
Site	3	22.0					
	4	22.5					
	5	23.5					
	6	21.5					
	7	21.0					
	8	21.0					
	9	22.0					
	10	21.0					
	11	22.0					
	12	21.5					
	13	21.5					
	14	22.0					
	15	22.0					
	16	22.5					
	17	22.0					
	18	22.0					
	19	23.0					
	20	22.0					
	21	22.0					
	22	22.5					
	23	21.0					
	24	22.0					
	25	21.5					
	26	22.0					
	27	21.5					
	28						
	29						
	30						

Total Weight (pooled): 1.525

Number of survivors: 27

Number of deformed/have difficulty swimming: 0/0

Initials: BRL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 16/15 @ 1130h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F12	1	22.5	0	0	0	0	
C	2	23.0					
Site	3	23.0					
	4	21.5					
	5	22.0					
	6	20.0					
	7	22.0					
	8	21.0					
	9	21.0					
	10	22.0					
	11	21.0					
	12	22.0					
	13	21.5					
	14	21.5					
	15	21.0					
	16	22.0					
	17	21.5					
	18	21.5					
	19	21.5					
	20	21.0					
	21	22.0					
	22	21.0					
	23	21.5					
	24	21.5					
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.36

Number of survivors: 24

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: ~~15426~~ KS Golder

Work Order No.: 15426

Start Date: June 3, 2015 @ 1935h

Termination Date: July 16/15 @ 1130

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FI2	1	21.5	0	0	0	0	
D	2	21.5					
SITE	3	21.0					
	4	20.5					
	5	21.0					
	6	23.0					
	7	21.5					
	8	20.0					
	9	21.5					
	10	21.0					
	11	22.0					
	12	20.5					
	13	21.0					
	14	19.5					
	15	21.0					
	16	20.5					
	17	22.0					
	18	23.0					
	19	22.0					
	20	22.5					
	21	22.0					
	22	22.0					
	23	21.0					
	24	22.0					
	25	22.5					
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.43g

Number of survivors: 25

Number of deformed/have difficulty swimming: 0 / 0

Initials: BZ / WL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 5th, 2015 @ 2015h ~~1935h~~

Termination Date: July 16/15 @ 1130h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F13	1	22.5	0	0	0	0	
A	2	23.0					
Dechlor	3	22.5					
	4	22.0					
	5	23.0					
	6	23.0					
	7	23.0					
	8	22.5					
	9	23.5					
	10	22.5					
	11	23.0					
	12	23.0					
	13	23.0					
	14	23.0					
	15	22.5					
	16	22.0					
	17	21.5					
	18	23.0					
	19	23.0					
	20	23.0					
	21	23.0					
	22	23.0					
	23	23.0					
	24	24.0					
	25	22.0					
	26	22.0					
	27	22.0					
	28	23.0					
	29	23.0					
	30	23.5					

Total Weight (pooled): 2.10 g

Number of survivors: 30

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 5th, 2015 @1935h KS

Termination Date: July 16/15 @1130h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F13	1	23.0	0	0	0	0	
13	2	23.0					
Richter	3	22.0					
	4	21.0					
	5	22.0					
	6	23.0					
	7	23.0					
	8	23.0					
	9	22.5					
	10	22.0					
	11	23.0					
	12	23.0					
	13	22.5					
	14	23.0					
	15	22.5					
	16	23.0					
	17	23.5					
	18	23.0					
	19	21.0					
	20	22.0					
	21	23.0					
	22	22.0					
	23	22.5					
	24	22.0					
	25	22.0					
	26	23.0					
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.79 g

Number of survivors: 26

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 5, 2015 @ 1935h (5 KS, 20 ISh, KS)

Termination Date: July 6/15 @ 1130h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F13	1	21.0	0	0	0	0	
C	2	22.0					
Dechlor	3	20.5					
	4	22.5					
	5	22.5					
	6	23.0					
	7	24.0					
	8	21.0					
	9	23.0					
	10	22.5					
	11	22.0					
	12	22.5					
	13	22.5					
	14	22.5					
	15	22.0					
	16	22.0					
	17	22.0					
	18	22.0					
	19	21.5					
	20	22.5					
	21	22.0					
	22	22.5					
	23	22.0					
	24	22.0					
	25	22.0					
	26	22.5					
	27	22.0					
	28	22.0					
	29	24.0					
	30	21.0					
	31	23.0					

Total Weight (pooled): 219 g

Number of survivors: 31

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL/WL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 5, 2015 @ 1435h

Termination Date: July 16/15 @ 1130h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F13	1	21.5	0	0	0	0	
D	2	22.0					
Dechlor	3	21.5					
	4	23.5					
	5	22.5					
	6	21.5					
	7	21.5					
	8	22.0					
	9	22.0					
	10	22.0					
	11	23.0					
	12	23.0					
	13	22.0					
	14	23.0					
	15	23.5					
	16	22.0					
	17	23.5					
	18	22.5					
	19	21.0					
	20	23.0					
	21	22.0					
	22	23.5					
	23	22.5					
	24	23.0					
	25	23.0					
	26	23.0					
	27	22.0					
	28	22.0					
	29	22.5					
	30	22.0					

Total Weight (pooled): 2.15g

Number of survivors: 30

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL / YHL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 5, 2015 @ 2015h

Termination Date: July 16, 2015 @ 1130h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FB	1	24.0	0	0	0	0	
A	2	24.0					
Site	3	23.5					
	4	22.5					
	5	23.5					
	6	23.5					
	7	23.0					
	8	24.0					
	9	23.5					
	10	23.5					
	11	24.5					
	12	24.0					
	13	24.0					
	14	24.0					
	15	23.5					
	16	22.0					
	17	23.0					
	18	23.5		3			missing lower jaw
	19	23.0		0			
	20	23.0					
	21	21.0					
	22	24.0					
	23	23.0					
	24	23.0					
	25	23.0					
	26	24.0					
	27	23.0					
	28	21.5					
	29	24.0	3				
	30	21.0	3				kyphosis and lordosis Scoliosis

Total Weight (pooled): 2.29g

Number of survivors: 30

Number of deformed/have difficulty swimming: 3 / 1 - swimming erratically

Initials: BDL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Gobler

Work Order No.: 15426

Start Date: June 5, 2015 @ 2015h

Termination Date: July 16, 2015 @ 1130h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F13	1	23.0	0	0	0	0	
B	2	23.5					
site	3	22.5					
	4	23.5					
	5	23.0					
	6	23.0					
	7	23.0					
	8	24.0					
	9	23.5					
	10	23.0					
	11	22.5					
	12	22.5					
	13	22.5					
	14	22.0					
	15	24.0					
	16	23.5					
	17	22.0					
	18	24.0					
	19	22.5					
	20	24.0					
	21	23.5					
	22	22.5					
	23	23.0					
	24	22.5					
	25	22.5					
	26	24.5					
	27	24.5					
	28	22.0	↓	↓	↓	↓	
	29						
	30						

Total Weight (pooled): 2.13g

Number of survivors: 28

Number of deformed/have difficulty swimming: 0 / 0

Initials: BDL/NVL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 5, 2015 @ 2015h

Termination Date: July 16, 2015 @ 1130h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F13	1	24.0	0	0	0	0	
C	2	23.5					
SILT	3	23.0					
	4	24.5					
	5	24.0					
	6	23.0					
	7	23.5					
	8	23.5					
	9	23.0					
	10	23.0					
	11	23.5					
	12	24.0					
	13	23.0					
	14	23.5					
	15	23.0					
	16	24.0					
	17	22.5					
	18	23.0					
	19	24.5					
	20	22.5					
	21	23.5					
	22	22.0					
	23	22.5					
	24	23.5					
	25	24.5					
	26	23.0					
	27	23.0					
	28	22.0					
	29	23.0					
	30						

Total Weight (pooled): 2.23g

Number of survivors: 29

Number of deformed/have difficulty swimming: 0 / 0

Initials: BDL IYYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 5, 2015 @ 1205

Termination Date: July 16, 2015 @ 1130h

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FB	1	22.0	0	0	0	0	
D	2	21.0					
Site	3	22.5					
	4	22.5					
	5	23.5					
	6	24.0					
	7	23.5					
	8	23.5					
	9	24.0					
	10	24.0					
	11	23.5					
	12	21.5					
	13	23.5					
	14	23.0					
	15	23.0					
	16	24.0					
	17	23.0					
	18	23.0					
	19	23.5					
	20	24.0					
	21	23.5					
	22	23.0					
	23	24.0					
	24	24.0					
	25	23.0					
	26	23.5					
	27	23.5					
	28	23.5					
	29						
	30						

Total Weight (pooled): 2.19 g

Number of survivors: 28

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24, 2015

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F15	1	20.0	0	0	0	0	
A	2	23.0	↓	↓	↓	↓	
Dechlor	3	22.5					
	4	23.0					
	5	22.5					
	6	22.5					
	7	22.5					
	8	22.5					
	9	23.0					
	10	23.0					
	11	22.0					
	12	23.0					
	13	22.5					
	14	22.0					
	15	22.5					
	16	23.5					
	17	23.0					
	18	23.0					
	19	23.5					
	20	23.0					
	21	22.5					
	22	22.5					
	23	22.5					
	24	23.0					
	25	21.5	↓	↓	↓	↓	
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.873

Number of survivors: 25

Number of deformed/have difficulty swimming: 0 | 0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11, 2015

Termination Date: July 24, 2015

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FIS	1	22.0	0	0	0	0	
B	2	21.5					
Dechlor	3	22.0					
	4	23.0					
	5	23.0					
	6	22.5					
	7	22.0					
	8	21.5					
	9	22.0					
	10	22.5					
	11	22.5					
	12	22.5					
	13	22.0					
	14	20.0					
	15	23.0					
	16	21.5					
	17	22.5					
	18	23.0					
	19	22.5					
	20	22.0					
	21	22.0					
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.61 g

Number of survivors: 21

Number of deformed/have difficulty swimming: 0 / 0

Initials: BDL / YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F15	1	23.0	0	0	0	0	
C	2	23.0	↓	↓	↓	↓	
Dechlor	3	23.0					
	4	21.5					
	5	22.5					
	6	22.0					
	7	17.0	0	0	[illegible]	0	malformed tail fin., still have yolk.
	8	21.0					
	9	22.0					
	10	22.5					
	11	23.0					
	12	22.5					
	13	22.5					
	14	23.0					
	15	22.0					
	16	22.0					
	17	22.0					
	18	22.0					
	19	23.0					
	20	21.5	↓	↓	↓	↓	
	21	18.0	0	0	0	3	yolk sac ⅓ pericardial edema
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.683

Number of survivors: 21

Number of deformed/have difficulty swimming: 2 / 1 - swimming slowly [illegible]

Initials: BCL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FIS	1	22.0	0	0	0	0	
D	2	24.0					
Dechlor	3	23.0					
	4	23.0					
	5	21.0		BC 1	BP +		slight lower jaw malformation
	6	24.0		JP 0			
	7	22.0					
	8	23.0					
	9	22.5					
	10	22.0					
	11	22.0					
	12	23.5					
	13	24.0					
	14	22.0					
	15	22.5					
	16	21.5					
	17	23.0					
	18	22.5					
	19	23.0					
	20	22.0					
	21	22.0					
	22	23.0					
	23	23.0					
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.71 g

Number of survivors: 23

Number of deformed/have difficulty swimming: 1 / 0

Initials: BPW

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 29/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FIS	1	~~22.0~~ BAD	0	0	0	0	
A	2	21.5 ~~22.0~~ BAD					
Site	3	21.5					
	4	22.0					
	5	23.0					
	6	22.0					
	7	21.5					
	8	23.0					
	9	21.5					
	10	22.0					
	11	21.0					
	12	20.5					
	13	21.0					
	14	20.0					
	15	24.0					
	16	21.0					
BAD	16 ~~17~~	22.5					
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.13 g

Number of survivors: 16

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL / YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 11/15
Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F15	1	23.0	0	0	0	0	
B	2	24.0					
Site	3	~~20~~ 22.5					
	4	23.0					
	5	22.0					
	6	22.5					
	7	23.0					
	8	23.5					
	9	22.0					
	10	23.0					
	11	23.0					
	12	22.5					
	13	23.0					
	14	23.0					
	15	23.0					
	16	22.0					
	17	22.5					
	18	23.0					
	19	23.0					
	20	22.5	3	1	0	0	hyphosis 3/or dosis; shortened nose.
	21	23.5	0	0	0	0	
	22	23.5	0	0	0	0	
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.82
Number of survivors: 22
Number of deformed/have difficulty swimming: 1 / 1 swimming erratically

Initials: SCL

Reviewed by: _____

Date Reviewed: _____

Nautilus Environmental

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: _____

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FIS	1	22.5	0	0	0	0	
C	2	23.0	↓	↓	↓	↓	
Site	3	22.0	↓	↓	↓	↓	
	4	21.5	↓	↓	↓	↓	
	5	23.0	↓	↓	↓	↓	
	6	21.5	↓	↓	↓	↓	
	7	22.0	↓	↓	↓	↓	
	8	23.0	↓	↓	↓	↓	
	9	22.0	↓	↓	↓	↓	
	10	21.0	↓	↓	↓	↓	
	11	22.0	↓	↓	↓	↓	
	12	20.5	↓	↓	↓	↓	
	13	22.0	↓	↓	↓	↓	
	14	22.0	↓	↓	↓	↓	
	15	23.0	↓	↓	↓	↓	
	16	23.0	↓	↓	↓	↓	
	17	22.0	↓	1	↓	↓	Slightly longer tower jar
	18	22.5	↓	0	↓	↓	
	19	23.0	1	↓	↓	↓	Kyphosis
	20	23.0	0	↓	↓	↓	
	21	22.5	↓	↓	↓	↓	
	22	22.0	↓	↓	↓	↓	
	23	21.5	↓	↓	↓	↓	
	24	22.0	↓	↓	↓	↓	
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.74g

Number of survivors: 24

Number of deformed/have difficulty swimming: 2 | 0

Initials: _____

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11 /15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FIS	1	23.0	0	0	0	0	
D	2	23.0					
Site	3	23.5					
	4	22.5					
	5	23.5					
	6	23.0					
	7	22.5					
	8	22.0					
	9	22.5					
	10	21.5					
	11	22.5					
	12	23.5					
	13	24.0					
	14	22.5					
	15	22.0					
	16	23.0					
	17	23.5					
	18	22.5					
	19	23.5					
	20	23.0					
	21	23.0					
	22	22.0	↓	↓	↓	↓	
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.67g

Number of survivors: 22

Number of deformed/have difficulty swimming: 0 10

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Geisler

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FT6	1	21.5	0	0	0	0	
A	2	20.5	↓	↓	0	↓	
Dechlor	3	20.5			1		Malformed anal fin
	4	22.0			1	↓	Malformed Lower fin
	5	21.0			0	2	In tissue close to Pelvic fin
	6	22.0	↓		0	0	
	7	2*S 18.5	2		3	2	Scoliosis, Kyphosis, missing tail fin. edema in tissue below dorsal f
	8	21.0	2		0	0	Scoliosis, Lordosis
	9	20.0	0	↓	0	0	
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.43g

Number of survivors: 9

Number of deformed/have difficulty swimming: 5 / 1 - slightly erratic

Initials: BPL / YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F16	1	20.0	0	0	0	0	
B	2	19.5	0			3	In-muscle tissue & anal fin, yolk-sac
Dechlor	3	20.0	2			1	scoliosis, in muscle tissue above anal fin
	4	20.0	0			0	
	5	22.0					
	6	19.0			2		Malformed muscle tissue mid fish, malformed tail fin
	7	20.5			0		
	8	17.5	2	3	3		scoliosis Both eyes Assymetrical Kyphosis, malformed, Lower jaw, tailfin
	9	19.0	3	0	0		scoliosis Lordosis
	10	20.0	2	0	0		scoliosis
	11	15.5	1	2	3	3	Lordosis, Missing, Malformed Tailfin, Lower Jaw, yolk-sa
	12	18.0	2	0	3	0	scoliosis, tailfin Malformed
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.70g

Number of survivors: 12

Number of deformed/have difficulty swimming: 8/ 1- slightly erratic

Initials: BPL / YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 11/15
Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F16	1	19.5	0	~~1~~ 2	0	0	1 malformed eye Asymmetrical lower jaw, Malformed tissue pericardia region
C	2	21.0	2	0	↓	↓	Scoliosis ~~Kyphosis~~
Dechlor	3	19.5	2	↓	↓	↓	Scoliosis Kyphosis
	4	19.0	2	↓	↓	↓	Scoliosis
	5	19.5	0	3	2	↓	Both eyes malformed, Malformed tail fin
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.25g
Number of survivors: 5
Number of deformed/have difficulty swimming: ~~0 1 unable to swim~~ KS 5/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Nautilus Environmental

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15 (4pc)

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F16	1	19.5	0	0	0	0	
A	2	19.5	0	3	2		one eye | Reduced malformed | pectoral fin
Site	3	19.0	1	0	0		Scoliosis (malnourished)
	4	18.0	0	0	0		
	5	19.5	2	0	0		Scoliosis, Dark object in yolk-sac
	6	19.0	1	0	0		scoliosis
	7	17.0	3	yolk 2	3	V	scoliosis, kyphosis, lordosis, asymmetric head, missing tailfin
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.309

Number of survivors: 7

Number of deformed/have difficulty swimming: 5 / 1- unable to swim

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F16	1	20.0	1	0	0	0	scoliosis
B	2						
Site	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.04g

Number of survivors: 1

Number of deformed/have difficulty swimming: 1/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F17	1	25.0	0	0	0	0	
A	2	24.0	0	↓			
Dechlor	3	24.0	1	↓			Sclerosis
	4	24.0	0	1			Malformed lower jaw
	5	24.0	↓	0			
	6	24.0		1			Malformed Lower Jaw
	7	25.0		0			
	8	24.0		1			Malformed Lower Jaw
	9	24.0		0			
	10	23.5		↓			
	11	~~19.5~~ 24.5					
	12	24.5					
	13	24.5					
	14	25.0					
	15	25.0					
	16	24.5					
	17	25.0					
	18	24.5					
	19	25.0					
	20	25.0					
	21	24.5					
	22	24.5	↓				
	23	24.5	3				Scoliosis/Kyphosis.
	24	24.0	0				
	25	24.0	0	↓	↓	↓	
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.729

Number of survivors: 25

Number of deformed/have difficulty swimming: 5/0

Initials: BPL / YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F17	1	24.5	0	0	0	0	
B	2	24.0	↓	↓	↓	↓	
Dechlor	3	23.5	↓	↓	↓	↓	
	4	24.5	↓	↓	↓	↓	
	5	23.0	1	↓	↓	↓	kyphosis
	6	23.0	0	↓	↓	↓	
	7	25.5	↓	↓	↓	↓	
	8	23.5	↓	↓	↓	↓	
	9	23.0	↓	↓	↓	2	yolksac edema, pericardial edema
	10	24.0	1	↓	↓	0	scoliosis
	11	23.5	0	↓	↓	↓	
	12	24.5	↓	↓	↓	↓	
	13	24.5	↓	↓	↓	↓	
	14	24.0	↓	↓	↓	1	~~edem~~ yolksac edema
	15	24.0	↓	↓	↓	0	
	16	24.0	↓	↓	↓	↓	
	17	22.5	↓	↓	↓	↓	
	18	21.5	↓	↓	↓	↓	
	19	22.5	↓	↓	↓	↓	
	20	24.5	↓	↓	↓	↓	
	21	24.5	↓	↓	↓	2	yolk-sac
	22	25.5	2	↓	↓	0	kyphosis scoliosis
	23	23.5	0	↓	↓	↓	
	24	23.0	0	↓	↓	↓	
	25	23.0	1	↓	↓	↓	scoliosis
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 2.029

Number of survivors: 25

Number of deformed/have difficulty swimming: 7/0

Initials: BPL / YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F17	1	~~19.0~~ 24.0	0	0	0	0	
C	2	24.5	↓	↓	↓	↓	
Dechlor	3	25.0	↓	↓	↓	↓	
	4	23.0	↓	↓	↓	↓	
	5	21.5	↓	2	↓	↓	Lower JAW
	6	21.0	~~2~~ YUC 1 KS 0	0	↓	↓	~~Lordosis~~ YUC ~~Scoliosis~~ YUC
	7	21.0	~~2~~ YUC 0	↓	↓	↓	~~Lordosis~~ YUC ~~Scoliosis~~ YUC
	8	24.0	3	↓	↓	↓	Scoliosis Lordosis
	9	23.0	2	↓	↓	↓	~~Lordosis~~ YUC Kyphosis.
	10	25.0	0	↓	↓	↓	
	11	24.0	↓	↓	↓	↓	
	12	25.5	↓	↓	↓	↓	
	13	24.0	↓	1	↓	↓	Lower Jaw
	14	24.0	2 KS	0	↓	↓	Scoliosis Lordosis
	15	23.5	0	↓	↓	2	Yolk-sac
	16	24.0	↓	↓	↓	0	
	17	21.0	↓	1	↓	0	Lower Jaw
	18	23.5	↓	0	↓	2	Yolk-sac, hemorrhaging
	19	24.5	↓	↓	↓	0	
	20	24.0	↓	↓	↓	1	Yolk-sac, hemorrhaging
	21	24.5	↓	↓	↓	0	
	22	22.5	↓	↓	↓	↓	
	23	22.5	↓	↓	↓	↓	
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 2.109

Number of survivors: 23

Number of deformed/have difficulty swimming: 9/0

Initials: BPL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F17	1	25.0	1	0	0	0	Kyphosis
D	2	23.5	0	↓	↓	↓	
Dechlor	3	24.0	1				scoliosis
	4	25.0	0				
	5	24.0	1				Kyphosis
	6	23.0	1				lordosis
	7	25.0	1				Kyphosis
	8	23.0	3				Scoliosis
	9	24.5	0				
	10	25.0	2			↓	Kyphosis
	11	24.0	0			2	yolk sac
	12	24.0	1			0	scoliosis
	13	23.0	2	↓			Kyphosis
	14	24.0	2	1			Lower jaw malformed, Kyphosis
	15	25.0	1	0			scoliosis
	16	25.0	0	0	↓	↓	
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.42g

Number of survivors: 16

Number of deformed/have difficulty swimming: 12/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F17	1	23.5	0	0	0	0	
A	2	24.0	0	↓	↓	↓	
Site	3	21.5	3	↓	↓	↓	scoliosis
	4	24.0	0	1	↓	~~1~~ 3	yolk-sac hemorrhaging
	5	22.0	0	0	↓	0	
	6	24.5	2	↓	↓	↓	Lordosis
	7	23.0	1	↓	↓	↓	Lordosis
	8	23.5	0	↓	↓	↓	
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

shortened nose
eye edem
malforma
Lower Jaw
edema
anal po

Total Weight (pooled): 0.82

Number of survivors: 8

Number of deformed/have difficulty swimming: 4 ~~5~~ 1 - unable to swim

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F17	1	23.5	0	0	0	0	
B	2	24.0	2	0	↓	↓	Kyphosis
Site	3	23.0	3	2	↓	↓	Kyphosis, Lordosis, Malformed Lower Jaw
	4	22.5	1	0	↓	↓	Lordosis
	5	22.5	0	↓	↓	↓	
	6	24.0	1	↓	1	↓	one short pectoral fin, Kyphosis
	7	23.0	1	↓	0	↓	Lordosis
	8	23.5	1	↓	↓	↓	Kyphosis
	9	23.0	2	↓	↓	↓	Kyphosis, Scoliosis
	10	23.0	0	↓	↓	↓	
	11	24.5	0	↓	↓	↓	
	12			↓	↓	↓	
	13			↓	↓	↓	
	14			↓	↓	↓	
	15			↓	↓	↓	
	16			↓	↓	↓	
	17			↓	↓	↓	
	18			↓	↓	↓	
	19			↓	↓	↓	
	20			↓	↓	↓	
	21			↓	↓	↓	
	22			↓	↓	↓	
	23			↓	↓	↓	
	24			↓	↓	↓	
	25			↓	↓	↓	
	26			↓	↓	↓	
	27			↓	↓	↓	
	28			↓	↓	↓	
	29			↓	↓	↓	
	30			↓	↓	↓	

Total Weight (pooled): 0.869

Number of survivors: 11

Number of deformed/have difficulty swimming: 7/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F17	1	21.5	1	0	0	0	Kyphosis
C	2	23.0	0	0		0	
Site	3	24.0		1		2	Lower jaw malformed, yolk-sac, eye edem
	4	22.5		0		0	
	5	22.5					
	6	23.0					
	7	22.5					
	8	22.0					
	9	22.0					
	10	23.0					
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.173g

Number of survivors: 10

Number of deformed/have difficulty swimming: 2/1 - swimming erratically

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11 /15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F17	1	21.5	0	0	0	0	
D	2	21.0	0	↓	↓	↓	
Site	3	22.5	3				Lordosis Kyphosis
	4	19.0 ~~23.0~~	0			1	Yolk-sac
	5	21.5	↓			1	Yolk-sac
	6	22.0				0	
	7	21.5	↓	↓		0	
	8	23.0	0 KS	1		3	Shortened yolk sac, both eyes nose,
	9	20.0	1	0			Kyphosis
	10	22.5	0				
	11	22.0					
	12	22.5					
	13	23.0					
	14	23.0	↓	↓	↓	↓	
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.05g

Number of survivors: 14

Number of deformed/have difficulty swimming: 5/3 - difficulty swimming

Initials: BPL/HH KS

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F18	1	23.0	0	0	0	0	
A	2	24.0	↓	↓	↓	↓	
Dechlor	3	23.0					
	4	23.0					
	5	22.5					
	6	24.0					
	7	24.0					
	8	23.0					
	9	22.5		↓			
	10	22.0		1			Lower Jaw malformed
	11	24.0		0			
	12	20.5		↓			
	13	22.5					
	14	22.5					
	15	23.5					
	16	22.5					
	17	22.5					
	18	22.0					
	19	23.5	↓				
	20	22.0	~~1~~ 2				Scoliosis
	21	24.0	0	↓	↓	↓	
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.56g

Number of survivors: 21

Number of deformed/have difficulty swimming: 2 / 0

Initials: BPL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F18	1	24.5	0	0	0	0	
B	2	23.5					
Dechlor	3	23.5					
	4	23.5					
	5	23.5					
	6	23.0					
	7	23.5					
	8	24.0					
	9	24.0	2				Kyphosis
	10	24.0	0				
	11	22.0					
	12	23.5					
	13	24.5					
	14	24.0					
	15	24.0					
	16	22.0					
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.249

Number of survivors: 16

Number of deformed/have difficulty swimming: 1/0

Initials: BDL AYL [illegible]

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FIB	1	24.0	0	0	0	0	
C	2	23.0		0		0	
Dechlor	3	19.0		2		1	Malformed Lower Jaw, pericardial
	4	24.0				0	
	5	19.0	↓				
	6	24.0					Kyphosis
	7	23.0	0				
	8	24.5	1				Kyphosis
	9	24.0					
	10	21.0					
	11	23.5					
	12	23.5					
	13	21.0					
	14	23.5					
	15	22.5					
	16	25.0					
	17	23.0					
	18	24.0	↓	↓	↓	↓	
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.29g

Number of survivors: 18

Number of deformed/have difficulty swimming: 3/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 11/15
Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F18	1	24.0	0	0	0	0	
D	2	22.5					
Dechlor	3	22.0					
	4	22.5					
	5	22.5					
	6	23.0					
	7	22.0					
	8	22.5					
	9	18.0	2	2			Kyphosis, Malformed Shortened Lower Jaw, nose
	10	23.0	0	0			
	11	22.5					
	12	23.0					
	13	24.0					
	14	22.0					
	15	22.5					
	16	22.0					
	17	22.5					
	18	22.0					
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.34g
Number of survivors: 18
Number of deformed/have difficulty swimming: 1 / 1 - swimming slowly

Initials: BPL / ~~YTL~~ KS

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F18	1	23.0	1	0	0	0	Kyphosis
A	2	22.5	0				
Site	3	23.5	~~2~~ 1				scoliosis
	4	22.5	0				
	5	22.5					
	6	24.0					
	7	23.5					
	8	24.0					
	9	22.5					
	10	23.0					
	11	23.0					
	12	23.0					
	13	23.0					
	14	23.0					
	15	23.0					
	16	23.0					
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.249

Number of survivors: 16

Number of deformed/have difficulty swimming: 2/0

Initials: YYL / BDL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F18	1	23.0	0	0	0	0	
B	2	23.0	↓	↓	↓	↓	
Site	3	23.0	↓	↓	↓	↓	
	4	21.5	1	↓	↓	↓	Kyphosis
	5	23.0	0	↓	↓	↓	
	6	21.0	↓	↓	↓	↓	
	7	22.5	↓	↓	↓	↓	
	8	23.0	↓	↓	↓	↓	
	9	22.0	↓	↓	↓	↓	
	10	22.0	↓	↓	↓	↓	
	11	21.0	↓	↓	↓	↓	
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.79g

Number of survivors: 11

Number of deformed/have difficulty swimming: 1/1 - swimming slowly

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F18	1	22.0	0	1	0	0	Shortened Lower Jaw
C	2	21.0	↓	0	↓	↓	
SIR	3	23.0	↓	0	↓	↓	
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.219

Number of survivors: 3

Number of deformed/have difficulty swimming: 1/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F18	1	22.0	0	0	0	0	
D	2	21.0			0		
Sit	3	22.5			1		1 Malformed pectoral fin
	4	22.5			0		
	5	22.0					
	6	21.5					
	7	22.0					
	8	22.0	1				Kyphosis
	9	22.5	0				
	10	22.5					
	11	22.0					
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.779

Number of survivors: 11

Number of deformed/have difficulty swimming: 2/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F19	1	22.5	0	0	0	0	
A	2	22.0	↓	↓	↓	↓	
Dechlor	3	22.5	↓	↓	↓	↓	
	4	21.0	↓	↓	↓	↓	
	5	21.0	1	↓	↓	↓	Kyphosis
	6	22.0	0	↓	↓	↓	
	7	22.0	↓	↓	↓	↓	
	8	22.0	↓	↓	↓	↓	
	9	21.5	↓	↓	↓	↓	
	10	21.5	↓	↓	↓	↓	
	11	21.5	↓	↓	↓	↓	
	12	22.0	↓	↓	↓	↓	
	13	22.0	↓	↓	↓	↓	
	14	22.0	1	↓	↓	↓	Kyphosis
	15	22.0	0	↓	↓	↓	
	16	22.0	↓	↓	↓	↓	
	17	22.5	↓	↓	↓	↓	
	18	23.5	↓	↓	↓	↓	
	19	22.5	↓	↓	↓	↓	
	20	22.0	↓	↓	↓	↓	
	21	22.0	↓	↓	↓	↓	
	22	22.0	↓	↓	↓	↓	
	23	22.0	↓	↓	↓	↓	
	24	23.0	↓	↓	↓	↓	
	25	22.0	↓	↓	↓	↓	
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.57g

Number of survivors: 25

Number of deformed/have difficulty swimming: 2 / 0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Geiger

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F19	1	22.0	0	0	0	0	
B	2	22.5					
Dechlor	3	22.0					
	4	20.5					
	5	21.0					
	6	21.0					
	7	21.0					
	8	21.0					
	9	21.5					
	10	23.5					
	11	21.0					
	12	21.0					
	13	21.0					
	14	22.5					
	15	21.0					
	16	22.0					
	17	20.0					
	18	20.5					
	19	20.5					
	20	21.0					
	21	22.0					
	22	21.5					
	23	21.5					
	24	21.5					
	25	22.0					
	26	21.5	↓	↓	↓	↓	
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.63g

Number of survivors: 26

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/MYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F19	1	22.0	0	0	0	0	
C	2	22.5					
Dechlor	3	22.0					
	4	22.0					
	5	22.5					
	6	22.0					
	7	22.0					
	8	23.0	1				scoliosis
	9	21.0	0				
	10	22.0					
	11	23.0					
	12	22.0					
	13	22.0					
	14	22.5					
	15	22.5					
	16	20.5					
	17	22.0					
	18	22.0					
	19	22.5	1				Kyphosis
	20	22.5	1				Kyphosis
	21	22.0	0				
	22	21.5					
	23	22.5					
	24	22.0					
	25	21.5					
	26	22.0					
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.61g

Number of survivors: 26

Number of deformed/have difficulty swimming: 3/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F19	1	22.0	0	0	0	0	
D	2	22.0	↓	↓	↓	↓	
Dechlor	3	22.5	↓	↓	↓	↓	
	4	22.0	↓	↓	↓	↓	
	5	22.0	↓	↓	↓	↓	
	6	23.0	↓	↓	↓	↓	
	7	22.0	↓	↓	↓	↓	
	8	21.0	↓	↓	↓	↓	
	9	22.5	↓	↓	↓	↓	
	10	21.5	↓	↓	↓	↓	
	11	22.0	1	↓	↓	↓	Kyphosis
	12	21.0	0	↓	↓	↓	
	13	22.5	↓	↓	↓	↓	
	14	21.0	↓	↓	↓	↓	
	15	23.0	↓	↓	↓	↓	
	16	22.0	↓	↓	↓	↓	
	17	22.5	↓	↓	↓	↓	
	18	21.0	↓	↓	↓	↓	
	19	21.5	↓	↓	↓	↓	
	20	23.0	↓	↓	↓	↓	
	21	22.0	↓	↓	↓	↓	
	22	22.5	↓	↓	↓	↓	
	23	21.5	↓	↓	↓	↓	
	24	22.0	↓	↓	↓	↓	
	25	22.0	↓	↓	1	↓	one malformed pectoral
	26	22.0	↓	↓	0	↓	
	27	19.0	↓	↓	↓	↓	
	28	21.5	3	↓	↓	↓	Lordosis, pectoral fin
	29						
	30						

Total Weight (pooled): 1.58g

Number of survivors: 28

Number of deformed/have difficulty swimming: 0 w/ 3/L swimming in circles.

Initials: BPL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F19	1	24.5	0	0	0	0	
A	2	19.0	0	0	1	0	shortened tail
Sik	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.099

Number of survivors: 2

Number of deformed/have difficulty swimming: 1/1 - unable to swim

Initials: BPL / YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F19	1	23.0	0	0	0	0	
B	2	22.5	0				
Site	3	22.0	KS2 1				Kyphosis
	4	22.5	0				
	5	22.0					
	6	21.0					
	7	21.0					
	8	20.0					
	9	22.0					
	10	21.5					
	11	20.5					
	12	22.0					
	13	19.0		1			Slightly malformed Lower Jaw
	14	21.0		0			
	15	21.0					
	16	21.0					
	17	21.0					
	18	19.0	2				scoliosis, Lordosis
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.19g

Number of survivors: 18

Number of deformed/have difficulty swimming: 3/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F19	1	22.5	1	0	0	0	Kyphosis
C	2	21.0	0	↓	↓	↓	
Sit	3	20.5	1				Lordosis
	4	22.0	0				
	5	22.0	↓				
	6	22.5					
	7	23.0					
	8	22.0	2				scoliosis
	9	22.0	0				
	10	22.0					
	11	21.5					
	12	22.5		↓			
	13	22.5	1 KS	0 KS			~~Slightly malformed~~ KS Lower Jaw
	14	22.0					
	15	22.0					
	16	22.0					
	17	22.0					
	18	21.5					
	19	21.5					
	20	21.5					
	21	22.0					
	22	22.5	↓				
	23	22.0	2				Kyphosis
	24	21.5	0	↓	↓	↓	
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.57g

Number of survivors: 24

Number of deformed/have difficulty swimming: 4/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F19	1	22.0	0	0	0	0	
D	2	21.5					
sit	3	22.0					
	4	22.0					
	5	21.5					
	6	22.5					
	7	22.0					
	8	20.5					
	9	21.5					
	10	21.5					
	11	22.0					
	12	21.5					
	13	20.5					
	14	21.0					
	15	19.0					
	16	21.0					
	17	21.5					
	18	22.0					
	19	22.5					
	20	20.5					
	21	21.5					
	22	21.0					
	23	21.0					
	24	22.0					
	25	22.0					
	26	22.0					
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.66g

Number of survivors: 26

Number of deformed/have difficulty swimming: 0 10

Initials: BPL/YVL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F20	1	24.0	0	0		0	
A	2	25.0					
Dechlor	3	24.5					
	4	25.0					
	5	26.0					
	6	26.0					
	7	25.0	3	3			one poorly formed eye; Kyphosis, Lordosis
	8	21.0	3	0			Lordosis
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.719

Number of survivors: 8

Number of deformed/have difficulty swimming: 2/1 - unable to swim

Initials: BPL / YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F20 B Dechlor	1	24.0	0	0	0	0	
	2	25.5	↓	↓	↓	↓	
	3	25.0					
	4	26.5					
	5	24.5		↓	↓		
	6	20.5		3	2		malformed Lower Jaw, missing eye, tail fin malformed
	7	24.0		0	0		
	8	25.0		↓	↓		
	9	25.0					
	10	25.5	↓	↓	↓	↓	
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.97g

Number of survivors: 10

Number of deformed/have difficulty swimming: 1/1 - unable to swim

Initials: BPL MYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F20	1	25.0	0	0	0	0	
C	2	25.5	↓	↓	↓	↓	
Dechlor	3	24.0					
	4	25.0					
	5	25.0					
	6	25.5					
	7	26.0					
	8	25.0					
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.819

Number of survivors: 8

Number of deformed/have difficulty swimming: 0/8

Initials: BPL MYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F20	1	250	0	0	0	0	
D	2	250	↓	↓	↓	↓	
Dechlor	3	250					
	4	250					
	5	245					
	6	240		↓			
	7	240	↓	1	↓	↓	malformed mouth
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.69g

Number of survivors: 7

Number of deformed/have difficulty swimming: 1/0

Initials: BPL MYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F20	1	20.5	0	0	0	0	
B	2	20.5	↓	↓	↓	↓	
Site	3	18.5	↓	↓	↓	↓	
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.18g

Number of survivors: 3

Number of deformed/have difficulty swimming: 0/0

Initials: BR LYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 11/15

Termination Date: July 24/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F20	1	22.5	0	0	0	0	
D	2	23.0	2	↓	↓	↓	lordosis & kyphosis.
Site	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.169

Number of survivors: 2

Number of deformed/have difficulty swimming: 1 / 1

Initials: BSL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F2	1	23.3	0	0	0	0	
A	2	23.5	↓	↓	↓	↓	
Dechlor	3	23.0					
	4	24.0					
	5	24.0					
	6	22.5					
	7	24.0					
	8	22.0					
	9	23.0					
	10	22.5					
	11	24.0					
	12	23.0					
	13	22.5					
	14	22.5					
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.07 g

Number of survivors: 14

Number of deformed/have difficulty swimming: 0 / 10

Initials: BPL NYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F21	1	24.0	0	0	0	0	
B	2	22.5					
Dechlor	3	23.5					
	4	22.5					
	5	23.0					
	6	22.5					
	7	23.0					
	8	23.5					
	9	23.5					
	10	23.5					
	11	22.5					
	12	22.5					
	13	23.5					
	14	23.5					
	15	24.0					
	16	22.5					
	17	20.5					
	18	22.0					
	19	21.0					
	20	22.0					
	21	23.5					
	22	23.0					
	23	23.5					
	24	23.0	↓	↓	↓	↓	
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.86 g

Number of survivors: 24

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL KYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F21	1	23.0	0	0	0	0	
C	2	24.0					
Dechlor	3	23.0					
	4	23.5					
	5	22.0					
	6	22.5					
	7	23.5					
	8	22.5					
	9	22.0					
	10	23.5					
	11	22.5					
	12	23.0					
	13	24.0					
	14	23.0					
	15	22.5	↓	↓	↓	↓	
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.16 g

Number of survivors: 15

Number of deformed/have difficulty swimming: 0/0

Initials: BRL/YKL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F21	1	22.0	0	0	0	0	
D	2	23.0					
Dechlor	3	22.0					
	4	23.5					
	5	23.0					
	6	24.0					
	7	23.5					
	8	23.5					
	9	22.5					
	10	23.5					
	11	23.5					
	12	23.0					
	13	23.0					
	14	23.0					
	15	23.0					
	16	22.0					
	17	23.0					
	18	22.5					
	19	23.0					
	20	22.5					
	21	23.0					
	22	23.0					
	23	23.5					
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.72 g

Number of survivors: 23

Number of deformed/have difficulty swimming: 0 / 10

Initials: BRL/YL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F21	1	23.0	0	0	0	0	
A	2	23.5	↓	↓	↓	↓	
Site	3	23.5					
	4	23.0					
	5	23.0					
	6	24.0					
	7	24.0					
	8	23.0					
	9	23.5					
	10	23.0					
	11	23.5					
	12	24.0					
	13	24.0					
	14	24.0					
	15	23.0					
	16	24.0					
	17	23.5					
	18	23.5					
	19	22.0					
	20	23.5					
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.88 g

Number of survivors: 20

Number of deformed/have difficulty swimming: 0 / 0

Initials: BAL/NVL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F21	1	23.0	0	0	0	0	
B	2	24.0					
Site	3	23.0					
	4	23.0					
	5	22.0					
	6	22.0					
	7	21.0					
	8	22.0					
	9	22.0					
	10	23.0					
	11	22.0					
	12	22.5					
	13	21.0	↓	↓	↓	↓	
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.939

Number of survivors: 13

Number of deformed/have difficulty swimming: 0 10

Initials: BSL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F21	1	23.5	0	0	0	0	
C	2	23.0	0	↓	↓	↓	
Style	3	22.5	2				lordosis
	4	23.0	0				
	5	23.5	↓				
	6	23.0					
	7	23.5					
	8	22.5					
	9	22.5					
	10	23.0					
	11	23.0					
	12	23.5					
	13	23.0					
	14	22.3					
	15	23.5					
	16	22.5					
	17	23.5					
	18	23.5					
	19	23.5					
	20	23.5					
	21	23.5					
	22	23.5					
	23	23.5					
	24	23.5					
	25	24.0					
	26	22.5					
	27	23.5	↓				
	28	23.5	2	↓	↓	↓	scoliosis
	29						
	30						

Total Weight (pooled): 2.29

Number of survivors: 28

Number of deformed/have difficulty swimming: 2/1 - swimming erratically

Initials: BPL NYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F21	1	23.0	0	0	0	0	
D	2	23.0					
Site	3	23.0					
	4	22.5					
	5	22.5					
	6	23.0					
	7	22.5					
	8	22.0					
	9	23.0					
	10	23.0					
	11	23.0					
	12	22.5					
	13	22.0					
	14	23.0					
	15	23.5					
	16	22.0					
	17	23.0					
	18	23.0					
	19	23.5					
	20	23.0					
	21	23.0					
	22	23.5					
	23	22.5					
	24	23.5					
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.96g

Number of survivors: 24

Number of deformed/have difficulty swimming: 0

Initials: BS

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F-22	1	22.0	0	0	0	0	
A	2	23.0	↓	↓	↓	↓	
Dechlor	3	22.5					
	4	23.0					
	5	24.0					
	6	22.0					
	7	21.5					
	8	22.5					
	9	21.0					
	10	22.5					
	11	22.5					
	12	22.0					
	13	21.5					
	14	22.0					
	15	22.0					
	16	22.0					
	17	22.0					
	18	21.0					
	19	22.5	↓	↓	↓	↓	
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.29 g

Number of survivors: 19

Number of deformed/have difficulty swimming: 0/0

Initials: BDL/YK

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F22	1	22.0	0	0	0	0	
B	2	22.0	2				lordosis
Dechlor	3	21.5	0				
	4	22.0					
	5	19.0					
	6	23.0					
	7	19.0					
	8	22.5					
	9	21.5					
	10	21.0					
	11	23.0					
	12	21.5					
	13	21.5					
	14	21.0					
	15	22.0					
	16	21.0					
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.013

Number of survivors: 16

Number of deformed/have difficulty swimming: 1/0

Initials: BRL / YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F22	1	21.5	0	0	0	0	
C	2	22.5					
Dechlor	3	23.0					
	4	22.0					
	5	23.0					
	6	23.0					
	7	22.5					
	8	22.0					
	9	22.5					
	10	22.0					
	11	21.0					
	12	22.5					
	13	22.5					
	14	22.5					
	15	22.5					
	16	21.5	↓				
	17	21.5	2	↓		↓	lordosis
	18	19.5	02	3	↓	3	yolksac, pericardial; malformed jaw, shortened nose; lordosis
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.29g

Number of survivors: 18

Number of deformed/have difficulty swimming: 2 | 0

Initials: BDL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F22	1	22.5	0	0	0	0	
D	2	22.5					
Dechlor	3	21.5					
	4	22.0					
	5	22.0					
	6	23.0					
	7	22.0					
	8	23.5					
	9	21.0					
	10	22.5					
	11	22.5					
	12	22.5					
	13	22.0					
	14	22.5					
	15	22.0		1			shortened lower jaw
	16	21.5		0			
	17	23.0					
	18	22.0					
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.24 g

Number of survivors: 18

Number of deformed/have difficulty swimming: 1/0

Initials: BRL NVL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F22	1	20.0	2	0	0	0	lordosis
B	2	21.5	0	↓	↓	↓	
Site	3	21.5	↓				
	4	22.0					
	5	20.5	↓				
	6	20.5	2				lordosis
	7	20.5	0				
	8	22.0	0				
	9	22.0	2	↓	↓	↓	lordosis, scoliosis
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.63g

Number of survivors: 9

Number of deformed/have difficulty swimming: 3 10

Initials: BP

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: JUN 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F22	1	21.5	0	0	0	0	
C	2	20.0	↓	↓	↓	↓	
Stte	3	20.0					
	4	20.5					
	5	20.5					
	6	18.5					
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.42g

Number of survivors: 6

Number of deformed/have difficulty swimming: 0 1 0

Initials: BPL/YL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F22	1	23.0	0	0	0	0	
D	2	21.0	↓	↓	↓	↓	
site	3	22.5	↓	↓	↓	↓	
	4	20.5	↓	↓	↓	↓	
	5	22.5	↓	↓	↓	↓	
	6	22.0	↓	↓	↓	↓	
	7	20.5	↓	↓	↓	↓	
	8	22.5	↓	↓	↓	↓	
	9	22.0	↓	↓	1	↓	1 malformed pectoral fin
	10	23.0	↓	↓	0	↓	
	11	22.5	yolk 2	↓	0	↓	lordosis.
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.80g

Number of survivors: 11

Number of deformed/have difficulty swimming: 3 - 1 2 10

Initials: BS-/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F23	1	23.0	0	0	0	0	
A	2	23.5	↓	↓	↓	↓	
Dechlor	3	23.0	0	3	0	0	poorly formed eye
	4	23.5	0	0	0	1	yolk sac
	5	22.5	|	0	|	0	
	6	22.0	|	|	|	|	
	7	22.5	|	|	|	|	
	8	23.0	|	|	|	|	
	9	21.5	|	|	|	|	
	10	22.5	|	|	|	|	
	11	23.0	|	|	|	|	
	12	22.5	|	|	|	|	
	13	23.0	|	|	|	|	
	14	22.5	|	|	|	|	
	15	24.0	|	|	|	|	
	16	22.0	|	|	|	|	
	17	23.0	|	|	|	|	
	18	23.0	|	|	|	|	
	19	22.5	|	|	|	|	
	20	23.0	|	|	|	|	
	21	23.0	|	|	|	|	
	22	23.0	|	|	|	|	
	23	22.5	|	|	|	|	
	24	23.5	|	|	↓	|	
	25	21.5	|	|	1	|	shortened tail fin
	26	22.5	|	|	0	|	
	27	23.5	|	|	|	|	
	28	23.5	|	|	|	|	
	29	23.5	↓	↓	↓	↓	
	30						

Total Weight (pooled): 2.52g

Number of survivors: 29

Number of deformed/have difficulty swimming: 3/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F23	1	22.5	0	0	0	0	
B	2	24.0					
Dechlor	3	22.5					
	4	23.0					
	5	22.5					
	6	24.0					
	7	23.5					
	8	23.0					
	9	22.0					
	10	23.0					
	11	22.5					
	12	24.0					
	13	22.5					
	14	23.5					
	15	23.0					
	16	23.0					
	17	24.0					
	18	23.0					
	19	24.0					
	20	22.5					
	21	23.5					
	22	23.5					
	23	23.0					
	24	23.0					
	25	23.0					
	26	23.5					
	27	23.5					
	28	23.5					
	29	22.0					
	30	22.0	↓	↓	↓	↓	

Total Weight (pooled): 2.38 g

Number of survivors: 30

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL/YVL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F23	1	22.0	0	0	0	0	
C	2	22.50					
Dechlor	3	24.0					
	4	23.5					
	5	23.0					
	6	22.0					
	7	24.0					
	8	24.0					
	9	23.5					
	10	24.0					
	11	23.0					
	12	22.0					
	13	23.0					
	14	23.5					
	15	21.5					
	16	23.5					
	17	23.0					
	18	23.0					
	19	23.0					
	20	22.0					
	21	22.0					
	22	21.5					
	23	24.5					
	24	23.5					
	25	23.0					
	26	22.5	↓	↓	↓	↓	
	27						
	28						
	29						
	30						

Total Weight (pooled): 2.12g

Number of survivors: 26

Number of deformed/have difficulty swimming: 0 10

Initials: BR/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F23	1	23.5	0	0	0	0	
D	2	23.0	↓	↓	↓	↓	
Dechlor	3	23.5					
	4	23.5					
	5	23.5					
	6	23.0					
	7	23.5					
	8	23.5					
	9	23.5					
	10	23.0					
	11	23.0				↓	
	12	23.0				1	YOLK-SAC
	13	23.0				0	
	14	23.0					
	15	22.5					
	16	23.5					
	17	23.5					
	18	23.0					
	19	23.0					
	20	22.5					
	21	23.0					
	22	23.0					
	23	22.5					
	24	23.5					
	25	22.0					
	26	23.0	↓	↓	↓	↓	
	27						
	28						
	29						
	30						

Total Weight (pooled): 2.019

Number of survivors: 26

Number of deformed/have difficulty swimming: 1/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FZ&3	1	23.0	0	0	0	0	
A	2	22.0	↓	↓	↓	↓	
STle	3	22.0					
	4	23.0					
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.29g

Number of survivors: 4

Number of deformed/have difficulty swimming: 0 /0

Initials: BPL /YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F23	1	23.0	0	0	0	0	
B	2	23.5					
Site	3	23.0					
	4	24.0					
	5	23.0					
	6	23.5					
	7	23.0					
	8	24.0					
	9	23.5					
	10	23.0					
	11	23.0					
	12	22.0					
	13	22.5					
	14	23.5					
	15	24.0					
	16	23.0					
	17	23.0					
	18	22.5					
	19	23.0					
	20	23.0					
	21	23.5					
	22	23.5					
	23	23.0					
	24	24.0					
	25	24.0					
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 2.08g

Number of survivors: 25

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F23	1	23.5	0	0	0	0	
C	2	23.0	↓	↓	↓	↓	
site	3	23.0					
	4	24.0					
	5	24.0					
	6	23.0					
	7	23.0					
	8	23.5					
	9	23.5					
	10	24.0					
	11	23.0					
	12	23.5					
	13	23.0					
	14	24.0					
	15	23.0					
	16	23.0					
	17	23.5					
	18	23.5					
	19	23.5					
	20	23.0					
	21	21.5					
	22	23.0					
	23	22.5					
	24	24.0					
	25	23.0					
	26	23.0	↓	↓	↓	↓	
	27						
	28						
	29						
	30						

Total Weight (pooled): 2.22g

Number of survivors: 26

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F23	1	23.0	0	0	0	0	
D	2	23.0					
site	3	22.0					
	4	23.0					
	5	22.5					
	6	23.5					
	7	23.0					
	8	23.0					
	9	23.0					
	10	22.5					
	11	23.5					
	12	23.5					
	13	23.5					
	14	23.0					
	15	23.5					
	16	23.0					
	17	22.0					
	18	23.5					
	19	22.5					
	20	23.0					
	21	23.0					
	22	23.0					
	23	23.0					
	24	23.0					
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.95g

Number of survivors: 24

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F24	1	25.0	0	0	0	0	
A	2	23.0					
Dechlor	3	22.5					
	4	24.0					
	5	24.5					
	6	23.5					
	7	24.0					
	8	24.5					
	9	25.0					
	10	25.0					
	11	24.5					
	12	24.5					
	13	24.0					
	14	22.5					
	15	23.5					
	16	24.0					
	17	24.5					
	18	24.5					
	19	24.5					
	20	25.0					
	21	23.0					
	22	24.5					
	23	25.0					
	24	25.0					
	25	24.0					
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 2.129
Number of survivors: 25
Number of deformed/have difficulty swimming: 0/6

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F24	1	24.5	0	0	0	0	
B	2	25.0					
Dechlor	3	25.0					
	4	24.0					
	5	24.5					
	6	24.5					
	7	24.0					
	8	24.5					
	9	23.0					
	10	25.0					
	11	24.0					
	12	23.0					
	13	23.0					
	14	24.0					
	15	24.5					
	16	24.0					
	17	23.5					
	18	25.5					
	19	25.5					
	20	24.0					
	21	22.5					
	22	23.0					
	23	24.0					
	24	23.5					
	25	24.5					
	26	23.5					
	27	24.0					
	28	25.5					
	29						
	30						

Total Weight (pooled): 2.43g
Number of survivors: 28
Number of deformed/have difficulty swimming: 0 /0

Initials: BPL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F24	1	24.0	0	0	0	0	
C	2	25.0	↓	↓	↓	↓	
Dechlor	3	24.0					
	4	24.5					
	5	25.0					
	6	24.5					
	7	25.0					
	8	24.5					
	9	24.0					
	10	25.0					
	11	24.5					
	12	23.0					
	13	25.0					
	14	25.0					
	15	23.0					
	16	24.0					
	17	24.0					
	18	24.5					
	19	24.5					
	20	23.5					
	21	25.5					
	22	25.0					
	23	25.0					
	24	24.0					
	25	25.5	↓	↓	↓	↓	
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 2.249

Number of survivors: 25

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F24	1	25.0	0	0	0	0	
D	2	25.5					
Dechlor	3	25.5					
	4	25.0					
	5	25.5					
	6	24.5					
	7	24.5					
	8	25.0					
	9	24.5					
	10	24.5					
	11	25.0					
	12	25.0					
	13	25.0					
	14	24.5					
	15	25.0					
	16	26.0					
	17	24.5					
	18	25.0					
	19	25.0					
	20	25.0					
	21	25.0					
	22	24.5					
	23	24.0					
	24	24.5					
	25	25.0					
	26	25.0					
	27						
	28						
	29						
	30						

Total Weight (pooled): 2.33g
Number of survivors: 26
Number of deformed/have difficulty swimming: 0/0

Initials: BDL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F24	1	24.0	0	0	0	0	
A	2	25.0					
Site	3	24.0					
	4	25.5					
	5	25.0					
	6	25.0					
	7	25.0					
	8	24.0					
	9	24.5					
	10	24.5					
	11	24.0					
	12	24.5					
	13	24.5					
	14	25.0					
	15	25.5					
	16	23.5					
	17	23.0					
	18	25.0					
	19	25.0					
	20	24.0					
	21	24.0					
	22	24.5					
	23	25.0					
	24	24.0					
	25	25.5					
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 2.53g

Number of survivors: 25

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL MYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F24	1	25.0	0	0	0	0	
B	2	24.0					
Site	3	25.0					
	4	25.5					
	5	25.0					
	6	23.0					
	7	25.5					
	8	25.0					
	9	26.0					
	10	25.0					
	11	25.0					
	12	25.0					
	13	24.5					
	14	24.5					
	15	25.0					
	16	24.0					
	17	25.5					
	18	25.0					
	19	25.0					
	20	25.5					
	21	25.0					
	22	24.5					
	23	25.5					
	24	24.5					
	25	23.5					
	26	25.5	↓	↓	↓	↓	
	27						
	28						
	29						
	30						

Total Weight (pooled): 2.38g
Number of survivors: ~~26~~
Number of deformed/have difficulty swimming: 0 10

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F24	1	25.0	0	0	0	0	
C	2	24.5					
site	3	24.0					
	4	24.0					
	5	25.0					
	6	23.5					
	7	24.0					
	8	23.0					
	9	22.5					
	10	24.0					
	11	23.5					
	12	24.5					
	13	24.0					
	14	24.0					
	15	24.0					
	16	24.0					
	17	24.0					
	18	24.0					
	19	24.5					
	20	24.5					
	21	24.0					
	22	24.0					
	23	25.0					
	24	25.0					
	25	24.5					
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 2.20g
Number of survivors: 25
Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F24	1	24.0	0	0	0	0	
D	2	24.0					
site	3	25.0					
	4	25.0					
	5	25.0					
	6	25.5					
	7	23.5					
	8	24.0					
	9	25.0					
	10	25.5					
	11	24.0					
	12	24.0					
	13	25.0					
	14	25.0					
	15	25.0					
	16	25.0					
	17	25.0					
	18	25.0					
	19	25.5					
	20	24.5					
	21	23.5					
	22	24.0					
	23	25.0			1		Malformed Anal Fin
	24	24.0			0		
	25	24.5			0		
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 2.279
Number of survivors: 25
Number of deformed/have difficulty swimming: 1/0

Initials: BR/WL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F25	1	22.0	0	0	0	0	
A	2	22.0					
Dechlor	3	21.5					
	4	23.0					
	5	23.0					
	6	21.0					
	7	22.0					
	8	22.0					
	9	21.0					
	10	23.0					
	11	22.5					
	12	22.5					
	13	22.5					
	14	24.0					
	15	23.0					
	16	18.0			1	2	Yolk sac, pericardial, shortened tail fin, tissue damage near anal pore
	17	22.0			0	0	
	18	22.0					
	19	23.0					
	20	22.5					
	21	23.0					
	22	23.0					
	23	23.0					
	24	23.0					
	25	24.0					
	26	22.5					
	27	21.5					
	28	22.5					
	29	22.5					
	30						

Total Weight (pooled): 1.96g

Number of survivors: 29

Number of deformed/have difficulty swimming: 1/1 - swimming sideways

Initials: BPL NYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F25	1	21.5	0	0	0	0	
B	2	22.0					
Dechlor	3	23.5					
	4	22.5					
	5	23.0					
	6	21.5					
	7	22.0					
	8	21.5					
	9	21.0					
	10	22.0					
	11	21.0					
	12	22.0					
	13	19.0		1			shortened nose
	14	21.5		0			
	15	21.0					
	16	23.0					
	17	22.5					
	18	22.5					
	19	21.0					
	20	21.5					
	21	23.5					
	22	21.0					
	23	22.0					
	24	20.0					
	25	21.5					
	26	23.0					
	27	22.0					
	28	19.0					
	29						
	30						

Total Weight (pooled): 1.92g

Number of survivors: 28

Number of deformed/have difficulty swimming: 1/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F25	1	22.5	0	0	0	0	
C	2	22.0					
Dechlor	3	23.0					
	4	23.0					
	5	22.5					
	6	23.0					
	7	23.5					
	8	21.5					
	9	22.0					
	10	23.0					
	11	23.0					
	12	22.5					
	13	23.0					
	14	23.0					
	15	23.0					
	16	23.0					
	17	22.5					
	18	22.0					
	19	22.0					
	20	22.5					
	21	21.0					
	22	23.5					
	23	22.0					
	24	23.0					
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.669
Number of survivors: 24
Number of deformed/have difficulty swimming: 0/10

Initials: BPL JYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F25	1	22.5	0	0	0	0	
D	2	22.5					
Dechlor	3	22.0					
	4	22.0					
	5	22.5					
	6	22.5					
	7	22.0					
	8	22.5					
	9	22.0					
	10	23.0					
	11	22.5					
	12	22.5					
	13	23.0					
	14	20.5					
	15	22.5					
	16	22.0					
	17	22.5					
	18	22.0					
	19	22.0					
	20	22.0					
	21	22.0					
	22	23.5					
	23	23.5					
	24	22.5					
	25	23.5					
	26	22.0					
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.86g
Number of survivors: 26
Number of deformed/have difficulty swimming: 0 / 0

Initials: BDL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F25	1	20.0	0	0	0	0	
A	2	23.0	0	0	0	0	
Site	3						
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.11g

Number of survivors: 2

Number of deformed/have difficulty swimming: 0 10

Initials: BPL /WL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F25	1	21.5	0	0	0	0	
B	2	22.5	↓	↓	↓	↓	
site	3	23.0					
	4	22.0					
	5	22.0					
	6	23.0					
	7	21.5					
	8	23.0					
	9	22.0					
	10	23.0					
	11	22.0					
	12	23.5					
	13	24.0					
	14	21.5					
	15	24.0					
	16	22.0					
	17	22.5					
	18	23.0	↓	↓			
	19	~~21~~ 16.5	3	1			Scoliosis, Lordosis, Kyphosis, Asymmetrical lower jaw
	20	22.5	~~KS~~ 3 0	~~KS~~ 1 0			Scoliosis, Lordosis, Kyphosis, Asymmetrical KS
	21	22.5	↓	↓			
	22	23.0	↓	↓	↓	↓	
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.46g
Number of survivors: 22
Number of deformed/have difficulty swimming: 1/1 - swimming in circles

Initials: BPL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F25	1	22.0	0	0	0	0	
C	2	22.5	↓	↓	↓	↓	
Site	3	22.5					
	4	22.5					
	5	22.0					
	6	23.5					
	7	22.0					
	8	22.0					
	9	22.5 ~~23.5~~					
	10	22.0					
	11	23.0					
	12	22.0					
	13	21.5					
	14	22.0					
	15	23.0					
	16	22.0					
	17	23.0					
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.27g
Number of survivors: 17
Number of deformed/have difficulty swimming: 0 / 0

Initials: BDL/NYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F25	1	19.5	0	0	0	0	
D	2	21.0	0	0	0	0	
site	3	19.0	3	1	0	1	Scoliosis, shortened yolk Lordosis Nose, sac
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.17g

Number of survivors: 3

Number of deformed/have difficulty swimming: ~~0~~ 1/1- unable to swim

Initials: BPL MYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F26	1	21.5	0	0	0	0	
A	2	21.5					
Dechlor	3	22.0					
	4	21.0					
	5	20.5					
	6	21.0					
	7	22.5					
	8	21.5					
	9	22.0					
	10	22.0					
	11	22.0					
	12	22.0					
	13	22.5					
	14	22.5					
	15	20.0					
	16	21.0					
	17	21.0					
	18	20.0					
	19	21.5					
	20	20.0					
	21	22.5					
	22	22.5					
	23	22.0					
	24	21.5					
	25	22.5					
	26	22.0					
	27	22.0					
	28	21.5	↓	↓	↓	↓	
	29						
	30						

Total Weight (pooled): 1.64g

Number of survivors: 28

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL / WL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F26	1	22.0	0	0	0	0	
B	2	23.0					
Dechlor	3	22.0					
	4	22.0					
	5	22.5					
	6	22.0					
	7	22.0					
	8	22.0					
	9	21.5					
	10	20.0				1	pericardial
	11	21.5				0	
	12	22.0					
	13	21.0					
	14	22.0					
	15	21.0					
	16	22.0					
	17	21.5					
	18	21.5					
	19	21.0					
	20	22.0					
	21	21.0					
	22	21.5					
	23	20.0					
	24	21.5					
	25	19.5					
	26	21.0					
	27	22.0					
	28						
	29						
	30						

Total Weight (pooled): 1.85g
Number of survivors: 27
Number of deformed/have difficulty swimming: 1/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F26	1	21.5	0	0	0	0	
C	2	23.0	↓	↓	↓	↓	
Dechlor	3	20.5	↓	↓	↓	↓	
	4	21.0	↓	↓	↓	↓	
	5	20.5	↓	↓	↓	1	pericardial
	6	22.0	↓	↓	↓	0	
	7	22.5	↓	↓	↓	↓	
	8	22.0	↓	↓	↓	↓	
	9	22.0	↓	↓	↓	↓	
	10	21.5	↓	↓	↓	↓	
	11	22.0	↓	↓	↓	↓	
	12	21.0	↓	↓	↓	1	yolk sac
	13	22.0	↓	↓	↓	0	
	14	23.0	↓	↓	↓	↓	
	15	22.0	↓	↓	↓	↓	
	16	20.0	↓	↓	↓	↓	
	17	21.5	↓	↓	↓	↓	
	18	22.5	↓	↓	↓	↓	
	19	22.0	↓	↓	↓	↓	
	20	22.5	↓	↓	↓	↓	
	21	21.0	↓	↓	↓	↓	
	22	21.5	↓	↓	↓	↓	
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.429
Number of survivors: 22
Number of deformed/have difficulty swimming: 2/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F26	1	23.0	0	0	0	0	
D	2	22.0					
Dechlor	3	22.5					
	4	22.0					
	5	22.0					
	6	23.0					
	7	23.0					
	8	23.0					
	9	23.5					
	10	22.5					
	11	21.5					
	12	22.5					
	13	22.0					
	14	22.0					
	15	21.0					
	16	22.0					
	17	22.75					
	18	22.5					
	19	22.0					
	20	22.0					
	21	22.0					
	22	22.5					
	23	22.0					
	24	22.0					
	25	21.5					
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.64g

Number of survivors: 25

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL IYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F26	1	22.0	0	0	0	0	
A	2	21.0	↓	↓	↓	↓	
Site	3	21.5					
	4	22.0					
	5	22.0					
	6	23.0					
	7	23.0					
	8	22.5					
	9	22.0					
	10	22.0					
	11	22.0					
	12	22.5					
	13	22.5					
	14	22.0					
	15	22.5					
	16	22.5					
	17	22.0					
	18	21.5					
	19	22.0					
	20	22.0					
	21	22.5					
	22	22.0					
	23	21.5					
	24	21.5					
	25	21.5					
	26	22.0					
	27	22.0					
	28	22.0	↓	↓	↓	↓	
	29						
	30						

Total Weight (pooled): 1.82g
Number of survivors: 28
Number of deformed/have difficulty swimming: 0 | 0

Initials: BPL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F26	1	22.5	0	0	0	0	
B	2	22.0					
site	3	22.0					
	4	22.0					
	5	22.0					
	6	22.0					
	7	21.0					
	8	22.0					
	9	22.0					
	10	22.0					
	11	22.0					
	12	22.0					
	13	22.0					
	14	22.5					
	15	22.5					
	16	22.5					
	17	22.0					
	18	22.0					
	19	22.5					
	20	22.0					
	21	22.0					
	22	21.5					
	23	22.0					
	24	22.0					
	25	22.5					
	26	23.0					
	27	22.5					
	28	22.0	↓	↓	↓	↓	
	29						
	30						

Total Weight (pooled): 1.899

Number of survivors: 28

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F26	1	21.5	0	0	0	0	
C	2	20.0					
Site	3	21.0					
	4	21.0					
	5	22.5					
	6	22.5					
	7	22.0					
	8	22.0					
	9	22.0					
	10	21.5					
	11	21.5					
	12	22.0					
	13	22.5					
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.799
Number of survivors: 13
Number of deformed/have difficulty swimming: 0 10

Initials: BPL/NYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F26	1	21.0	0	0	0	0	
D	2	22.0					
Site	3	21.5					
	4	22.5					
	5	22.0					
	6	21.5					
	7	22.5					
	8	22.5					
	9	22.5					
	10	22.0					
	11	21.5					
	12	22.0					
	13	22.0					
	14	22.0					
	15	22.0					
	16	22.0					
	17	22.0					
	18	23.0					
	19	22.0					
	20	21.0					
	21	22.0					
	22	21.0					
	23	22.0					
	24	22.0					
	25	22.5					
	26	23.0					
	27	22.5	3	1	0	0	scl-003; shortened nose
	28						
	29						
	30						

Total Weight (pooled): 1.78g
Number of survivors: 27
Number of deformed/have difficulty swimming: 1/1- unable to swim

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F27	1	19.5	0	0	0	0	
A	2	22.5					
Dechlor	3	23.0					
	4	22.5					
	5	21.0					
	6	23.0					
	7	21.5					
	8	21.0					
	9	20.0					
	10	21.0					
	11	22.0					
	12	22.0					
	13	22.0					
	14	22.0					
	15	22.0					
	16	22.0					
	17	22.5					
	18	22.0					
	19	22.0					
	20	21.0					
	21	22.5					
	22	20.5		1			shortened nose
	23	20.5		0			
	24	20.5					
	25	20.5					
	26	22.0					
	27	18.5		2		1	yolk-sac, malformed Lower Jaw
	28						
	29						
	30						

Total Weight (pooled): 1.61g
Number of survivors: 27
Number of deformed/have difficulty swimming: 2 3 / 0

Initials: BPL NYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F27	1	22.0	0	0	0	0	
B	2	22.0					
Dechlor	3	22.5					
	4	22.5					
	5	22.0					
	6	23.0					
	7	22.5					
	8	23.5					
	9	22.5					
	10	22.0					
	11	22.5					
	12	21.0	1				Kyphosis
	13	22.5	0				
	14	22.0					
	15	22.5					
	16	22.0					
	17	23.0					
	18	22.5					
	19	23.0					
	20	22.5					
	21	21.0					
	22	22.5					
	23	21.5					
	24	21.5					
	25	21.5					
	26	23.0					
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.62g
Number of survivors: 26
Number of deformed/have difficulty swimming: 1 ~~2~~ 0

Initials: BPL / YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F27	1	22.0	0	0	0	0	
C	2	22.5					
Dech6	3	22.0					
	4	22.0					
	5	23.0					
	6	19.5	3				Scoliosis, Lordosis
	7	19.0	0				
	8	22.0					
	9	22.5					
	10	23.0					
	11	22.0					
	12	21.5					
	13	21.0					
	14	21.0					
	15	22.0					
	16	22.5					
	17	22.0					
	18	22.0					
	19	22.5					
	20	22.0					
	21	21.0					
	22	21.0					
	23	21.0					
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.389
Number of survivors: 23
Number of deformed/have difficulty swimming: 1/1 - unable to swim

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F27	1	21.5	0	0	0	0	
D	2	18.0	3		1		Scoliosis, undeveloped/malformed dorsal fin
Dechlor	3	21.5	0		0		
	4	21.5					
	5	22.0					
	6	22.0					
	7	21.0					
	8	21.5					
	9	22.5					
	10	22.0					
	11	22.0					
	12	20.0					
	13	21.0					
	14	18.5		2			Malformed Lower Jaw
	15	20.5		0			
	16	22.0					
	17	21.0					
	18	20.0					
	19	22.5					
	20	22.5					
	21	21.5					
	22	22.0					
	23	22.5					
	24	20.5					
	25	21.0					
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.51g

Number of survivors: 25

Number of deformed/have difficulty swimming: 2/ 1- swimming erratically

Initials: BPL/WL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F27	1	22.5	0	0	0	0	
A	2	22.0	0	0	↓	↓	
site	3	22.0	0	0	↓		
	4	18.0	3	3	3		Kyphosis, missing, severely reduced eye, tail fin
	5	19.0	0	3	1		Eyes misplaced, upper jaw severely malformed, Lowe/Fa malforme
	6	22.0	↓	0	0	↓	
	7	22.0	↓	↓	↓	↓	
	8	22.0	↓	↓	↓	↓	
	9	22.0	↓	↓	↓	↓	
	10	21.5	↓	↓	↓	↓	
	11	20.0	↓	↓	↓	↓	
	12	22.0	↓	↓	↓	↓	
	13	21.5	↓	↓	↓	↓	
	14	21.5	↓	↓	↓	↓	
	15	20.5	↓	↓	↓	↓	
	16	22.0	↓	↓	↓	↓	
	17	22.5	↓	↓	↓	↓	
	18	22.5	↓	↓	↓	↓	
	19	22.0	↓	↓	↓	↓	
	20	22.0	↓	↓	↓	↓	
	21	21.0	↓	↓	↓	↓	
	22	21.0	↓	↓	↓	↓	
	23	20.0	↓	↓	↓	↓	
	24	22.25	↓	↓	↓	↓	
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.439

Number of survivors: 24

Number of deformed/have difficulty swimming: 2/2 X-35 swimming erratically

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F27	1	22.0	1	0	0	0	Kyphosis
B	2	22.5	0	↓	↓	↓	
Site	3	22.0	↓				
	4	22.0					
	5	22.0					
	6	22.0					
	7	22.5					
	8	22.0	↓				
	9	21.0	2				Kyphosis
	10	21.0	2				Kyphosis
	11	21.0	0				
	12	21.5	↓				
	13	22.0					
	14	21.5				↓	
	15	22.0				2	Tissue by Pelvic Fin
	16	21.0				0	
	17	21.5				↓	
	18	22.0					
	19	22.0	↓				
	20	22.5	1				Kyphosis
	21	20.0	0				
	22	22.5	0	↓	↓	↓	
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.369

Number of survivors: 22

Number of deformed/have difficulty swimming: 5/0

Initials: BPL IYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F27 C	1	22.0	1	0	0	0	Kyphosis
	2	19.5	0		0		
Sick	3	21.5			1		Malformed Pectoral Fin
	4	20.0			0		
	5	22.5					
	6	21.5					
	7	22.0					
	8	22.0					
	9	22.0					
	10	22.0					
	11	22.0					
	12	22.0					
	13	22.5					
	14	22.5					
	15	22.0	2				Kyphosis, scoliosis
	16	22.0	0				
	17	22.5					
	18	21.5					
	19	21.5					
	20	22.0					
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.229
Number of survivors: 20
Number of deformed/have difficulty swimming: 3/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F27	1	21.0	0	0	0	0	
D	2	22.0	↓	↓	↓	↓	
site	3	21.0	↓	↓	↓	↓	
	4	20.0	↓	↓	↓	↓	
	5	21.5	↓	↓	↓	↓	
	6	21.5	↓	↓	↓	↓	
	7	21.0	↓	↓	↓	↓	
	8	22.0	↓	↓	↓	↓	
	9	22.0	↓	↓	1	↓	1 Malformed pectoral fin
	10	22.5	↓	↓	0	↓	
	11	21.5	↓	↓	↓	↓	
	12	21.5	↓	↓	↓	↓	
	13	21.5	1	↓	↓	↓	Kyphosis
	14	22.0	0	↓	↓	↓	
	15	20.0	↓	↓	↓	↓	
	16	19.0	↓	↓	↓	↓	
	17	21.5	↓	↓	↓	↓	
	18	22.0	↓	↓	↓	↓	
	19	20.0	↓	↓	↓	↓	
	20	21.0	↓	↓	↓	↓	
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.11g
Number of survivors: 20
Number of deformed/have difficulty swimming: 2/0

Initials: BPL NYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F28	1	22.0	0	0	0	0	
A	2	22.0					
Dechlor	3	21.5					
	4	22.0					
	5	23.0					
	6	21.5					
	7	23.0					
	8	23.0					
	9	22.0					
	10	23.0					
	11	22.5					
	12	22.0					
	13	22.0					
	14	23.0					
	15	22.0					
	16	23.0					
	17	21.0					
	18	22.5					
	19	23.0					
	20	23.0					
	21	22.5					
	22	23.5					
	23	23.0					
	24	23.0					
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.85g

Number of survivors: 24

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/YL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F28	1	22.0	0	0	0	0	
B	2	22.5					
Dechlor	3	22.0					
	4	21.0					
	5	24.0					
	6	22.0					
	7	22.5					
	8	23.5					
	9	24.0					
	10	22.0					
	11	24.0					
	12	24.0					
	13	23.5					
	14	23.5					
	15	24.0					
	16	21.5					
	17	23.5					
	18	24.0					
	19	22.5					
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.479
Number of survivors: 19
Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F28	1	23.0	0	0	0	0	
C	2	22.0					
Dechlor	3	22.0					
	4	22.0					
	5	22.5					
	6	23.5					
	7	23.0					
	8	23.5					
	9	24.0					
	10	23.0					
	11	23.0					
	12	22.5					
	13	22.0					
	14	23.0					
	15	21.0					
	16	22.5					
	17	22.0					
	18	22.0					
	19	21.5					
	20	21.0					
	21	22.5					
	22	22.0					
	23	23.0					
	24	22.0					
	25	21.0					
	26	22.0					
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.729
Number of survivors: 26
Number of deformed/have difficulty swimming: 0 10

Initials: BR IYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F28	1	14.5	3	2	0	3	scoliosis, malformed, shortened, yolk-sac + eye edema, Lordosis, Lower Jaw, nose,
D	2	22.5	0	0		0	
Dechlor	3	23.5					
	4	23.0					
	5	23.0					
	6	23.5					
	7	23.0					
	8	24.0					
	9	21.5					
	10	23.5					
	11	24.0					
	12	23.0					
	13	24.5					
	14	23.0					
	15	23.0					
	16	23.5					
	17	23.5					
	18	23.0					
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1,429

Number of survivors: 18

Number of deformed/have difficulty swimming: 1/1 - unable to swim

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F28	1	22.5	0	0	0	0	
A	2	21.5					
Site	3	23.0					
	4	23.0					
	5	21.0					
	6	24.0					
	7	22.0					
	8	23.0					
	9	23.5					
	10	23.0					
	11	22.5	1				Lordosis
	12	23.0	0				
	13	24.0					
	14	22.0					
	15	23.0					
	16	23.0					
	17	20.5					
	18	23.0					
	19	23.5					
	20	23.0					
	21	22.0					
	22	~~22.0~~ 22.5					
	23	23.5					
	24	23.0					
	25	23.0					
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.79g
Number of survivors: 25
Number of deformed/have difficulty swimming: 1/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F28	1	22.0	0	0	0	0	
B	2	23.5					
Sit	3	23.0					
	4	21.0					
	5	21.0					
	6	22.5					
	7	22.5					
	8	22.0					
	9	21.0					
	10	23.5					
	11	24.0					
	12	22.0					
	13	22.0					
	14	24.0					
	15	23.0					
	16	23.0					
	17	23.0					
	18	22.5					
	19	23.0					
	20	21.5					
	21	23.0					
	22	22.0					
	23	23.5					
	24	24.0					
	25	22.5					
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.95g

Number of survivors: 25

Number of deformed/have difficulty swimming: 0 / 10

Initials: BPL NHL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 15/15

Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F28	1	23.0	0	0	0	0	
C	2	23.0					
Silt	3	22.5					
	4	23.5					
	5	22.5					
	6	23.0					
	7	22.5					
	8	22.0					
	9	22.0					
	10	22.0					
	11	22.0					
	12	22.0					
	13	22.0					
	14	24.0					
	15	22.5					
	16	21.0					
	17	22.0					
	18	23.0					
	19	20.5					
	20	20.0					
	21	24.0					
	22	22.0					
	23	22.0					
	24	21.0					
	25	23.0					
	26	23.5					
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.78g

Number of survivors: 26

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 15/15
Termination Date: July 27/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F28	1	23.0	0	0	0	0	
D	2	23.0					
Site	3	22.0					
	4	22.5					
	5	22.5					
	6	23.0					
	7	23.5					
	8	22.0					
	9	23.0					
	10	22.5					
	11	23.0					
	12	24.0					
	13	22.5					
	14	23.0					
	15	23.5					
	16	22.0					
	17	22.5					
	18	22.5					
	19	22.0					
	20	23.0					
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.49g
Number of survivors: 20
Number of deformed/have difficulty swimming: 0 / 0

Initials: BDL / YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 18/15

Termination Date: July 30/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F29	1	23.0	0	0	0	0	
A	2	22.5					
Dechlor	3	22.5					
	4	22.5					
	5	22.5					
	6	23.0					
	7	21.5					
	8	23.0					
	9	22.5					
	10	23.5					
	11	22.0					
	12	23.0					
	13	22.5					
	14	23.0					
	15	22.5					
	16	22.0					
	17	22.0					
	18	22.5					
	19	23.0					
	20	22.0					
	21	23.0					
	22	22.5					
	23	22.5					
	24	22.0					
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): ~~3.14~~ er 1.58g

Number of survivors: 24

Number of deformed/have difficulty swimming: 0/0

Initials: BPL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 18/15

Termination Date: July 30/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F29	1	22.5	0	0	0	0	
B	2	23.0	0				
Dechlor	3	22.5	1				lordosis -
	4	23.0	0				
	5	22.5					
	6	22.0					
	7	23.0					
	8	22.0					
	9	21.5					
	10	23.0					
	11	22.0					
	12	23.0					
	13	22.5					
	14	22.0					
	15	22.5					
	16	23.0					
	17	22.0					
	18	23.0					
	19	23.0					
	20	22.5					
	21	23.0					
	22	23.5	↓				
	23	22.5	1				scoliosis
	24	22.0	↓				
	25	22.5	↓	↓	↓	↓	
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.90g

Number of survivors: 25

Number of deformed/have difficulty swimming: 2 / 10

Initials: BPL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 18/15

Termination Date: July 30/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F29	1	23.0	0	0	0	0	
C	2	23.0					
Dechlor	3	22.0					
	4	21.0					
	5	22.5					
	6	22.5					
	7	23.0					
	8	22.0					
	9	23.0					
	10	23.0					
	11	22.5					
	12	22.0					
	13	23.0					
	14	23.0					
	15	22.0					
	16	22.0					
	17	22.5					
	18	23.0					
	19	22.0					
	20	22.0					
	21	22.6					
	22	22.0					
	23	22.5					
	24	21.0					
	25	19.0	3				scoliosis
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.73g

Number of survivors: 25

Number of deformed/have difficulty swimming: 1 / 1 unable to swim

Initials: BPL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 18/15

Termination Date: July 30/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F29	1	22.0	0	0	0	0	
D	2	22.5	1				
Dechlor	3	23.0					
	4	23.0					
	5	23.0					
	6	22.5					
	7	22.5					
	8	22.5					
	9	23.0					
	10	23.0					
	11	23.5					
	12	23.0					
	13	21.5					
	14	20.0					
	15	22.0	↓				
	16	22.0	1				~~scoliosis~~ BPL kyphosis
	17	23.0	0				
	18	23.0					
	19	23.0					
	20	22.5					
	21	23.0					
	22	22.5					
	23	23.0	↓	↓	↓	↓	
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.659

Number of survivors: 23

Number of deformed/have difficulty swimming: 1 / 0

Initials: BPL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 18/15

Termination Date: July 30/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F29	1	22.0	0	0	0	0	
A	2	22.0					
Site	3	22.0					
	4	22.5					
	5	21.5					
	6	22.0					
	7	22.0					
	8	22.0					
	9	22.5					
	10	22.0					
	11	22.0					
	12	21.0					
	13	22.0					
	14	22.0					
	15	23.0					
	16	23.0					
	17	23.0					
	18	21.5					
	19	22.0					
	20	22.0					
	21	21.5					
	22	21.5					
	23	22.0					
	24	23.0					
	25	22.0					
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.60

Number of survivors: 25

Number of deformed/have difficulty swimming: ~ 10

Initials: BR

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 18/15

Termination Date: July 30/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F29	1	23.0	0	0	0	0	
B	2	22.0					
STE	3	22.5					
	4	22.0					
	5	22.0					
	6	22.5 ~~20~~					
	7	23.0					
	8	23.0					
	9	22.5					
	10	22.5					
	11	22.0					
	12	22.5					
	13	22.0					
	14	22.5 ~~25~~					
	15	23.5 ~~30~~					
	16	22.5					
	17	22.5					
	18	22.5					
	19	23.0					
	20	22.5					
	21	22.5					
	22	22.5					
	23	22.0					
	24	23.0					
	25	22.5					
	26	22.5					
	27	23.0					
	28						
	29						
	30						

Total Weight (pooled): 1.88 g

Number of survivors: 27

Number of deformed/have difficulty swimming: 10

Initials: BR

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 18/15
Termination Date: July 30/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F29	1	22.0	0	0	0	0	
C	2	21.5	↓	↓	↓	↓	
Site	3	22.0	↓	↓	↓	↓	
	4	21.5	↓	↓	↓	↓	
	5	19.0	3	0	0	0	lordosis
	6	21.0	0	0	0	0	
	7	20.5	↓	↓	↓	↓	
	8	21.0	↓	↓	↓	↓	
	9	22.0	↓	↓	↓	↓	
	10	22.0	↓	↓	↓	↓	
	11	21.5	↓	↓	↓	↓	
	12	21.5	↓	↓	↓	↓	
	13	22.0	↓	↓	↓	↓	
	14	21.0	↓	↓	↓	↓	
	15	22.5	↓	↓	↓	↓	
	16	22.0	↓	↓	↓	↓	
	17	22.0	↓	↓	↓	↓	
	18	22.5	↓	↓	↓	↓	
	19	22.0	↓	↓	↓	↓	
	20	23.0	↓	↓	↓	↓	
	21	21.5	↓	↓	↓	↓	
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.36 g
Number of survivors: 21
Number of deformed/have difficulty swimming: 1 / one swimming erratically

Initials: BRL / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 18/15

Termination Date: July 30/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F29	1	23.5	0	0	0	0	
D	2	22.0					
Site	3	22.5					
	4	22.0					
	5	22.5					
	6	22.5					
	7	23.0					
	8	22.5					
	9	23.0					
	10	23.0					
	11	22.0					
	12	23.0					
	13	23.0					
	14	23.5					
	15	23.0					
	16	22.0					
	17	23.0					
	18	22.5					
	19	23.0					
	20	23.5					
	21	23.0					
	22	23.0					
	23	23.0					
	24	21.0					
	25	22.5					
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.80 g

Number of survivors: 25

Number of deformed/have difficulty swimming: 0 / 0

Initials: BPL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 18/15

Termination Date: July 30/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F30	1	22.5	0	0	0	0	
A	2	22.0					
Rechlor	3	23.0					
	4	22.0					
	5	23.0					
	6	22.0					
	7	22.0					
	8	23.0					
	9	22.5					
	10	23.0					
	11	23.0					
	12	22.5					
	13	23.0					
	14	23.5					
	15	24.0					
	16	23.0					
	17	22.5					
	18	23.0					
	19	23.0					
	20	22.5					
	21	23.0					
	22	23.5					
	23	22.5					
	24	23.0					
	25	22.0					
	26	22.5					
	27	23.0					
	28	23.0					
	29	23.0					
	30	22.5					

Total Weight (pooled): 2.18g

Number of survivors: 30

Number of deformed/have difficulty swimming: 0 / 10

Initials: BPL / EMM

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 18/15

Termination Date: July 30/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F30	1	23.0	0	0	0	0	
B	2	22.0					
Dechlor	3	23.0					
	4	22.5					
	5	22.5					
	6	22.5					
	7	23.5					
	8	21.0					
	9	22.0					
	10	23.0					
	11	22.5					
	12	23.0					
	13	22.0					
	14	21.5					
	15	23.0					
	16	22.0					
	17	22.0					
	18	22.0					
	19	22.5					
	20	23.0					
	21	23.5					
	22	23.0					
	23	23.5					
	24	22.0					
	25	22.0					
	26	22.0					
	27	22.0					
	28	21.5	↓	↓	↓	↓	
	29						
	30						

Total Weight (pooled): 2.06

Number of survivors: 28

Number of deformed/have difficulty swimming: ~~0~~ 10

Initials: BPL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 18/15

Termination Date: July 30/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F30	1	22.5	0	0	0	0	
C	2	23.0					
Dechlor	3	22.5					
	4	23.0					
	5	23.0					
	6	23.5					
	7	23.0					
	8	22.0					
	9	22.5					
	10	23.0					
	11	22.5					
	12	24.0					
	13	22.0					
	14	23.0					
	15	22.5					
	16	22.5					
	17	22.0					
	18	23.0					
	19	21.5					
	20	21.5					
	21	22.0					
	22	23.0					
	23	22.0					
	24	22.5					
	25	22.0					
	26	23.0					
	27	23.0					
	28	23.0					
	29	22.0					
	30						

Total Weight (pooled): 2.00

Number of survivors: 29

Number of deformed/have difficulty swimming: ~~0~~ 10

Initials: BPL | EMM

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 18/15

Termination Date: July 30/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F30	1	22.0	0	0	0	0	
D	2	21.5					
Dechlor	3	22.0					
	4	22.0					
	5	23.0					
	6	23.0					
	7	22.5					
	8	22.5					
	9	22.5					
	10	22.0					
	11	23.0					
	12	22.5					
	13	22.5					
	14	22.0					
	15	22.5					
	16	23.0					
	17	22.5					
	18	22.5					
	19	22.5					
	20	22.0					
	21	22.0					
	22	23.0					
	23	23.0					
	24	21.5					
	25	22.5					
	26	20.5					
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.84

Number of survivors: 26

Number of deformed/have difficulty swimming: ~~0~~ 10

Initials: BPL/EMM

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 18/15

Termination Date: July 30/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F30	1	22.0	0	0	0	0	
A	2	20.5					
Site	3	22.0					
	4	22.5					
	5	22.0					
	6	23.0					
	7	23.0					
	8	23.0					
	9	23.5					
	10	23.0					
	11	22.5					
	12	22.0					
	13	21.5					
	14	23.0					
	15	23.0					
	16	22.0					
	17	21.0					
	18	21.0					
	19	20.0					
	20	23.0					
	21	22.0					
	22	22.5					
	23	23.0					
	24	22.5					
	25	22.5					
	26	22.0					
	27	23.0					
	28						
	29						
	30						

Total Weight (pooled): 1.96 g

Number of survivors: 27

Number of deformed/have difficulty swimming: 0 10

Initials: BPL | EMM

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 18/15

Termination Date: July 30/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F30	1	22.0	0	0	0	0	
13	2	23.0					
SHR	3	23.0					
	4	23.5					
	5	22.0					
	6	22.0					
	7	22.5					
	8	23.5					
	9	22.0					
	10	23.5					
	11	23.0					
	12	22.5					
	13	23.0					
	14	23.0					
	15	22.5					
	16	22.5					
	17	22.0					
	18	23.5					
	19	23.0					
	20	23.5					
	21	22.5					
	22	23.0					
	23	23.5					
	24	23.5					
	25	23.5					
	26	23.0					
	27	23.5					
	28	23.5					
	29	23.0	↓	↓	↓	↓	
	30						

Total Weight (pooled): 220

Number of survivors: 29

Number of deformed/have difficulty swimming: 0 10

Initials: BPL / GMM

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 18/15

Termination Date: July 30/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F30	1	23.0	0	0	0	0	
C	2	23.0			0		
Site	3	23.5					
	4	22.5					
	5	23.0					
	6	21.5					
	7	22.0					
	8	23.0					
	9	23.5					
	10	23.0					
	11	23.0					
	12	23.5					
	13	23.5					
	14	23.5					
	15	23.0					
	16	22.0					
	17	23.5					
	18	23.0					
	19	23.0					
	20	23.5					
	21	23.5					
	22	22.0					
	23	23.5					
	24	23.0					
	25	22.5					
	26	21.5					
	27	22.0					
	28	23.0					
	29						
	30						

Total Weight (pooled): 2.16g.

Number of survivors: 28

Number of deformed/have difficulty swimming: ϕ 10

Initials: BRL/KMM

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 18/15

Termination Date: July 30/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F30	1	23.0	0	0	0	0	
D	2	22.5					
Site	3	21.0					
	4	22.5					
	5	22.5					
	6	23.0					
	7	22.5					
	8	22.5					
	9	19.0					
	10	22.0					
	11	23.0					
	12	23.0					
	13	23.0					
	14	22.0					
	15	23.0					
	16	23.0					
	17	23.5					
	18	22.0					
	19	23.0					
	20	23.0					
	21	23.0					
	22	22.0					
	23	23.0					
	24	22.0					
	25	23.0					
	26	23.0					
	27	22.0					
	28	23.0					
	29						
	30						

Total Weight (pooled): 2.1 g

Number of survivors: 28

Number of deformed/have difficulty swimming: 0 / 10

Initials: BPL / EMM

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 29, 2015

Termination Date: Aug-10, 2015

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F31	1	23.5	0	0	0	0	
Dechlor	2	24.0	↓	↓	↓	↓	
A	3	23.5					
	4	23.0					
	5	23.0					
	6	23.5					
	7	23.0					
	8	23.0					
	9	23.0					
	10	23.5					
	11	23.0					
	12	24.0					
	13	23.0					
	14	23.0					
	15	23.0					
	16	24.0					
	17	24.0					
	18	24.0			↓		
	19	19.0			2		tailfin malformed.
	20	22.5			0		
	21	22.0			↓		
	22	22.0					
	23	24.0					
	24	23.0					
	25	24.0					
	26	24.0					
	27	~~24.0~~ 24.0					
	28	23.0	↓	↓	↓	↓	
	29						
	30						

Total Weight (pooled): 215 g

Number of survivors: 28

Number of deformed/have difficulty swimming: 1/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 29/15

Termination Date: Aug. 10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F31	1	23.0	0	0	0	0	
Dechlor	2	22.0	↓	↓	↓	↓	
B	3	23.0					
	4	23.5					
	5	24.0					
	6	23.5					
	7	23.0					
	8	22.0					
	9	24.0					
	10	24.0					
	11	23.0					
	12	23.5					
	13	23.0					
	14	24.0					
	15	24.0					
	16	24.0					
	17	23.0					
	18	23.0					
	19	23.5					
	20	22.5					
	21	23.0					
	22	23.0					
	23	22.5					
	24	23.0					
	25	23.0	↓	↓	↓	↓	
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.92 g

Number of survivors: 25

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 29/15

Termination Date: Aug. 10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F31	1	23.5	0	0	0	0	
Dechlor C	2	23.5	↓	↓	↓	↓	
	3	23.5					
	4	23.5 ~~23.0~~					
	5	23.5					
	6	23.5					
	7	24.0					
	8	24.0					
	9	24.0					
	10	24.5					
	11	24.5					
	12	24.0					
	13	23.0					
	14	23.5					
	15	24.0					
	16	24.0					
	17	24.0					
	18	24.0					
	19	24.0					
	20	23.5					
	21	23.5					
	22	24.0					
	23	24.5					
	24	23.5					
	25	24.0					
	26	22.5					
	27	23.5					
	28	23.0					
	29	23.5					
	30	23.5	↓	↓	↓	↓	

Total Weight (pooled): 2.48 g

Number of survivors: 30

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/YVL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 29/15

Termination Date: Aug. 10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F31	1	23.0	0	0	0	0	
Dechlor	2	23.5			0		
D	3	23.0			1		small extra fin
	4	23.5			0		
	5	23.5					
	6	23.0					
	7	23.5					
	8	23.5					
	9	23.5					
	10	24.0					
	11	24.0					
	12	23.5					
	13	23.5					
	14	23.5					
	15	24.0		2	2		malformed & misplaced pectoral fins, misshaped head.
	16	23.5		0	0		
	17	23.5					
	18	23.5					
	19	20.5					
	20	23.5					
	21	24.0					
	22	23.5					
	23	24.0					
	24	24.0					
	25	22.0					
	26	23.5					
	27	21.5					
	28						
	29						
	30						

Total Weight (pooled): 2.12 g

Number of survivors: 27

Number of deformed/have difficulty swimming: 2/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 29/15

Termination Date: Aug. 10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F31	1	22.5	0	0	0	0	
Site	2	22.0	↓	↓	↓	↓	
A	3	23.0					
	4	24.0					
	5	23.5					
	6	21.0					
	7	23.0					
	8	19.0					
	9	23.5					
	10	23.0					
	11	22.0					
	12	22.0					
	13	21.0					
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.999

Number of survivors: 13

Number of deformed/have difficulty swimming: 0/0

Initials: BRL/NYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 29/15

Termination Date: Aug. 10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F31	1	25.0	0	0	0	0	
Site	2	22.0	↓	↓	↓	↓	
B	3	24.5					
	4	24.0					
	5	24.0					
	6	23.5					
	7	22.0					
	8	24.0					
	9	23.0					
	10	23.0					
	11	22.0					
	12	22.0					
	13	24.0					
	14	23.5					
	15	22.0					
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.15 g

Number of survivors: 15

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 29/15

Termination Date: Aug 10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F31	1	23.0	0	0	0	0	
Site	2	23.0	↓	↓	↓	↓	
C	3	22.0					
	4	22.5					
	5	19.0					
	6	22.0					
	7	22.0					
	8	22.5					
	9	22.0			↓		
	10	20.0			|		shortened tailfin
	11	23.0			0		
	12	23.0			↓		
	13	22.0					
	14	18.5					
	15	22.0					
	16	23.0					
	17	22.5					
	18	22.5					
	19	23.0					
	20	22.0					
	21	22.5					
	22	22.5					
	23	22.5					
	24	21.0	↓	↓	↓	↓	
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.88 g

Number of survivors: 24

Number of deformed/have difficulty swimming: 1/0

Initials: BPL/NYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 29/15

Termination Date: Aug. 10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F31	1	22.0	0	0	0	0	
Site	2	24.0	↓	↓	↓	↓	
D	3	23.0					
	4	24.0					
	5	23.5					
	6	24.0					
	7	21.5					
	8	23.0					
	9	23.0					
	10	23.0					
	11	24.0					
	12	19.0					
	13	23.5					
	14	23.5					
	15	21.5					
	16	23.0					
	17	23.0					
	18	23.0					
	19	22.0					
	20	21.0					
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 2.107 g

Number of survivors: 20

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 29/15

Termination Date: Aug. 10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F32	1	22.0	O	O	O	O	
Rechlor	2	22.0			O		
A	3	22.0					
	4	20.5					
	5	21.5					
	6	22.0					
	7	22.0					
	8	22.0					
	9	21.0					
	10	21.5					
	11	22.0					
	12	22.0					
	13	21.5					
	14	22.5					
	15	22.5					
	16	22.5					
	17	22.0					
	18	21.5					
	19	22.0					
	20	21.5					
	21	22.0					
	22	21.0					
	23	22.5					
	24	21.0					
	25	22.0					
	26	21.5					
	27	23.0					
	28	22.5					
	29	21.5					
	30	21.0	↓	↓	↓	↓	

Total Weight (pooled): 1.83 g

Number of survivors: 30

Number of deformed/have difficulty swimming: 0/0

Initials: BPL / NYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 29/15

Termination Date: Aug. 10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F32	1	21.5	0	0	0	0	
Dechlor	2	21.5	↓	↓	↓	↓	
B	3	22.0					
	4	20.0					
	5	21.0					
	6	22.0					
	7	21.5					
	8	22.0					
	9	21.5					
	10	22.0					
	11	21.5					
	12	21.0					
	13	21.0					
	14	22.5					
	15	21.0					
	16	22.5					
	17	20.5					
	18	22.0					
	19	22.0					
	20	22.0					
	21	22.0					
	22	22.5					
	23	21.5					
	24	21.5					
	25	22.0					
	26	21.5					
	27	22.0					
	28	22.0					
	29	21.0	↓	↓	↓	↓	
	30						

Total Weight (pooled): 1.77g

Number of survivors: 29

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 29/15

Termination Date: Aug. 10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F32	1	21.0	0	0	0	0	
Dechlor	2	22.0	↓	↓	↓	↓	
C	3	21.0					
	4	21.5					
	5	22.0					
	6	21.5					
	7	22.5					
	8	21.5					
	9	22.0					
	10	22.5					
	11	22.0					
	12	22.5					
	13	21.5					
	14	21.0					
	15	21.5					
	16	22.0					
	17	22.0					
	18	22.0					
	19	22.0					
	20	21.5					
	21	22.0					
	22	21.5					
	23	22.0					
	24	22.5					
	25	22.0					
	26	22.0					
	27	21.0					
	28	22.0					
	29	22.0					
	30						

Total Weight (pooled): 1.73 g

Number of survivors: 29

Number of deformed/have difficulty swimming: 0/0

Initials: BBL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 29/15

Termination Date: Aug 10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F32	1	22.0	0	0	0	0	
Reclor	2	22.5					
D	3	21.5					
	4	21.5					
	5	21.5					
	6	22.0					
	7	22.5					
	8	22.5					
	9	21.5					
	10	22.0					
	11	22.0					
	12	23.0					
	13	22.0					
	14	22.0					
	15	22.0					
	16	21.5					
	17	21.5					
	18	21.5					
	19	21.5					
	20	22.5					
	21	21.0					
	22	22.0					
	23	22.0					
	24	22.0					
	25	21.5					
	26	22.0					
	27	22.0					
	28	21.0					
	29	21.5					
	30	22.0					

Total Weight (pooled): 1.92 g

Number of survivors: 30

Number of deformed/have difficulty swimming: 0/0

Initials: BPL NYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 29/15

Termination Date: Aug. 10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F32	1	22.0	0	0	0	0	
Site	2	21.5					
A	3	20.5					
	4	21.0					
	5	22.0					
	6	21.0					
	7	22.5					
	8	22.0					
	9	22.0					
	10	21.5					
	11	22.5					
	12	23.0					
	13	22.5					
	14	22.0					
	15	22.0					
	16	22.5					
	17	22.5					
	18	21.5					
	19	22.5					
	20	22.0					
	21	21.5					
	22	22.0					
	23	22.0					
	24	22.0					
	25	21.5					
	26	21.0					
	27	22.5					
	28						
	29						
	30						

Total Weight (pooled): 1.80g

Number of survivors: 27

Number of deformed/have difficulty swimming: 0/0

Initials: BPL NYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 29/15

Termination Date: Aug 10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F32	1	22.0	0	0	0	0	
Site	2	21.5					
B	3	22.5					
	4	22.0					
	5	21.5					
	6	21.0					
	7	21.5					
	8	22.0					
	9	21.0					
	10	22.0					
	11	22.0					
	12	22.0					
	13	21.5					
	14	22.0					
	15	22.5					
	16	22.0					
	17	22.0					
	18	21.5					
	19	22.0					
	20	22.0					
	21	22.5					
	22	21.5					
	23	21.5					
	24	22.0					
	25	21.5					
	26	22.5					
	27	22.5					
	28	22.0					
	29	22.0					
	30	21.5	3	2			lordosis, one malformed eye

Total Weight (pooled): 2.07g

Number of survivors: 30

Number of deformed/have difficulty swimming: 1/1 - swimming in circles

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 29/15

Termination Date: Aug. 10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
FB2	1	22.5	0	0	0	0	
Site	2	22.0	↓	↓	↓	↓	
C	3	22.0	↓	↓	↓	↓	
	4	22.0	↓	↓	↓	↓	
	5	22.0	↓	↓	↓	↓	
	6	22.0	↓	↓	↓	↓	
	7	22.0	↓	↓	↓	↓	
	8	22.0	↓	↓	↓	↓	
	9	22.5	↓	↓	↓	↓	
	10	21.0	↓	↓	↓	↓	
	11	22.0	↓	↓	↓	↓	
	12	22.0	↓	↓	↓	↓	
	13	22.5	↓	↓	↓	↓	
	14	22.0	↓	↓	↓	↓	
	15	22.5	↓	↓	↓	↓	
	16	22.5	↓	↓	↓	↓	
	17	22.0	↓	↓	↓	↓	
	18	22.0	↓	↓	↓	↓	
	19	22.0	↓	↓	↓	↓	
	20	22.0	↓	↓	↓	↓	
	21	22.0	↓	↓	↓	↓	
	22	22.0	↓	↓	↓	↓	
	23	19.5	3				conjoined (2 headed)
	24	22.5	0				
	25	21.5	↓				
	26	22.0	↓				
	27	22.0	↓				
	28	21.5	↓				
	29	23.0	↓	↓	↓	↓	
	30						

Total Weight (pooled): 2.10 g

Number of survivors: 29

Number of deformed/have difficulty swimming: 1 / 1- swimming erratically

Initials: BPL MYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 29/15

Termination Date: Aug-10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F32	1	22.0	0	0	0	0	
Site	2	22.0	↓	↓	↓	↓	
D	3	22.5					
	4	22.0					
	5	20.5					
	6	22.0					
	7	21.0					
	8	22.0					
	9	20.0					
	10	21.0					
	11	22.5					
	12	22.0					
	13	22.0					
	14	21.5					
	15	21.5					
	16	22.0					
	17	21.5					
	18	22.5					
	19	21.5					
	20	22.0					
	21	21.0					
	22	22.0					
	23	21.0					
	24	22.0					
	25	22.0					
	26	22.0					
	27	22.0	✓	✓	✓	✓	
	28						
	29						
	30						

Total Weight (pooled): 1.80g

Number of survivors: 27

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 29/15

Termination Date: Aug 10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F33	1	22.0	0	0	0	0	
Dechlor	2	22.5	↓	↓	↓	↓	
A	3	23.0	↓	↓	↓	↓	
	4	23.0	↓	↓	↓	↓	
	5	22.0	↓	↓	1	↓	-one pectoral fin malformed.
	6	22.0	2	↓	0	↓	-kyphosis
	7	23.0	0	↓	↓	↓	
	8	22.0	0	↓	↓	↓	
	9	21.0	1	↓	↓	↓	-lordosis
	10	23.0	0	↓	↓	↓	
	11	22.0	↓	↓	↓	↓	
	12	23.0	↓	↓	↓	↓	
	13	21.5	↓	↓	↓	↓	
	14	18.5	3	3	3	3	-scoliosis + lordosis; yolksac edema; both eyes malformed lower jaw malformed; pectoral fins malform
	15	16.5	3	3	3	0	Scoliosis, kyphosis, lordosis ①
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.20

Number of survivors: 15

Number of deformed/have difficulty swimming: 5/ 2- swimming erratically.

① malformed eyes + head, malformed head, one malformed pectoral fin

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 29/15
Termination Date: Aug-10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F33	1	23.0	0	0	0	0	
Dichlor	2	24.0	↓	↓	↓	↓	
B	3	23.0					
	4	23.0					
	5	23.5					
	6	22.5					
	7	23.0					
	8	24.0					
	9	23.5					
	10	23.0					
	11	23.0					
	12	23.0					
	13	22.0	↓		↓		
	14	16.0	3	↓	3	↓	- scoliosis, malformed tail
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.079
Number of survivors: 14
Number of deformed/have difficulty swimming: 1 - unable to swim

Initials: BPL NYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 29/15

Termination Date: Aug. 10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F33	1	22.5	0		0	0	malformed head
Dechlor	2	22.0		0			
C	3	22.5		0			
	4	22.0					malformed head
	5	22.5		0			
	6	20.0					
	7	22.0					
	8	22.0					
	9	23.5					
	10	16.5	2	2			scoliosis & lordosis; malformed eye & jaw
	11	23.0	0	0			
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.709

Number of survivors: 11

Number of deformed/have difficulty swimming: 3/ 1-swimming erratically

Initials: BR / YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet
Swim-up wet weight, length and deformities

Client: Golder
Work Order No.: 15426

Start Date: June 29/15
Termination Date: Aug 10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F33	1	24.0	0	0	0	0	
Dechlor	2	23.0	↓	↓	↓	↓	
D	3	22.5					
	4	23.0					
	5	23.5					
	6	22.5					
	7	23.0					
	8	22.5					
	9	23.5					
	10	23.0					
	11	23.5					
	12	23.5					
	13	23.5					
	14	21.0	1	2			one malformed eye; Scoliosis
	15	22.5	0	0			
	16	23.0	0	0			
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 1.079
Number of survivors: 16
Number of deformed/have difficulty swimming: 110

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 29/15

Termination Date: Aug. 10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F33	1	21.0	0	0	0	0	
Site	2	22.0	↓	↓	↓	↓	
A	3	22.5	↓	↓	↓	↓	
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.16 g

Number of survivors: 3

Number of deformed/have difficulty swimming: 0/0

Initials: BPL/YYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 29/15

Termination Date: Aug. 10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F33	1	23.5	0	0	0	0	
Site	2	23.5	0	↓	0	↓	
B	3	17.5	3	↓	2	↓	-malformed pectoral, scoliosis
	4						
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.19 g

Number of survivors: 3

Number of deformed/have difficulty swimming: 1/1 - swimming erratically

Initials: BPL/YYL

Reviewed by: _____

Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 29/15

Termination Date: Aug. 10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F33	1	21.0	0	0	0	0	
Site	2	21.0	↓	↓	↓	↓	
C	3	21.5					
	4	21.0					
	5	22.5					
	6	21.0					
	7	22.0	2				scoliosis
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): 0.140g

Number of survivors: 7

Number of deformed/have difficulty swimming: 1/0

Initials: BAL NYL

Reviewed by: _____ Date Reviewed: _____

Embryo-Alevin-Fry Toxicity Test Data Sheet

Swim-up wet weight, length and deformities

Client: Golder

Work Order No.: 15426

Start Date: June 29/15

Termination Date: Aug. 10/15

Sample ID	Fish	Length (mm)	Skeletal	Craniofacial	Finfold	Edema	Comments
F33	1	22.0	0	0	0	0	
Site	2	21.0	3	↓	↓	↓	lordosis
D	3	29.5	0				
	4	21.0	2				lordosis
	5	20.5	2				lordosis
	6						
	7						
	8						
	9						
	10						
	11						
	12						
	13						
	14						
	15						
	16						
	17						
	18						
	19						
	20						
	21						
	22						
	23						
	24						
	25						
	26						
	27						
	28						
	29						
	30						

Total Weight (pooled): ~~0.285~~ 0.34g.

Number of survivors: ~~5~~ 5

Number of deformed/have difficulty swimming: 3/10

Initials: BPL NYL

Reviewed by: _____ Date Reviewed: _____

APPENDIX D – Chemistry reports

August 25, 2015

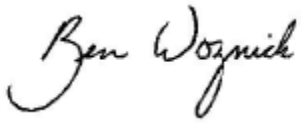
Bonnie Lo
Nautilus Environmental
8664 Commerce Court
Burnaby, British Columbia
Canada V5A 4N7
(604) 420-8773

Ms. Lo,

Attached is the report associated with the thirty-seven (37) fish egg samples submitted for total selenium quantitation on July 13, 2015. The samples were received on July 15, 2015 in a sealed container at -0.5°C. Total selenium analysis was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). Any issues associated with the analyses are addressed in the following report.

If you have any questions, please feel free to contact me at your convenience.

Sincerely,



Ben Wozniak
Project Manager
Brooks Rand Labs, LLC

Brooks Rand Labs, LLC

Report Prepared for:

Bonnie Lo
Nautilus Environmental
8664 Commerce Court
Burnaby, British Columbia
Canada V5A 4N7

August 25, 2015

1. Sample Reception

Thirty-seven (37) fish egg samples were submitted for total selenium quantitation on July 13, 2015. The samples were received in acceptable condition in a sealed container at -0.5°C on July 15, 2015.

The samples were received in a laminar flow clean hood void of trace metals contamination and ultra-violet radiation. Immediately upon reception all samples were designated discrete sample identifiers and stored in a secure, monitored freezer (maintained at a temperature of ≤-4°C) until digestion and analysis could be performed.

2. Sample Preparation

All sample preparation is performed in laminar flow clean hoods known to be free from trace metals contamination. All applied water for dilutions and sample preservatives are monitored for contamination to account for any biases associated with the sample results.

Total Selenium Analyses by ICP-QQQ-MS All samples submitted for total selenium quantitation were digested via EPA Method 3050B. In summary, a known mass of each sample was weighed into a polypropylene centrifuge tube. Each resulting sample was digested in a hotblock digestion apparatus (set to maintain a temperature of 95°C) using repeated additions of nitric acid and hydrogen peroxide. All resulting digests were analyzed for total selenium as described herein.

3. Sample Analysis

All sample analysis is preceded by a minimum of a five-point calibration curve spanning the entire concentration range of interest. All calibration curves, associated with each species of interest, are standardized by linear regression resulting in a response factor. All sample results are **instrument blank corrected** to account for any operational biases associated with the analytical platform.

Prior to sample analysis, all calibration curves are verified using second source standards which are identified as initial calibration verification standards (ICV).

Ongoing instrument performance is identified by the analysis of continuing calibration verification standards (CCV) and continuing calibration blanks (CCB) at a minimum interval of every ten analytical runs.

Total Selenium Analyses by ICP-QQQ-MS The samples for total selenium quantitation were analyzed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). Aliquots of each sample digest are introduced into a radio frequency (RF) plasma where energy-transfer processes cause desolvation, atomization, and ionization. The ions are extracted from the plasma through a differentially-pumped vacuum interface and travel through an initial quadrupole (Q1), which filters the target masses prior to their entrance into a second chamber, which contains reactive gases that preferentially react with interfering ions of the same target mass to charge ratios (m/z). The ions then exit the collision/reaction chamber into the mass analyzer (Q2). A solid-state detector detects ions transmitted through the mass analyzer, on the basis of their mass-to-charge ratio (m/z), and the resulting current is processed by a data handling system.

Total Solids Analysis A known mass of each sample was placed into a pre-weighed pan, then the combined mass of the sample and pan was recorded. All samples were placed into a convection oven maintained at a temperature of 60°C. After drying for a minimum of sixteen (16) hours, all samples were briefly cooled and reweighed. The total solids percentage of each sample was calculated by dividing the weight of the dried sample by the weight of the original sample.

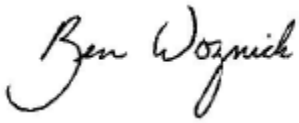
No total solids measurement was possible on the egg samples identified as F7, F14, and F16 due to limited sample mass. At the client's request, the average total solids value of the other submitted egg samples was instead used for samples F7, F14, and F16.

4. Analytical Issues

No significant issues were encountered with the requested analyses. All quality control parameters associated with these samples were within acceptance limits.

If you have any questions or concerns regarding this report, please feel free to contact me.

Sincerely,



Ben Wozniak
Project Manager
Brooks Rand Labs, LLC

Selenium Results for Nautilus Environmental
Contact: Bonnie Lo

Date: August 25, 2015
Report Generated by: Ben Wozniak
Brooks Rand Labs, LLC

Sample Results

Sample ID	Matrix	Batch ID	Total Se (Wet Wt.)	Total Se (Dry Wt.)	Total Solids* (%)
F1	Fish Eggs	A, C	4.61	11.4	40.5
F2	Fish Eggs	A, C	4.38	11.8	37.1
F3	Fish Eggs	A, C	4.29	11.0	39.0
F4	Fish Eggs	A, C	4.17	11.5	36.4
F5	Fish Eggs	A, E	4.31	12.0	35.9
F6	Fish Eggs	A, C	6.42	16.9	37.9
F7	Fish Eggs	A	3.33	8.81	37.8
F8	Fish Eggs	A, C	5.69	15.3	37.1
F9	Fish Eggs	A, C	3.53	9.44	37.4
F10	Fish Eggs	A, C	15.3	38.2	40.0
F11	Fish Eggs	A, C	3.54	9.27	38.2
F12	Fish Eggs	A, C	4.82	11.8	40.7
F13	Fish Eggs	A, C	3.55	8.83	40.1
F14	Fish Eggs	A	3.37	8.91	37.8
F15	Fish Eggs	A, C	4.60	11.6	39.7
F16	Fish Eggs	A	3.00	7.93	37.8
F17	Fish Eggs	A, C	6.71	17.4	38.5
F18	Fish Eggs	A, C	3.13	8.16	38.4
F19	Fish Eggs	A, C	3.81	9.83	38.7
F20	Fish Eggs	A, C	5.19	13.5	38.5

All results are reported in mg/kg, with the exception of Total Solids

ND = Not detected at the applied dilution

* Please see narrative regarding total solids results

Selenium Results for Nautilus Environmental
Contact: Bonnie Lo

Date: August 25, 2015
Report Generated by: Ben Wozniak
Brooks Rand Labs, LLC

Sample Results

Sample ID	Matrix	Batch ID	Total Se (Wet Wt.)	Total Se (Dry Wt.)	Total Solids* (%)
F21	Fish Eggs	B, D	4.10	10.3	39.7
F22	Fish Eggs	B, D	2.84	7.96	35.7
F23	Fish Eggs	B, D	3.28	8.52	38.5
F24	Fish Eggs	B, D	4.99	13.2	37.9
F25	Fish Eggs	B, D	3.95	10.4	37.9
F26	Fish Eggs	B, D	4.55	11.9	38.2
F27	Fish Eggs	B, D	2.53	7.13	35.4
F28	Fish Eggs	B, D	3.70	10.1	36.7
F29	Fish Eggs	B, D	3.19	9.37	34.0
F30	Fish Eggs	B, D	3.97	10.2	38.8
F31	Fish Eggs	B, D	3.98	10.5	37.7
F32	Fish Eggs	B, D	4.13	11.4	36.0
F33	Fish Eggs	B, D	3.49	9.66	36.1
Sample 1	Fish Eggs	B, D	5.31	14.1	37.6
Sample D	Fish Eggs	B, D	3.84	10.7	35.9
Sample E	Fish Eggs	B, D	3.95	9.99	39.6
Sample F	Fish Eggs	B, D	3.52	9.65	36.4

All results are reported in mg/kg, with the exception of Total Solids
ND = Not detected at the applied dilution
* Please see narrative regarding total solids results

Selenium Results for Nautilus Environmental
Contact: Bonnie Lo

Date: August 25, 2015
Report Generated by: Ben Wozniak
Brooks Rand Labs, LLC

Quality Control Summary - Preparation Blank Summary

Analyte	Units	Batch ID	PB1	PB2	PB3	PB4	Mean	StdDev	eMDL
Total Se	mg/kg (wet wt.)	A	0.000	0.001	0.010	0.001	0.003	0.005	0.014
Total Se	mg/kg (wet wt.)	B	0.002	0.002	0.002	0.002	0.002	0.000	0.001

eMDL = estimated Method Detection Limit

Quality Control Summary - Certified Reference Materials

Analyte	Units	Batch ID	CRM	True Value	Result	Recovery
Total Se	mg/kg (wet wt.)	A	LCS	5.000	4.429	88.6
Total Se	mg/kg (wet wt.)	B	LCS	5.000	4.371	87.4
Total Se	mg/kg (wet wt.)	A	DORM-3	3.30	3.124	94.7
Total Se	mg/kg (wet wt.)	B	DORM-3	3.30	3.208	97.2

Selenium Results for Nautilus Environmental
Contact: Bonnie Lo

Date: August 25, 2015
Report Generated by: Ben Wozniak
Brooks Rand Labs, LLC

Quality Control Summary - Matrix Duplicates

Analyte	Units	Batch ID	Sample ID	Rep 1	Rep 2	Mean	RPD
Total Se	mg/kg (wet wt.)	A	F10	15.28	14.26	14.77	6.9
Total Se	mg/kg (wet wt.)	B	F31	3.976	3.690	3.833	7.5
Total Solids	%	C	F20	38.54	38.25	38.39	0.8
Total Solids	%	D	F31	37.74	36.55	37.15	3.2
Total Solids	%	E	F5	35.93	35.44	35.68	1.4

Quality Control Summary - Matrix Spike/ Matrix Spike Duplicate

Analyte	Units	Batch ID	Sample ID	MS Conc	MS Result	Recovery	MSD Conc	MSD Result	Recovery	RPD
Total Se	mg/kg (wet wt.)	A	F18	4.384	6.998	88.2	4.651	7.226	88.0	0.2
Total Se	mg/kg (wet wt.)	B	F32	5.362	8.793	87.0	5.025	8.634	89.7	3.0

Nautilus Environmental

BRITISH COLUMBIA
8664 Commerce Court
Burnaby British Columbia Canada V5A 4N7
Phone 604.420.8773
Fax 604.357.1361

(1)

Chain of Custody
1431

Date July 13/15 Page 1 of 4

Sample Collection by: BPL

Report to:
Company
Address
City Prov. PC
Contact bonnie@nautilusenvironmental.com
Phone No.

Invoice to:
Company
Address
City Prov. PC
Contact
Phone No.

ANALYSIS REQUIRED

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS	Selenium	% solids	RECEIPT TEMPERATURE (°C)
F1	June	BPL ~~1800~~ 2000	L	eggs bags	1		✓	✓	
F2	↓								
F3	↓								
F4	June 3								
F5									
F6									
F7									
F8									
F9									
F10	↓	↓	↓	↓	↓		↓	↓	

PROJECT INFORMATION
CLIENT
P.O. NO.
SHIPPED VIA:

SAMPLE RECEIPT
TOTAL NO. OF CONTAINERS
REC'D GOOD CONDITION

SPECIAL INSTRUCTIONS/COMMENTS:

RELINQUISHED BY (CLIENT)
(Signature) (Time)
(Printed Name) BPL (Date) July 13/15 1430
(Company) Nautilus

RECEIVED BY (COURIER)
(Signature) (Time)
(Printed Name) (Date)
(Company)

RELINQUISHED BY (COURIER)
(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY (LABORATORY)
(Signature) (Time) 1605
(Printed Name) Sam Naa t (Date) 7/15/15
Temp on arrival: 0.5 °C

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

DISTRIBUTION: WHITE - Nautilus Environmental, COLOR - Originator

Nautilus Environmental

BRITISH COLUMBIA
8664 Commerce Court
Burnaby British Columbia Canada V5A 4N7
Phone 604.420.8773
Fax 604.357.1361

(1)

Chain of Custody
1432

Date July 13/15 Page 2 of 4

Sample Collection by: BBL

Report to:
Company
Address
City Prov. PC
Contact bonnie@nautilusenvironmental.com
Phone No.

Invoice to:
Company
Address
City Prov. PC
Contact
Phone No.

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS	ANALYSIS REQUIRED: extractable	ANALYSIS REQUIRED: % solids	RECEIPT TEMPERATURE (°C)
F11	June3	2000	ESS>	bag	1		✓	✓	
F12	↓								
F13	June5								
F14	June11								
F15									
F16									
F17									
F18									
F19									
F20	↓	↓	↓	↓	↓		↓	↓	

PROJECT INFORMATION	SAMPLE RECEIPT
CLIENT	TOTAL NO. OF CONTAINERS
P.O. NO.	REC'D GOOD CONDITION
SHIPPED VIA:	

SPECIAL INSTRUCTIONS/COMMENTS:

RELINQUISHED BY (CLIENT)
(Signature) (Time) July 13/15
(Printed Name) BBL (Date) 1430
(Company) Nautilus

RECEIVED BY (COURIER)
(Signature) (Time)
(Printed Name) (Date)
(Company)

RELINQUISHED BY (COURIER)
(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY (LABORATORY)
(Signature) 1600 (Time)
(Printed Name) 7/15/15 (Date)
Temp: -0.5°C

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

DISTRIBUTION: WHITE - Nautilus Environmental, COLOR - Originator

Nautilus Environmental

BRITISH COLUMBIA
8664 Commerce Court
Burnaby British Columbia Canada V5A 4N7
Phone 604.420.8773
Fax 604.357.1361

(1)

Chain of Custody
1433

Date July 13/15 Page 3 of 4

Sample Collection by: BRL

Report to:
Company
Address
City Prov. PC
Contact bonnie@nautilusenvironmental.com
Phone No.

Invoice to:
Company
Address
City Prov. PC
Contact
Phone No.

ANALYSIS REQUIRED

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS	Selenium	% solids	RECEIPT TEMPERATURE (°C)
F21	June 15	2000	soil	bag	1		✓	✓	
F22	↓	↓	↓	↓	↓		↓	↓	
F23									
F24									
F25									
F26									
F27									
F28									
F29	June 18								
F30	↓						↓	↓	

PROJECT INFORMATION
CLIENT
P.O. NO.
SHIPPED VIA:

SAMPLE RECEIPT
TOTAL NO. OF CONTAINERS
REC'D GOOD CONDITION

SPECIAL INSTRUCTIONS/COMMENTS:

RELINQUISHED BY (CLIENT)
(Signature) (Time) 1430
(Printed Name) BRL (Date) July 13/15
(Company) Nautilus

RECEIVED BY (COURIER)
(Signature) (Time)
(Printed Name) (Date)
(Company)

RELINQUISHED BY (COURIER)
(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY (LABORATORY)
(Signature) 1600 (Time)
(Printed Name) 7/15/15 (Date)
Temp: -0.5°C

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

DISTRIBUTION: WHITE - Nautilus Environmental, COLOR - Originator

Nautilus Environmental

BRITISH COLUMBIA
8664 Commerce Court
Burnaby British Columbia Canada V5A 4N7
Phone 604.420.8773
Fax 604.357.1361

(1)

Chain of Custody
1434

Date July 13/15 Page 4 of 4

Sample Collection by: BBL

Report to:
Company
Address
City Prov. PC
Contact bonnie@nautilusenvironmental.com
Phone No.

Invoice to:
Company
Address
City Prov. PC
Contact
Phone No.

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS	ANALYSIS REQUIRED: selenium	ANALYSIS REQUIRED: % solids	RECEIPT TEMPERATURE (°C)
F31	June 29	2000	ESS	bag	1				
F32	↓								
F33	↓								
Sample 1	June								
Sample D	July 13								
Sample E	↓								
Sample F	↓								

PROJECT INFORMATION
CLIENT
P.O. NO.
SHIPPED VIA:

SAMPLE RECEIPT
TOTAL NO. OF CONTAINERS
REC'D GOOD CONDITION

SPECIAL INSTRUCTIONS/COMMENTS:

RELINQUISHED BY (CLIENT)
(Signature) (Time) 1430
(Printed Name) BBL (Date) July 13/15
(Company) Nautilus

RECEIVED BY (COURIER)
(Signature) (Time)
(Printed Name) (Date)
(Company)

RELINQUISHED BY (COURIER)
(Signature) (Time)
(Printed Name) (Date)
(Company)

RECEIVED BY (LABORATORY)
(Signature) Sam Vaatz (Time) 1600
(Printed Name) (Date) 7/15/15
Temp: -0.5°C

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

DISTRIBUTION: WHITE - Nautilus Environmental, COLOR - Originator

NAUTILUS ENVIRONMENTAL
ATTN: Bonnie Lo
8664 Commerce Court
Imperial Square Lake City
Burnaby BC V5A 4N7

Date Received: 28-MAY-15
Report Date: 01-JUN-15 13:31 (MT)
Version: FINAL REV. 2

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1618385

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 1357
Legal Site Desc:

Comments: 1-JUN-2015 This report replaces and supersedes previously sent report. This report includes revised Cadmium results for ALS identified samples L1618385-2 and -3.

Jamie Lo, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1618385-1	L1618385-2	L1618385-3	L1618385-4	
	Description	Water	Water	Water	Water	
	Sampled Date	28-MAY-15	28-MAY-15	28-MAY-15	28-MAY-15	
	Sampled Time	15:00	15:00	15:00	15:00	
	Client ID	NITRATE/SULPHATE	CD-TOTAL	CD-DISSOLVED	SE-TOTAL	
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Nitrate (as N) (mg/L)	6.31				
	Sulfate (SO4) (mg/L)	88.8				
Total Metals	Cadmium (Cd)-Total (mg/L)		0.0000165			
	Selenium (Se)-Total (mg/L)				0.0219	
Dissolved Metals	Dissolved Metals Filtration Location			FIELD		
	Cadmium (Cd)-Dissolved (mg/L)			0.0000207		

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-DIS-ICP-VA	Water	Dissolved Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SE-T-CCMS-VA	Water	Total Selenium in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modifed from EPA Method 6020A).

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1357

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Nautilus Environmental

L1618385

BRITISH COLUMBIA
8664 Commerce Court
Burnaby British Columbia Canada V5A 4N7
Phone 604.420.8773
Fax 604.357.1361

(1)

Chain of Custody
1357

Date May 28/15 Page 1 of 1

Sample Collection by: BPL

Report to:
Company (1)
Address
City Prov. PC
Contact bonnie@nautilusenvironmental.com
Phone No.

Invoice to:
Company
Address
City Prov. PC
Contact
Phone No.

ANALYSIS REQUIRED

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS	Sulphate	Nitrate	Se - total	Cd - total	Cd - dissolved	RECEIPT TEMPERATURE (°C)
Nitrate/Sulphate	05/28/15	1500	water	125 mL	1		✓	✓				
Cd - total	↓	↓	↓	↓	↓					✓		
Cd - dissolved											✓	
Se - total									✓			

RUSH

Priority processing

L1618385-COFC

PROJECT INFORMATION	SAMPLE RECEIPT
CLIENT	TOTAL NO. OF CONTAINERS
P.O. NO.	REC'D GOOD CONDITION
SHIPPED VIA:	

SPECIAL INSTRUCTIONS/COMMENTS:
Rush please.
Results by May 29/2015

RELINQUISHED BY (CLIENT)	RELINQUISHED BY (COURIER)
(Signature) (Time) 1510	(Signature) (Time)
(Printed Name) BPL (Date) May 28/15	(Printed Name) (Date)
(Company) Nautilus	(Company)
RECEIVED BY (COURIER)	**RECEIVED BY (LABORATORY)** YC May 28 15:30
(Signature) (Time)	(Signature) 20.4°C (Time)
(Printed Name) (Date)	(Printed Name) (Date)
(Company)	

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

DISTRIBUTION: WHITE - Nautilus Environmental, COLOR - Originator

NAUTILUS ENVIRONMENTAL
ATTN: Bonnie Lo
8664 Commerce Court
Imperial Square Lake City
Burnaby BC V5A 4N7

Date Received: 30-MAY-15
Report Date: 01-JUN-15 10:39 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1619116

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 1359
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1619116-1				
	Description	Water				
	Sampled Date	30-MAY-15				
	Sampled Time	09:30				
	Client ID	CA & MG				
Grouping	**Analyte**					
WATER						
Total Metals	Calcium (Ca)-Total (mg/L)	66.5				
	Magnesium (Mg)-Total (mg/L)	24.4				

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1359

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

L1619116-COFC

BRITISH COLUMBIA
8664 Commerce Court
Burnaby British Columbia Canada V5A 4N7
Phone 604.420.8773
Fax 604.357.1361

(1)

Chain of Custody
1359

Date May 30/15 Page 1 of 1

Sample Collection by: BPL

Report to:	**Invoice to:**
Company	Company
Address	Address
City Prov. PC	City Prov. PC
Contact bonnie@nautilusenvironmental.com	Contact
Phone No.	Phone No.

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS	ANALYSIS REQUIRED: Calcium	ANALYSIS REQUIRED: Magnesium	RECEIPT TEMPERATURE (°C)
Ca3Mg	May30	930	water	125mL	1		✓	✓	

RUSH

Priority processing

PROJECT INFORMATION	SAMPLE RECEIPT
CLIENT	TOTAL NO. OF CONTAINERS
P.O. NO.	REC'D GOOD CONDITION
SHIPPED VIA:	

SPECIAL INSTRUCTIONS/COMMENTS: RUSH BPL

RELINQUISHED BY (CLIENT)	RELINQUISHED BY (COURIER)
(Signature) (Time) 940	(Signature) (Time)
(Printed Name) BPL (Date) May 30/15	(Printed Name) (Date)
(Company) Nautilus	(Company)

RECEIVED BY (COURIER)	RECEIVED BY (LABORATORY)
(Signature) (Time)	(Signature) Jody 21.8°C (Time) 05/30 9:30AM
(Printed Name) (Date)	(Printed Name) (Date)
(Company)	

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

DISTRIBUTION: WHITE - Nautilus Environmental, COLOR - Originator

NAUTILUS ENVIRONMENTAL
ATTN: Bonnie Lo
8664 Commerce Court
Imperial Square Lake City
Burnaby BC V5A 4N7

Date Received: 04-JUN-15
Report Date: 05-JUN-15 16:41 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1621985

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 1363
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1621985-1 Water 04-JUN-15 13:45 SITE	L1621985-2 Water 04-JUN-15 13:45 SITE SE	L1621985-3 Water 04-JUN-15 13:45 SITE-CD TOTAL	L1621985-4 Water 04-JUN-15 13:45 SITE-CD DISSOLVED	
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Nitrate (as N) (mg/L)	5.24				
	Sulfate (SO4) (mg/L)	72.0				
Total Metals	Cadmium (Cd)-Total (mg/L)			0.0000238		
	Calcium (Ca)-Total (mg/L)	56.8				
	Magnesium (Mg)-Total (mg/L)	19.9				
	Selenium (Se)-Total (mg/L)		0.0172			
Dissolved Metals	Dissolved Metals Filtration Location				FIELD	
	Cadmium (Cd)-Dissolved (mg/L)				0.0000107	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L1621985-1	SITE	LPMB	Lab-Preserved for Metals. Sample received with pH > 2 and preserved at the lab. Metals results may be biased low.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SE-T-CCMS-VA	Water	Total Selenium in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modifed from EPA Method 6020A).

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1363

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Nautilus Environmental

BRITISH COLUMBIA (1)
8664 Commerce Court
Burnaby British Columbia Canada V5A 4N7
Phone 604.420.8773
Fax 604.357.1361

Chain of Custody
1363

Date June 4/15 Page 1 of 1

Sample Collection by: BPL/KS

Report to: (1)
Company
Address
City Prov. PC
Contact Bonnie@nautilusenvironmental.com
Phone No: ~~Keelin~~ Kristina@nautilusenvironmental.com

Invoice to:
Company
Address
City Prov. PC
Contact
Phone No.

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS	Nitrate	Sulphate	Calcium	Magnesium	Selenium	Cadmium total	Cadmium dissolved	RECEIPT TEMPERATURE (°C)
Site	June 4/15	13:45	water	125mL Bottle	1		✓	✓	✓	✓				
Site Se	↓	↓	↓	↓	↓						✓			
Site - Cd total												✓		
Site - Cd dissolved													✓	

L1621985-COFC

Short Holding Time

Rush Processing

PROJECT INFORMATION	SAMPLE RECEIPT
CLIENT	TOTAL NO. OF CONTAINERS
P.O. NO.	REC'D GOOD CONDITION
SHIPPED VIA:	

SPECIAL INSTRUCTIONS/COMMENTS:
Se - > 1 ug/L
Cd - low level please (< 1 ug/L)

RELINQUISHED BY (CLIENT)	RELINQUISHED BY (COURIER)
(Signature) KS K.Lucas (Time)	(Signature) (Time)
(Printed Name) KS (Date)	(Printed Name) (Date)
(Company) Nautilus	(Company)
RECEIVED BY (COURIER)	**RECEIVED BY (LABORATORY)**
(Signature) (Time)	(Signature) 13:50 (Time)
(Printed Name) (Date)	(Printed Name) Shayan June 4 (Date)
(Company)	ALS 18°C

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

DISTRIBUTION: WHITE - Nautilus Environmental, COLOR - Originator

NAUTILUS ENVIRONMENTAL
ATTN: Bonnie Lo
8664 Commerce Court
Imperial Square Lake City
Burnaby BC V5A 4N7

Date Received: 15-JUN-15
Report Date: 16-JUN-15 15:42 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1626931

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 1365
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1626931-1	L1626931-2	L1626931-3		
	Description	Water	Water	Water		
	Sampled Date	15-JUN-15	15-JUN-15	15-JUN-15		
	Sampled Time	12:30	12:30	12:30		
	Client ID	SITE	SITE SE/CD	SITE CD D		
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Nitrate (as N) (mg/L)	6.69				
	Sulfate (SO4) (mg/L)	85.8				
Total Metals	Cadmium (Cd)-Total (mg/L)		0.0000276			
	Calcium (Ca)-Total (mg/L)	66.6				
	Magnesium (Mg)-Total (mg/L)	24.4				
	Selenium (Se)-Total (mg/L)		0.0220			
Dissolved Metals	Dissolved Metals Filtration Location			FIELD		
	Cadmium (Cd)-Dissolved (mg/L)			0.000583		

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SE-T-CCMS-VA	Water	Total Selenium in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modifed from EPA Method 6020A).

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1365

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Nautilus Environmental

BRITISH COLUMBIA
8664 Commerce Court
Burnaby British Columbia Canada V5A 4N7
Phone 604.420.8773
Fax 604.357.1361

(1)

Chain of Custody
1365

Date June 15/15 Page 1 of 1

Sample Collection by: BPL

Report to:
Company
Address
City Prov. PC
Contact bonnie@nautilusenvironmental.com
Phone No.

Invoice to:
Company
Address
City Prov. PC
Contact
Phone No.

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS	Calcium	Magnesium	Nitrate	Sulphate	Cadmium total	Selenium total	Cadmium dissolved					RECEIPT TEMPERATURE (°C)
Site	June 15	1230	water	125mL	1		✓	✓	✓	✓								
SiteCd	↓	↓	↓	↓	↓						✓	✓						
SiteCdD	↓	↓	↓	↓	↓								✓					

L1626931-COFC

RUSH

Priority processing

PROJECT
CLIENT
P.O. NO.
SHIPPED VIA:
TOTAL NO. OF CONTAINERS
REC'D GOOD CONDITION

SPECIAL INSTRUCTIONS/COMMENTS: Preserved 3; Cd dissolved to Filtered
Cd & Se - low level please
Rush - Results for Tues June 16 please

RELINQUISHED BY (CLIENT)	RELINQUISHED BY (COURIER)
(Signature) (Time) 1245	(Signature) (Time)
(Printed Name) BPL (Date) June 15/15	(Printed Name) (Date)
(Company)	(Company)
RECEIVED BY (COURIER)	**RECEIVED BY (LABORATORY)**
(Signature) (Time)	(Signature) Strafel (Time) 13:40 June 15
(Printed Name) (Date)	(Printed Name) 7°C (Date)
(Company)	

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

DISTRIBUTION: WHITE - Nautilus Environmental, COLOR - Originator

NAUTILUS ENVIRONMENTAL
ATTN: Bonnie Lo
8664 Commerce Court
Imperial Square Lake City
Burnaby BC V5A 4N7

Date Received: 19-JUN-15
Report Date: 22-JUN-15 15:41 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1630121

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 1367
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1630121-1	L1630121-2	L1630121-3		
	Description	Water	Water	Water		
	Sampled Date	19-JUN-15	19-JUN-15	19-JUN-15		
	Sampled Time	14:45	14:45	14:45		
	Client ID	SITE	SITE SE/CD	SITE CD D		
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Nitrate (as N) (mg/L)	8.11				
	Sulfate (SO4) (mg/L)	106				
Total Metals	Cadmium (Cd)-Total (mg/L)		0.0000259			
	Calcium (Ca)-Total (mg/L)	69.6				
	Magnesium (Mg)-Total (mg/L)	27.3				
	Selenium (Se)-Total (mg/L)		0.0269			
Dissolved Metals	Dissolved Metals Filtration Location			FIELD		
	Cadmium (Cd)-Dissolved (mg/L)			0.0000160		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L1630121-1	SITE	LPMB	Lab-Preserved for Metals. Sample received with pH > 2 and preserved at the lab. Metals results may be biased low.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SE-T-CCMS-VA	Water	Total Selenium in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modifed from EPA Method 6020A).

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1367

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Nautilus Environmental

BRITISH COLUMBIA
8664 Commerce Court
Burnaby British Columbia Canada V5A 4N7
Phone 604.420.8773
Fax 604.357.1361

(1)

Chain of Custody
1367

Date June 19/15 Page 1 of 1

Sample Collection by: BRL

Report to:
Company (1)
Address
City Prov. PC
Contact bonnie@nautilusenvironmental.com
Phone No.

Invoice to:
Company
Address
City Prov. PC
Contact
Phone No.

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS	Sulphate	Nitrate as N	Calcium	Magnesium	Selenium (total)	Cadmium (total)	Cadmium (dissolved)	RECEIPT TEMPERATURE (°C)
Site	June 19	1445	water	125 mL	1		✓	✓	✓	✓				
Site Se/Cd	↓	↓	↓		↓						✓	✓		
Site Cd D	↓	↓	↓		↓								✓	

RUSH

Priority processing

L1630121-COFC

PROJECT INFORMATION	SAMPLE RECEIPT
CLIENT	TOTAL NO. OF CONTAINERS
P.O. NO.	REC'D GOOD CONDITION
SHIPPED VIA:	

SPECIAL INSTRUCTIONS/COMMENTS:
Rush HS - results on Monday June 22/15
Se3Cd - low level, already preserved.
Cd dissolved - pre-filtered, preserved.

RELINQUISHED BY (CLIENT)	RELINQUISHED BY (COURIER)
(Signature) (Time) 1455	(Signature) (Time)
(Printed Name) BRL (Date) June 19/15	(Printed Name) (Date)
(Company) Nautilus	(Company)
RECEIVED BY (COURIER)	**RECEIVED BY (LABORATORY)**
(Signature) (Time)	(Signature) (Time) 14:55
(Printed Name) (Date)	(Printed Name) Shayan (Date) June 19
(Company)	16°C

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

DISTRIBUTION: WHITE - Nautilus Environmental, COLOR - Originator

NAUTILUS ENVIRONMENTAL
ATTN: Bonnie Lo
8664 Commerce Court
Imperial Square Lake City
Burnaby BC V5A 4N7

Date Received: 26-JUN-15
Report Date: 30-JUN-15 17:07 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1633885

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 1430
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1633885-1	L1633885-2	L1633885-3		
	Description	Water	Water	Water		
	Sampled Date	26-JUN-15	26-JUN-15	26-JUN-15		
	Sampled Time	17:00	17:00	17:00		
	Client ID	SITE	SITE SE/CD	SITE CD D		
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Nitrate (as N) (mg/L)	8.35				
	Sulfate (SO4) (mg/L)	113				
Total Metals	Cadmium (Cd)-Total (mg/L)		0.0000248			
	Calcium (Ca)-Total (mg/L)	80.4				
	Magnesium (Mg)-Total (mg/L)	30.5				
	Selenium (Se)-Total (mg/L)		0.0286			
Dissolved Metals	Dissolved Metals Filtration Location			FIELD		
	Cadmium (Cd)-Dissolved (mg/L)			0.0000226		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L1633885-1	SITE	LPMB	Lab-Preserved for Metals. Sample received with pH > 2 and preserved at the lab. Metals results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Nitrate (as N)	DLM	L1633885-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L1633885-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L1633885-1
Matrix Spike	Sulfate (SO4)	MS-B	L1633885-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1430

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Nautilus Environmental

BRITISH COLUMBIA
8664 Commerce Court
Burnaby British Columbia Canada V5A 4N7
Phone 604.420.8773
Fax 604.357.1361

(1)

Chain of Custody
1430

Date June 26/15 Page 1 of 1

Sample Collection by: _____

Report to:
Company (1)
Address
City Prov. PC
Contact Bonnie@nautilusenvironmental.com
Phone No.

Invoice to:
Company
Address
City Prov. PC
Contact
Phone No.

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS	Sulphate	Nitrate as N	Calcium	Magnesium	Selenium total	Cadmium total	Cadmium dissolved	RECEIPT TEMPERATURE (°C)
Site	June26/15	1700h	water	125mL Bottle	1		✓	✓	✓	✓				
Site Se/Cd	↓	↓	↓	↓	↓						✓	✓		
Site Cd ▷	↓	↓	↓	↓	↓								✓	

RUSH

Priority processing

L1633[illegible]

PROJECT INFORMATION	SAMPLE RECEIPT
CLIENT	TOTAL NO. OF CONTAINERS
P.O. NO.	REC'D GOOD CONDITION
SHIPPED VIA:	

SPECIAL INSTRUCTIONS/COMMENTS:
Se & Cd - low level (preserved)
Cd dissolved - prefiltered & preserved
Rush - Results by July 2nd

RELINQUISHED BY (CLIENT)		RELINQUISHED BY (COURIER)	
(Signature)	(Time) 1700h	(Signature)	(Time)
(Printed Name) Yvonne Lam	(Date) June 26/15	(Printed Name)	(Date)
(Company) Nautilus Environmental		(Company)	
RECEIVED BY (COURIER)		**RECEIVED BY (LABORATORY)**	
(Signature)	(Time)	(Signature)	(Time) 17:00
(Printed Name)	(Date)	(Printed Name) 3°C	(Date) June 26
(Company)			

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

DISTRIBUTION: WHITE - Nautilus Environmental, COLOR - Originator

NAUTILUS ENVIRONMENTAL
ATTN: Bonnie Lo
8664 Commerce Court
Imperial Square Lake City
Burnaby BC V5A 4N7

Date Received: 09-JUL-15
Report Date: 13-JUL-15 17:48 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1640132

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 1437
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1640132-1	L1640132-2	L1640132-3		
	Description	WATER	WATER	WATER		
	Sampled Date	09-JUL-15	09-JUL-15	09-JUL-15		
	Sampled Time	14:30	14:30	14:30		
	Client ID	SITE R6	SITE CD DISSOLVED R6	SITE CD/SE R6		
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Nitrate (as N) (mg/L)	9.31				
	Sulfate (SO4) (mg/L)	126				
Total Metals	Cadmium (Cd)-Total (mg/L)			0.0000213		
	Calcium (Ca)-Total (mg/L)	90.0				
	Magnesium (Mg)-Total (mg/L)	33.3				
	Selenium (Se)-Total (mg/L)			0.0321		
Dissolved Metals	Dissolved Metals Filtration Location		FIELD			
	Cadmium (Cd)-Dissolved (mg/L)		0.0000254			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L1640132-1	SITE R6	LPML	Lab-Preserved for Total Metals. Sample received with pH > 2 and preserved at the lab. Total Metals results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Total	MS-B	L1640132-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1437

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Nautilus Environmental

BRITISH COLUMBIA (1)
8664 Commerce Court
Burnaby British Columbia Canada V5A 4N7
Phone 604.420.8773
Fax 604.357.1361

Chain of Custody
1437

Date July 9/15 Page 1 of 1

Sample Collection by: KS

Report to: (1)	**Invoice to:**
Company	Company
Address	Address
City Prov. PC	City Prov. PC
Contact Bonnie @ nautilusenvironmental.com	Contact
Phone No.	Phone No.

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS	Nitrate	Sulphate	Calcium	Magnesium	Selenium total	Cadmium total	Cadmium dissolved					RECEIPT TEMPERATURE (°C)
							ANALYSIS REQUIRED											
Site R6	July9/15	14:30	water	125mL bottle	1		✓	✓	✓	✓								
Site Cd dissolved R6	↓	↓	↓	↓	↓						.		✓					
Site Cd Se R6	↓	↓	↓	↓	↓						✓	✓						

L1640132-COFC

Short Holding Time

Rush Processing

RUSH

Priority processing

PROJECT INFORMATION	SAMPLE RECEIPT
CLIENT	TOTAL NO. OF CONTAINERS
P.O. NO.	REC'D GOOD CONDITION
SHIPPED VIA:	

SPECIAL INSTRUCTIONS/COMMENTS:
Cd Se - preserved
Cd dissolved - pre-filtered
Cd Se - Low level
RUSH - Results by July 13/15 (end of day)

RELINQUISHED BY (CLIENT)	RELINQUISHED BY (COURIER)
(Signature) KS (Time) 14:30	(Signature) (Time)
(Printed Name) Krishna (Date) July 9/15	(Printed Name) (Date)
(Company) Nautilus	(Company)
RECEIVED BY (COURIER)	**RECEIVED BY (LABORATORY)**
(Signature) (Time)	(Signature) Edward Cheung (Time) 17:05
(Printed Name) (Date)	(Printed Name) (Date) 9/7/15
(Company)	Temp: 11°C

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

DISTRIBUTION: WHITE - Nautilus Environmental, COLOR - Originator

NAUTILUS ENVIRONMENTAL
ATTN: Bonnie Lo
8664 Commerce Court
Imperial Square Lake City
Burnaby BC V5A 4N7

Date Received: 17-JUL-15
Report Date: 22-JUL-15 14:35 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1644396

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 1436
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1644396-1 Water 17-JUL-15 13:00 SITE R7	L1644396-2 Water 17-JUL-15 13:00 SITE CD/SE R7	L1644396-3 Water 17-JUL-15 13:00 SITE CAD R7		
Sample ID						
Description						
Sampled Date						
Sampled Time						
Client ID						
WATER						
Anions and Nutrients	Nitrate (as N) (mg/L)	9.75				
	Sulfate (SO4) (mg/L)	132				
Total Metals	Cadmium (Cd)-Total (mg/L)		0.0000300			
	Calcium (Ca)-Total (mg/L)	82.3				
	Magnesium (Mg)-Total (mg/L)	32.9				
	Selenium (Se)-Total (mg/L)		0.0326			
Dissolved Metals	Dissolved Metals Filtration Location			FIELD		
	Cadmium (Cd)-Dissolved (mg/L)			0.0000305		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L1644396-1	SITE R7	LPMB	Lab-Preserved for Total Metals. Sample received with pH > 2 and preserved at the lab. Total Metals results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Nitrate (as N)	DLM	L1644396-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L1644396-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1436

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Nautilus Environmental

BRITISH COLUMBIA
8664 Commerce Court
Burnaby British Columbia Canada V5A 4N7
Phone 604.420.8773
Fax 604.357.1361

(1)

Chain of Custody
1436

Date July 17/15 Page 1 of 1

Sample Collection by: BPL

Report to:
Company (1)
Address
City Prov. PC
Contact bonnie@nautilusenvironmental.com
Phone No.

Invoice to:
Company (1)
Address
City Prov. PC
Contact
Phone No.

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS	Substrate	Nitrate as N	Calcium	Magnesium	Selenium (total)	& Cadmium (total)	Cadmium (dissolved)					RECEIPT TEMPERATURE (°C)
Site R7	July 17	1300	water	125mL	1		✓	✓	✓	✓								
Site Cd/Se R7	↓	↓	↓	↓	↓						✓	✓						
Site Cd D R7	↓	↓	↓	↓	↓								✓					

L1644396-COFC

Short Holding Time
Rush Processing

PROJECT INFORMATION	SAMPLE RECEIPT
CLIENT	TOTAL NO. OF CONTAINERS
P.O. NO.	REC'D GOOD CONDITION
SHIPPED VIA:	

SPECIAL INSTRUCTIONS/COMMENTS:
Se, Cd - low level pls. metals preserved.
Cd dissolved - pre-filtered
Rush: Results by Wed, July 22

RELINQUISHED (CLIENT)	RELINQUISHED BY (COURIER)
(Signature) (Time) 1600	(Signature) (Time)
(Printed Name) (Date) July 17/15	(Printed Name) (Date)
(Company) Nautilus	(Company)
RECEIVED BY (COURIER)	**RECEIVED BY (LABORATORY)**
(Signature) (Time)	(Signature) Edward (Time)
(Printed Name) (Date)	(Printed Name) (Date)
(Company)	

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

17:25 SG

DISTRIBUTION: WHITE - Nautilus Environmental, COLOR - Originator

July 17/15

NAUTILUS ENVIRONMENTAL
ATTN: Bonnie Lo
8664 Commerce Court
Imperial Square Lake City
Burnaby BC V5A 4N7

Date Received: 31-JUL-15
Report Date: 05-AUG-15 13:55 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1651420

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1651420-1 Water 31-JUL-15 SITE - R8	L1651420-2 Water 31-JUL-15 SITE - CD/SE R8	L1651420-3 Water 31-JUL-15 SITE - CDD R8		
WATER						
Anions and Nutrients	Nitrate (as N) (mg/L)	9.49				
	Sulfate (SO4) (mg/L)	131				
Total Metals	Cadmium (Cd)-Total (mg/L)		0.0000251			
	Calcium (Ca)-Total (mg/L)	83.7				
	Magnesium (Mg)-Total (mg/L)	34.0				
	Selenium (Se)-Total (mg/L)		0.0321			
Dissolved Metals	Dissolved Metals Filtration Location			FIELD		
	Cadmium (Cd)-Dissolved (mg/L)			0.0000344		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L1651420-1	SITE - R8	LPMB	Lab-Preserved for Total Metals. Sample received with pH > 2 and preserved at the lab. Total Metals results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Nitrate (as N)	MS-B	L1651420-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Nautilus Environmental

TESTING LOCATION (Please Circle)

British Columbia
8664 Commerce Court
Burnaby, British Columbia, Canada
V5A 4N3
Phone 604.420.8773
Fax 604.357.1361

L1651420-COFC

Chain of Custody

Date July 31/15 Page 1 of 1

Sample Collection By:

Report to:

Company	Nautilus Environmental
Address	8664 Commerce Court
City/State/Zip	Burnaby, BC
Contact	Bonnie Lo
Phone	604-420-8773
Email	bonnie@nautilusenvironmental.com

Invoice To:

Company	Same as Report to
Address	
City/State/Zip	
Contact	
Phone	
Email	

	SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NO. OF CONTAINERS	COMMENTS	Sulphate	Nitrate as N	Calcium	Magnesium	Total Selenium - Low Level	Total Cadmium - Low Level	Dissolved Cadmium - Low Level	Receipt Temperature (°C)
1	Site - R8	31-Jul-15		water	125 ml	1	Rush analysis - see notes	X	X	X	X				
2	Site - Cd/Se R8	31-Jul-15		water	125 ml	1						X	X		
3	Site - CdD R8	31-Jul-15		water	125 ml	1								X	
4															
5															
6															
7															
8															
9															
10															

ANALYSES REQUIRED

RUSH

Priority processing

PROJECT INFORMATION		SAMPLE RECEIPT	
Client:		**Total No. of Containers**	
PO No.:		**Received Good Condition?**	
Shipped Via:		**Matches Test Schedule?**	

SPECIAL INSTRUCTIONS/COMMENTS:

All metals have been preserved. Cd & Se - Low Level analysis.
Dissolved Cd has been pre-filtered

Rush - pls send results by Aug. 5, 2015 (wed)

RELINQUISHED BY (CLIENT)

(Signature) (Time) 1630h

(Printed Name) Yvonne Lam (Date) July 31/15

NO. OF CONTAINERS 3

RELINQUISHED BY (COURIER)

(Signature) (Time)

(Printed Name) (Date)

(Company)

RECEIVED BY (COURIER)

(Signature) (Time)

(Printed Name) (Date)

(Company)

RECEIVED BY (LABORATORY)

(Signature) ISAAC L (Time) 17:05

(Printed Name) 12°C (Date) July 31

(Company)

Additional costs may be required for sample disposal or storage. Payment net 30 unless otherwise contracted.

NAUTILUS ENVIRONMENTAL
ATTN: Bonnie Lo
8664 Commerce Court
Imperial Square Lake City
Burnaby BC V5A 4N7

Date Received: 03-JUN-15
Report Date: 24-JUN-15 14:34 (MT)
Version: FINAL REV. 2

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1621291

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 1361
Legal Site Desc:

Comments: 24-JUN-2015 This report replaces and supersedes previously sent report. This report includes modified Selenium results for ALS identified sample L1621291-3.

Jamie Lo, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1621291-1	L1621291-2	L1621291-3	L1621291-4	
Description	Water	Water	Water	Water	
Sampled Date	01-JUN-15	01-JUN-15	01-JUN-15	01-JUN-15	
Sampled Time	19:30	19:30	19:30	19:30	
Client ID	SITE-CD TOTAL	SITE-CD DISSOLVED	SITE-SE	SITE	
Grouping / **Analyte**					
WATER					
Anions and Nutrients					
Nitrate (as N) (mg/L)				22.2	
Sulfate (SO4) (mg/L)				443	
Total Metals					
Cadmium (Cd)-Total (mg/L)	0.000716				
Calcium (Ca)-Total (mg/L)				154	
Magnesium (Mg)-Total (mg/L)				54.3	
Selenium (Se)-Total (mg/L)			0.0567		
Dissolved Metals					
Dissolved Metals Filtration Location		FIELD			
Cadmium (Cd)-Dissolved (mg/L)		0.000701			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L1621291-4	SITE	LPMB	Lab-Preserved for Metals. Sample received with pH > 2 and preserved at the lab. Metals results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Sulfate (SO4)	MS-B	L1621291-4

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SE-T-CCMS-VA	Water	Total Selenium in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modifed from EPA Method 6020A).

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1361

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Nautilus Environmental

BRITISH COLUMBIA
8664 Commerce Court
Burnaby British Columbia Canada V5A 4N7
Phone 604.420.8773
Fax 604.357.1361

Chain of Custody
1361

Date June 1/15 Page 1 of 1

Sample Collection by: BPL

Report to:
Company (1)
Address
City Prov. PC
Contact bonnie@nautilusenvironmental.com
Phone No.

Invoice to:
Company
Address
City Prov. PC
Contact
Phone No.

ANALYSIS REQUIRED

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS	Cadmium-total	Cadmium-dissolved	BPL Selenium	Calcium	Magnesium	Nitrate	Sulphate					RECEIPT TEMPERATURE (°C)
Site-Cd total	June 1	1930	water	125 mL	1		✓											
Site-Cd dissolved	↓	↓	↓	↓	↓			✓										
Site-Se	↓	↓	↓	↓	↓				✓									
Site	↓	↓	↓	↓	↓					✓	✓	✓	✓					

L1621291-COFC

PROJECT INFORMATION	SAMPLE RECEIPT	
CLIENT	TOTAL NO. OF CONTAINERS	
P.O. NO.	REC'D GOOD CONDITION	
SHIPPED VIA:		

SPECIAL INSTRUCTIONS/COMMENTS:
Cd - µg/L range (low level)
Se > 10 µg/L
Cd dissolved - pre-filtered

RELINQUISHED BY (CLIENT)		RELINQUISHED BY (COURIER)	
(Signature)	(Time) 1200	(Signature)	(Time)
(Printed Name) BPL	(Date) June 2/15	(Printed Name)	(Date)
(Company) Nautilus		(Company)	
RECEIVED BY (COURIER)		**RECEIVED BY (LABORATORY)**	
(Signature)	(Time)	(Signature)	(Time) 17:00
(Printed Name)	(Date)	(Printed Name) ISAAC	(Date) June 3
(Company)			3°C

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

DISTRIBUTION: WHITE - Nautilus Environmental, COLOR - Originator

NAUTILUS ENVIRONMENTAL
ATTN: Bonnie Lo
8664 Commerce Court
Imperial Square Lake City
Burnaby BC V5A 4N7

Date Received: 15-JUN-15
Report Date: 23-JUN-15 10:52 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1626950

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 1364
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1626950-1 Water 15-JUN-15 13:00 SITE - AMENDED	L1626950-2 Water 10-JUN-15 15:00 SITE - AMENDED SE	L1626950-3 Water 10-JUN-15 15:00 SITE - AMENDED CDT	L1626950-4 Water 10-JUN-15 15:00 SITE - AMENDED CDD	
Sample ID **Description** **Sampled Date** **Sampled Time** **Client ID**						
WATER						
Anions and Nutrients	Nitrate (as N) (mg/L)	22.5				
	Sulfate (SO4) (mg/L)	460				
Total Metals	Cadmium (Cd)-Total (mg/L)			0.000531		
	Calcium (Ca)-Total (mg/L)	150				
	Magnesium (Mg)-Total (mg/L)	58.7				
	Selenium (Se)-Total (mg/L)		0.0507			
Dissolved Metals	Dissolved Metals Filtration Location				FIELD	
	Cadmium (Cd)-Dissolved (mg/L)				0.0000260	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Nitrate (as N)	DLM	L1626950-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SE-T-CCMS-VA	Water	Total Selenium in Water by CRC ICPMS	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modifed from EPA Method 6020A).

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1364

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Nautilus Environmental

BRITISH COLUMBIA
8664 Commerce Court
Burnaby British Columbia Canada V5A 4N7
Phone 604.420.8773
Fax 604.357.1361

(1)

Chain of Custody
1364

Date June 15/15 Page 1 of 1

Sample Collection by: BRL

Report to:
Company (1)
Address
City Prov. PC
Contact bonnie@nautilusenvironmental.com
Phone No.

Invoice to:
Company
Address
City Prov. PC
Contact
Phone No.

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS	ANALYSIS REQUIRED: Calcium	Magnesium	Sulphate	Nitrate as N	Selenium	Cadmium total	Cadmium dissolved	RECEIPT TEMPERATURE (°C)
Site-Amended 15	June 15/15	1300 1500	water	125mL	1		✓	✓	✓	✓				
Site Amended Se	June 10/15	1500	↓	↓	↓						✓			
Site Amended CdT	↓	↓	↓	↓	↓							✓		
Site Amended CdD	↓	↓	↓	↓	↓								✓	

L1626950-COFC

PROJECT INFORMATION	SAMPLE RECEIPT
CLIENT	TOTAL NO. OF CONTAINERS
P.O. NO.	REC'D GOOD CONDITION
SHIPPED VIA:	

SPECIAL INSTRUCTIONS/COMMENTS:
Se- ug/L (low level)
Cd- low level <1ng/L
Dissolved- pre-filtered

RELINQUISHED BY (CLIENT)	RELINQUISHED BY (COURIER)
(Signature) (Time) 1300 1500	(Signature) (Time)
(Printed Name) BRL (Date) June 15/15 June 11/15	(Printed Name) (Date)
(Company) Nautilus	(Company)
RECEIVED BY (COURIER)	**RECEIVED BY (LABORATORY)**
(Signature) (Time)	(Signature) 13:40 (Time)
(Printed Name) (Date)	(Printed Name) SC June 15 (Date)
(Company)	

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

DISTRIBUTION: WHITE - Nautilus Environmental, COLOR - Originator

NAUTILUS ENVIRONMENTAL
ATTN: Bonnie Lo
8664 Commerce Court
Imperial Square Lake City
Burnaby BC V5A 4N7

Date Received: 26-JUN-15
Report Date: 07-JUL-15 09:41 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1633891

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 1429
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1633891-1	L1633891-2	L1633891-3		
	Description	Water	Water	Water		
	Sampled Date	26-JUN-15	26-JUN-15	26-JUN-15		
	Sampled Time	17:00	17:00	17:00		
	Client ID	SITE AMMENDED	SITE AMMENDED SE/CD	SITE AMMENDED CD D		
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Nitrate (as N) (mg/L)	18.8				
	Sulfate (SO4) (mg/L)	372				
Total Metals	Cadmium (Cd)-Total (mg/L)		0.00152			
	Calcium (Ca)-Total (mg/L)	127				
	Magnesium (Mg)-Total (mg/L)	62.6				
	Selenium (Se)-Total (mg/L)		0.0806			
Dissolved Metals	Dissolved Metals Filtration Location			FIELD		
	Cadmium (Cd)-Dissolved (mg/L)			0.00158		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L1633891-1	SITE AMMENDED	LPMB	Lab-Preserved for Metals. Sample received with pH > 2 and preserved at the lab. Metals results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Cadmium (Cd)-Dissolved	DLA	L1633891-3

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1429

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Nautilus Environmental

BRITISH COLUMBIA
8664 Commerce Court
Burnaby British Columbia Canada V5A 4N7 (1)
Phone 604.420.8773
Fax 604.357.1361

Chain of Custody
1429

Date June 26/15 Page 1 of 1

Sample Collection by: _____

Report to:
Company (1)
Address
City Prov. PC
Contact Bonnie @ nautilusenvironmental.com
Phone No.

Invoice to:
Company
Address
City Prov. PC
Contact
Phone No.

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS	Sulphate	Nitrate as N	Calcium	Magnesium	Selenium total	Cadmium total	Cadmium dissolved	RECEIPT TEMPERATURE (°C)
Site Ammended	June 26/15	1700h	water	125 mL Bottle	1		✓	✓	✓	✓				
Site Ammended Se/d	June 26/15	↓	↓	↓	↓						✓	✓		
Site Ammended Cd D	↓	↓	↓	↓	↓								✓	

Short Holding Time
Rush Processing

L1633891-COFC

PROJECT INFORMATION	SAMPLE RECEIPT
CLIENT	TOTAL NO. OF CONTAINERS
P.O. NO.	REC'D GOOD CONDITION
SHIPPED VIA:	

SPECIAL INSTRUCTIONS/COMMENTS:
Se & Cd - low level (preserved)
Cd dissolved - prefiltered & preserved.

RELINQUISHED BY (CLIENT)	RELINQUISHED BY (COURIER)
(Signature) (Time) 1700h	(Signature) (Time)
(Printed Name) Yvonne Lam (Date) June 26/15	(Printed Name) (Date)
(Company) Nautilus Environmental	(Company)
RECEIVED BY (COURIER)	**RECEIVED BY (LABORATORY)** 1700
(Signature) (Time)	(Signature) JUN 26 (Time)
(Printed Name) (Date)	(Printed Name) 3°C (Date)
(Company)	

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

DISTRIBUTION: WHITE - Nautilus Environmental, COLOR - Originator

NAUTILUS ENVIRONMENTAL
ATTN: Bonnie Lo
8664 Commerce Court
Imperial Square Lake City
Burnaby BC V5A 4N7

Date Received: 09-JUL-15
Report Date: 15-JUL-15 16:02 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1640134

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 1438
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1640134-1 Water 09-JUL-15 14:30 SITE AMMENDED R5	L1640134-2 Water 09-JUL-15 14:30 SITE CD DISSOLVED AMMENDED R5	L1640134-3 Water 09-JUL-15 14:30 SITE CD/SE AMMENDED R5		
WATER						
Anions and Nutrients	Nitrate (as N) (mg/L)	20.3				
	Sulfate (SO4) (mg/L)	409				
Total Metals	Cadmium (Cd)-Total (mg/L)			0.00113		
	Calcium (Ca)-Total (mg/L)	142				
	Magnesium (Mg)-Total (mg/L)	58.2				
	Selenium (Se)-Total (mg/L)			0.0960		
Dissolved Metals	Dissolved Metals Filtration Location		FIELD			
	Cadmium (Cd)-Dissolved (mg/L)		0.00121			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L1640134-1	SITE AMMENDED R5	LPMB	Lab-Preserved for Total Metals. Sample received with pH > 2 and preserved at the lab. Total Metals results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Nitrate (as N)	DLM	L1640134-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L1640134-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1438

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Nautilus Environmental

BRITISH COLUMBIA ①
8664 Commerce Court
Burnaby British Columbia Canada V5A 4N7
Phone 604.420.8773
Fax 604.357.1361

Chain of Custody

1438

Date July 9/15 Page 1 of 1

Sample Collection by: KS

Report to: ①
Company
Address
City Prov. PC
Contact Bonnie@nautilusenvironmental.com
Phone No.

Invoice to:
Company
Address
City Prov. PC
Contact
Phone No.

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS	ANALYSIS REQUIRED: Nitrate	Sulphate	Calcium	Magnesium	Selenium total	Cadmium total	Cadmium dissolved	RECEIPT TEMPERATURE (°C)
Site Ammended R5	July9/15	14:30	Water	125mL Bottle	1		✓	✓	✓	✓				
Site Cd dissolved Ammended R5	↓	↓	↓	↓	↓								✓	
Site Cd/Se Ammended R5	↓	↓	↓	↓	↓						✓	✓		

Short Holding Time
Rush Processing

L1640134-COFC

PROJECT INFORMATION	SAMPLE RECEIPT
CLIENT	TOTAL NO. OF CONTAINERS
P.O. NO.	REC'D GOOD CONDITION
SHIPPED VIA:	

SPECIAL INSTRUCTIONS/COMMENTS:
Cd/Se - preserved
Cd dissolved - pre-filtered
Cd/Se - low level

RELINQUISHED BY (CLIENT)	RELINQUISHED BY (COURIER)
(Signature) KS (Time) 14:30	(Signature) (Time)
(Printed Name) Kristina (Date) July9/15	(Printed Name) (Date)
(Company) Nautilus	(Company)
RECEIVED BY (COURIER)	**RECEIVED BY (LABORATORY)** 17:05
(Signature) (Time)	(Signature) Edward Cheung (Time) 7/10
(Printed Name) (Date)	(Printed Name) (Date)
(Company)	Temp: KRA 10°C

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

DISTRIBUTION: WHITE - Nautilus Environmental, COLOR - Originator

NAUTILUS ENVIRONMENTAL
ATTN: Bonnie Lo
8664 Commerce Court
Imperial Square Lake City
Burnaby BC V5A 4N7

Date Received: 17-JUL-15
Report Date: 27-JUL-15 15:59 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1644397

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 1435
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1644397-1	L1644397-2	L1644397-3		
	Description	Water	Water	Water		
	Sampled Date	17-JUL-15	17-JUL-15	17-JUL-15		
	Sampled Time	13:00	13:00	13:00		
	Client ID	SITE AMENDED R6	SITE AMENDED CD/SE R6	SITE AMENDED CAD R6		
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Nitrate (as N) (mg/L)	21.7				
	Sulfate (SO4) (mg/L)	444				
Total Metals	Cadmium (Cd)-Total (mg/L)		0.000785			
	Calcium (Ca)-Total (mg/L)	159				
	Magnesium (Mg)-Total (mg/L)	62.4				
	Selenium (Se)-Total (mg/L)		0.0627			
Dissolved Metals	Dissolved Metals Filtration Location			FIELD		
	Cadmium (Cd)-Dissolved (mg/L)			0.000931		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L1644397-1	SITE AMENDED R6	LPML	Lab-Preserved for Total Metals. Sample received with pH > 2 and preserved at the lab. Total Metals results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Cadmium (Cd)-Total	DLM	L1644397-2
Duplicate	Nitrate (as N)	DLM	L1644397-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLM	Detection Limit Adjusted due to sample matrix effects.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1435

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Nautilus Environmental

BRITISH COLUMBIA
8664 Commerce Court
Burnaby British Columbia Canada V5A 4N7
Phone 604.420.8773
Fax 604.357.1361

(1)

Chain of Custody

1435

Date July 17/15 Page 1 of 1

Sample Collection by: BRL

Report to:
Company
Address
City Prov. PC
Contact bonnie@nautilusenvironmental.com
Phone No.

Invoice to: (1)
Company
Address
City Prov. PC
Contact
Phone No.

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS	Sulphate	Nitrate - as N	Calcium	Magnesium	Selenium (total)	Cadmium (total)	Cadmium (dissolved)	RECEIPT TEMPERATURE (°C)
Site Amended R6	July 17	1300	water	125mL	1		✓	✓	✓	✓				
Site Amended Cd Sed 6	↓	↓	↓	↓	↓						✓	✓		
Site Amended Cd DR6	↓	↓	↓	↓	↓								✓	

L1644397-COFC

Short Hold Time!
Rush Processing

PROJECT INFORMATION	SAMPLE RECEIPT
CLIENT	TOTAL NO. OF CONTAINERS
P.O. NO.	REC'D GOOD CONDITION
SHIPPED VIA:	

SPECIAL INSTRUCTIONS/COMMENTS:
Low level ~~metals~~ ds (S & 3 Col)
Preserved
Col - dissolved - prefiltered

RELINQUISHED BY (CLIENT)	RELINQUISHED BY (COURIER)
(Signature) (Time) 1600	(Signature) (Time)
(Printed Name) BRL (Date) July 17/15	(Printed Name) (Date)
(Company) Nautilus	(Company)
RECEIVED BY (COURIER)	**RECEIVED BY (LABORATORY)**
(Signature) (Time)	(Signature) (Time)
(Printed Name) (Date)	(Printed Name) Edward (Date)
(Company)	

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

July 17/15 SR 17:25

DISTRIBUTION: WHITE - Nautilus Environmental, COLOR - Originator

NAUTILUS ENVIRONMENTAL
ATTN: Bonnie Lo
8664 Commerce Court
Imperial Square Lake City
Burnaby BC V5A 4N7

Date Received: 31-JUL-15
Report Date: 06-AUG-15 15:27 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1651428

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1651428-1	L1651428-2	L1651428-3		
	Description	Water	Water	Water		
	Sampled Date	31-JUL-15	31-JUL-15	31-JUL-15		
	Sampled Time					
	Client ID	SITE - AMENDED R7	SITE - AMENDED CD/SE R7	SITE - AMENDED CDD R7		
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Nitrate (as N) (mg/L)	21.2				
	Sulfate (SO4) (mg/L)	469				
Total Metals	Cadmium (Cd)-Total (mg/L)		0.0000903			
	Calcium (Ca)-Total (mg/L)	165				
	Magnesium (Mg)-Total (mg/L)	62.1				
	Selenium (Se)-Total (mg/L)		0.0542			
Dissolved Metals	Dissolved Metals Filtration Location			FIELD		
	Cadmium (Cd)-Dissolved (mg/L)			0.0000941		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L1651428-1	SITE - AMENDED R7	LPMB	Lab-Preserved for Total Metals. Sample received with pH > 2 and preserved at the lab. Total Metals results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Nitrate (as N)	MS-B	L1651428-1

Qualifiers for Individual Parameters Listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

TESTING LOCATION (Please Circle)

Nautilus Environmental

L1651428-COFC

British Columbia
8664 Commerce Court
Burnaby, British Columbia, Canada
V5A 4N3
Phone 604.420.8773
Fax 604.357.1361

Chain of Custody

Date July 31/15 Page 1 of 1

Sample Collection By:

Report to:		Invoice To:	
Company	Nautilus Environmental	Company	Same as Report to
Address	8664 Commerce Court	Address	
City/State/Zip	Burnaby, BC	City/State/Zip	
Contact	Bonnie Lo	Contact	
Phone	604-420-8773	Phone	
Email	bonnie@nautilusenvironmental.com	Email	

	SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NO. OF CONTAINERS	COMMENTS	ANALYSES REQUIRED: Sulphate	Nitrate as N	Calcium	Magnesium	Total Selenium - Low Level	Total Cadmium - Low Level	Dissolved Cadmium - Low Level				Receipt Temperature (°C)
1	Site - Amended R7	31-Jul-15		water	125 ml	1		X	X	X	X							
2	Site - Amended Cd/Se R7	31-Jul-15		water	125 ml	1						X	X					
3	Site - Amended CdD R7	31-Jul-15		water	125 ml	1								X				
4																		
5																		
6																		
7																		
8																		
9																		
10																		

PROJECT INFORMATION		SAMPLE RECEIPT	
Client:		Total No. of Containers	
PO No.:		Received Good Condition?	
Shipped Via:		Matches Test Schedule?	

SPECIAL INSTRUCTIONS/COMMENTS:

All metals have been preserved. Cd & Se - Low Level analysis.
Dissolved Cd has been pre-filtered

RELINQUISHED BY (CLIENT)

(Signature) (Time) 1630h

(Printed Name) Yvonne Lam (Date) July 31/15

NO. OF CONTAINERS 3

RELINQUISHED BY (COURIER)

(Signature) (Time)

(Printed Name) (Date)

(Company)

RECEIVED BY (COURIER)

(Signature) (Time)

(Printed Name) (Date)

(Company)

RECEIVED BY (LABORATORY)

(Signature) ISAAC L (Time) 17:05

(Printed Name) 12°c (Date) July 31

(Company)

Additional costs may be required for sample disposal or storage. Payment net 30 unless otherwise contracted.

NAUTILUS ENVIRONMENTAL
ATTN: Bonnie Lo
8664 Commerce Court
Imperial Square Lake City
Burnaby BC V5A 4N7

Date Received: 07-AUG-15
Report Date: 12-AUG-15 14:36 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1654622

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1654622-1	L1654622-2	L1654622-3		
	Description	Water	Water	Water		
	Sampled Date	07-AUG-15	07-AUG-15	07-AUG-15		
	Sampled Time					
	Client ID	SITE - AMENDED R8	SITE - AMENDED CD/SE R8	SITE - AMENDED CDD R8		
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Nitrate (as N) (mg/L)	20.0				
	Sulfate (SO4) (mg/L)	433				
Total Metals	Cadmium (Cd)-Total (mg/L)		0.000614			
	Calcium (Ca)-Total (mg/L)	161				
	Magnesium (Mg)-Total (mg/L)	64.8				
	Selenium (Se)-Total (mg/L)		0.0574			
Dissolved Metals	Dissolved Metals Filtration Location			FIELD		
	Cadmium (Cd)-Dissolved (mg/L)			0.000650		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L1654622-1	SITE - AMENDED R8	LPMB	Lab-Preserved for Total Metals. Sample received with pH > 2 and preserved at the lab. Total Metals results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Cadmium (Cd)-Total	DLA	L1654622-2
Duplicate	Selenium (Se)-Total	DLA	L1654622-2
Method Blank	Cadmium (Cd)-Total	MB-LOR	L1654622-2

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
MET-D-CCMS-VA	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NO3-L-IC-N-VA	Water	Nitrate in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SO4-IC-N-VA	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Nautilus Environmental

TESTING LOCATION (Please Circle)

British Columbia
8664 Commerce Court
Burnaby, British Columbia, Canada
V5A 4N3
Phone 604.420.8773
Fax 604.357.1361

Chain of Custody

Date Aug. 7/15 Page 1 of 1

Sample Collection By:

Report to:

Company	Nautilus Environmental
Address	8664 Commerce Court
City/State/Zip	Burnaby, BC
Contact	Bonnie Lo
Phone	604-420-8773
Email	bonnie@nautilusenvironmental.com

Invoice To:

Company	Same as Report to
Address	
City/State/Zip	
Contact	
Phone	
Email	

	SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NO. OF CONTAINERS	COMMENTS	Sulphate	Nitrate as N	Calcium	Magnesium	Total Selenium - Low Level	Total Cadmium - Low Level	Dissolved Cadmium - Low Level				Receipt Temperature (°C)
								ANALYSES REQUIRED										
1	Site - Amended R8	07-Aug-15		water	125 ml	1		X	X	X	X							
2	Site - Amended Cd/Se R8	07-Aug-15		water	125 ml	1						X	X					
3	Site - Amended CdD R8	07-Aug-15		water	125 ml	1								X				
4																		
5																		
6																		
7																		
8																		
9																		
10																		

L1654622-COFC

Short Holding Time

Rush Processing

PROJECT INFORMATION		SAMPLE RECEIPT	
Client:		**Total No. of Containers**	
PO No.:		**Received Good Condition?**	
Shipped Via:		**Matches Test Schedule?**	

SPECIAL INSTRUCTIONS/COMMENTS:

All metals have been preserved. Cd & Se - Low Level analysis.
Dissolved Cd has been pre-filtered

RELINQUISHED BY (CLIENT)

(Signature) (Time) 1630h

(Printed Name) Yvonne Lam (Date) Aug. 07/15

NO. OF CONTAINERS 3

RELINQUISHED BY (COURIER)

(Signature) (Time)

(Printed Name) (Date)

(Company)

RECEIVED BY (COURIER)

(Signature) (Time)

(Printed Name) (Date)

(Company)

RECEIVED BY (LABORATORY)

(Signature) (Time) 16:25

(Printed Name) Shayon (Date) AUG.7

(Company) ACS 9.5°C

Additional costs may be required for sample disposal or storage. Payment net 30 unless otherwise contracted.

NAUTILUS ENVIRONMENTAL
ATTN: Bonnie Lo
8664 Commerce Court
Imperial Square Lake City
Burnaby BC V5A 4N7

Date Received: 15-JUN-15
Report Date: 22-JUN-15 11:33 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1626954

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 1366
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1626954-1	L1626954-2			
	Description					
	Sampled Date	15-JUN-15	15-JUN-15			
	Sampled Time	13:00	13:00			
	Client ID	DECHLOR	SITE AMENDED			
Grouping	**Analyte**					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	7.74	631			
Total Metals	Aluminum (Al)-Total (mg/L)	0.0463	0.0040			
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00012			
	Arsenic (As)-Total (mg/L)	0.00011	0.00016			
	Barium (Ba)-Total (mg/L)	0.00268	0.0894			
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010			
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050			
	Boron (B)-Total (mg/L)	<0.010	<0.010			
	Cadmium (Cd)-Total (mg/L)	0.0000055	0.000487			
	Calcium (Ca)-Total (mg/L)	2.83	153			
	Chromium (Cr)-Total (mg/L)	<0.00010	0.00018			
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010			
	Copper (Cu)-Total (mg/L)	0.00074	<0.00050			
	Iron (Fe)-Total (mg/L)	<0.030	<0.030			
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050			
	Lithium (Li)-Total (mg/L)	<0.0050	0.0105			
	Magnesium (Mg)-Total (mg/L)	0.16	60.1			
	Manganese (Mn)-Total (mg/L)	0.00052	0.00020			
	Molybdenum (Mo)-Total (mg/L)	0.000193	0.000861			
	Nickel (Ni)-Total (mg/L)	<0.00050	0.00060			
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30			
	Potassium (K)-Total (mg/L)	<2.0	<2.0			
	Selenium (Se)-Total (mg/L)	<0.000050	0.0572			
	Silicon (Si)-Total (mg/L)	1.42	1.68			
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Total (mg/L)	4.5	30.1			
	Strontium (Sr)-Total (mg/L)	0.00976	0.139			
	Thallium (Tl)-Total (mg/L)	<0.00010	<0.00010			
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010			
	Uranium (U)-Total (mg/L)	0.000019	0.00108			
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Total (mg/L)	<0.0030	0.0032			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Beryllium (Be)-Total	DLA	L1626954-1, -2
Matrix Spike	Iron (Fe)-Total	MS-B	L1626954-1, -2
Matrix Spike	Silicon (Si)-Total	MS-B	L1626954-1, -2
Matrix Spike	Copper (Cu)-Total	MS-B	L1626954-1, -2
Matrix Spike	Manganese (Mn)-Total	MS-B	L1626954-1, -2
Matrix Spike	Strontium (Sr)-Total	MS-B	L1626954-1, -2

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1366

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Nautilus Environmental

BRITISH COLUMBIA
8664 Commerce Court
Burnaby British Columbia Canada V5A 4N7
Phone 604.420.8773
Fax 604.357.1361

(1)

Chain of Custody
1366

Date June 15/15 Page 1 of 1

Sample Collection by: BPL

Report to:
Company (1)
Address
City Prov. PC
Contact bonnie@nautilusenvironmental.com
Phone No.

Invoice to:
Company
Address
City Prov. PC
Contact
Phone No.

ANALYSIS REQUIRED

SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NUMBER OF CONTAINERS	COMMENTS	Metals (low level)	~~Metals (low level)~~ BPL										RECEIPT TEMPERATURE (°C)
Dechlor	June 15	1300	water	125mL	1		✓											
Site Amended	↓	↓	↓	↓	1		✓											

L1626954-COFC

PROJECT INFORMATION	SAMPLE RECEIPT
CLIENT	TOTAL NO. OF CONTAINERS
P.O. NO.	REC'D GOOD CONDITION
SHIPPED VIA:	

SPECIAL INSTRUCTIONS/COMMENTS:

RELINQUISHED BY (CLIENT)		RELINQUISHED BY (COURIER)	
(Signature)	(Time) 1315	(Signature)	(Time)
(Printed Name) BPL	(Date) June 15/15	(Printed Name)	(Date)
(Company)		(Company)	
RECEIVED BY (COURIER)		**RECEIVED BY (LABORATORY)**	
(Signature)	(Time)	(Signature)	(Time) 13:40
(Printed Name)	(Date)	(Printed Name)	(Date) June 15
(Company)			

6°C

Additional costs may be required for sample disposal or storage. Net 30 unless otherwise contracted.

DISTRIBUTION: WHITE - Nautilus Environmental, COLOR - Originator

NAUTILUS ENVIRONMENTAL
ATTN: Bonnie Lo
8664 Commerce Court
Imperial Square Lake City
Burnaby BC V5A 4N7

Date Received: 18-AUG-15
Report Date: 21-AUG-15 12:27 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L1659500

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:

Jamie Lo, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1659500-1	L1659500-2			
	Description	Water	Water			
	Sampled Date	14-AUG-15	14-AUG-15			
	Sampled Time					
	Client ID	DECHLOR	SITE (0727) UNAMENDED			
Grouping	**Analyte**					
WATER						
Physical Tests	Hardness (as CaCO3) (mg/L)	7.10	347			
Total Metals	Aluminum (Al)-Total (mg/L)	0.0450	0.0037			
	Antimony (Sb)-Total (mg/L)	<0.00010	0.00011			
	Arsenic (As)-Total (mg/L)	0.00018	0.00017			
	Barium (Ba)-Total (mg/L)	0.00238	0.0924			
	Beryllium (Be)-Total (mg/L)	<0.00010	<0.00010			
	Bismuth (Bi)-Total (mg/L)	<0.000050	<0.000050			
	Boron (B)-Total (mg/L)	<0.010	<0.010			
	Cadmium (Cd)-Total (mg/L)	0.0000051	0.0000219			
	Calcium (Ca)-Total (mg/L)	2.59	84.5			
	Chromium (Cr)-Total (mg/L)	<0.00010	0.00017			
	Cobalt (Co)-Total (mg/L)	<0.00010	<0.00010			
	Copper (Cu)-Total (mg/L)	0.00082	<0.00050			
	Iron (Fe)-Total (mg/L)	<0.030	<0.030			
	Lead (Pb)-Total (mg/L)	<0.000050	<0.000050			
	Lithium (Li)-Total (mg/L)	<0.0050	0.0156			
	Magnesium (Mg)-Total (mg/L)	0.15	33.0			
	Manganese (Mn)-Total (mg/L)	0.00197	0.00049			
	Molybdenum (Mo)-Total (mg/L)	0.000180	0.000877			
	Nickel (Ni)-Total (mg/L)	<0.00050	<0.00050			
	Phosphorus (P)-Total (mg/L)	<0.30	<0.30			
	Potassium (K)-Total (mg/L)	<2.0	<2.0			
	Selenium (Se)-Total (mg/L)	<0.000050	0.0326			
	Silicon (Si)-Total (mg/L)	1.44	2.10			
	Silver (Ag)-Total (mg/L)	<0.000010	<0.000010			
	Sodium (Na)-Total (mg/L)	4.4	<2.0			
	Strontium (Sr)-Total (mg/L)	0.00779	0.127			
	Thallium (Tl)-Total (mg/L)	<0.00010	<0.00010			
	Tin (Sn)-Total (mg/L)	<0.00010	<0.00010			
	Titanium (Ti)-Total (mg/L)	<0.010	<0.010			
	Uranium (U)-Total (mg/L)	0.000020	0.00158			
	Vanadium (V)-Total (mg/L)	<0.00050	<0.00050			
	Zinc (Zn)-Total (mg/L)	<0.0030	<0.0030			

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-TOT-ICP-VA	Water	Total Metals in Water by ICPOES	EPA SW-846 3005A/6010B

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Nautilus Environmental

TESTING LOCATION (Please Circle)

British Columbia
8664 Commerce Court
Burnaby, British Columbia, Can
V5A 4N3
Phone 604.420.8773
Fax 604.357.1361

L1659500-COFC

Chain of Custody

Date Aug 18/15 Page 1 of 1

Sample Collection By:

Report to:		Invoice To:	
Company	Nautilus Environmental	**Company**	Same as Report to
Address	8664 Commerce Court	**Address**	
City/State/Zip	Burnaby, BC	**City/State/Zip**	
Contact	Bonnie Lo	**Contact**	
Phone	604-420-8773	**Phone**	
Email	bonnie@nautilusenvironmental.com	**Email**	

	SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NO. OF CONTAINERS	COMMENTS	ANALYSES REQUIRED: Total Metals	Receipt Temperature (°C)
1	Dechlor	14-Aug-15		water	125 ml	1		X	
2	Site (0727) Unamended	14-Aug-15		water	125 ml	1		X	
3									
4									
5									
6									
7									
8									
9									
10									

PROJECT INFORMATION		SAMPLE RECEIPT	
Client:		**Total No. of Containers**	
PO No.:		**Received Good Condition?**	
Shipped Via:		**Matches Test Schedule?**	

SPECIAL INSTRUCTIONS/COMMENTS:

All metals have been preserved.

RELINQUISHED BY (CLIENT)

(Signature) (Time) 1430h

(Printed Name) Yvonne Lam (Date) ~~Aug. 14/15~~ Aug 18/15

NO. OF CONTAINERS 2

RELINQUISHED BY (COURIER)

(Signature) (Time)

(Printed Name) (Date)

(Company)

RECEIVED BY (COURIER)

(Signature) (Time)

(Printed Name) (Date)

(Company)

RECEIVED BY (LABORATORY)

(Signature) (Time) 16:30

(Printed Name) Shayan (Date) Aug 18/15

(Company) ALS 14°C

Additional costs may be required for sample disposal or storage. Payment net 30 unless otherwise contracted.

APPENDIX E – Chain of custody forms

COC ID:	20150526-1442	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS									ANALYSIS REQUESTED											
Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	WCT Gamete Analysis WO # 15426											Temp.
FR_FRBRG-WS-201505261314				WS	2015/05/26	13:14	G	3	3											15.5

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Tech PRO / Mr Bezzoli		Nautilus NY - Nari Yamamoto 3x 200L cherry buckets.	May 27/15 @ 10:20

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Mr Bezzoli	Mobile #	
	Sampler's Signature		Date/Time	May 26 2015 12:00

COC ID:	20150526-1442	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS									ANALYSIS REQUESTED											
Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	WCT Gamete Analysis	WO # 154426										Temp
FR_FRBRG-WS-201506021400				WS	2015/06/02	14:00	G	3	3											13.2

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
= Refresh sample =	Teck FRO Nate Bezzola	Jun 2 2015 15:30	Nautilus NY - Nan Yamamoto	Jun 04/15 - 12:35
				3x200L

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Nate Bezzola	Mobile #	
	Sampler's Signature		Date/Time	June 2 2015 15:30

COC ID:	20150610-1401	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: WCT Gamete Analysis	Temp
FR_FRBRG-WS-201506101310				WS	2015/06/10	13:10	G	3	3	18.8

WO # 15426

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
= refresh sample =	Tech FRO A.L. Bezzola	June 10 2015 14:00	Nautilus	Jun 15/15 @ 11:20
			NY - Nair Yamamoto	
			3x 200L drums	

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	A.L. Bezzola	Mobile #	
	Sampler's Signature	[signature]	Date/Time	June 10 2015 14:00

COC ID:	20150616-1356	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	WCT Gamete Analysis											Temp
FR_FRBRG-WS-201506161242				WS	2015/06/16	12:42	G	3		3											15.7

WO# 15426

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
= refresh sample =	Tak PPO Ata Bezzola	June 16 2015 14:10	Nautilus NY - Nair Yamamoto 3x200 L drums Jun 19/15 @ 11:00	

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Ata Bezzola	Mobile #	
	Sampler's Signature	[signature]	Date/Time	June 16 2015 14:10

COC ID:	20150623-0936	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS									ANALYSIS REQUESTED											
Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	WCT Gamete Analysis	30 # 15426										Temp.
FR_FRBRG-WS-201506230830				WS	2015/06/23	08:30	G	3	3											17.0 °C

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
= refresh sample =	Tak FRO Arte Bozzolo	June 23 10:00	Nautilus NY - Nan Yamamoto	Jun 25/15 @ 09:30
			3x200L	

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Arte Bozzolo	Mobile #	
	Sampler's Signature		Date/Time	June 23 2015 10:00

COC ID:	20150706-1349	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

	Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	WCT Gamete Analysis	48 hr Dapnia Sinlge Conc. Pass/Fail (EPS1RM14)	96 Hr Rainbow Trout Single Conc. Pass/Fail (EPS1RM13)									Temp
1	FR_FRBRG-WS-201507061145				WS	2015/07/06	11:45	G	3		3											17.7
2	FR_CC1_Q_06072015_N				WS	2015/07/06	11:13	G	3			2	1									14.3
										WO #	15426	15504	15505									

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
1 3x200L - refresh sample	A Bezzoli Tech FRO	July 6 2015 14:24	Nautilus	
2 1x20L + 2x1L			NY - Nai Yamamoto	
			Jul 08/15 @ 09:41	

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Aita Bezzoli	Mobile #	
	Sampler's Signature	[signature]	Date/Time	July 6 2015 14:24

COC ID:	20150710-1317	TURNAROUND TIME:	RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	WCT Gamete Analysis	WO # 15426										Temp.
FR_FRBRG-WS-201507101315				WS	2015/07/10	13:15	G	3		3											20.8

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
= refresh sample =	Teck FRC Aita Bezzola	July 10 2015 14:00	Nautilus NY - Nan Yamamoto Jul 13/15 @ 08:19 3x200L drums.	

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Aita Bezzola	Mobile #	
	Sampler's Signature	[signature]	Date/Time	July 10, 2015 14:00

COC ID:	20150728-1500	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Fording River Operation			Lab Name	Nautilus Environmental			Email Invoice To	
Project Number				Lab Contact				Invoice Reports	
Department				Email				Email Report To	
Address	PO Box 100			Address	8664 Commerce Court			Email Reports	
								Shipping Company	
City	Elkford	State	BC	City	Burnaby	State	BC	Tracking Number	
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Cooler Count	
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Description	
Project Manager				Quote Number				Sampler 2	
Email Address				PO Number				Sampler 3	

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID	Start Depth	End Depth	Depth Unit	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: WCT Gamete Analysis	Temp. 20.4°C
FR_FRBRG-WS-201507281430				WS	2015/07/28	14:30	G	2	2	

WO# 15426

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Eco KPRO Ada Bezzoli	July 29 2015 15:00	[signature]	July 31/15 @ 10:30h
			Jill Jones	
			JS July 31/15 @ 10:30h	

NB OF BOTTLES RETURNED/DESCRIPTION				
	Sampler's Name	Ada Bezzoli	Mobile #	
	Sampler's Signature	[signature]	Date/Time	July 29 2015 15:00

APPENDIX G

Amphibian Pilot Study

Nautilus Environmental

January 21, 2016

Memo: **Pilot toxicity testing using *Lithobates pipiens***

To	Cait Good	*From*	Bonnie Lo, James Elphick
Affiliation	Teck Coal Ltd.	*Tel*	604-420-8773
e-mail	Cait.Good@teck.com	*e-mail*	bonnie@nautilusenvironmental.com james@nautilusenvironmental.com

Background

As outlined in the Regional Aquatic Effects Monitoring Program (RAEMP) Approval Letter (November 14, 2014), the BC Ministry of Environment has requested that Teck Coal Ltd. (Teck) investigate the effects of nitrate on amphibians, invertebrates and early life stage rainbow trout in site water. With respect to amphibians, testing should be a long-term test, encompassing metamorphosis of the organisms and use a representative species. In addition, Permit 107517 under section 9.8.1, requires Teck to develop and implement a toxicity testing program specifically to assess sulphate at high hardness concentration which is to include fathead minnows and other sensitive species including amphibians, trout, water fleas etc. Currently, a standardized method for assessing toxicity in amphibians is under development by Environment Canada (EC). The exposures conducted by EC, have primarily focused on testing using the leopard frog, *Lithobates pipiens* (formerly called *Rana pipiens*). EC identified *L. pipiens* a suitable species in part, due to its relevance to a wide range of Canadian environments.

While EC has made significant progress in methodological development, some elements require further refinement (Lo et al. 2014). Therefore, prior to undertaking amphibian testing as specified by the RAEMP letter and Permit 107517, method development based on the draft EC methods was undertaken to ensure that amphibian testing can be conducted in a reliable manner. During this preliminary phase of testing, practical details (e.g., organism source, feeding regime, etc.) were evaluated. As part of this method development, organisms were exposed to nitrate and sulphate, thus providing some preliminary information regarding the sensitivity of *L. pipiens* tadpoles to these compounds under chronic exposure conditions. These range-finding results will help in establishing appropriate test concentrations for definitive tests with this species.

Methods

Testing conditions were adapted from draft methodology described by EC (Lo et al., 2014). Tadpoles in the early stages of pre-metamorphosis (Gosner stage 27) were exposed to five treatments of nitrate (3.3, 10, 30, 90, 270, mg/L as NO_3-N). The exposure continued until >70% of control tadpoles reached the onset of metamorphosis (Gosner stage 42). In addition to survival, non-lethal growth and development endpoints were recorded (weight, snout to vent length, length and developmental stage). The laboratory control and dilution water consisted of dechlorinated municipal tap water; however, a second water type, reconstituted hard water, was also tested to assess whether water hardness would impact the growth and development of *L. pipiens*. The water hardness was approximately 10 mg/L for the laboratory control water and 180 mg/L (as $CaCO_3$) for the hard water treatment.

Two concentrations of sulphate, 500 and 1000 mg/L, were also tested. The sulphate treatments consisted of dechlorinated municipal tap water amended with calcium and magnesium sulphates at a ratio of 2.6 Ca: 1 Mg (on a mass basis). The hardness of these two treatments was approximately 569 mg/L for the 500 mg/L sulphate and 1106 mg/L for the 1000 mg/L sulphate treatment.

Laboratory control, hard water and nitrate treatments were tested in triplicate while sulphate was tested in duplicate as a result of a shortage of test organisms of the correct life stage. Treatment waters were measured for nitrate or sulphate three times during exposure.

Dunnet's method was used to compare growth and development results to the control using JMP (SAS, 2015). The Spearman Karber model was used to estimate a LC50 value for nitrate and linear regression was used to estimate an LC20 value. The point estimates were calculated using CETIS (Tidepool Scientific Software, 2013).

Results and Discussion

The results of the tests are summarized in Table 1. Mean (± standard deviation) control survival was 96.7 ± 5.8% and the average time to metamorphosis was 44.2 ± 4.0 days. The number of days to metamorphosis was similar to the results from various exposures conducted by EC using *L. pipiens* tadpoles. Thus, the organism supply, control water type, feeding regime, and other test methods employed in the trial were suitable to produce viable control performance of this species.

Exposure to reconstituted hard water resulted in a statistically significant decrease (p-value of 0.047) in survival when compared to laboratory water (83.3% in hard water compared to 96.7% in dechlorinated municipal water); however, this difference was not large and the rate of survival (i.e., 83.3%) met the performance criterion for control performance as well. Hard water also resulted in a statistically significant increase in the mean number of days to metamorphosis (51.6 ± 1.1 days for hard water and 44.2 ± 4.0 days for dechlorinated municipal water). Significant differences in growth endpoints were not observed between the two water types.

The LC50 (with 95% confidence limits) for nitrate in laboratory control water was 28.8 (21.7 – 35.3) mg/L NO_3- N, and the LC20 was 19.2 (11.5-24.6) mg/L NO_3-N. For growth and developmental endpoints, the 11.7 and 35.1 mg/L NO_3- N did not produce statistically significant adverse effects relative to the control exposure. The effect level presented here is relevant to very soft water associated with the laboratory control, and may not be relevant to higher hardness water associated with the Elk Valley.

Survival rates in the 500 and 1000 mg/L sulphate treatments were 75.0 ± 7.1 and 90.0 ± 14.1%, respectively. The growth and development endpoints of tadpoles was not significantly different between 1000 mg/L sulphate and the control, suggesting that adverse effects are not expected at sulphate concentrations up to 1000 mg/L.

Table 1. Results of *Lithobates pipiens* tadpole exposures.

	Treatment	Survival (%)	Days to metamorphosis	Length (mm)	Snout to Vent length (mm)	Wet weight (g)
	Control	96.7 ± 5.8	44.2 ± 4.0	48.8 ± 2.9	16.1 ± 0.1	0.65 ± 0.06
	Hard Water	83.3 ± 5.8	51.6 ± 1.1	45.3 ± 2.2	15.1 ± 0.8	0.58 ± 0.05
Nitrate	4.2	100.0 ± 0.0	43.3 ± 2.9	46.2 ± 1.4	15.1 ± 0.6	0.63 ± 0.03
(mg/L as N)	11.7	93.3 ± 5.8	45.4 ± 2.1	46.1 ± 2.1	15.5 ± 0.8	0.63 ± 0.07
	35.1	36.7 ± 5.8	28.8 ± 24.1	47.4 ± 2.9	17.1 ± 2.2	0.71 ± 0.11
	87.7	0.0 ± 0.0				
	289	0.0 ± 0.0				
Sulphate	531	75.0 ± 7.1	46.4 ± 2.8	40.7 ± 2.2	13.6 ± 0.6	0.47 ± 0.06
(mg/L)	1047	90.0 ± 14.1	41.0 ± 1.3	44.8 ± 0.5	14.9 ± 0.7	0.57 ± 0.02

The results of this preliminary study suggest that testing conditions used in this exposure (e.g., organism source and transportation, handling practices, temperature, feeding regimes, water renewals) were suitable for testing with this species and are appropriate for future exposures. The difference in survival and time to metamorphosis between hard water and the laboratory control treatments suggest that if future testing is conducted using high hardness site water, a laboratory water of similar hardness and/or a site reference control should also be tested to serve as a representative benchmark for organism performance, although subsequent tests may show that the difference observed between waters types in the present test related to random variability, rather than being a real effect.

References

JMP, Version 12. SAS Institute Inc., Cary, NC, 1989-2015.

Lo, BP, Van der Vliet L, Elphick, JR, Marlatt, VL, Jackman, P, Trudeau, VL, Taylor, L. 2014. Update on development of a standardized amphibian test method using *Lithobates spp.* 41st Annual Aquatic Toxicity workshop: September 28-October 1, 2014, Ottawa, ON. *Platform presentation*

Tidepool Scientific Software. 2013. CETIS comprehensive environmental toxicity information system, version 1.8.7.16 Tidepool Scientific Software, McKinleyville, CA. 222 pp.

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