
Technical Report Overview

Teck Coal Limited
Sparwood Administration Office
P.O. Box 1777
609 Douglas Fir Road
Sparwood, BC Canada V0B 2G0

+1 250 425 3331 Tel
+1 250 425 3330 Fax
www.teck.com



Report: Permit 107517 Annual Water Quality Monitoring Report, 2016 (March 31, 2017)

Overview: This report presents the 2016 results of the surface water monitoring program required under Permit 107517. The report summarizes environmental incidents (i.e., non-compliances) recorded in 2016, summarizes monitoring data for discharges and receiving environment water sampling sites set forth in Permit 107517, and provides an assessment of the data and associated recommendations, as appropriate.

This report was prepared by Teck.

For More Information

If you have questions regarding this report, please:

- Phone toll-free to 1.855.806.6854
- Email feedbackteckcoal@teck.com

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

Permit 107517

Annual Water Quality Monitoring Report

March 31, 2017



Kirsten Gillespie P. Eng
Manager, Environmental Monitoring and Adaptive
Management



Alexandra Wade P. Eng
Water Quality Engineer



Aaron Lee Wilm B.Sc.
Regional Monitoring Lead

Table of Contents

List of Tables.....	iv
List of Figures	iv
Abbreviations	1
Executive Summary.....	2
1 Introduction	4
1.1 Authorized Discharge and Receiving Environment Water Sampling Sites	4
1.1.1 Compliance Points.....	9
1.1.2 Order Stations	10
2 Compliance.....	11
2.1 Effluent Limits and Site Performance Objectives – Compliance Points	11
2.2 Site Performance Objectives – Order Stations	34
2.3 Non-Compliances	43
2.4 Unattainable Sample Data	50
3 Surface Water Monitoring Program	51
3.1 Surface Water Monitoring Program	51
3.2 Quality Assurance/Quality Control Program	51
3.3 QA/QC Issues.....	53
3.4 Toxicity Testing Program.....	55
4 Spills and Incidents.....	55
5 Monitoring Results.....	56
5.1 Surface Water Quality – Receiving Environment.....	56
5.2 Order-Defined Constituents of Interest.....	66
5.2.1 Selenium.....	67
5.2.2 Nitrate-N	70
5.2.3 Sulphate and Cadmium.....	74
5.3 Toxicity	76
5.3.1 Acute Toxicity	76
5.3.2 Chronic Toxicity.....	78
5.4 West Line Creek Active Water Treatment Facility.....	79
5.4.1 Selenium Speciation.....	79

6	Linkages to the Adaptive Management Plan	80
7	Discussion.....	83
	Appendix A – Summary of Unattained Samples	85
	Appendix B – Surface Water Monitoring Program Requirements	86
	Appendix C – Surface Water Quantity Monitoring Program Summary.....	87
	Appendix D – Quality Assurance/Quality Control Data Issues	88
	Appendix E – Summary of Receiving Environment Samples at or Above Approved/Working Water Quality Guidelines.....	89
	Appendix F – Surface Water Monitoring Program: Acute Toxicity Test Results (includes Biological Tests Reports	90
	Appendix G – 2016 Spills and Incidents	91
	Appendix H – MSX Short Dump- MSAN LC7 Statistics	92
	Appendix I – Maps.....	93

List of Tables

Table 1. Summary of discharge, receiving environment, and other water sampling sites for Fording River Operation based on the version of Permit 107517 dated May 2016.	6
Table 2. Summary of discharge and receiving environment water sampling sites for Greenhills Operation based on the version of Permit 107517 dated May 2016.	7
Table 3. Summary of discharge and receiving environment water sampling sites for Line Creek Operation based on the version of Permit 107517 dated May 2016.	7
Table 4. Summary of discharge, receiving environment, and other sampling sites for Elkview Operation based on the version of Permit 107517 dated May 2016.	8
Table 5. Summary of discharge and receiving environment water sampling sites for Coal Mountain Operation based on the version of Permit 107517 dated May 2016.	9
Table 6. Summary of receiving environment water sampling sites for Lake Kocanusa based on the version of Permit 107517 dated May 2016.	9
Table 7. Summary of water sampling sites for the West Line Creek Active Water Treatment Facility	9
Table 8. Summary of authorized discharge compliance points within the Elk Valley.	10
Table 9. Summary of Order stations within the Elk Valley.	11
Table 10. Authorized discharge effluent limits established at Compliance Points within the Elk Valley (2016). .	12
Table 11. Sulphate SPO at various water hardness values expressed as CaCO ₃	13
Table 12. Short-term site performance objectives established at Order stations within the Elk Valley.	34
Table 13. Summary of 2016 non-compliances documented via inspection report or warning letter.	43
Table 14. Summary of 2016 exceedances of authorized discharge compliance limits.	45
Table 15. Summary of 2016 missed sample non-compliances for Permit 107517.	49
Table 17. Summary of spills that occurred at Teck's mines in the Elk Valley in 2016.	56
Table 18. Summary of receiving environment water sampling sites where concentrations were measured above a British Columbia Approved or Working Freshwater Aquatic Life Water Quality Guideline in 2016.	57
Table 19. Summary of field measurements that exceeded BC FAL WQG in 2016	65
Table 16. Failed acute toxicity tests and results for test performed at 20° and 10°.	77

List of Figures

Figure 1. Location of Teck's five steelmaking coal operations within the Elk Valley, British Columbia.	5
Figure 2. Monthly average total selenium concentrations recorded at Fording River Operation Compliance Point E300071 (FR_FRCP1).	13
Figure 3. Monthly average nitrate (top panel) and sulphate (bottom panel) concentrations recorded at Fording River Operation Compliance Point E300071 (FR_FRCP1).	14
Figure 4. Daily maximum total selenium (top panel) and nitrate-N (Bottom Panel) concentrations recorded at Fording River Operation Compliance Point E300071 (FR_FRCP1).	15
Figure 5. Monthly average total selenium (top panel) and nitrate-N (bottom panel) concentrations recorded at Greenhills Operation Compliance Point 0200378 (GH_FR1).	16

Figure 6. Monthly average sulphate (top panel) and cadmium (bottom panel) concentrations recorded at Greenhills Operation Compliance Point 0200378 (GH_FR1). 17

Figure 7. Daily maximum selenium (top panel) and nitrate-N (bottom panel) concentrations recorded at Greenhills Operation Compliance Point 0200378 (GH_FR1). 18

Figure 8. Monthly average total selenium (top panel) and nitrate-N (bottom panel) concentrations recorded at Greenhills Operation Compliance Point E300090 (GH_ERC). 19

Figure 9. Monthly average sulphate (top panel) and cadmium (bottom panel) concentrations recorded at Greenhills Operation Compliance Point E300090 (GH_ERC). 20

Figure 10. Monthly average total selenium (top panel) and nitrate-N (bottom panel) concentrations recorded at Line Creek Operation Compliance Point E297110 (LC_LCDSSLCC). 21

Figure 11. Daily maximum total selenium (top panel) and nitrate-N (bottom panel) concentrations recorded at Line Creek Operation Compliance Point E297110 (LC_LCDSSLCC). 22

Figure 12. Monthly average sulphate (top panel) and cadmium (bottom panel) concentrations recorded at Line Creek Operation Compliance Point E297110 (LC_LCDSSLCC). 23

Figure 13. Monthly average total selenium (top panel) and nitrate-N (bottom panel) concentrations recorded at Elkview Operation Compliance Point E102682 (EV_HC1). 24

Figure 14. Monthly average sulphate (top panel) and cadmium (bottom panel) concentrations recorded at Elkview Operation Compliance Point E102682 (EV_HC1). 25

Figure 15. Monthly average total selenium (top panel) and nitrate-N (bottom panel) concentrations recorded at Elkview Operation Compliance Point E300091 (EV_MC2). 26

Figure 16. Monthly average sulphate (top panel) and cadmium (bottom panel) concentrations recorded at Elkview Operation Compliance Point E300091 (EV_MC2) 27

Figure 17. Monthly average total selenium (top panel) and nitrate-N (bottom panel) concentrations recorded at Coal Mountain Operation Compliance Point E258937 (CM_MC2). 28

Figure 18. Monthly average sulphate (top panel) and cadmium (bottom panel) concentrations recorded at Coal Mountain Operation Compliance Point E258937 (CM_MC2). 29

Figure 19. Monthly average total selenium (top panel) and nitrate-N (bottom panel) concentrations recorded at the West Line Creek Active Water Treatment Facility Compliance Point E291569 (LC_WTF_OUT/WL_BFWB_OUT_SP21). 30

Figure 20. Ammonia (top panel) and Biological Oxygen Demand (bottom panel) concentrations recorded at the West Line Creek Active Water Treatment Facility Compliance Point E291569 (LC_WTF_OUT/WL_BFWB_OUT_SP21). 31

Figure 21. pH (top panel) and Total Phosphorus (bottom panel) concentrations recorded at the West Line Creek Active Water Treatment Facility Compliance Point E291569 (LC_WTF_OUT/WL_BFWB_OUT_SP21). 32

Figure 22. Total suspended solids concentrations and flows recorded at the West Line Creek Active Water Treatment Facility Compliance Point E291569 (LC_WTF_OUT/WL_BFWB_OUT_SP21). 33

Figure 23. Plot of monthly average total selenium, nitrate-N, sulphate, and dissolved cadmium concentrations relative to site performance objectives recorded at Order Station 0200378 (GH_FR1). 36

Figure 24. Plot of monthly average total selenium, nitrate-N, sulphate, and dissolved cadmium concentrations relative to site performance objectives recorded at Order Station 0200028 (LC_LC5). 37

Figure 25. Plot of monthly average total selenium, nitrate-N, sulphate, and dissolved cadmium concentrations relative to site performance objectives recorded at Order Station 0206661 (GH_ER1). 38

Figure 26. Plot of monthly average total selenium, nitrate-N, sulphate, and dissolved cadmium concentrations relative to site performance objectives recorded at Order Station 0200027 (EV_ER4).	39
Figure 27. Plot of monthly average total selenium, nitrate-N, sulphate, and dissolved cadmium concentrations relative to site performance objectives recorded at Order Station 0200393 (EV_ER1). Individual data points are illustrated.	40
Figure 28. Plot of monthly average total selenium, nitrate-N, sulphate, and dissolved cadmium concentrations relative to site performance objectives recorded at Order Station E294312 (RG_ELKORES). Individual data points are illustrated.	41
Figure 29. Plot of monthly average total selenium, nitrate-N, sulphate, and dissolved cadmium concentrations relative to site performance objectives recorded at Order Station E300230 (RG_DSELK).	42
Figure 30. Summary of daily maximum (top panel) and monthly average (bottom panel) compliance limit exceedances by analyte compared to total samples taken and total monthly averages at Compliance Points in 2016.	44
Figure 31. Daily and monthly average nitrate-N concentrations recorded at Line Creek Operation Compliance Point E297110 (LC_LCDSSLCC) in 2015 and 2016.	47
Figure 32 Summary of instances of concentrations measured above BC FAL WQG at receiving environment monitoring locations compared to total number of samples taken by parameter.	57
Figure 33. Mercury and TSS concentrations in the Fording River (top), Elk River (middle) and Michel Creek (bottom) results from upstream monitoring stations are shown in blue and downstream in orange.	59
Figure 34. Total uranium concentrations recorded at water sampling site E261958 (LC_WLC).....	60
Figure 35. Total uranium concentrations recorded at water sampling sites E261958 (LC_WLC) and 0200337 (LC_LC3).....	61
Figure 36. Iron concentrations in the Elk River (top) and Michel Creek (bottom) upstream and downstream of mining operations.	62
Figure 37. Cobalt concentrations at discharge E102488 (CM_SPD) and receiving stations 0200209 (CM_CC1), E25937 (CM_MC2) at Coal Mountain Operation. (Note the log scale on the y-axis).....	63
Figure 38. Nitrite concentrations at discharge E102488 (CM_SPD) and receiving stations 0200209 (CM_CC1), E25937 (CM_MC2) at Coal Mountain Operation.....	64
Figure 39. Field temperature measurements at Order Stations (top panel) and Compliance Points (bottom panel) in 2016.	66
Figure 40. Total selenium concentrations recorded at water quality surveillance monitoring station BC08NK0003 in the Elk River.	67
Figure 41. Total selenium concentrations recorded at order stations.	68
Figure 42. Total selenium concentrations at key source sites in the upper Fording River (top Left), lower Fording River (top right), upper Elk River (bottom left) and Michel Creek (bottom right) compared to relevant Order stations.....	69
Figure 43. [Nitrate + Nitrite] Concentrations recorded at water quality surveillance monitoring station BC08NK0003 in the Elk River.	70
Figure 44. Nitrate-N concentrations recorded at order stations.....	71
Figure 45. Nitrate- N concentrations at key source sites in the upper Fording River (top Left), lower Fording River (top right), upper Elk River (bottom left) and Michel Creek (bottom right) compared to relevant Order stations.....	73

Figure 46. Sulphate concentration trends at Order Stations.....74

Figure 47. Sulphate concentrations at key source sites in the upper Fording River (top Left), lower Fording River (top right), upper Elk River (bottom left) and Michel Creek (bottom right) compared to relevant Order stations.75

Figure 48. Dissolved cadmium concentrations at Order Stations.76

Figure 49. The process for re-evaluating the answer to Big Question 1 (Teck 2016, AMP Figure 6).81

Figure 50. The process for re-evaluating the answer to Big Question 5 (Teck 2016, AMP Figure 18),82

Abbreviations

ABMP	Area Based Management Plan (also known as the Elk Valley Water Quality Plan)
BC FAL WQG	British Columbia Freshwater Aquatic Life Water Quality Guideline
CaCO ₃	Calcium carbonate
CCME	Canadian Council of Ministers of the Environment
CMO	Coal Mountain Operations
EMA	Environmental Management Plan
EMS	Environmental Monitoring Site
EPA	Environmental Protection Agency
EVO	Elkview Operations
FRO	Fording River Operations
GHO	Greenhills Operations
LCO	Line Creek Operations
MDL	Method detection Limit
MoE	BC Ministry of Environment
MRL	Method reporting Limit
NO ₃ ⁻	Nitrate
QA/QC	Quality assurance/quality control
RAEMP	Regional Aquatic Effects Monitoring Program
RPD	Relative percent difference
RSD	Relative standard deviation
Se	Selenium
SO ₄ ²⁻	Sulphate
SP&P	Standard Practices and Procedures
SPO	Site performance objective
TIE	Toxicity Identification Evaluation
TKN	Total Kjeldahl Nitrogen
WLC AWTF	West Line Creek Active Water Treatment Facility

Executive Summary

Permit 107517 takes an area based approach to authorizing and managing water quality constituents of interest originating from current and historical mining activities in the Elk Valley. To do so, requires an extensive surface water monitoring program that includes 88 authorized discharge, receiving environment and other sampling sites; eight authorized discharge Compliance Points; and seven Order Stations for which Site Performance Objectives (SPO) have been established. These 88 permitted sampling locations are used to evaluate compliance, and overall effectiveness of the Area Based Management Plan. The following report is submitted in fulfillment of Section 10.2.4 of Permit No. 107517 and summarizes: non-compliances experienced in 2016; water quality/quantity measurements relative to appropriate compliance limits, Site Performance Objectives, and/or approved and working water quality guidelines; toxicity tests; and Quality Assurance/Quality Control issues during the 2016 calendar year.

There were non-compliances in 2016 associated with permit limit exceedances. A portion of permit limit exceedances recorded were hydrologic challenges associated with Fording River Operations' Compliance Point E300071 (FR_FRCP1). It has become evident that Compliance Point E300071 (FR_FRCP1) is not a representative location for compliance monitoring. As outlined within Permit 107517, Compliance Points are intended to monitor all or most of the point and non-point discharges from the mine operation. The Fording River Operations Compliance Point instead measures isolated surface water that is predominantly mine-influenced water from one creek during low flow winter conditions. Teck has proposed an alternative Compliance Point for Fording River Operations and is working on monitoring and analysis to understand the representativeness of the proposed location and pursue a permit amendment.

Other non-compliances were associated with Line Creek Operations. On December 31, 2015, the LCO Compliance Point limits for nitrate were reduced from 14 mg/L monthly average and 20 mg/L daily maximum to 7 mg/L monthly average and 9 mg/L daily maximum. These changes in limits were initially defined based on the limited data that was available at that location at the time, modelling that included that data, and the original commissioning schedule for the West Line Creek Active Water Treatment Facility. Since this time, monitoring data indicates that the regional water quality model may not be adequately representing the nitrate loadings in Line Creek. Despite higher than projected nitrate concentrations in Line Creek as measured at the LCO Compliance Point, nitrate concentrations at the Line Creek Order Station in the Fording River (FR5, LC_LC5) have remained below the SPO during all periods to date.

Several mitigation measures are ongoing to manage nitrate concentrations at LCO. These include active management of pit dewatering, changing blasting practices, identification of passive treatment opportunities and maximizing nitrate removal by the West Line Creek Active Water Treatment Facility. Source terms for nitrate loadings in the Regional Water Quality Model are currently being updated in an effort to improve model performance. Considerable effort is being made to determine appropriate preventative and mitigation measures that will support long term permit compliance and environmental protection.

Non-compliances were also recorded in 2016 associated with *Daphnia magna* acute toxicity testing. Toxicity Identification Evaluation tests and visual observations indicate that cause for reduced survival of *D. magna* is precipitate formation on the organism during lab testing. The two locations that account for the majority of *Daphnia magna* toxicity test failures (5 of 7) have treatment (Line Creek) or are planned for treatment (Cataract Creek) to improve water quality. In addition, Teck is committed to addressing the issue of precipitate/ calcite management in the valley. Identification of priority tributaries for calcite management is complete as per Permit requirements and Calcite management permitting is underway.

Other non-compliances were related to hold time exceedances or administrative issues. These were inadvertent. Improvements in planning (e.g., scheduling of sample collection/shipping around statutory holidays), internal and external communications (e.g., timely reporting), and following standard protocols are anticipated to reduce future non-compliances.

In consideration of the extensive surface water monitoring program required under Permit 107517, in conjunction with all other active monitoring programs, no additional monitoring is proposed at this time. This will continue to be evaluated to ensure that this monitoring program continues to provide information required to support Teck's Adaptive Management Plan.

1 Introduction

After consideration of the July 22, 2014, Elk Valley Area Based Management Plan (ABMP) and approval by the Minister on November 18, 2015, Permit 107517 was issued under provisions of the Environmental Management Act (EMA). Permit 107517 takes an area-based approach to authorizing and managing water quality constituents of interest originating from current and historical mining activities in the Elk Valley. This report was prepared to meet requirements of Permit 107517 dated May 2016.

The Elk Valley, located in the southeast corner of British Columbia, is bisected by the Elk River which in turn is fed by a number of tributaries of which the Fording River and Michel Creek are the largest. Primary communities in the Elk Valley include Elkford, Sparwood, Hosmer, Fernie, and Elko. Presently, five steelmaking coal mines are operated by Teck Coal Limited (Teck) within the Elk Valley. They include Fording River Operation, Greenhills Operation, Line Creek Operation, Elkview Operation, and Coal Mountain Operation (Figure 1). The following report summarizes environmental incidents (i.e., non-compliances) recorded in 2016, summarizes monitoring data for discharges and receiving environment water sampling sites set forth in Permit 107517, and provides an assessment of the data and associated recommendations, as appropriate.

1.1 Authorized Discharge and Receiving Environment Water Sampling Sites

Permit 107517 (May 2016) requires the collection of water samples from 88 authorized discharges, receiving environment, and other sampling sites. The relative allocation of water sampling sites per Operation is as follows:

- Fording River Operation (FRO) collects samples from 24 water sampling sites
- Greenhills Operation (GHO) collects samples from 19 water sampling sites
- Line Creek Operation (LCO) collects samples from 13 water sampling sites
- West Line Creek Active Water Treatment Facility (WLC) collects samples from 2 water sampling sites
- Elkview Operation (EVO) collects samples from 20 water sampling sites
- Coal Mountain Operation (CMO) collects samples from 6 water sampling sites
- Lake Koocanusa for which there are 4 water sampling sites

Authorized discharge and receiving environment water sampling sites noted above are numerically identified via dedicated Environmental Monitoring Site (EMS) numbers and corresponding site-specific sampling codes, a summary of which sampling sites are respectively presented in Tables 1 through 7, see below.

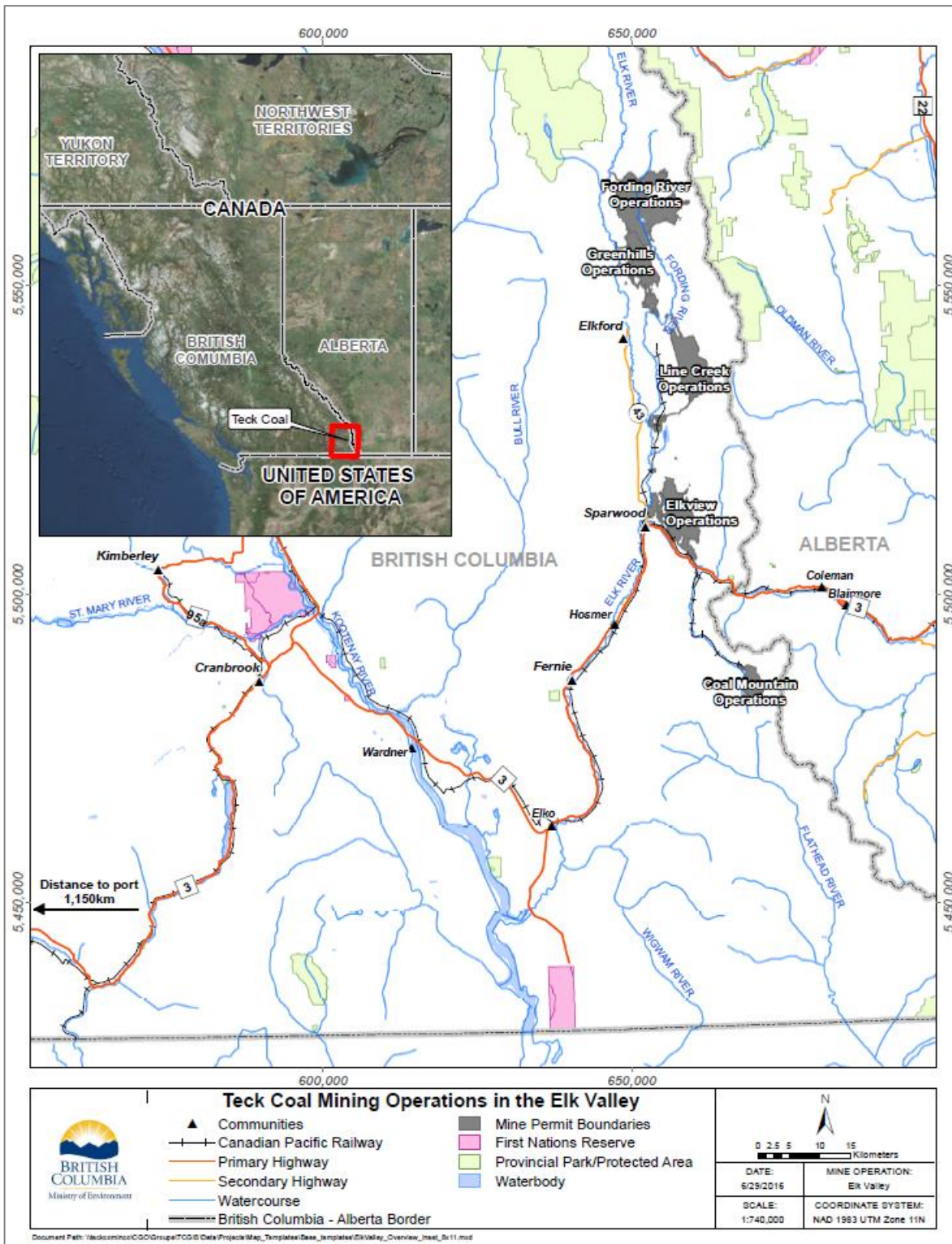


Figure 1. Location of Teck's five steelmaking coal operations within the Elk Valley, British Columbia.

Table 1. Summary of discharge, receiving environment, and other water sampling sites for Fording River Operation based on the version of Permit 107517 dated May 2016.

EMS ID	Site ID	Sampling Site Type	Sampling Site Description
E216777	FR_UFR1	Receiving Environment	Fording River U/S of Henretta Cr.
E300096	FR_HC3	Receiving Environment	Henretta Creek Upstream of McQuarrie Creek
E216781	FR_HP1	Authorized Discharge	Henretta Pit Effluent into Diversion Culvert
E216778	FR_HC1	Receiving Environment	Henretta Cr. U/S of Fording River
0200251	FR_FR1	Receiving Environment	Fording River D/S of Henretta Cr.
E102481	FR_CC1	Authorized Discharge	Clode Pond Decant
E304750	FR_PP1	Authorized Discharge	Post Sediment Ponds Decant
E105060	FR_NGD1	Other	North Greenhills Diversion Ditch
E102480	FR_EC1	Authorized Discharge	Eagle Sedimentation Pond Decant
E304835	FR_LP1	Authorized Discharge	Liverpool Sedimentation Pond Decant
E102475	FR_TP1	Authorized Discharge	Tailings Slurry to North Tailings Pond
E102478	FR_MS1	Authorized Discharge	Maintenance & Service Sediment Ponds Decant
E206660	FR_TP3	Authorized Discharge	Tailing Slurry to South Tailings Pond
E102476	FR_NL1	Authorized Discharge	North Loop Sedimentation Pond Decant
E217403	FR_3PIT	Authorized Discharge	Swift Pit Effluent to Fording River
E261897	FR_SP1	Authorized Discharge	Smith Pond Decant
0200201	FR_FR2	Receiving Environment	Fording River U/S of Kilmarnock Cr.
0200252	FR_KC1	Other	Kilmarnock Cr. D/S of Rock Drain
E208394	FR_SKP1	Authorized Discharge	South Kilmarnock Sediment Pond-Phs 1
E105061	GH_SC2	Authorized Discharge	Swift Creek Sed. Pond Bypass
E221329	GH_SC1	Authorized Discharge	Swift Pond Decant
E208395	FR_SKP2	Authorized Discharge	South Kilmarnock Sediment Pond-Phs 2
0200384	GH_CC1	Authorized Discharge	Cataract Creek Sed. Pond Decant
E300097	FR_FRRD	Receiving Environment	Fording River Near Fording River Road

Notes:

1. Environmental Monitoring Site (EMS) identification numbers (IDs) correspond to those listed in the Ministry's monitoring data repository.

The spatial location and distribution of authorized discharge, receiving environment, and other water sampling sites for FRO are presented in Map 1.

Table 2. Summary of discharge and receiving environment water sampling sites for Greenhills Operation based on the version of Permit 107517 dated May 2016.

EMS ID	Site ID	Sampling Site Type	Sampling Site Description
200389	GH_ER2	Receiving Environment	Elk River U/S of Greenhills Operation
E287437	GH_BR_F	Receiving Environment	Branch F at LRP Road
E305855	GH_WOLF_SP1	Authorized Discharge	Wolf Creek Sed. Pond Decant
E305854	GH_WILLOW_SP1	Authorized Discharge	Willow Sediment Pond Decant
E287433	GH_WADE	Authorized Discharge	Wade Creek at LRP Road
E287432	GH_COUGAR	Receiving Environment	Cougar Creek at LRP Road
E305875	GH_NNC	Receiving Environment	No Name Creek at LRP Road
0200388	GH_MC1	Authorized Discharge	Mickelson Creek at LRP Road
E257796	GH_LC1	Authorized Discharge	Leask Creek Sed. Pond Decant
E305878	GH_ERSC4	Receiving Environment	Elk River Side channel U/S of Wolfram Creek
E257795	GH_WC1	Authorized Discharge	Wolfram Creek Sed. Pond Decant
E305876	GH_ER1A	Receiving Environment	Elk River Side channel D/S of Wolfram Creek
E207436	GH_TC2	Authorized Discharge	Thompson Creek Sed. Pond Decant
E102714	GH_TC1	Receiving Environment	Thompson Creek at LRP Road
E305877	GH_ERSC2	Receiving Environment	Elk River Side Channel D/S of Thompson Creek
0200385	GH_PC1	Authorized Discharge	Porter Creek Sed. Pond Decant
E287438	GH_TPS	Authorized Discharge	Tailings Pond Water (Supernatant)
E102709	GH_GH1	Authorized Discharge	Greenhills Creek Sed. Pond Decant
E207437	GH_RLP	Authorized Discharge	Rail Loop Sed. Pond Decant

Note:

1. Environmental Monitoring Site (EMS) identification numbers (IDs) correspond to those listed in the Ministry's monitoring data repository.

The spatial location and distribution of authorized discharges and receiving environment water sampling sites for GHO are presented in Map 2.

Table 3. Summary of discharge and receiving environment water sampling sites for Line Creek Operation based on the version of Permit 107517 dated May 2016.

EMS ID	Site ID	Sampling Site Type	Sampling Site Description
E288273	LC_DC3	Receiving Environment	Dry Creek Upstream of East Tributary Creek
E216142	LC_LC1	Receiving Environment	Line Creek Upstream of MSA North Pit
0200335	LC_LC2	Receiving Environment	Line Creek Upstream of Rock Drain
E216144	LC_LC7	Authorized Discharge	MSA North Ponds Effluent to Line Creek
E304613	LC_LC7DSTF	Authorized Discharge	MSA North Ponds Effluent to Line Creek Alternate
E223240	LC_LC12	Receiving Environment	N Horseshoe Creek Near Mouth
E221268	LC_LC9	Authorized Discharge	No Name Creek Pond Decant
E293369	LC_LCUSWLC	Receiving Environment	Line Creek Upstream of West Line Creek, below rock drain
E261958	LC_WLC	Receiving Environment	West Line Creek
0200337	LC_LC3	Receiving Environment	Line Creek Downstream of West Line Creek
E282149	LC_SLC	Receiving Environment	South Line Creek

EMS ID	Site ID	Sampling Site Type	Sampling Site Description
E219411	LC_LC8	Authorized Discharge	Contingency Treatment System to Line Creek
0200044	LC_LC4	Receiving Environment	Line Creek Upstream of Process Plant

Note:

1. Environmental Monitoring Site (EMS) identification numbers (IDs) correspond to those listed in the Ministry's monitoring data repository.

The spatial location and distribution of authorized discharges and receiving environment water sampling sites for LCO are presented in Map 3.

Table 4. Summary of discharge, receiving environment, and other sampling sites for Elkview Operation based on the version of Permit 107517 dated May 2016.

EMS ID	Site ID	Sampling Site Type	Sampling Site Description
E298590	EV_DC1	Authorized Discharge	Dry Creek Sed. Pond Decant
E102681	EV_SM1	Authorized Discharge	Six Mine Sed. Pond Decant
E298592	EV_BLM2	Monitoring	Balmer Creek at CFI Road
E298591	EV_FC1	Monitoring	Fenelon Creek at CFI Road
E258135	EV_LC1	Authorized Discharge	Lindsay Creek infiltration basin discharge
E208043	EV_GC2	Authorized Discharge	Goddard Creek Sedimentation Pond Decant
E296310	EV_GH1	Authorized Discharge	West Fork tailings impoundment discharge to ground
E102679	EV_OC1	Authorized Discharge	Otto Creek Near Mouth (~80m upstream of Elk River)
0200111	EV_ER2	Receiving Environment	Elk River upstream of Michel Cr.
0200097	EV_EC1	Authorized Discharge	Erickson Creek at Mouth
0200203	EV_MC3	Receiving Environment	Michel Creek Upstream of Erickson Creek
E296311	EV_SP1	Authorized Discharge	South Pit Creek Sed. Pond Decant
E208057	EV_MG1	Authorized Discharge	Milligan Creek Sed. Pond Decant
E298593	EV_TC1	Monitoring	Thresher Creek at Milligan Road
E206231	EV_GT1	Authorized Discharge	Gate Creek Sedimentation Pond Decant
E102685	EV_BC1	Authorized Discharge	Bodie Creek Sedimentation Pond Decant
E210369	EV_AQ1	Authorized Discharge	Aqueduct Creek upstream of Michel Creek
E298594	EV_SPR2	Monitoring	Spring Creek at mouth with Aqueduct Creek
E298595	EV_WF_NW	Monitoring	West Fork North Monitoring Well
E298596	EV_WF_SW	Monitoring	West Fork South Monitoring Well

Note:

1. Environmental Monitoring Site (EMS) identification numbers (IDs) correspond to those listed in the Ministry's monitoring data repository.

The spatial location and distribution of authorized discharges, receiving environment, and other water sampling sites for EVO are presented in Map 4.

Table 5. Summary of discharge and receiving environment water sampling sites for Coal Mountain Operation based on the version of Permit 107517 dated May 2016.

EMS ID	Site ID	Sampling Site Type	Sampling Site Description
E258175	CM_MC1	Receiving Environment	Michel Creek Upstream of CMO
E298733	CM_PC2	Authorized Discharge	Pengelly channel decant
E206438	CM_CCPD	Authorized Discharge	Decant discharge from Corbin Sediment Pond
E298734	CM_SOW	Authorized Discharge	Sowchuck Sump
E102488	CM_SPD	Authorized Discharge	Main Pond Decant
0200209	CM_CC1	Receiving Environment	Corbin Creek Downstream of CMO

Note:

1. Environmental Monitoring Site (EMS) identification numbers (IDs) correspond to those listed in the Ministry's monitoring data repository.

The spatial location and distribution of authorized discharges and receiving environment water sampling sites for CMO are presented in Map 5.

Table 6. Summary of receiving environment water sampling sites for Lake Koochanusa based on the version of Permit 107517 dated May 2016.

EMS ID	Site ID	Sampling Site Type	Sampling Site Description
E300095	RG_KERRRD	Receiving Environment	Lake Koochanusa Downstream of Kikomun Creek
E300092	RG_GRASMERE	Receiving Environment	Lake Koochanusa West of Grasmere
E300093	RG_USGOLD	Receiving Environment	Lake Koochanusa Upstream of Gold Creek
E300094	RG_BORDER	Receiving Environment	Lake Koochanusa Upstream of the Canada/US border

Notes:

1. Environmental Monitoring Site (EMS) identification numbers (IDs) correspond to those listed in the Ministry's monitoring data repository.

2. All receiving water sampling sites within Lake Koochanusa are located on lands and waters of Canada.

The spatial location and distribution of receiving environment water sampling sites within Lake Koochanusa are presented in Map 6.

Table 7. Summary of water sampling sites for the West Line Creek Active Water Treatment Facility

EMS ID	Site ID	Sampling Site Type	Sampling Site Description
E293370	WL_LCI_SP02	Monitoring	AWTF Influent LC
E293371	WL_WLCI_SP01	Monitoring	AWTF Influent WLC

Note:

1. Environmental Monitoring Site (EMS) identification numbers (IDs) correspond to those listed in the Ministry's monitoring data repository.

The spatial location and distribution of authorized discharges and receiving environment water sampling sites for WLC are presented in Map 9.

1.1.1 Compliance Points

In addition to the 88 authorized discharges, receiving environment, and other water sampling sites outlined in Section 1.1, eight authorized discharge Compliance Points (referred to as Compliance Points) have also been designated within the Elk Valley. Monitoring data collected at compliance points is intended to capture and represent all or most point and non-point discharges from

Operations, and as such, reflect a total discharge from the Operation within the receiving environment. Compliance points are subject to compliance limits set forth in Permit 107517. A list of the seven compliance points and their dedicated EMS numbers and corresponding site-specific sampling codes is presented in Table 8 below.

Table 8. Summary of authorized discharge compliance points within the Elk Valley.

EMS ID ¹	Site ID	Sampling Site Type	Sampling Site Description ³
E300071	FR_FRCP1	Authorized Discharge	FRO - Fording River, 525 m Downstream of Cataract Creek
200378	GH_FR1	Authorized Discharge	GHO Fording River - Fording River, 205 m Downstream of Greenhills Creek
E300090	GH_ERC	Authorized Discharge	GHO Elk River - Elk River, 220 m downstream of Thompson Creek
E291569	LC_WTF_OUT/ WL_BFWB_OUT_SP21 ⁴	Authorized Discharge	WLC - AWTF Outfall (Effluent)
E297110	LC_LCDSSLCC	Authorized Discharge	LCO - Line Creek immediately downstream of South Line Creek Confluence (~700 m downstream of the WLC WTP outfall)
E102682	EV_HC1	Authorized Discharge	EVO Harmer - Harmer Spillway
E258937	CM_MC2	Authorized Discharge	CMO - Michel Creek, 50 m Upstream of Andy Good Creek
E300091	EV_MC2	Authorized Discharge	EVO Michel Creek - Michel Creek at Highway -3 Bridge

Notes:

1. Environmental Monitoring Site (EMS) identification numbers (IDs) correspond to those listed in the Ministry's monitoring data repository.
2. The **bold font** reflects which Operation the compliance point applies to and is intended to reflect, all or most point and non-point discharges from the Operation (e.g., FRO's compliance point is EMS E300071; FR_FRCP1).
3. Descriptions in this table reflect the descriptions in the May 2016 version of Permit 107517 and may differ from other versions of the Permit.
4. The location of WLC compliance point E291269 was changed effective April 2016 as per Amendment to Permit 107517 dated March 14, 2016.

The spatial location and distribution of the compliance points is presented in Map 7.

1.1.2 Order Stations

In addition to the 88 authorized discharges, receiving environment, and other water sampling sites, and eight authorized discharge compliance points, Teck collects water samples at seven Order Stations for which Site Performance Objectives (SPOs) have been established. Order Stations are used to monitor water quality in the Elk Valley (i.e., the Designated Area¹), and ultimately the implementation success of the ABMP. A summary of the seven Order Stations and their dedicated EMS numbers and corresponding site-specific sampling codes is presented in Table 9 below. The spatial location and distribution of the Order Stations as well as a summary of their status compared to SPOs is presented in Map 8.

¹ The Designated Area as defined within Permit 107517 is: "a portion of southeastern British Columbia that contains the Elk Valley Watershed and the portion of Lake Koochanusa within Canada, and is geographically defined by Ministerial Order M113. References to the Elk Valley are references to the Designated Area."

Table 9. Summary of Order stations within the Elk Valley.

EMS ID	Site ID	Sampling Site Type	Sampling Site Description
0200378	GH_FR1	Receiving Environment / Authorized Discharge	Upper Fording River (Upstream Josephine Falls)
0200028	LC_LC5	Receiving Environment	Lower Fording River (Fording River Downstream of Line Creek)
E206661	GH_ER1	Receiving Environment	Elk River upstream of Boivin Creek (Upstream of Fording River)
0200027	EV_ER4	Receiving Environment	Elk River upstream of Grave Creek (from Fording River to Michel Creek)
200393	EV_ER1	Receiving Environment	Elk River Downstream Michel Creek
E294312	RG_ELKORES	Receiving Environment	Elk River at Elko Reservoir
E300230	RG_DSELK	Receiving Environment	Lake Kooconusa – South of the Elk River

Notes:

1. Environmental Monitoring Site (EMS) identification numbers (IDs) correspond to those listed in the Ministry's monitoring data repository.
2. Water sampling site EMS 200378; GH_FR1 serves both as an Order Station (i.e., receiving environment sampling site), and as a Compliance Point (i.e., authorized discharge) for the Greenhills Operation.

2 Compliance

A number of water quality sampling sites have been established within Permit 107517 to evaluate compliance. The following section summarizes authorized discharge limits established for compliance points, and SPOs established at Order Stations. Environmental non-compliances recorded in 2016 and associated corrective actions are also summarized.

2.1 Effluent Limits and Site Performance Objectives – Compliance Points

As noted in Section 1.1.1, eight Compliance Points have been designated within the Elk Valley. The intent of each compliance point is to capture and reflect, all or most point and non-point discharges from an Operation, and as such, reflect an accumulated (i.e., integrated) discharge from that Operation. A summary of the eight Compliance Points and their respective discharge effluent limits is presented in Table 10 below.

Table 10. Authorized discharge effluent limits established at Compliance Points within the Elk Valley (2016).

EMS ID ¹	Site ID	Constituent	Monthly Average Limit	Daily Maximum Limit ²
E300071	FR_FRCP1	Total Selenium	130 µg/L	155 µg/L
		Nitrate-N	27 mg/L as N	32.5 mg/L as N
		Sulphate	580 mg/L	-
0200378	GH_FR1	Total Selenium	80 µg/L	100 µg/L
		Nitrate-N	24 mg/L as N ³	29 mg/L as N
E300090	GH_ERC	Total Selenium	15 µg/L	-
		Nitrate-N	3 mg/L as N	-
E297110	LC_LCDSSLCC	Total Selenium	50 µg/L	58 µg/L
		Nitrate-N	7 mg/L as N	9 mg/L as N
E291569	LC_WTF_OUT/ WL_BFWB_OUT_SP21 ⁴	Ammonia	-	1.0 mg/L
		Biological Oxygen Demand	-	25 mg/L
		pH range	-	6.5-8.5
		Nitrate	-	3.0 mg/L
		Total Phosphorus	-	0.3 mg/L
		Total Selenium	0.02 mg/L	-
		Total Suspended Solids	-	10.0 mg/L
E102682	EV_HC1	Total Selenium	45 µg/L	-
		Nitrate-N	4 mg/L as N	-
		Sulphate	300 mg/L	-
E300091	EV_MC2	Total Selenium	28 µg/L	-
		Nitrate-N	6 mg/L as N	-
E258937	CM_MC2	Total Selenium	19 µg/L	-
		Nitrate-N	5 mg/L as N	-
		Sulphate	500 mg/L	-

Notes:

1. Environmental Monitoring Site (EMS) identification numbers (IDs) correspond to those listed in the Ministry's monitoring data repository.
2. Although daily maximum discharge effluent limits have not been established at a number of the above-listed Compliance Points, it is expected that daily concentrations do not adversely affect the overall monthly average limit established.
3. Limits in this table are consistent with the version of Permit 107517 dated May 2016 and may differ from other versions of the Permit.
4. The location of the compliance point for the West Line Creek Active water treatment facility was changed in April 2016 as per Permit 107517 amendment dated March 14, 2016

In addition to the above-listed effluent limits, four specified Compliance Points (0200378 (GH_FR1), E300090 (GH_ERC), E297110 (LC_LCDSSLCC) and E300091 (EV_MC2) are required to maintain SPOs for sulphate per the following water hardness (expressed in terms of calcium carbonate (CaCO₃)) dependent relationship:

Table 11. Sulphate SPO at various water hardness values expressed as CaCO₃.

Water Hardness (mg/l CaCO ₃)	SO ₄ SPO (mg/l)
Very soft (<30)	128
Soft to moderately soft (31-75)	218
Moderately soft/hard to hard (76-180)	309
Very hard (181-250)	429
Very Hard (>250)	429

All Compliance Points are expected to maintain the following hardness dependant SPO for Cadmium:

$$\text{Cadmium (Cd): } Cd (\mu\text{g/L}) = 10^{0.831 \log(\text{hardness}) - 2.53}$$

A summary of 2016 water quality data recorded at Compliance Points relative to the above-listed effluent discharge limits is presented in Figures 2 to 22. Exceedances in effluent limits (i.e. non-compliances) are discussed in Section 2.3.

Compliance Point E300071 (FR_FRCP1)

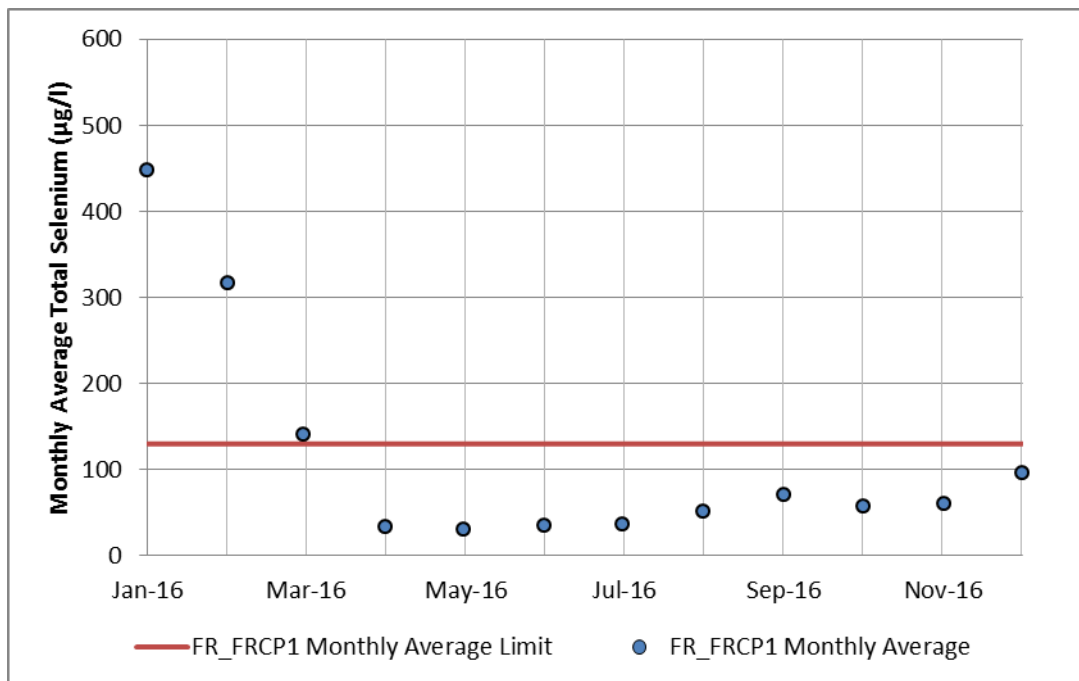


Figure 2. Monthly average total selenium concentrations recorded at Fording River Operation Compliance Point E300071 (FR_FRCP1).

Note: The monthly average compliance limit for total selenium was exceeded in January, February and March.

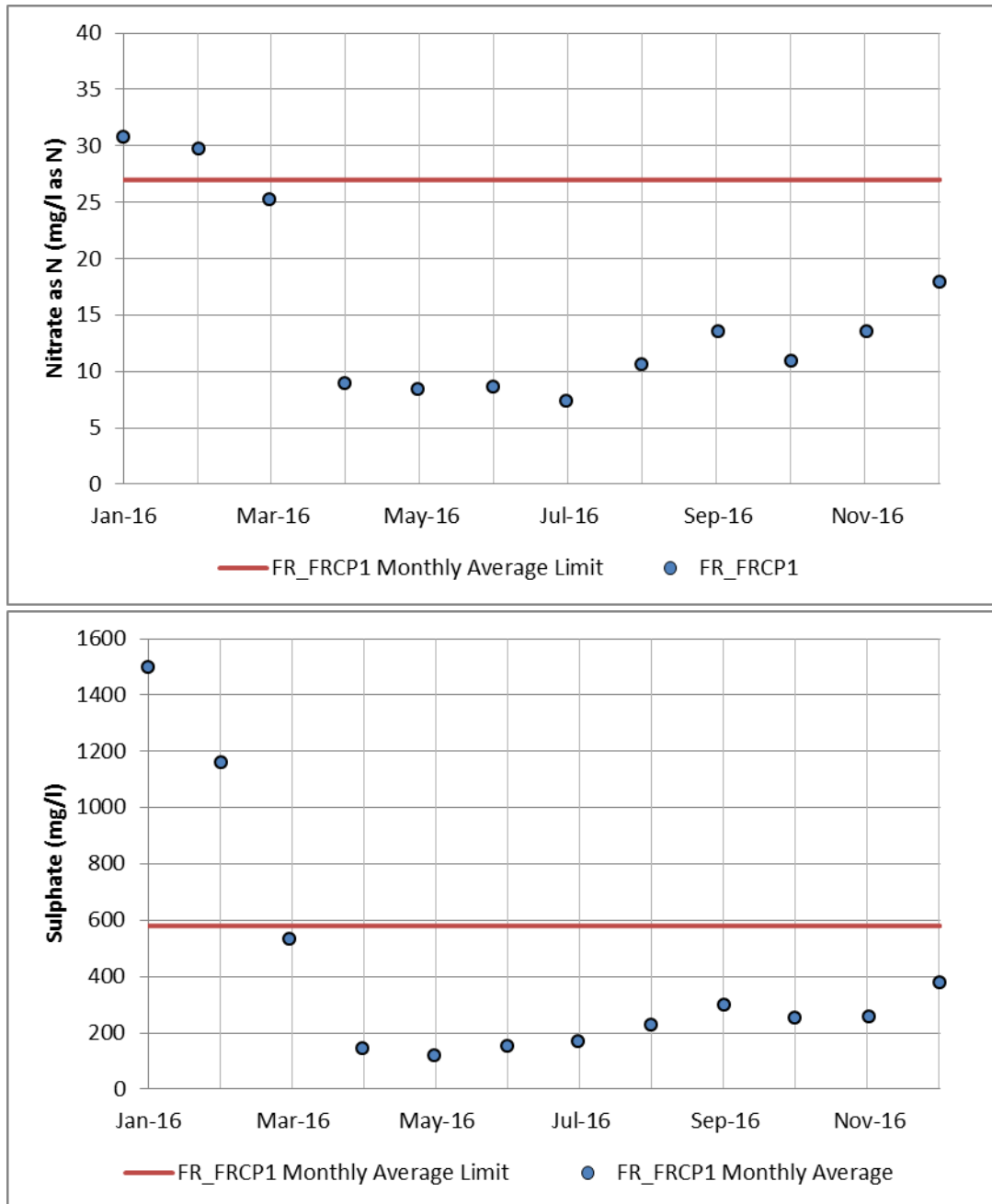


Figure 3. Monthly average nitrate (top panel) and sulphate (bottom panel) concentrations recorded at Fording River Operation Compliance Point E300071 (FR_FRCP1).

Note: The monthly average compliance limit for nitrate and sulphate were exceeded in January and February.

Compliance Point 0200378 (GH_FR1)

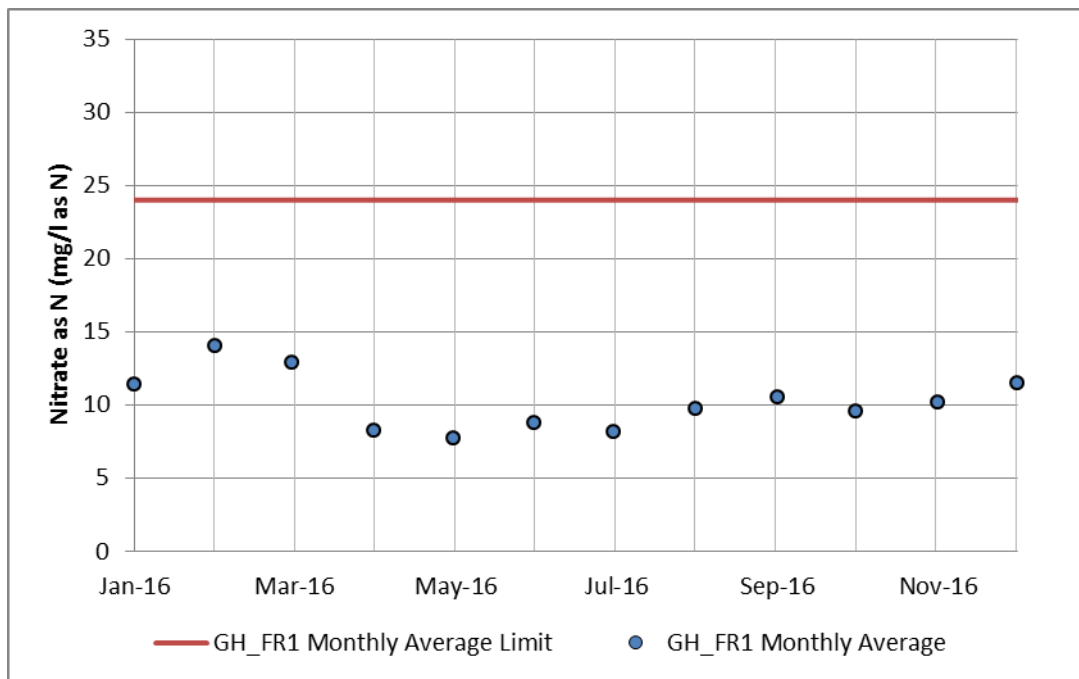
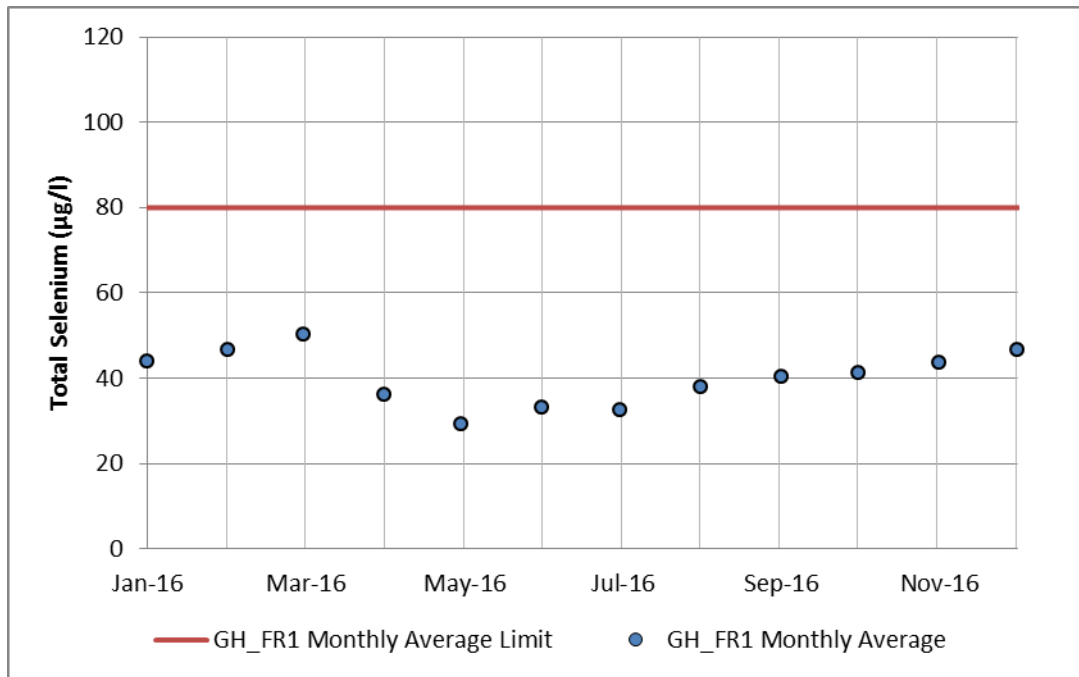


Figure 5. Monthly average total selenium (top panel) and nitrate-N (bottom panel) concentrations recorded at Greenhills Operation Compliance Point 0200378 (GH_FR1).

Note: No exceedances in average monthly compliance limits were recorded in 2016.

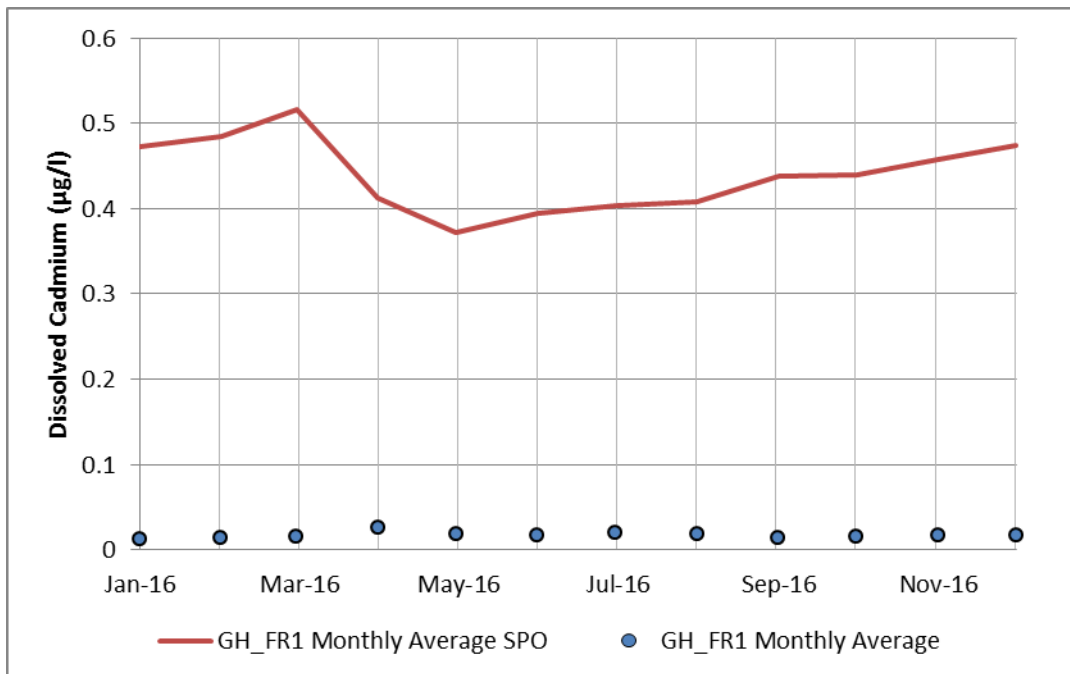
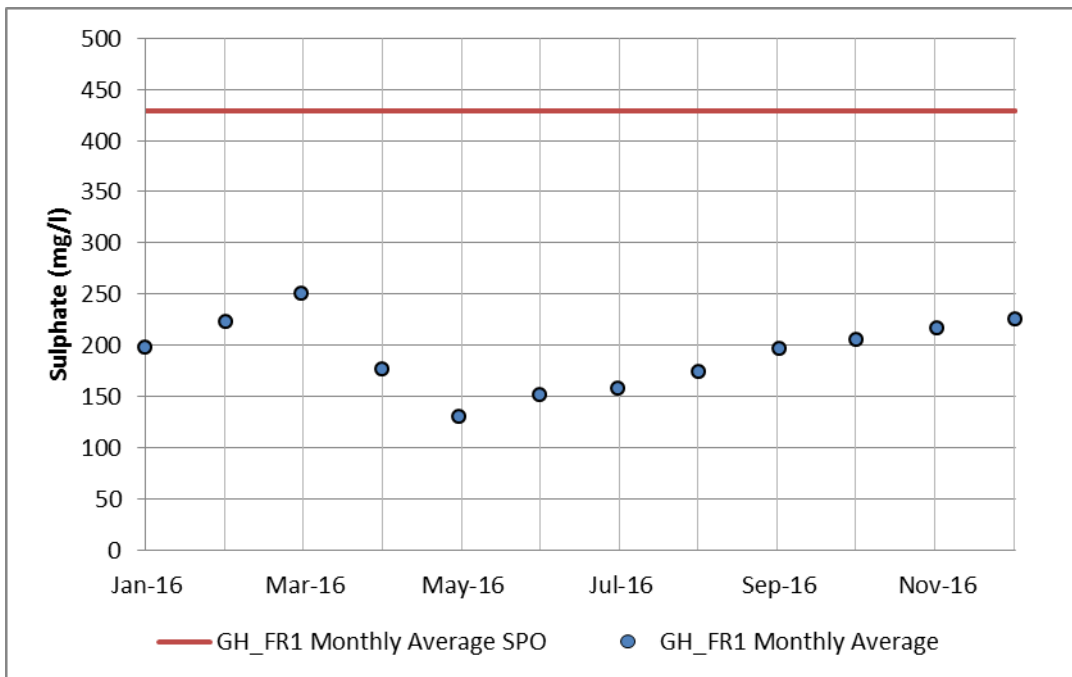


Figure 6. Monthly average sulphate (top panel) and cadmium (bottom panel) concentrations recorded at Greenhills Operation Compliance Point 0200378 (GH_FR1).

Note: No exceedances in average monthly compliance limits were recorded in 2016. The cadmium SPO is hardness dependent and as such, reflects temporal variation in water hardness.

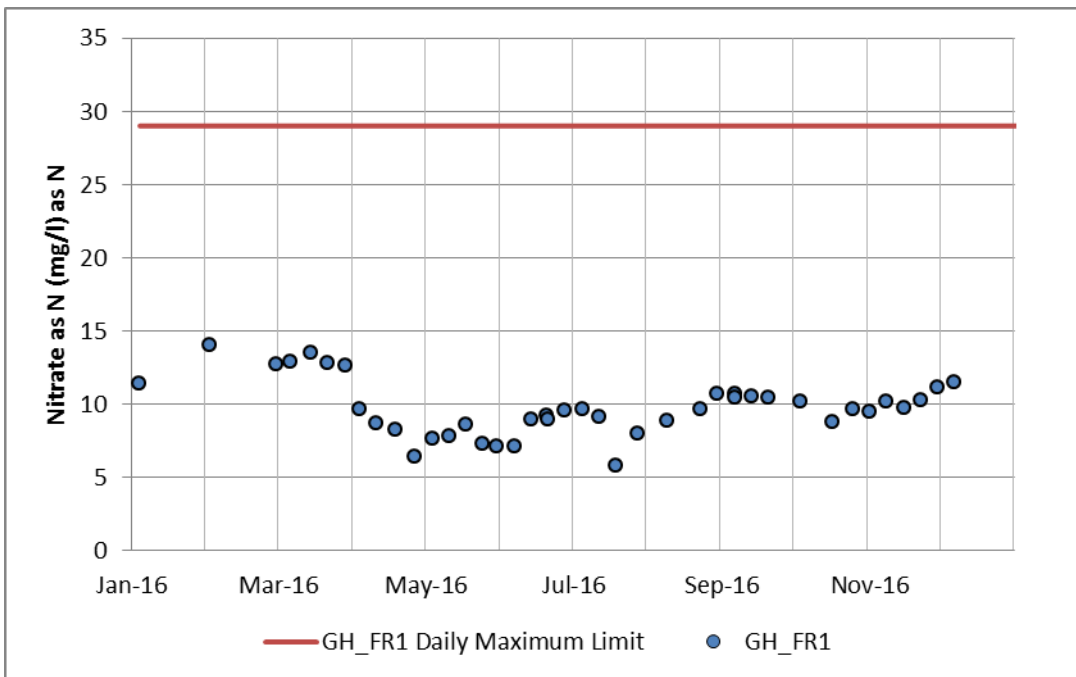
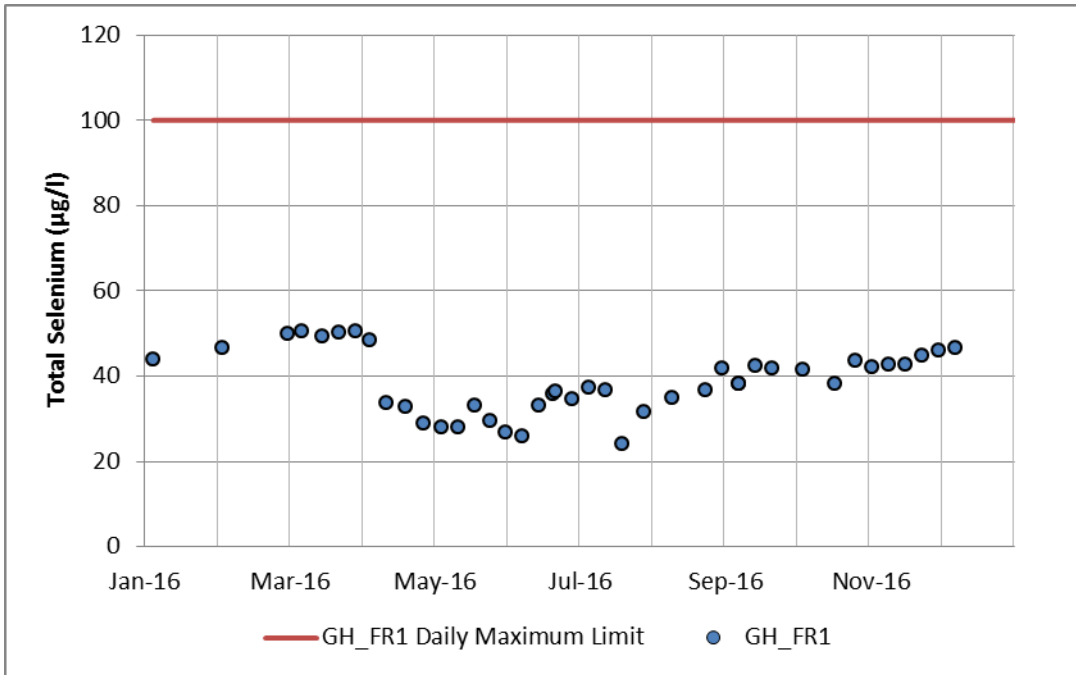


Figure 7. Daily maximum selenium (top panel) and nitrate-N (bottom panel) concentrations recorded at Greenhills Operation Compliance Point 0200378 (GH_FR1).

Note: No exceedances in average monthly compliance limits were recorded in 2016.

Compliance Point E300090 (GH_ERC)

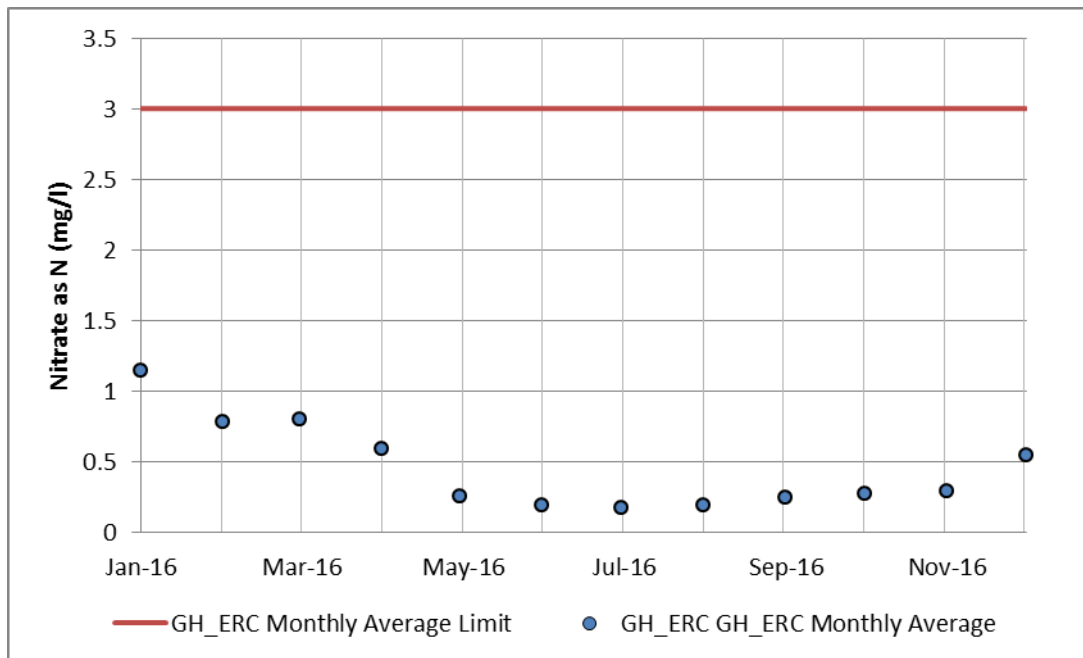
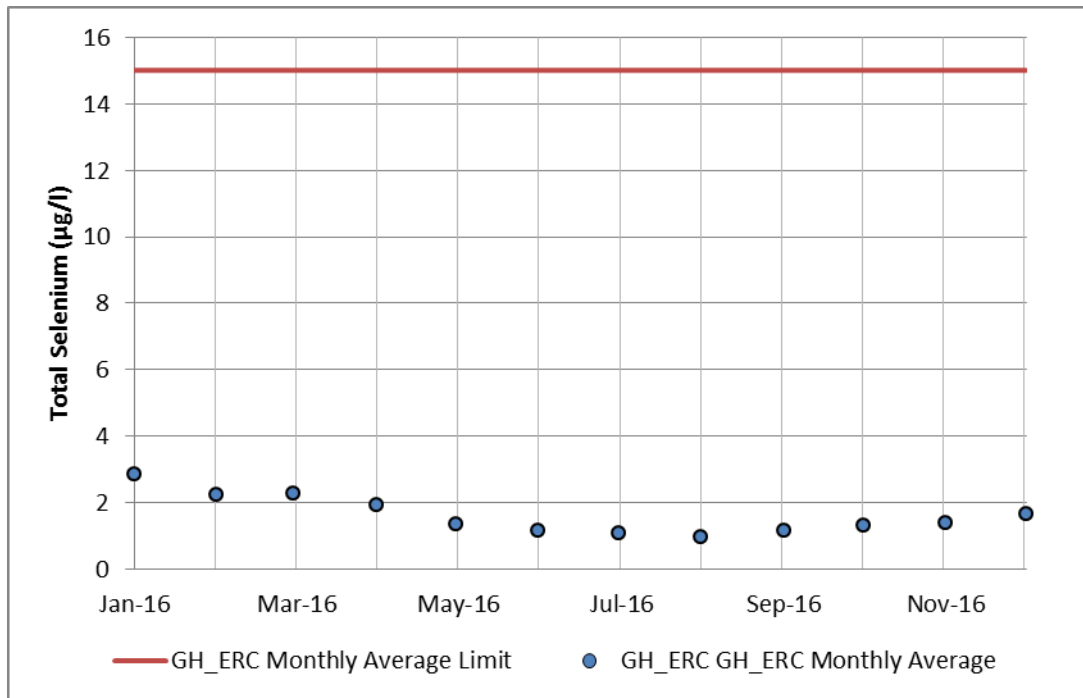


Figure 8. Monthly average total selenium (top panel) and nitrate-N (bottom panel) concentrations recorded at Greenhills Operation Compliance Point E300090 (GH_ERC).

Note: No exceedances in average monthly compliance limits were recorded in 2016.

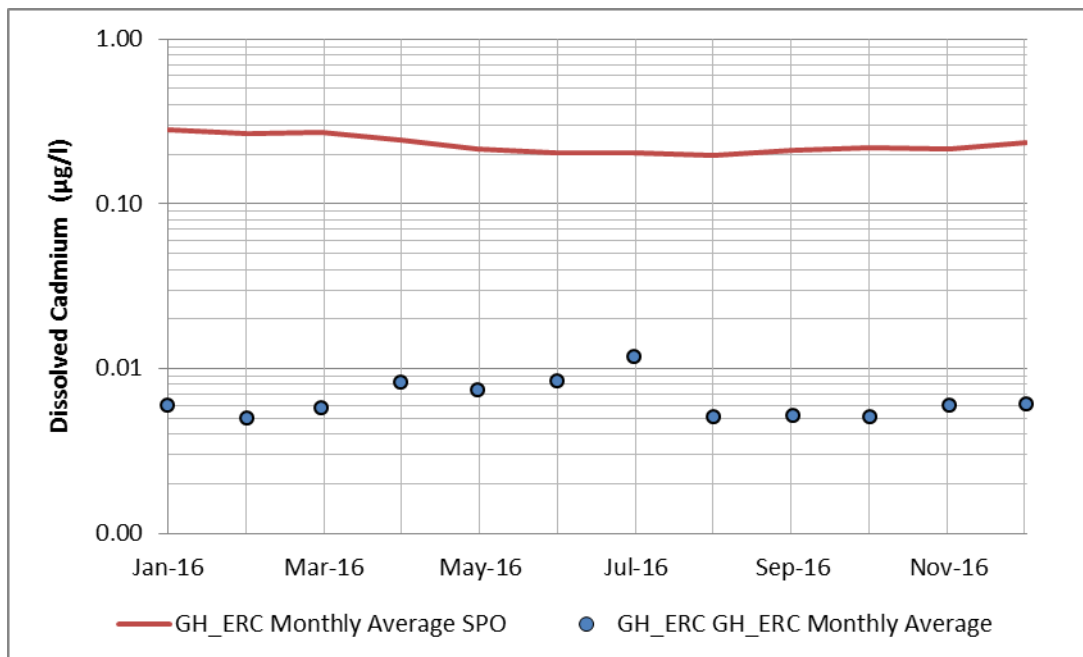
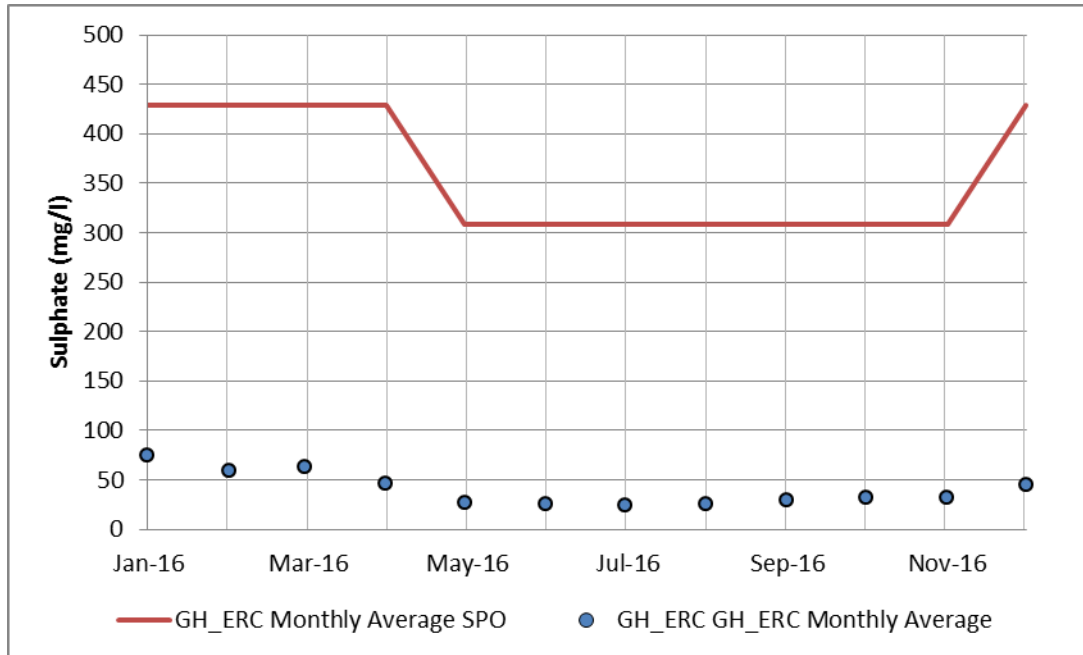


Figure 9. Monthly average sulphate (top panel) and cadmium (bottom panel) concentrations recorded at Greenhills Operation Compliance Point E300090 (GH_ERC).

Note: No exceedances in average monthly compliance limits were recorded in 2016. The sulphate and cadmium SPOs are hardness dependent and as such, reflect temporal variation in water hardness. Cadmium concentrations are on a logarithmic scale.

Compliance Point E297110 (LC_LCDSSLCC)

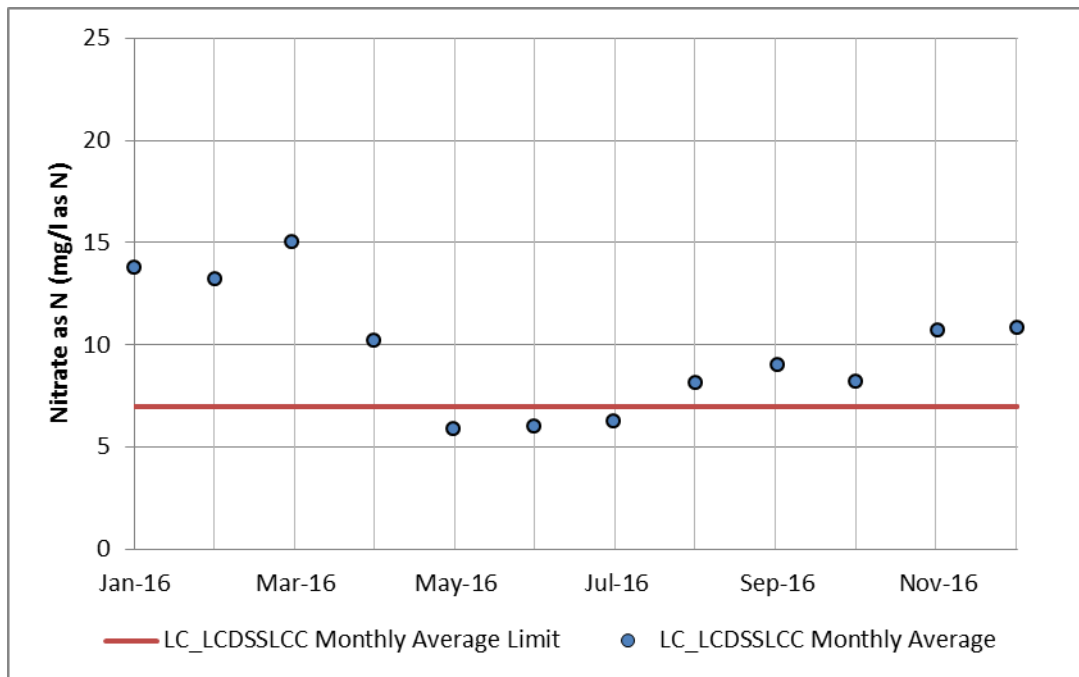
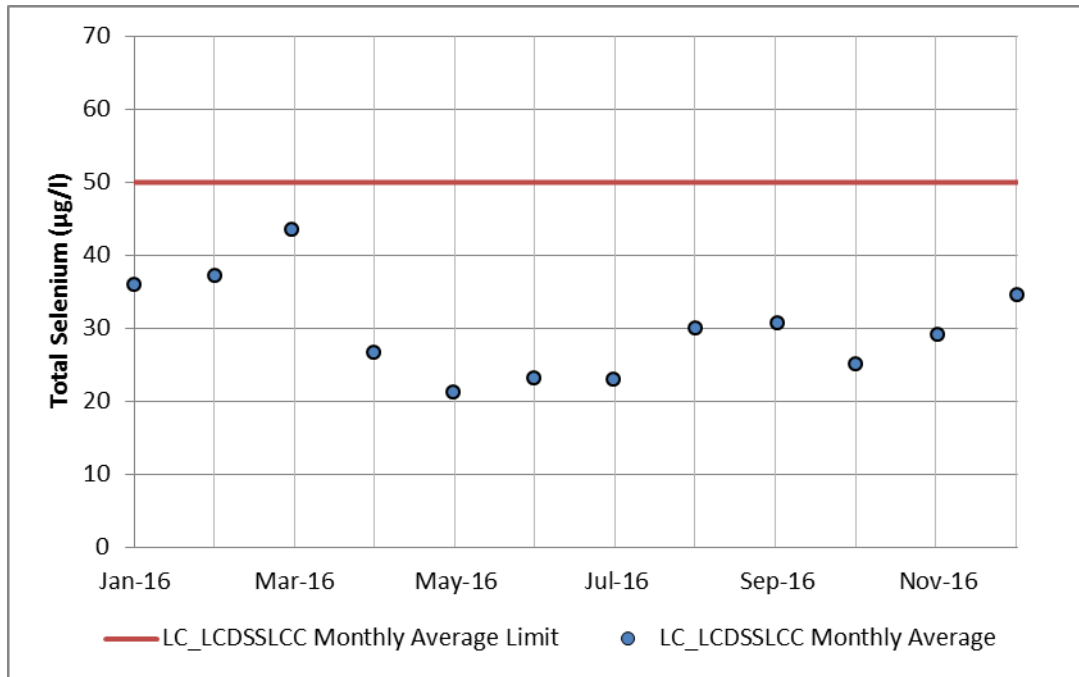


Figure 10. Monthly average total selenium (top panel) and nitrate-N (bottom panel) concentrations recorded at Line Creek Operation Compliance Point E297110 (LC_LCDSSLCC).

Note: The monthly average compliance limit for nitrate was exceeded in January, February, March, April, August, September, October, November and December and will be further discussed in Section 2.3.

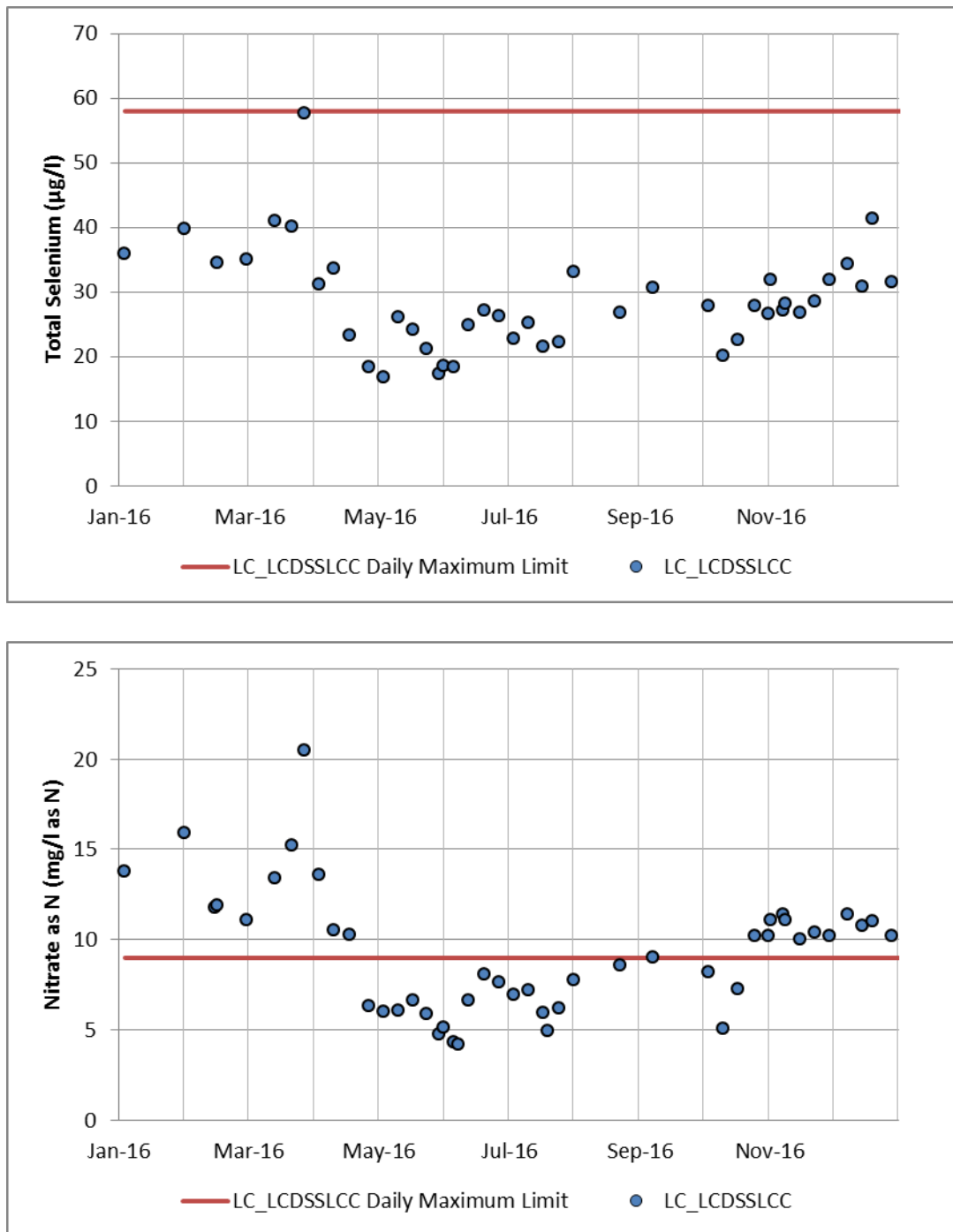


Figure 11. Daily maximum total selenium (top panel) and nitrate-N (bottom panel) concentrations recorded at Line Creek Operation Compliance Point E297110 (LC_LCDSSLCC).

Note: The daily maximum compliance limit for nitrate was exceeded in January, February, March, April, October, November and December and will be further discussed in Section 2.3.

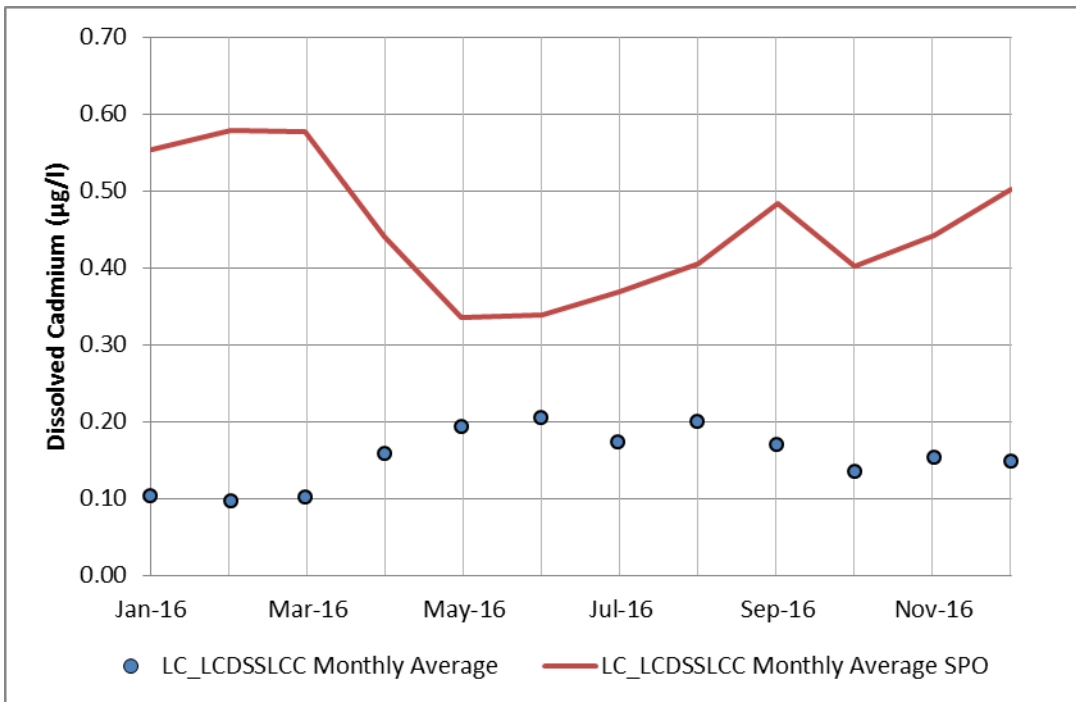
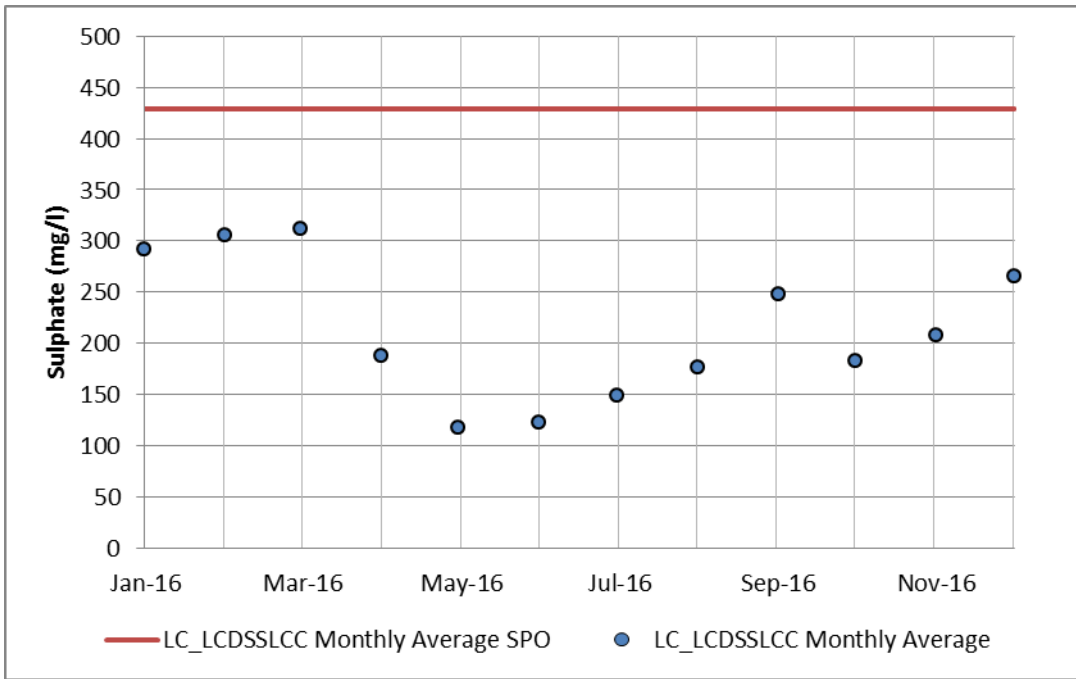


Figure 12. Monthly average sulphate (top panel) and cadmium (bottom panel) concentrations recorded at Line Creek Operation Compliance Point E297110 (LC_LCDSSLCC).

Note: Sulphate and cadmium SPOs are hardness dependent and as such, reflect temporal variation in water hardness.

Compliance Point E102682 (EV_HC1)

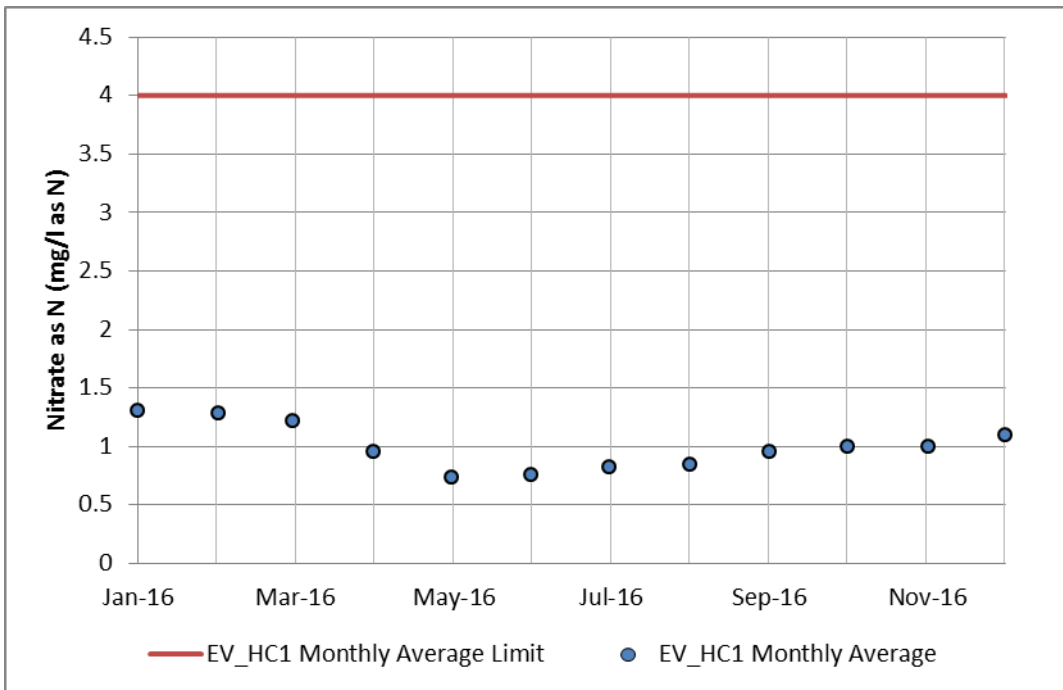
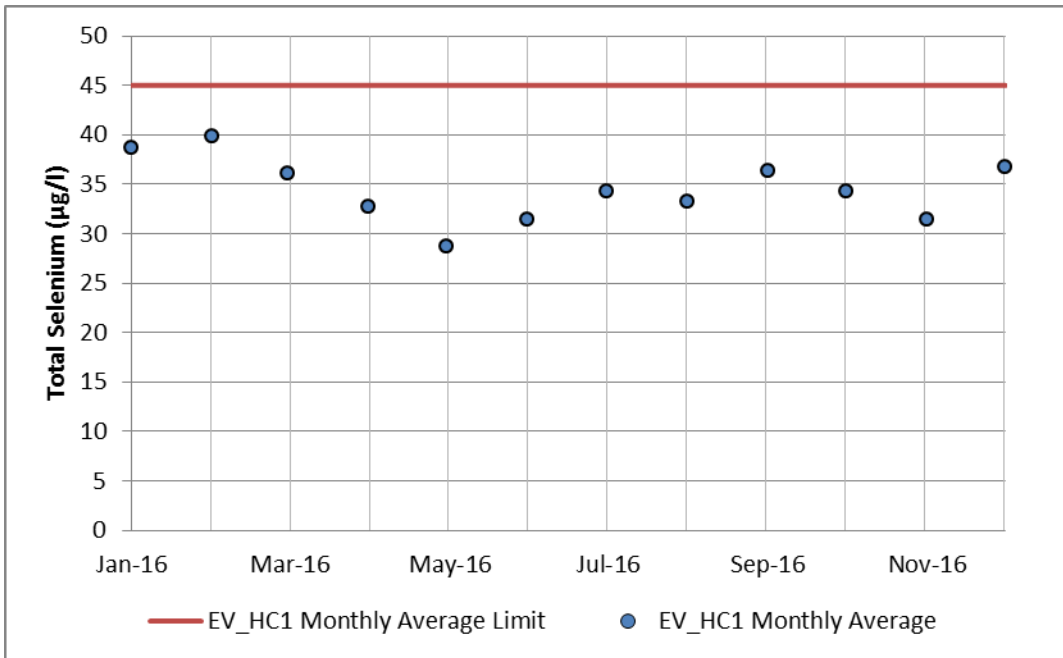


Figure 13. Monthly average total selenium (top panel) and nitrate-N (bottom panel) concentrations recorded at Elkview Operation Compliance Point E102682 (EV_HC1).

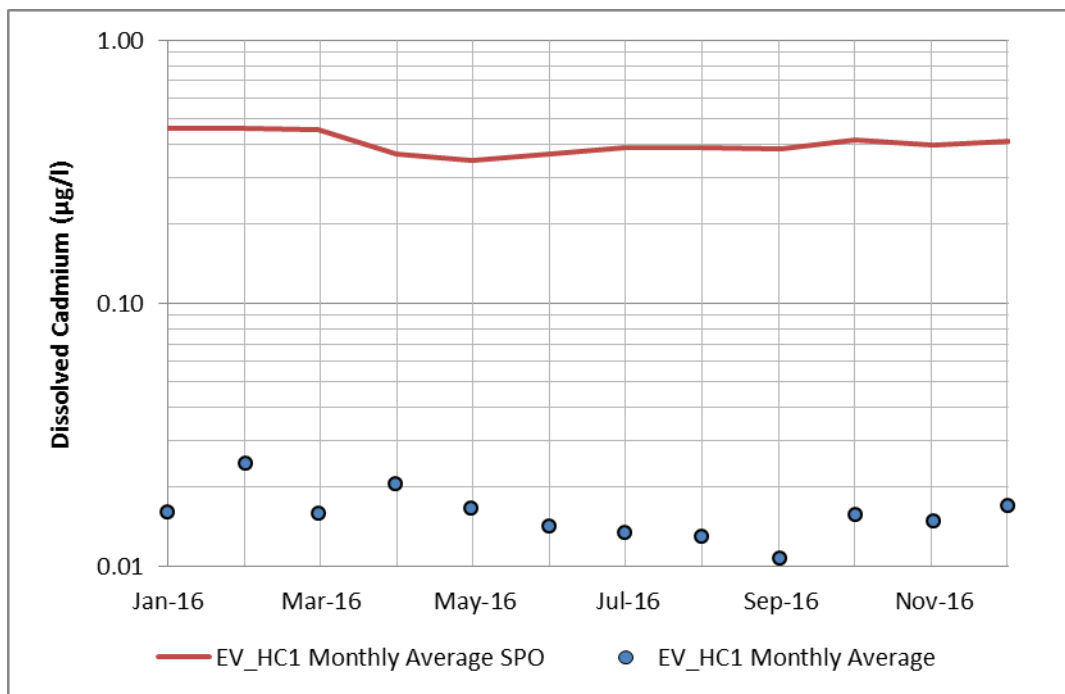
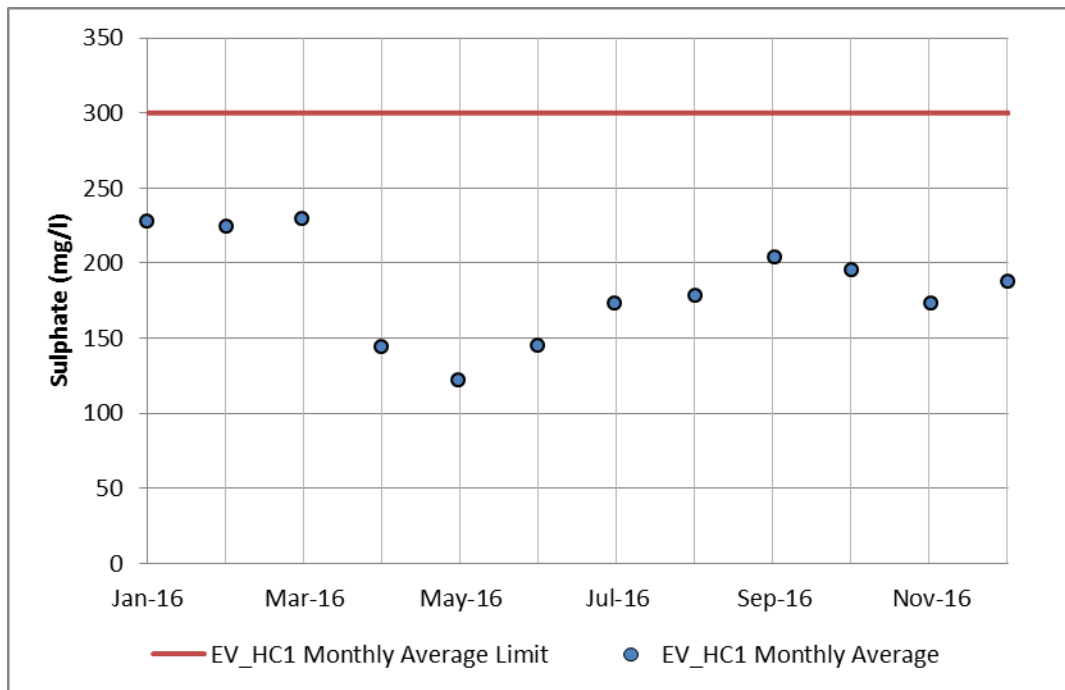


Figure 14. Monthly average sulphate (top panel) and cadmium (bottom panel) concentrations recorded at Elkview Operation Compliance Point E102682 (EV_HC1).

Note: The cadmium SPO is hardness dependent and as such, reflects temporal variation in water hardness. Cadmium concentrations are on a logarithmic scale.

Compliance Point E300091 (EV_MC2)

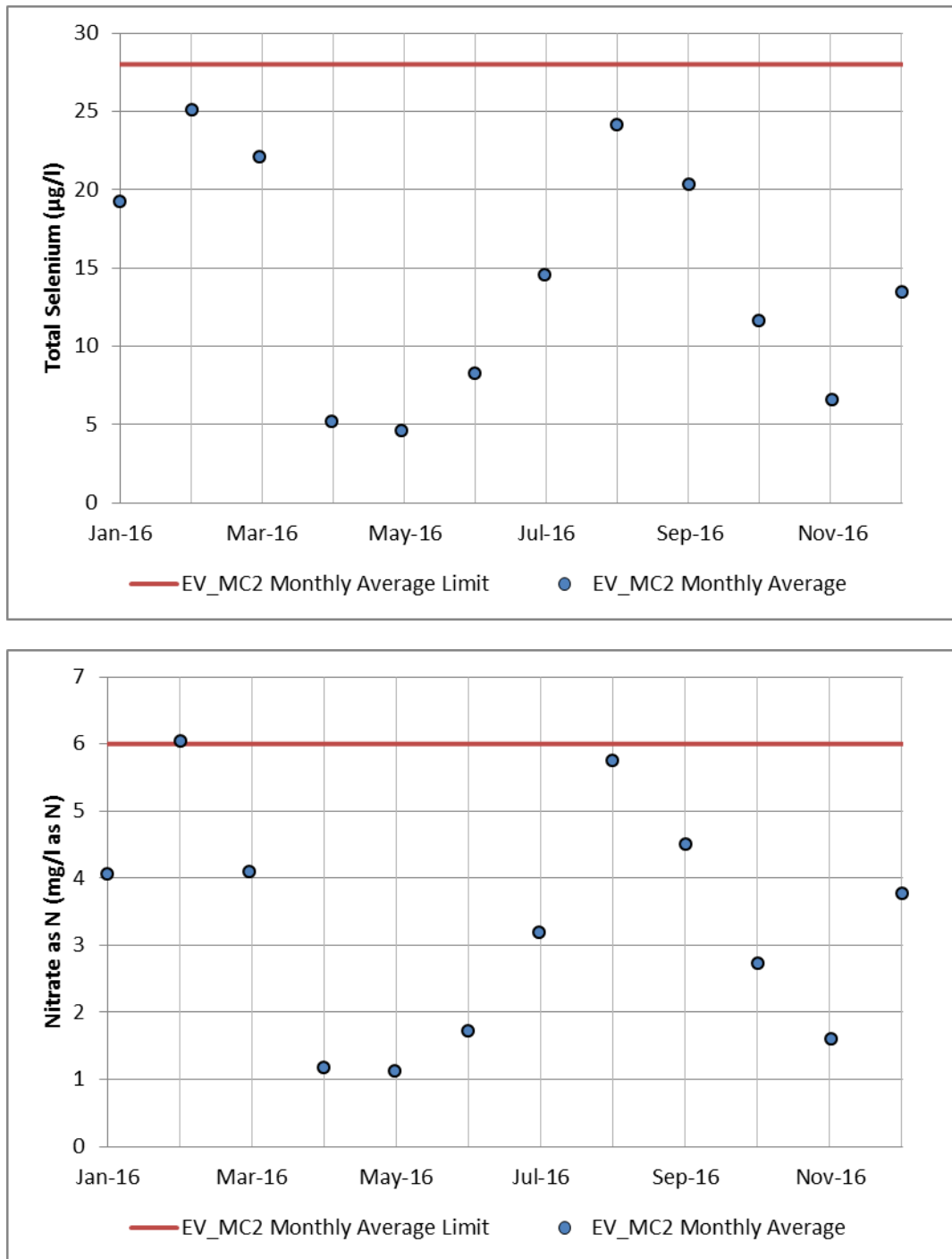


Figure 15. Monthly average total selenium (top panel) and nitrate-N (bottom panel) concentrations recorded at Elkview Operation Compliance Point E300091 (EV_MC2).

Note: The February monthly average nitrate-N concentrations were within the compliance limit with a calculated monthly average concentration of 6.03 mg/L as N.

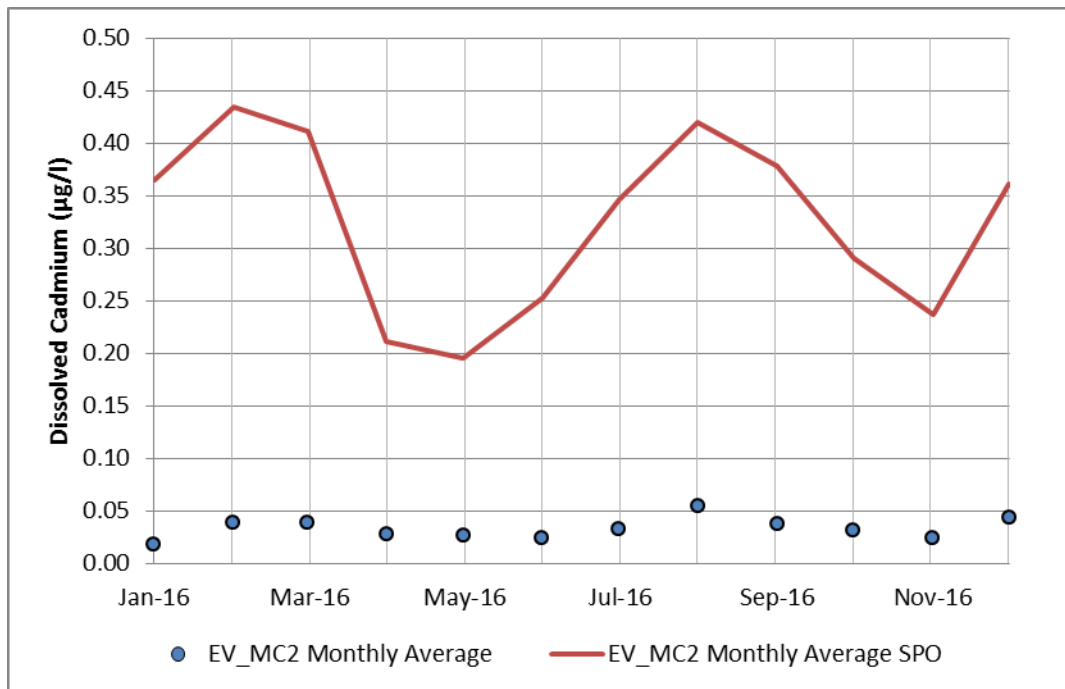
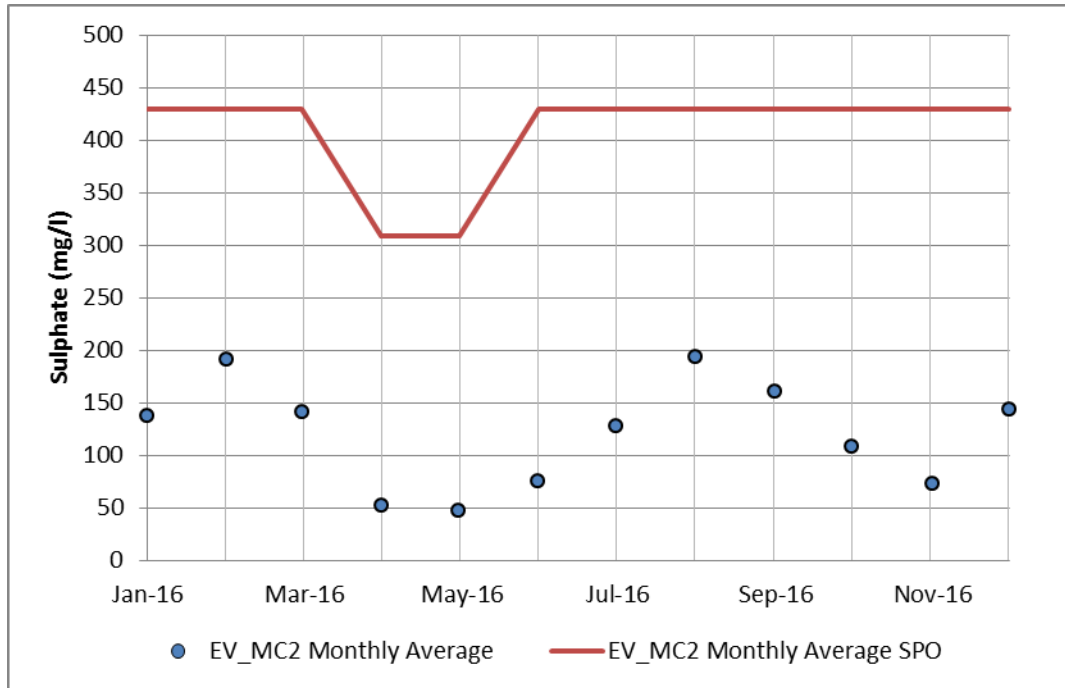


Figure 16. Monthly average sulphate (top panel) and cadmium (bottom panel) concentrations recorded at Elkview Operation Compliance Point E300091 (EV_MC2)

Note: Sulphate and cadmium SPOs are hardness dependent and as such, reflect temporal variation in water hardness.

Compliance Point E258937 (CM_MC2)

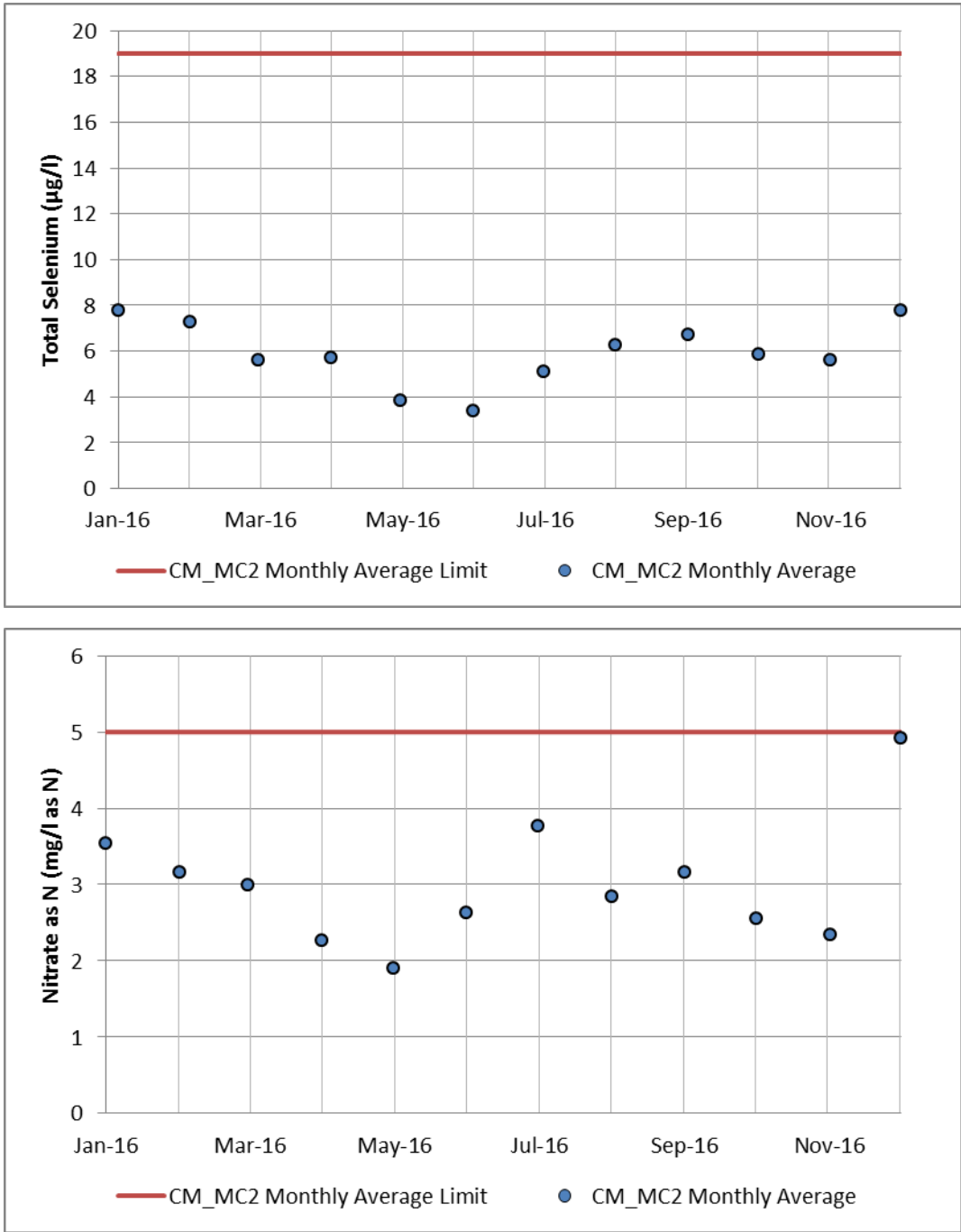


Figure 17. Monthly average total selenium (top panel) and nitrate-N (bottom panel) concentrations recorded at Coal Mountain Operation Compliance Point E258937 (CM_MC2).

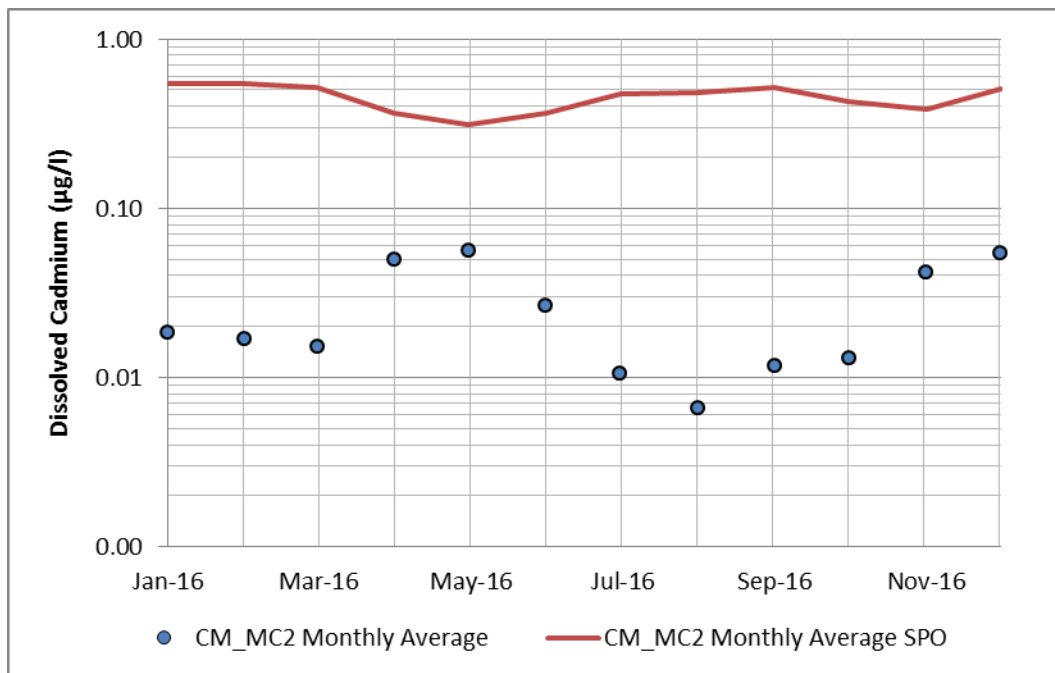
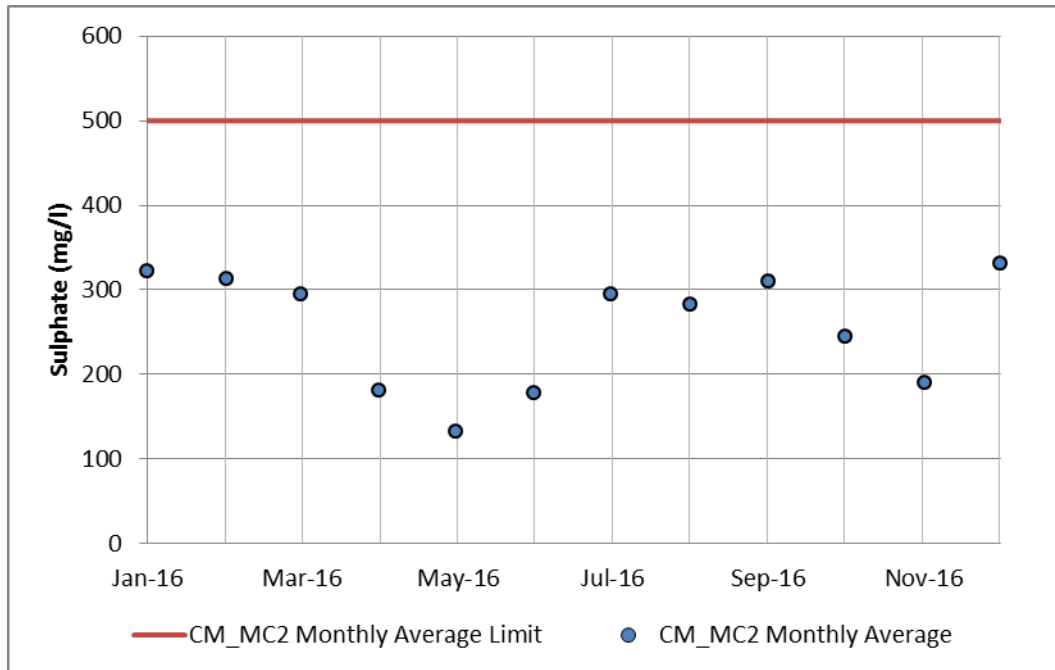


Figure 18. Monthly average sulphate (top panel) and cadmium (bottom panel) concentrations recorded at Coal Mountain Operation Compliance Point E258937 (CM_MC2).

Note: The cadmium SPO is hardness dependent and as such, reflects temporal variation in water hardness. Cadmium concentrations are on a logarithmic scale.

Compliance Point E291569 (LC_WTF_OUT/ WL_BFWB_OUT_SP21)

The West Line Creek Active water treatment plant finished commissioning and began operations on February 1, 2016. The location of the compliance point (E291569) was changed in 2016 as per Permit 107517 Amendment letter dated March 14, 2016. As such, the two Teck location codes are shown separately in the figures below.

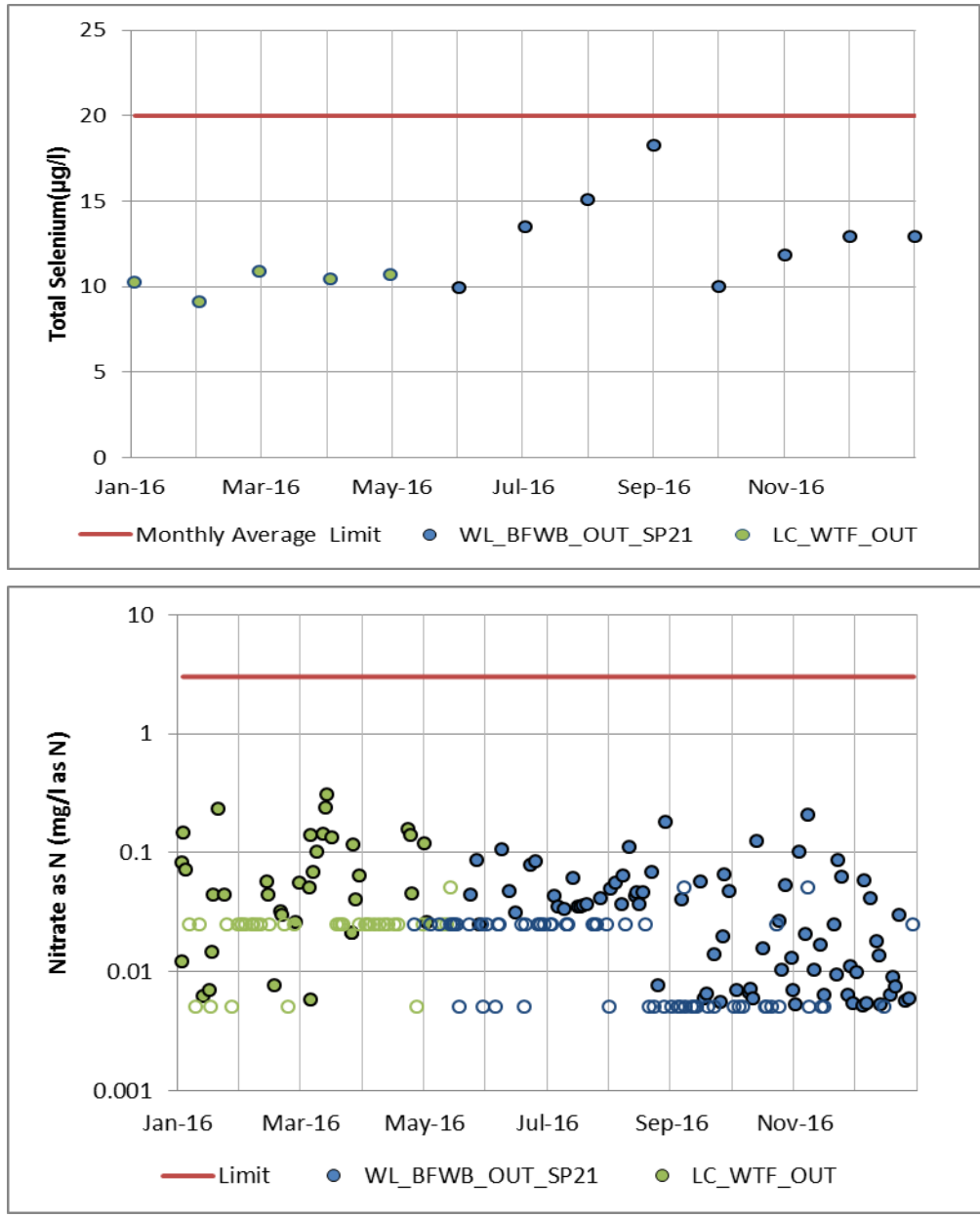


Figure 19. Monthly average total selenium (top panel) and nitrate-N (bottom panel) concentrations recorded at the West Line Creek Active Water Treatment Facility Compliance Point E291569 (LC_WTF_OUT/ WL_BFWB_OUT_SP21).

Note:

1. The location of the compliance point E291569 was changed in April 2016 as per Permit 107517 amendment dated March 14, 2016.
2. Sample results below Method Detection Limit (MDL) are indicated using hollow data points at the relevant MDL

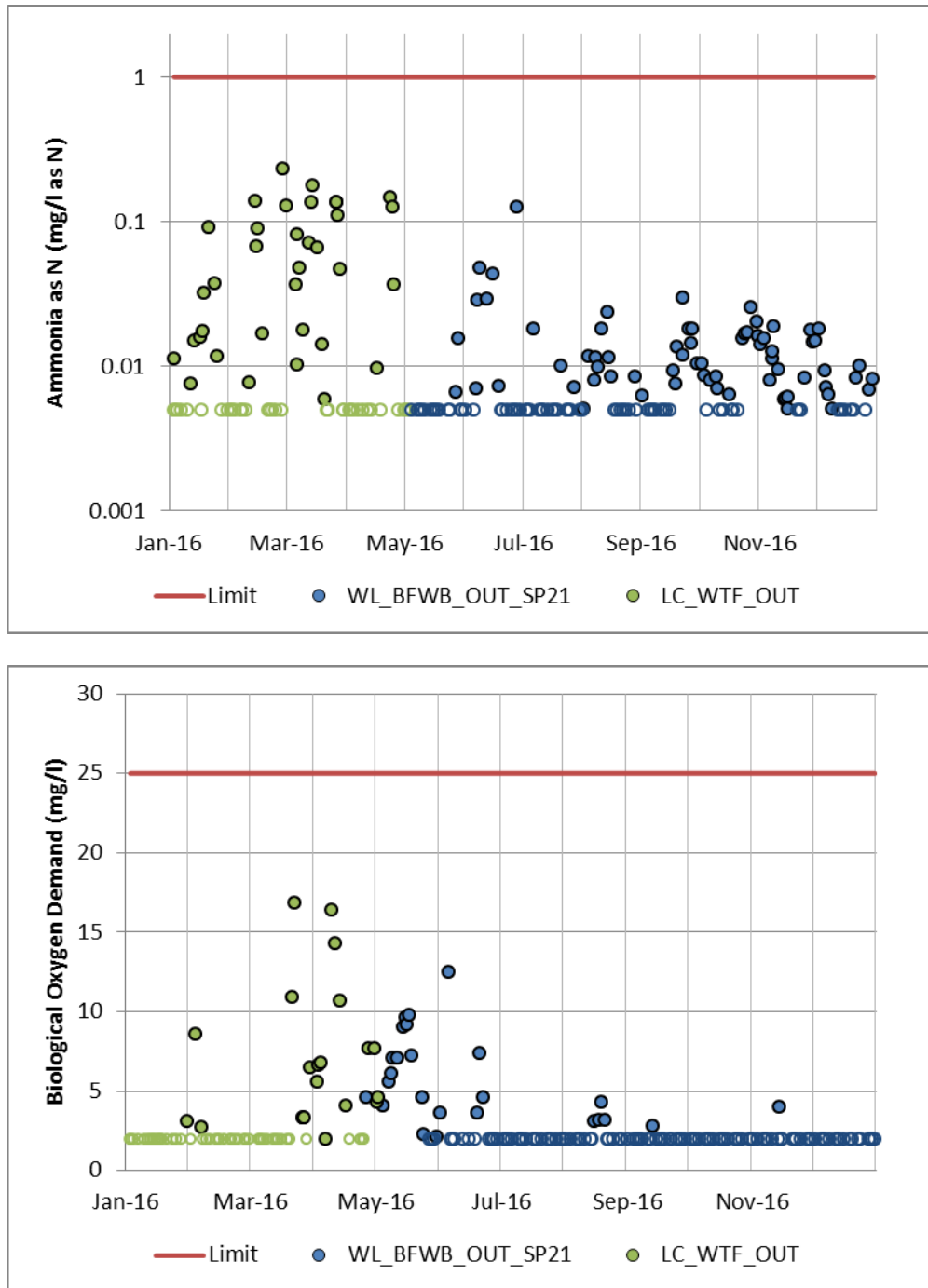


Figure 20. Ammonia (top panel) and Biological Oxygen Demand (bottom panel) concentrations recorded at the West Line Creek Active Water Treatment Facility Compliance Point E291569 (LC_WTF_OUT/ WL_BFWB_OUT_SP21).

Note:

1. The location of the compliance point E291569 was changed in April 2016 as per Permit 107517 amendment dated March 14, 2016.
2. Sample results below Method Detection Limit (MDL) are indicated using hollow data points at the relevant MDL

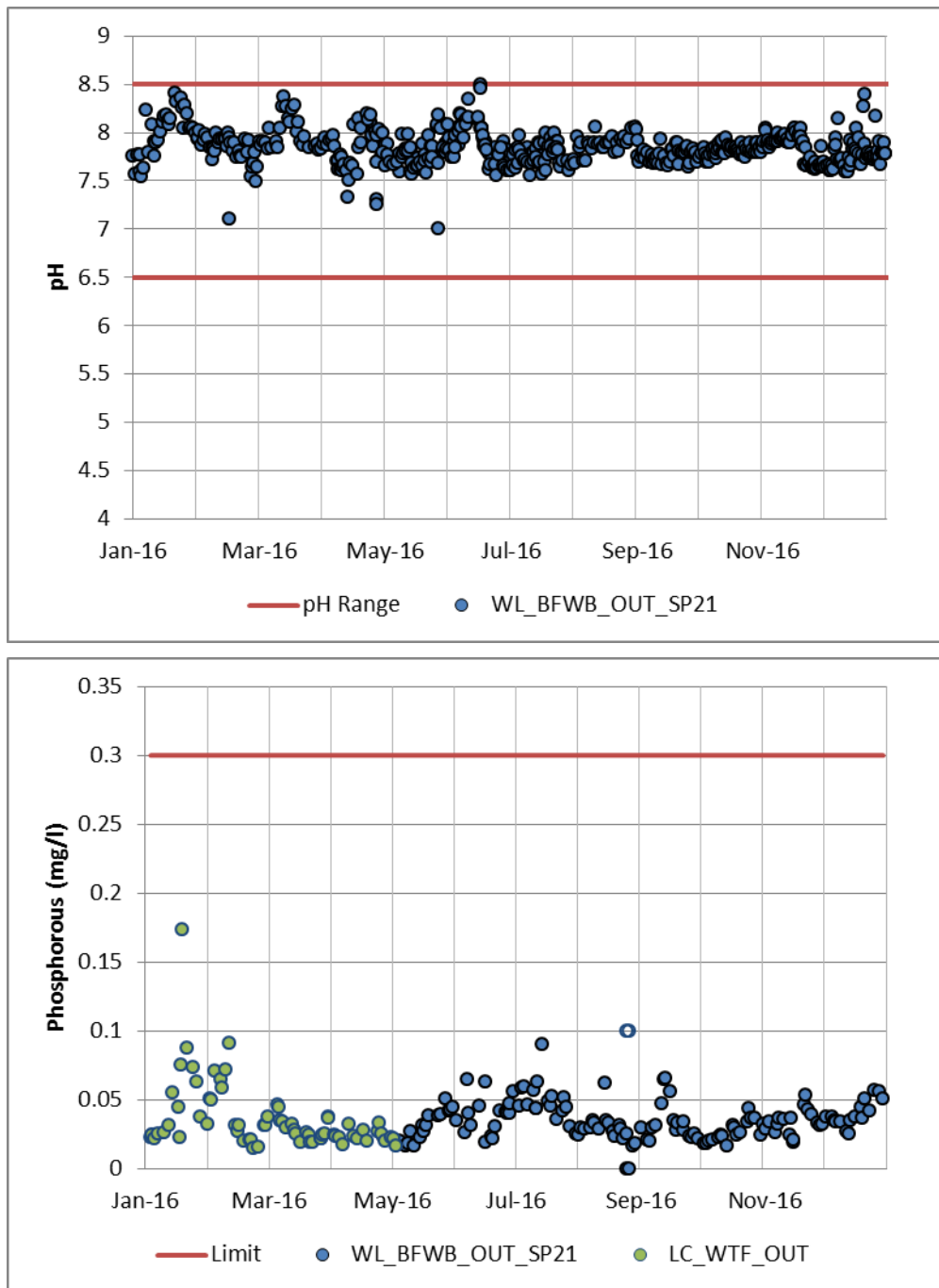


Figure 21. pH (top panel) and Total Phosphorus (bottom panel) concentrations recorded at the West Line Creek Active Water Treatment Facility Compliance Point E291569 (LC_WTF_OUT/ WL_BFWB_OUT_SP21).

Note:

1. The location of the compliance point E291569 was changed in April 2016 as per Permit 107517 amendment dated March 14, 2016.
2. Sample results below Method Detection Limit (MDL) are indicated using hollow data points at the relevant MDL

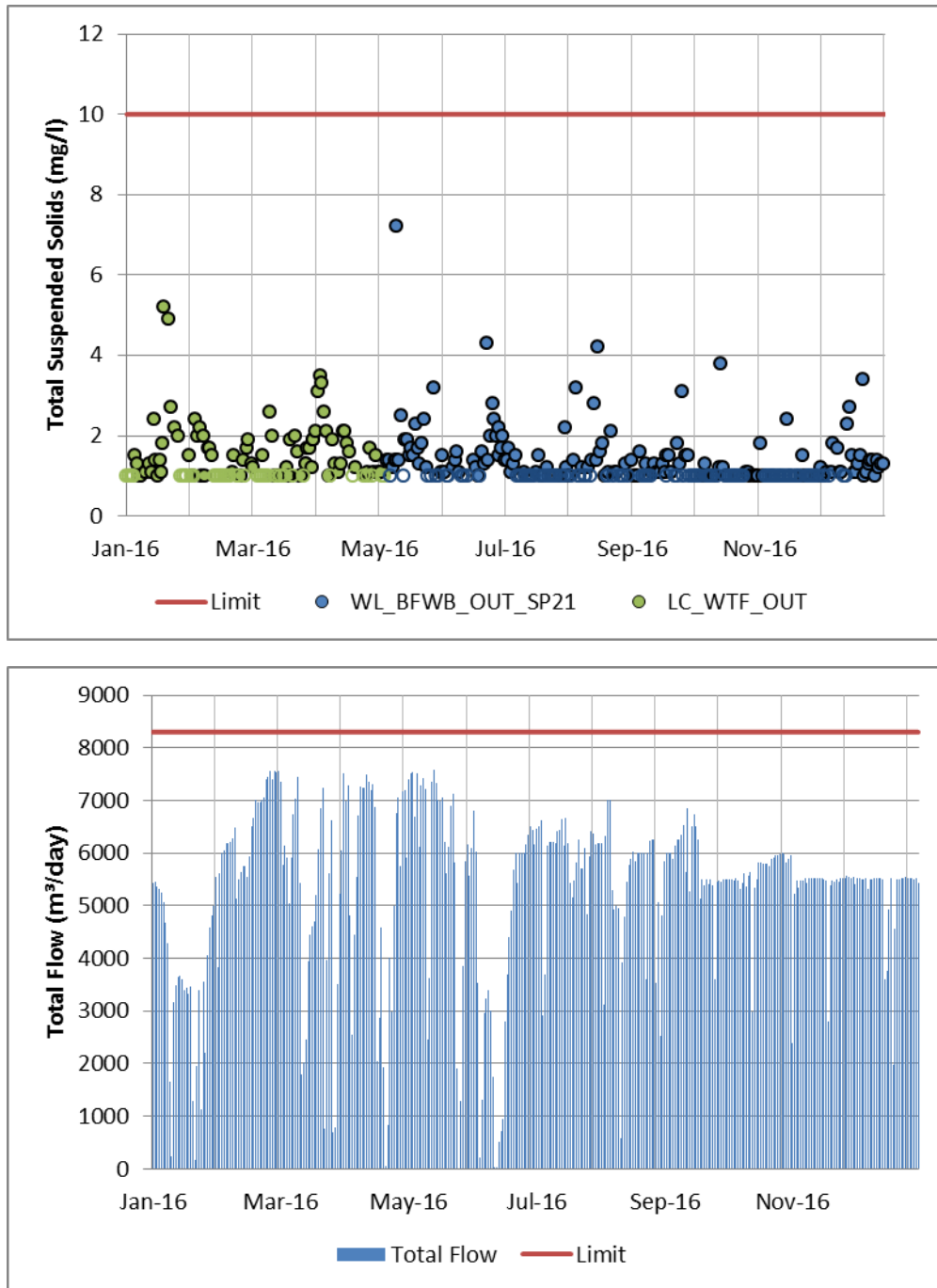


Figure 22. Total suspended solids concentrations and flows recorded at the West Line Creek Active Water Treatment Facility Compliance Point E291569 (LC_WTF_OUT/ WL_BFWB_OUT_SP21).

Note:

1. The location of the compliance point E291569 was changed in April 2016 as per Permit 107517 amendment dated March 14, 2016.
2. Sample results below Method Detection Limit (MDL) are indicated using hollow data points at the relevant MDL

2.2 Site Performance Objectives – Order Stations

As noted in Section 1.1.2, seven Order Stations have been designated to monitor water quality in the Elk Valley (i.e., the Designated Area), and ultimately the implementation success of the ABMP. To aid in this evaluation, timeframes of short-, medium-, and long-term SPOs have been established at each Order Station. SPOs are required to be attained by the outlined timeframes. A summary of the seven Order Stations and their respective short-term SPOs are presented in Table 12 below.

Table 12. Short-term site performance objectives established at Order stations within the Elk Valley.

EMS ID	Site ID	Constituent	Monthly Average SPO	Timeframe
0200378	GH_FR1	Total Selenium	63 µg/L	December 31, 2019
		Nitrate-N	20 mg/L as N	Immediately
		Sulphate	429 mg/L	Immediately
		Dissolved Cadmium	0.39 µg/L	Immediately
0200028	LC_LC5	Total Selenium	51 µg/L	December 31, 2019
		Nitrate-N	18 mg/L as N	Immediately
		Sulphate	429 mg/L	Immediately
		Dissolved Cadmium	0.39 µg/L	Immediately
E206661	GH_ER1	Total Selenium	19 µg/L	Immediately
		Nitrate-N	3 mg/L as N	Immediately
		Sulphate	309 mg/L	Immediately
		Dissolved Cadmium	0.24 µg/L	Immediately
0200027	EV_ER4	Total Selenium	23 µg/L	Immediately
		Nitrate-N	4 mg/L as N	December 31, 2019
		Sulphate	429 mg/L	Immediately
		Dissolved Cadmium	0.24 µg/L	Immediately
0200393	EV_ER1	Total Selenium	19 µg/L	Immediately
		Nitrate-N	3 mg/L as N	December 31, 2019
		Sulphate	429 mg/L	Immediately
		Dissolved Cadmium	0.24 µg/L	Immediately
E294312	RG_ELKORES	Total Selenium	19 µg/L	Immediately
		Nitrate-N	3 mg/L as N	December 31, 2019
		Sulphate	429 mg/L	Immediately
		Dissolved Cadmium	0.24 µg/L	Immediately
E300230	RG_DSELK	Total Selenium	2 µg/L	Immediately
		Nitrate-N	3 mg/L as N	Immediately
		Sulphate	308 mg/L	Immediately
		Dissolved Cadmium	0.19 µg/L	Immediately

Notes:

- Environmental Monitoring Site (EMS) identification numbers (IDs) correspond to those listed in the Ministry's monitoring data repository.
- As was the case for effluent limits developed for Compliance Points, SPOs for cadmium are hardness dependent and for purposes herein have been set at 360 mg/L as CaCO₃ (sites 0200378, 0200028, and E206661), 200 mg/L as CaCO₃ (sites 0200027, 0200393, and E294312), and 150 mg/L as CaCO₃ (site E300230), respectively.
- Long-term nitrate-N SPOs at sites 0200378 and 0200028 are hardness dependent per the following relationship:

$$\text{Nitrate-SPO} = 10^{1.0003 \log_{10}(\text{hardness}) - 1.52}$$
Short- and medium-term nitrate-N SPOs are not hardness dependent.

A summary of 2016 water quality data recorded at Order Stations relative to current SPOs are presented in Figure 23 (0200378; GH_FR1), Figure 24 (0200028; LC_LC5), Figure 25 (E206661;

GH_ER1), Figure 26 (0200027; EV_ER4), Figure 27 (0200393; EV_ER1), Figure 28 (E294312; RG_ELKORES), and Figure 29 (E300230; RG_DSELK).

All of the above-mentioned figures have been set-up and presented in a consistent format. Specifically, each figure is divided into four quadrants (panels) with nitrate-N concentrations appearing in quadrant 1 (top right panel), total selenium in quadrant 2 (top left panel), sulphate in quadrant 3 (bottom left panel), and dissolved cadmium in quadrant 4 (bottom right panel). Based on 2016 collected data and as illustrated within Figures 23 through 29, current SPOs were attained.

Order Station 0200378 (GH_FR1)

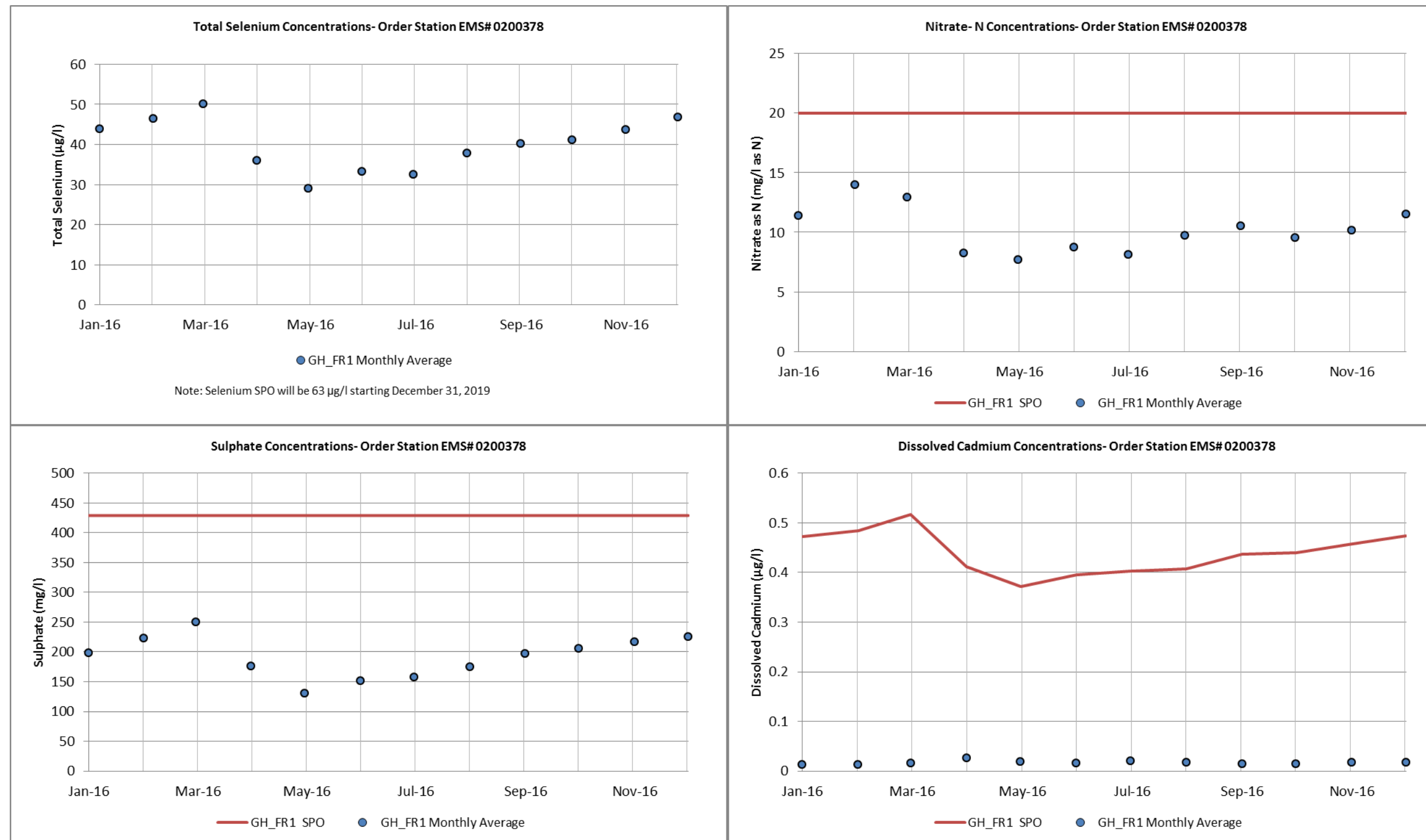


Figure 23. Plot of monthly average total selenium, nitrate-N, sulphate, and dissolved cadmium concentrations relative to site performance objectives recorded at Order Station 0200378 (GH_FR1).

Order Station 0200028 (LC_LC5)

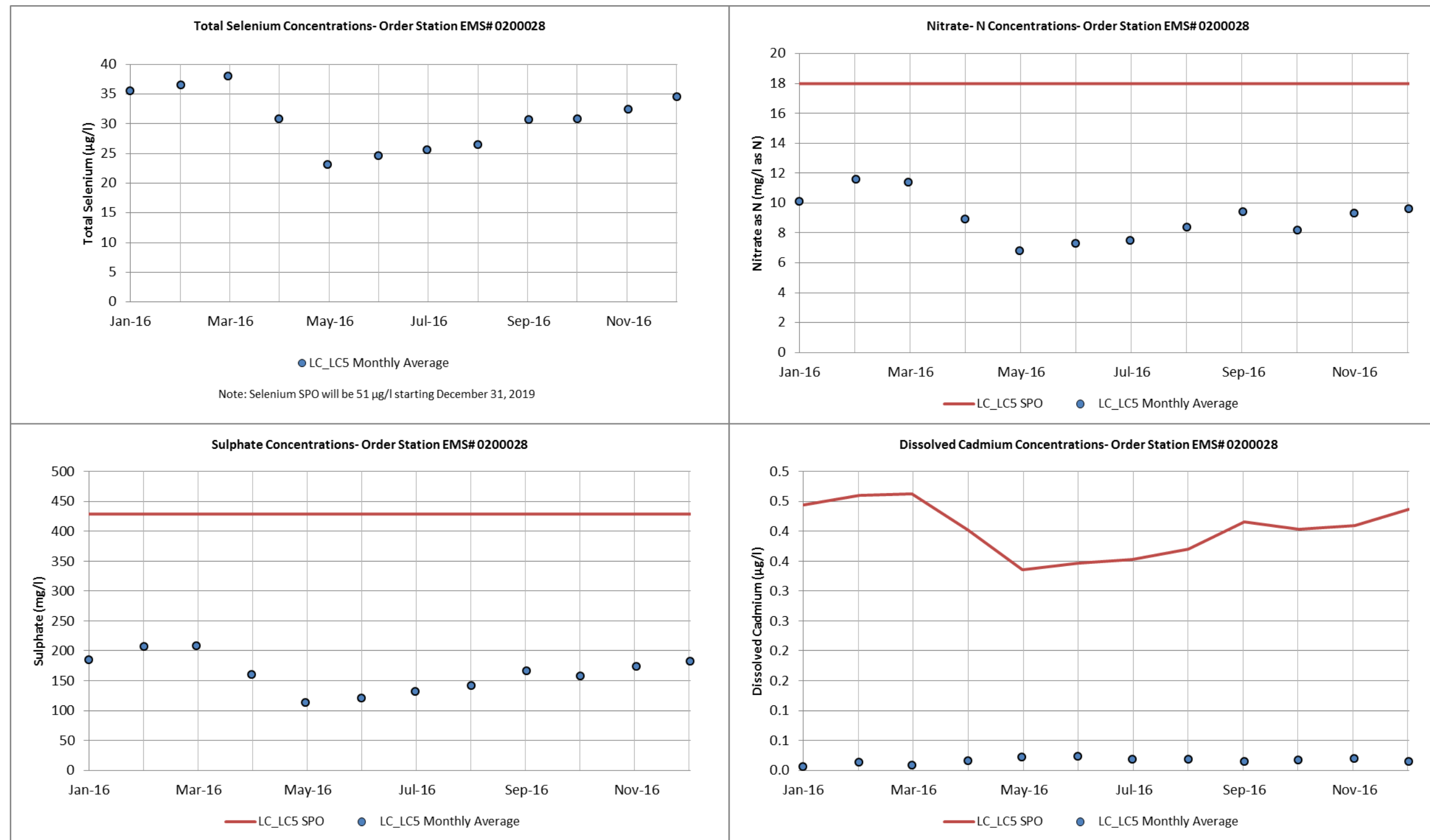


Figure 24. Plot of monthly average total selenium, nitrate-N, sulphate, and dissolved cadmium concentrations relative to site performance objectives recorded at Order Station 0200028 (LC_LC5).

Order Station 0206661 (GH_ER1)

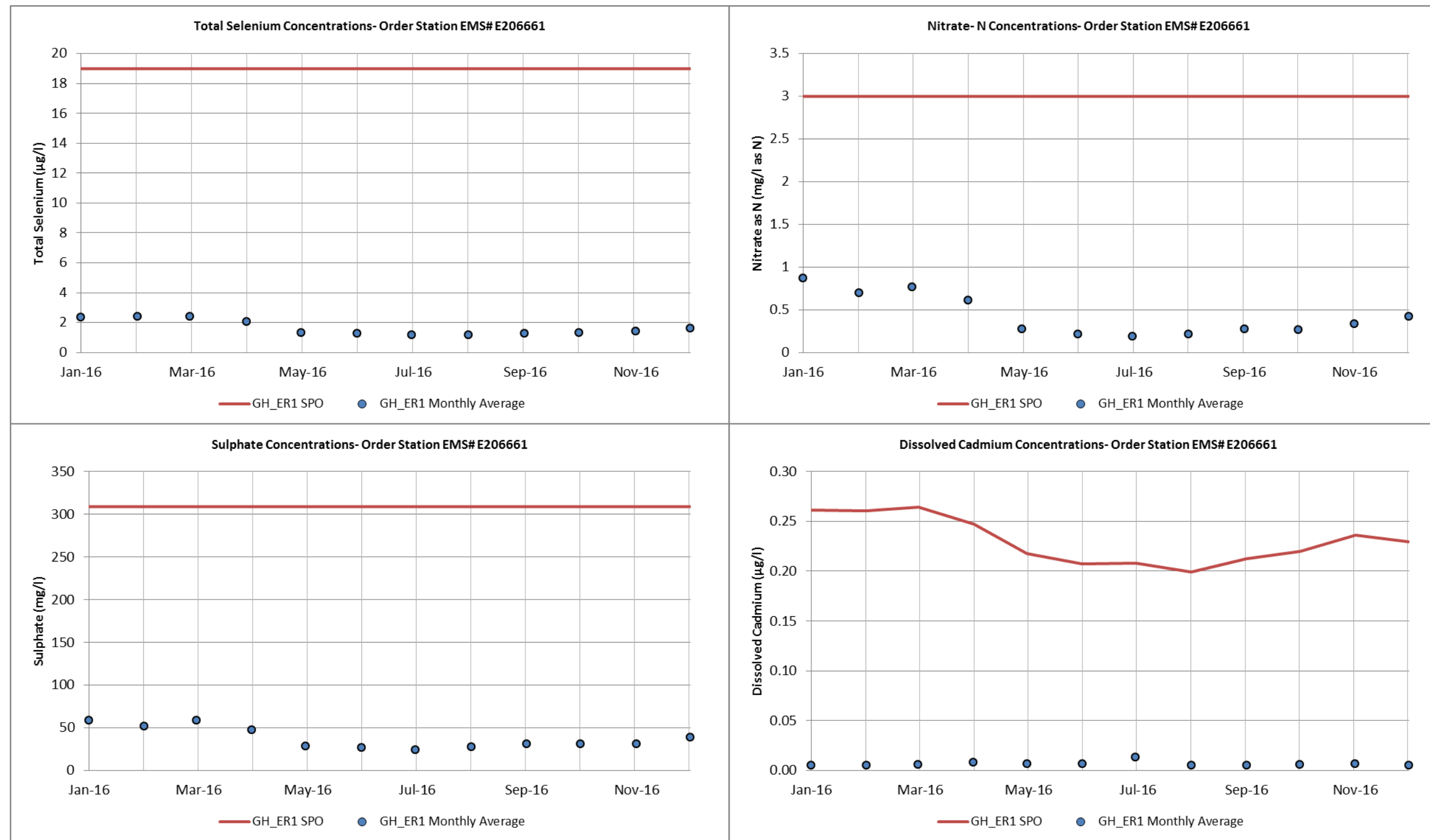


Figure 25. Plot of monthly average total selenium, nitrate-N, sulphate, and dissolved cadmium concentrations relative to site performance objectives recorded at Order Station 0206661 (GH_ER1).

Order Station 0200027 (EV_ER4)

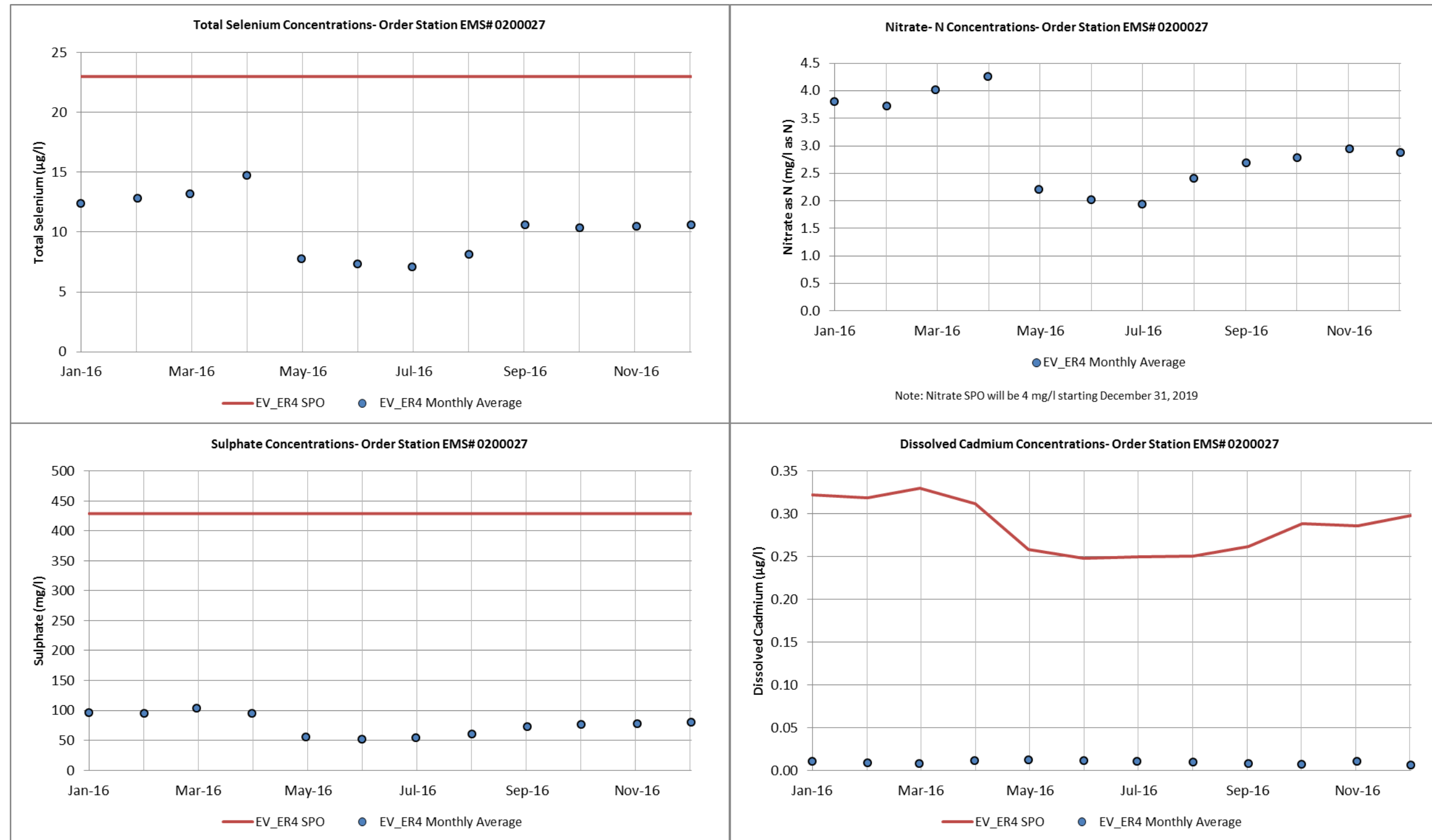


Figure 26. Plot of monthly average total selenium, nitrate-N, sulphate, and dissolved cadmium concentrations relative to site performance objectives recorded at Order Station 0200027 (EV_ER4).

Order Station 0200393 (EV_ER1)

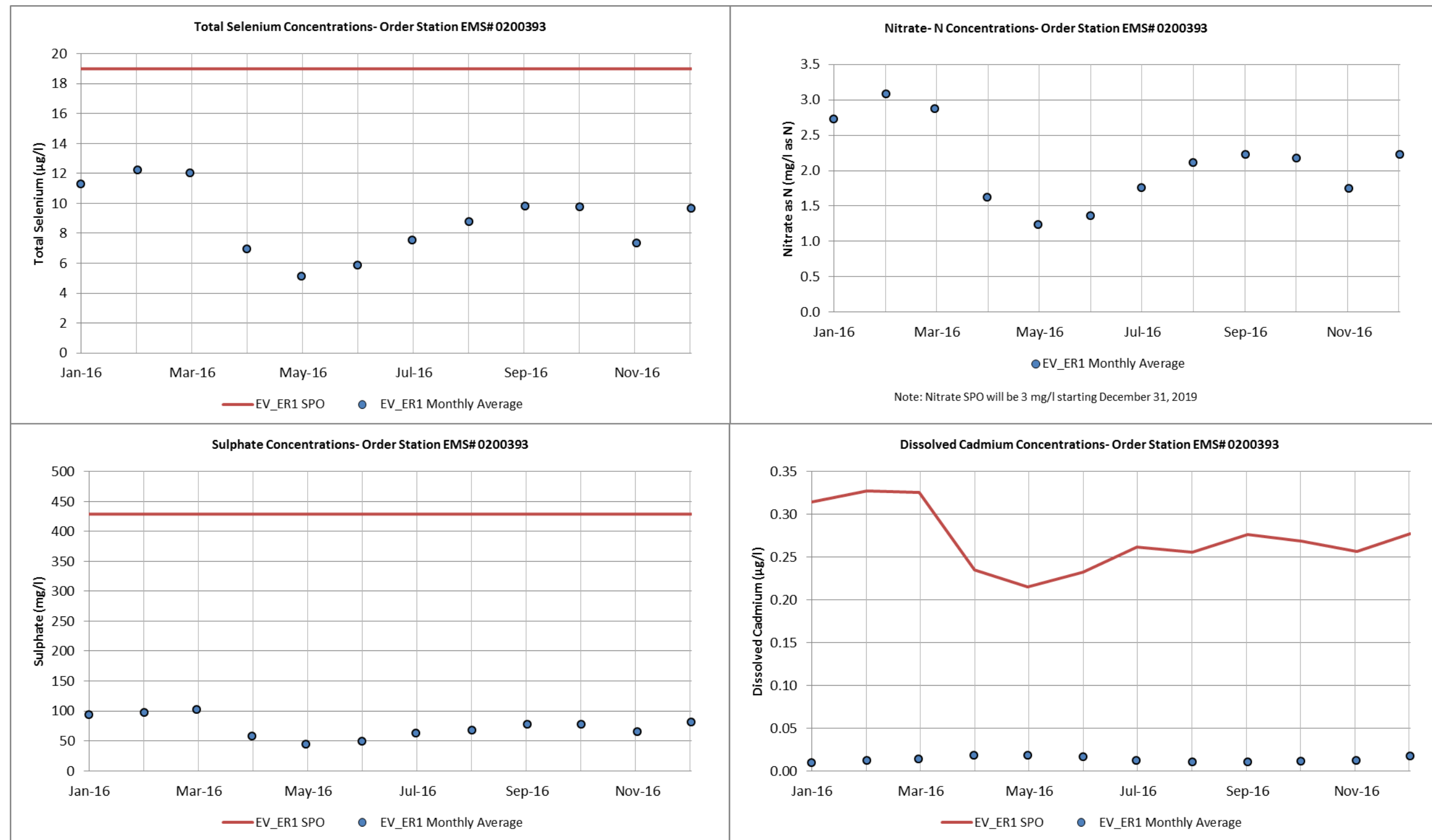


Figure 27. Plot of monthly average total selenium, nitrate-N, sulphate, and dissolved cadmium concentrations relative to site performance objectives recorded at Order Station 0200393 (EV_ER1). Individual data points are illustrated.

Order Station E294312 (RG_ELKORES)

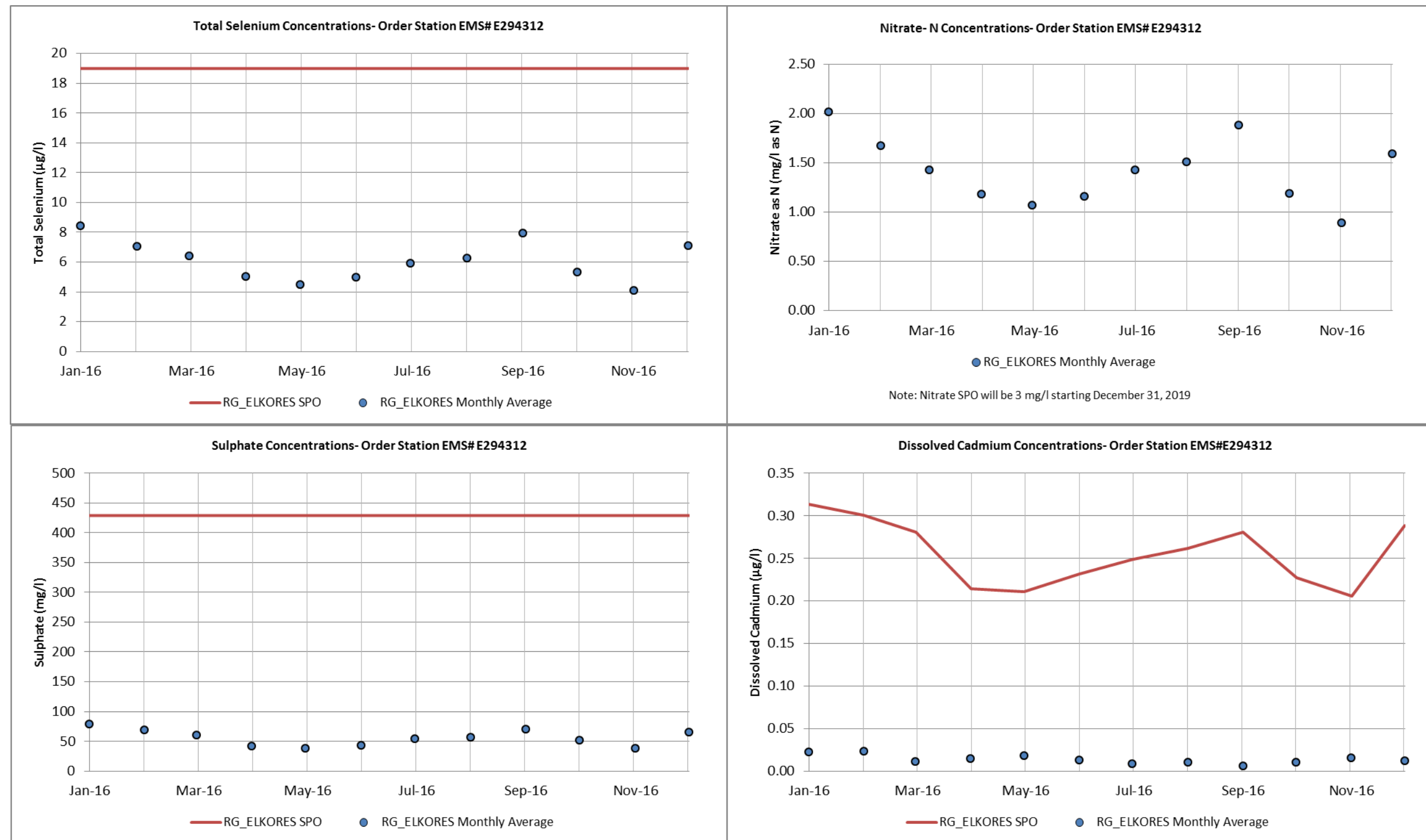


Figure 28. Plot of monthly average total selenium, nitrate-N, sulphate, and dissolved cadmium concentrations relative to site performance objectives recorded at Order Station E294312 (RG_ELKORES). Individual data points are illustrated.

Order Station E300230 (RG_DSELK)

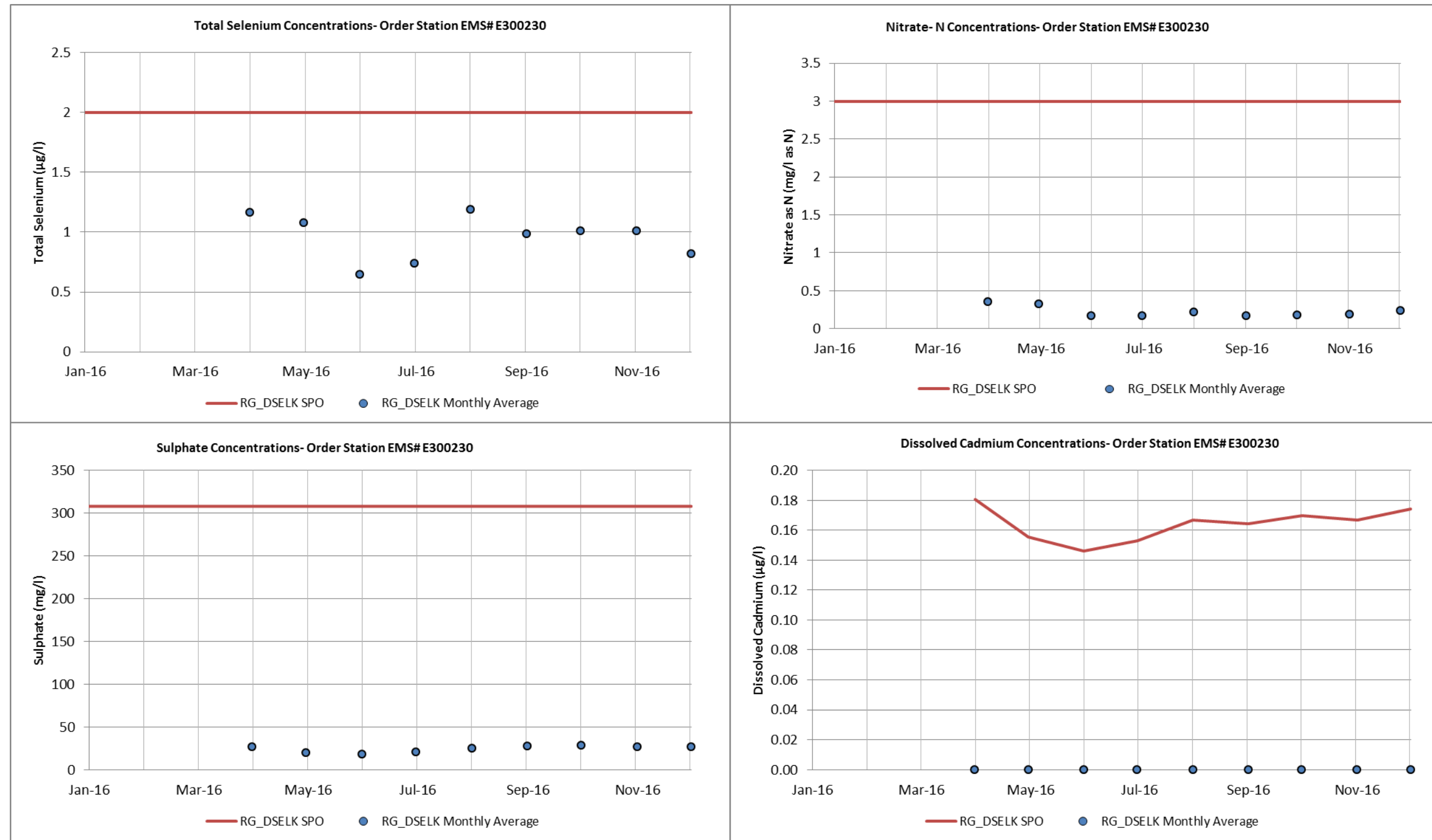


Figure 29. Plot of monthly average total selenium, nitrate-N, sulphate, and dissolved cadmium concentrations relative to site performance objectives recorded at Order Station E300230 (RG_DSELK).

Note that samples in January, February and March of 2016 were unattainable due to ice conditions at Lake Kocanusa.

2.3 Non-Compliances

Non-compliances as documented via MoE inspection reports and warning letters can be grouped into one of five categories: 1) permit level exceedances, 2) acute toxicity failures, 3) missed sample collection, 4) administrative non-compliances, and 5) hold time exceedances. A summary of inspection reports and associated findings are presented in Table 13. Responses have been provided previously to all inspection reports.

Table 13. Summary of 2016 non-compliances documented via inspection report or warning letter.

Inspection No.	Date Occurred	EMS ID (SITE ID)	Incident Category
25386	9-Nov-15, 23-Nov-15	E105061 (GH_SC2)	2- acute toxicity failure
	10-Dec-15	E300071 (FR_FRCP1)	1- permit level exceedances
	31-Dec-15	E297110 (LC_LCDSSLCC)	1- permit level exceedances
	8-Jan-16	0200384 (GH_CC1)	2- acute toxicity failure
	Q4 2015	19 Locations	5- hold time exceedances
26048/ 28047	2-Feb-16	E298590 (EV_DC1)	2- acute toxicity failure
	3- Feb-16, 10-Feb-16	E200384 (GH_CC1)	2- acute toxicity failure
	4- Feb-16, 11-Feb- 16	E261897 (FR_SP1)	2- acute toxicity failure
	28-Mar-16	E291569 (LC_WTF_OUT)	2- acute toxicity failure
23865/ 28047	5-Jan-16, 2-Feb-16, 29-Feb-16, 1-Mar-16, 9-Mar-16, 31-Mar-16	E300071 (FR_FRCP1)	1- permit level exceedances
26230/ 28047	4-Jan-16, 1-Feb-16, 15- Feb-16, 16-Feb-16, 14-Mar-16, 22-Mar-16, 28-Mar-16	E297110 (LC_LCDSSLCC)	1- permit level exceedances
28047	Q1 2016	Multiple Locations	5- hold time exceedances
28868/ 30691	4-Apr-16, 11-Apr-16, 18-Apr-16	E297110 (LC_LCDSSLCC)	1- permit level exceedances
30073/30691	10-May-16, 27-May-16	E200384 (GH_CC1)	2- acute toxicity failure
30691	26-May-16	E200384 (GH_CC1)	4- late reporting of non-compliance
	11-May-16	E300090 (GH_ERC), E206661 (GH_ER1)	3- missed sample collection
	Q2 2016	Multiple Locations	5- hold time exceedances

Notes:

Table 13 summarizes non-compliances identified on all inspections **received** by Teck in 2016, and not included in the 2015 annual report. This includes Inspection No 25386 which covered a review of Q4 2015 data.

Compliance limit exceedances were also recorded for selenium, sulphate and nitrate at Compliance Points E300071 (FR_FRCP1) and E297110 (LC_LCDSSLCC). A summary of exceedances by analyte is shown in Figure 30 and a summary by location is shown in Table 14.

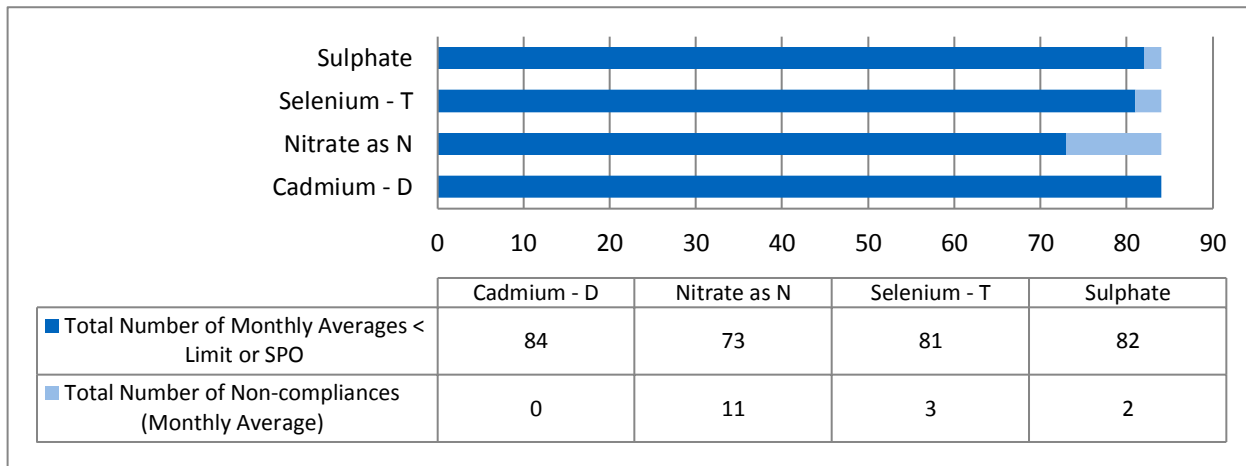
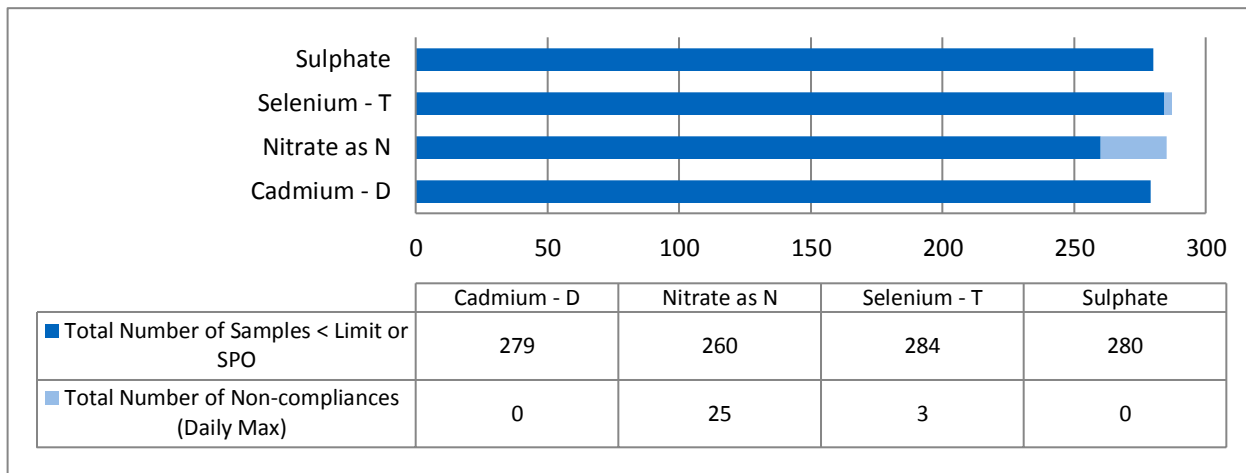


Figure 30. Summary of daily maximum (top panel) and monthly average (bottom panel) compliance limit exceedances by analyte compared to total samples taken and total monthly averages at Compliance Points in 2016.

Table 14. Summary of 2016 exceedances of authorized discharge compliance limits.

EMS ID	Site ID	Permitted Constituent and Limit	Recorded Concentrations	Date of Exceedance
E300071	FR_FRCP1	Daily Maximum – (Se) = 155 µg/L	447 µg/L	5-Jan
		Daily Maximum – (Se) = 155 µg/L	494 µg/L	2-Feb
		Daily Maximum – (Se) = 155 µg/L	209 µg/L	1-Mar
		Daily Maximum – (NO ₃ ⁻) = 32.5 mg/l	35 µg/L	2-Feb
		Monthly Average – (Se) = 130 µg/L	447 µg/L	January
		Monthly Average – (Se) = 130 µg/L	316 µg/L	February
		Monthly Average – (Se) = 130 µg/L	140 µg/L	March
		Monthly Average – (NO ₃ ⁻) = 27 mg/L as N	30.8 mg/l	January
		Monthly Average – (NO ₃ ⁻) = 27 mg/L as N	29.7 mg/l	February
		Monthly Average – (SO ₄ ²⁻) = 580 mg/L	1500 mg/L	January
		Monthly Average – (SO ₄ ²⁻) = 580 mg/L	1160 mg/L	February
E297110	LC_LCDSSLCC	Daily Maximum – (NO ₃ ⁻) = 9 mg/l	13.8 mg/l as N	4-Jan
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	15.9 mg/l as N	1-Feb
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	11.8 mg/l as N	15-Feb
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	11.9 mg/l as N	16-Feb
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	11.1 mg/l as N	1-Mar
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	13.4 mg/l as N	14-Mar
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	15.2 mg/l as N	22-Mar
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	20.5 mg/l as N	28-Mar
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	13.6 mg/l as N	4-Apr
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	10.5 mg/ as N	11-Apr
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	10.3 mg/l as N	18-Apr
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	10.2 mg/l as N	25-Oct
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	10.2 mg/l as N	31-Oct
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	11.1 mg/l as N	1-Nov
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	11.4 mg/l as N	7-Nov
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	11.4 mg/l as N	11-Nov
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	11.1 mg/l as N	8-Nov
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	10.0 mg/l as N	15-Nov
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	10.4 mg/l as N	22-Nov
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	10.2 mg/l as N	29-Nov
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	11.4 mg/l as N	7-Dec
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	10.8 mg/l as N	14-Dec
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	11.0 mg/l as N	19-Dec
		Daily Maximum – (NO ₃ ⁻) = 9 mg/l	10.2 mg/l as N	28-Dec
Monthly Average – (NO ₃ ⁻) = 7 mg/L as N	13.8 mg/l as N	January		
Monthly Average – (NO ₃ ⁻) = 7 mg/L as N	13.2 mg/l as N	February		
Monthly Average – (NO ₃ ⁻) = 7 mg/L as N	15.05 mg/ as N	March		
Monthly Average – (NO ₃ ⁻) = 7 mg/L as N	10.18 mg/l as N	April		
Monthly Average – (NO ₃ ⁻) = 7 mg/L as N	8.17 mg/l as N	August		

EMS ID	Site ID	Permitted Constituent and Limit	Recorded Concentrations	Date of Exceedance
		Monthly Average – (NO ₃ ⁻) = 7 mg/L as N	9 mg/l as N	September
		Monthly Average – (NO ₃ ⁻) = 7 mg/L as N	8.2mg/l as N	October
		Monthly Average – (NO ₃ ⁻) = 7 mg/L as N	10.7 mg/l as N	November
		Monthly Average – (NO ₃ ⁻) = 7 mg/L as N	10.85 mg/l as N	December

Additional detail and summary of the above-mentioned non-compliances, per category (e.g., permit level exceedances, missed sample collection etc.), are presented below.

Permit Level Exceedances (Category 1)

Permit level exceedances in 2016 were the result of exceeding compliance limits. As outlined within Table 14, a total of 44 permit level exceedances were recorded. This represents 2.5% of the total samples taken at compliance points in 2016 and 4.8% of the monthly averages calculated. The majority of these non-compliances (33 of the 44 exceedances) were associated with EMS E297110 (LC_LCDSSLCC). Teck's understanding of these non-compliances, as well as short and long term corrective actions, are described in detail in a response letter to Inspection #26230 addressed to Mark Graham, Operations Manager for the MoE dated May 20, 2016. The contents of this letter are summarized below.

On December 31, 2015, the LCO compliance limit for nitrate were reduced from 14 mg/L monthly average and 20 mg/L daily maximum to 7 mg/L monthly average and 9 mg/L daily maximum. These changes in limits were initially defined based on the limited data that was available at that location at the time, modelling that included that data, and the original commissioning schedule for the West Line Creek Active Water Treatment Facility. Since this time, monitoring data indicates that the regional water quality model is not adequately projecting the nitrate loadings in Line Creek. Despite higher than projected nitrate concentrations in Line Creek as measured at the LCO Compliance Point, recent winter (2016/2017) nitrate concentrations are lower than winter (2015/2016) concentrations and are below original permit limits (Figure 31). Nitrate concentrations at the first downstream Order Station in the Fording River (FR5, LC_LC5) have remained below the SPO during all periods to date.

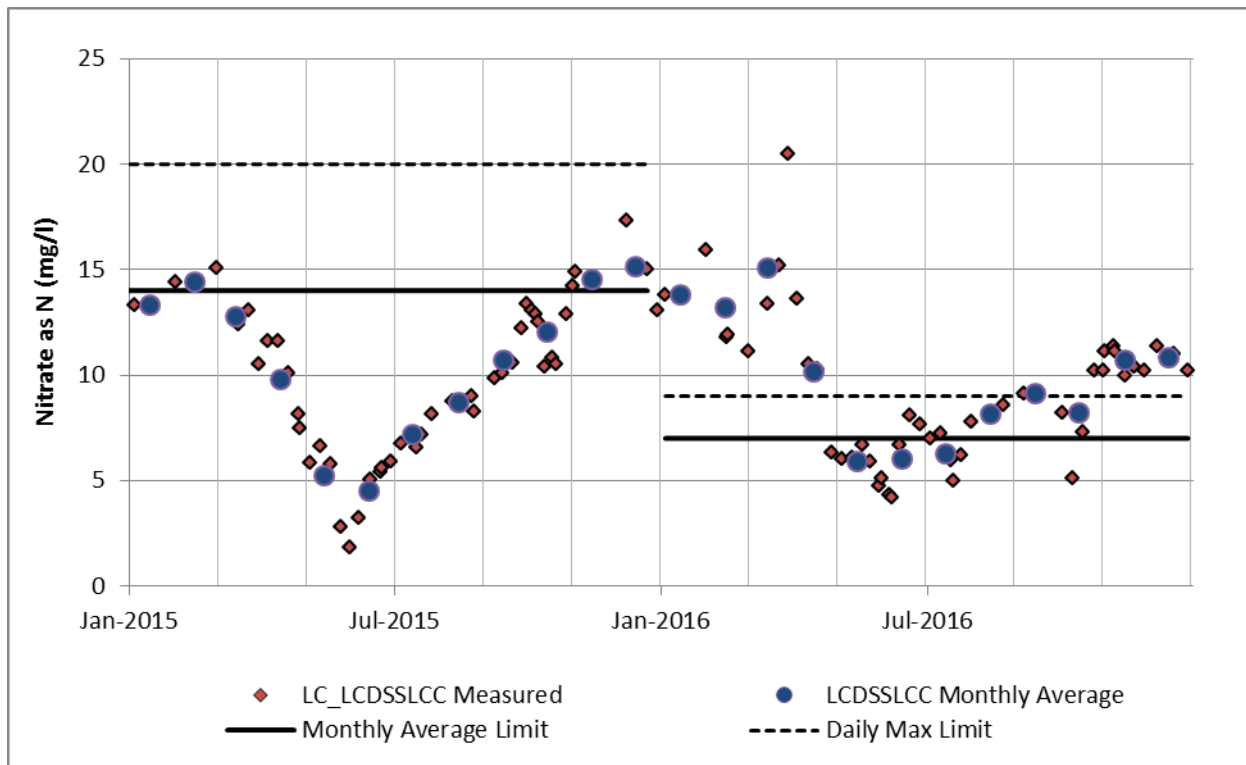


Figure 31. Daily and monthly average nitrate-N concentrations recorded at Line Creek Operation Compliance Point E297110 (LC_LCDSSLCC) in 2015 and 2016.

The potential for nitrate concentrations measured in 2015 and 2016 to cause adverse effects to aquatic health in Line Creek was evaluated by an independent third party Qualified Professional considering multiple lines of evidence 1) the toxicity of nitrate and its relationship with water hardness; 2) chronic toxicity testing data from Line Creek; and 3) biological monitoring data from Line Creek. The three lines of evidence outlined above indicate that no measurable effect of nitrate on populations of any species would be expected to occur in Line Creek. Nitrate concentrations in most reaches of Line Creek in 2015 and 2016 were below levels that would represent a risk to even the most sensitive aquatic species in the Elk Valley (Golder, 2016).

Teck is currently preparing a Compliance Action Plan that outlines the path forward and the timing of activities that will support bringing LCO back into compliance. Mitigation measures initiated to date include:

- **Nitrate source control** - A thorough review of blasting products and practices was completed and best practices to reduce nitrate loss to the environment were identified. These recommendations were implemented at LCO in 2016. Testing is ongoing to determine the optimal products for boreholes with flowing water and to improve blasting product delivery.
- **Water management** - Minimizing water accumulation in pits and blasting areas and target higher nitrate water sources for consumption or storage during low flow periods.
- **Modelling** - As part of the 2017 regional water quality model update (due October 31 2017), work is now underway to evaluate and improve representation of nitrate loads through

development of updated nitrate source terms and recalibration of the model to monitoring data. This updated model will improve nitrate projections and plan mitigation activities to maintain concentrations that will not have a significant adverse effect on aquatic health and will continue to meet the downstream nitrate SPO at Order Station FR5 (LC_LC5).

- **Optimizing the treatment plant and accelerating development of treatment alternatives-** A technology scan evaluation of treatment technologies for nitrate removal has been completed. No mobile or temporary options (e.g. package plant, containerized systems) were identified. Teck will continue to optimize the existing treatment facility for nitrate removal and advance research on saturated rock fill (SRF) technology with investigation into the potential for application at Line Creek.

At compliance point E300071 (FR_FRCP1), permit limits were exceeded in January, February and March of 2016. As outlined within Permit 107517, EMS E300071 (FR_FRCP1) is Fording River Operation's (FRO) Compliance Point. However, monitoring data to date and additional analysis by MOE Regional hydrologist Kyle Terry (October 28, 2015 correspondence to Ms. L. Payette) has confirmed that isolated surface water flow at the compliance point is predominantly discharge water from Cataract Creek during low flow.

As a result of the natural hydrologic conditions, surface water quality during low flow periods (i.e., November through March inclusive) at FR_FRCP1 is not representative of the combined and mixed contributions of FRO discharges. Therefore, Teck believes that FR_FRCP1 does not, as intended by Section 2 of Permit 107517, correspond to a sampling location "where all or most point and nonpoint discharges from a mine site or portions of a mine site are expected to accumulate." All permit level exceedances recorded to date FR_FRCP1 have occurred during low flow periods.

Teck is committed to improving water quality within the Elk Valley as outlined in the Elk Valley Water Quality Plan and Permit 107517. It has become evident that Compliance Point E300071 (FR_FRCP1) is not a representative location for compliance monitoring. As outlined within Permit 107517, Compliance Points are intended to monitor all or most of the point and non-point discharges from the mine operation. The Fording River Operations Compliance Point instead measures isolated surface water that is predominantly mine-influenced water from one creek during low flow winter conditions. Teck has proposed an alternative Compliance Point for Fording River Operations and is working on monitoring and analysis to understand the representativeness of the proposed location and pursue a permit amendment.

Acute Toxicity Failures (Category 2)

In addition to non-compliances resulting from water quality concentrations exceeding permitted limits, seven non-compliances due to failed *D. magna* acute toxicity tests were recorded in 2016 out of 451 total samples taken (1.55 %) These results are discussed in more detail in Section 5.3 of this report.

Missed Samples (Category 3)

Missed sample non-compliances were the result of either failed field equipment, scheduling errors and/ or lab error. A chronological summary of 2016 missed sample non-compliances are provided in

Table 15. Missed sample data represents out 178 of 182,774 or 0.1 % of surface water data points collected at Permit 107517 locations in 2016 and is not expected to affect the quality of data analysis.

Table 15. Summary of 2016 missed sample non-compliances for Permit 107517.

Date	EMS ID	Location Code	Parameters	Reason
03/23/2016	0200393	EV_ER1	TSS - Turbidity	Lab error
03/23/2016	E300091	EV_MC2	TSS - Turbidity	Lab error
03/23/2016	0200203	EV_MC3	TSS - Turbidity	Lab error
March	E287432	GH_COUGAR	Water Quality	Scheduling Error
Q1	E287432	GH_COUGAR	Acute Toxicity	Scheduling Error
5/11/2016	E300090	GH_ERC	pH - field	pH probe failure
5/11/2016	E206661	GH_ER1	pH - field	pH probe failure
Q3	E216144	LC_LC7	Acute Toxicity	Scheduling Error
9/7/2016	E300095	RG_KERRRD	Water Quality	Missing mid-depth due to multi-depth sampler failure.
Q4	E257796	GH_LC1	Acute Toxicity	Scheduling Error
Q4	E287433	GH_WADE	Acute Toxicity	Scheduling Error

Following the lab errors, Teck worked with its laboratories to ensure that similar instances are not repeated in the future. Teck is continuing effort to reduce the occurrences of missed field samples by ensuring back-ups of critical field equipment are available.

During the completion of the quarterly reports, the quarterly acute toxicity samples at E287432 GH_Cougar (Q1), E216144 LC_LC7 (Q3), E257796 GH_LC1 (Q4) and, E287433 GH_Wade (Q4) were misidentified as unattainable samples and the March E287432 GH_Cougar monthly water quality sample was not identified as a missed or unattainable sample. The samples were not collected as no flow was present during the scheduled quarterly sampling event making the sample unattainable at that time. However, flow was present at these locations during other sampling events during the quarter/month which makes these samples Missed Samples due to scheduling errors.

Teck continues to refine the approach for missed or unattainable samples. We have implemented changes to our sample schedules to reduce the risk of this type of scheduling error happening in the future.

Administrative Non-compliances (Category 4)

One non-compliance resulting from late reporting was identified in 2016. This was identified in inspection 30691 as a late reporting of a failed toxicity test at E200384 (GH_CC1). Teck will continue

to keep focus and awareness on immediate reporting requirements with all those responsible for data review and reporting associated with our Permits.

Additional screening notifications are being developed and implemented into our EQulS database to send automatic notification of exceedances to multiple staff via email to ensure appropriate reporting obligations are met.

During data review for the completion of the Permit 107517 Annual Report, it was discovered that the acute toxicity data for the 2016 Q2 E298733 (Pengelly Channel to Corbin Creek), the 2016 Q2 E102488 (Main Interceptor Sediment Pond Decant) and the 2016 Q4 EMS 200385 (Porter Creek Sediment Pond decant) sampling events were not uploaded to the Ministry EMS database. All sample results were included in Teck's written quarterly report however were missed in the EMS data upload.

Teck will be implementing an Equis generated completeness report that will warn the sites of missing data. This report, in conjunction with a visual inspection of the data will significantly reduce the risk of this issue going forward.

Hold Time Exceedances (Category 5)

Parameter hold times were exceeded on multiple samples in 2016. These were generally time-sensitive water quality parameters such as nitrate-N, nitrite-N, turbidity, phosphorous and total suspended solids (see Section 3.3 for a complete summary). Exceeding hold times may affect the reliability of the sample result in different ways depending on environmental conditions and contents of the sample. Teck continues to work on shipping options and available shipping contractors along with ALS Environmental to reduce the number of hold time exceedances. Advancements to date include sampling schedule adjustment to obtain same day or next day delivery of samples to the lab, shipping via airplane freight delivery services, and working with the lab to expedite sample analysis once sample received. Teck is also evaluating and implementing in a staged approach, a switch in laboratories (ALS Burnaby to ALS Calgary) to further reduce shipment and analysis delays for our samples. Teck will continue to stay focused on identifying QA/QC issues and implementing corrective actions to improve data integrity. 2016 QA/QC analyses are summarized in Appendix D.

2.4 Unattainable Sample Data

During the course of the calendar year there are a number of circumstances that prevent the collection of water samples from authorized discharges and/or receiving environment sampling sites. Such circumstances are generally out of Teck's control and include, but are not necessarily limited to, unsafe sampling conditions for personnel, no flow due to frozen conditions, or cessation of discharge activities. Although such circumstances prevent Teck from collecting water samples at specified EMS sites and/or at the frequencies outlined in Tables 9 through 24 of Appendix 2 in Permit 107517, these unattained samples do not result in non-compliances; but rather, are recorded as unattainable data. In 2016, a total of 230 sampling events had unattainable parameters resulting in 16,208 (or 6%) of individual analyses that could not be attained. Of these, 14,476 (89.3%) were occurrences of no flow, which indicates no load was being discharged at these times.

The most common unattainable data parameter is flow. Teck's priority is to ensure worker safety and accepts that samples are not always attainable. Teck is working to evaluate flow monitoring needs

through the Regional Flow Monitoring Plan (Section 9.1.2.4 of Permit 107517) which will define flow monitoring improvements. A summary of all unattained samples is presented in Appendix A.

3 Surface Water Monitoring Program

As outlined in Permit No. 107517, water samples are regularly collected from authorized discharges and receiving environment sampling sites. In addition to evaluating compliance as discussed in Section 2, water sampling sites and associated data are used to evaluate overall water quality at point source discharges and within the receiving environment. The following section summarizes water quality/quantity monitoring requirements, methodologies employed in data collection, and quality assurance/quality control (QA/QC) activities.

3.1 Surface Water Monitoring Program

Surface water sampling activities are carried-out over a wide range of frequencies throughout the calendar year (e.g., weekly, monthly, quarterly etc.), with samples analyzed for a number of water quality parameters such as, but not limited:

- Conventional parameters (i.e., specific conductance, total dissolved solids, total suspended solids, hardness, alkalinity, dissolved organic carbon, total organic carbon, and turbidity).
- Major ions (i.e., bromide, fluoride, calcium, chloride, magnesium, potassium, sodium, and sulphate).
- Metals, dissolved and total fractions (i.e., aluminum, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, chromium, cobalt, copper, iron, lead, lithium, manganese, mercury, molybdenum, nickel, selenium, silver, strontium, thallium, tin, titanium, uranium, vanadium, and zinc).

In addition, surface water flows and toxicity tests (acute and chronic) are routinely conducted at a number of sampling sites. A summary of the surface water monitoring program conducted in 2016 is presented in Appendix B.

In addition to surface water monitoring, two groundwater monitoring wells (i.e., E298595 (EV_WF_NW) and E298596 (EV_WF_SW)) are identified as a component of the monitoring program under Permit 107517. These two locations have been removed in the latest permit amendment received by Teck (dated March 1, 2017) and as outlined within the EVO Groundwater Monitoring Plan (submitted under separate cover), it is that groundwater be wholly addressed under the Groundwater monitoring program. As such, monitoring associated with E298596 (EV_WF_SW) is addressed under separate cover.

3.2 Quality Assurance/Quality Control Program

A QA/QC program has been established to promote consistency in field protocols and methodologies, and the collection of high quality environmental data. Sampling activities are not only carried out to meet the requirements of the monitoring program, in terms of location and frequency; but to collect

representative samples, and minimize the potential for deterioration and/or contamination prior to laboratory analysis. The overall objective for the QA/QC program is to develop and implement procedures that ensure the collection of representative data of acceptable quality. Data quality indicators such as precision, accuracy and bias, representativeness, comparability, and analytical sensitivity are routinely used to assess data quality; and are further discussed below.

Precision reflects the reproducibility between individual measurements of the same property. Field Duplicate sample precision was evaluated using a Relative Percent Difference (RPD), which is the difference between the duplicates as a function of their average. The following equation is used to calculate the RPD:

$$RPD = \frac{|C_1 - C_2|}{(C_1 + C_2)/2} \times 100$$

Where: RPD = Relative percent difference
C₁ = First measurement
C₂ = Second measurement

Three criteria were used to evaluate each set of duplicate samples:

- RPD of < 20% = Pass
- RPD of >20% with results < 5 times the detection limit = Pass-1
- RPD of > 20% and <50% with results > 5 times the detection limit = Pass-2
- RPD of >50% with results > 5 times the detection limit = Fail

Quality control samples and procedures specified in analytical method protocols are completed by respective analytical laboratories and include the following (as applicable to each analysis):

- Initial calibration
- Initial calibration verification
- Continuing calibration
- Calibration or instrument blanks
- Method blanks
- Laboratory control samples
- Internal standards (including certified reference material)
- Serial dilutions
- Matrix spikes
- Laboratory duplicates

The analytical laboratory determines a Method Detection Limit (MDL) for each analyte. MDLs are statistically derived and reflect the concentration at which an analyte can be detected in a clean matrix with 99 percent confidence that a false positive result has not been reported. The analytical laboratory establishes Method Reporting Limits (MRLs) at levels above the MDLs for respective analytes. These values are based on the laboratory's experience analyzing environmental samples and reflect the typical sensitivity obtained by the analytical system; they represent the level of analyte above which concentrations are accurately quantified.

The laboratory quantifies analytes at concentrations above the MRL. Analytes detected at concentrations between the MDL and MRL are flagged with a “J” qualifier to indicate that the value is an estimate (i.e., the analyte concentration is greater than or equal to the MDL and less than the MRL). Analytes that are not detected are reported as the MDL, and are flagged with a “U” qualifier. MDLs can be adjusted by the laboratory to reflect sample dilution and/or matrix interference.

Representativeness is the degree to which data represent a characteristic of an environmental condition. In the field, representativeness is addressed by collecting samples at the designated water sampling sites and adhering to sample collection procedures. In the laboratory, representativeness is ensured by the proper handling and storage of samples, the use of standard performance-based methods, and initiation of analyses within hold times.

Comparability is the qualitative similarity of one data set to another (i.e., the extent to which different data sets can be combined for use). Comparability is addressed through the use of field and laboratory methods that are consistent standardized procedures.

To ensure that field activities are conducted in a manner that meets the overall data quality objective of the QA/QC program, sampling activities are conducted in accordance with the 2013 Edition of the British Columbia Field Sampling Manual (Clark, M.J.R. (editor). 2002²). Environmental personal are trained using on-site SP&P’s as detailed in the “Teck Field Sampling Manual”.

Field and trip blanks, and duplicate sampling were conducted throughout the year in accordance with procedures established in “BC Field Sampling Manual for Continuous Monitoring Plus the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples,” or by suitable alternative procedures as authorized by the Director.

Despite the considerable level of effort and management system tools employed to ensure water data are of high quality, there are instances where data quality issues occurred. A summary of instances and associated issues are discussed in Section 3.3 below.

A summary of the QA/QC program associated with water quantity (i.e., flows) measurements is presented in Appendix C.

3.3 QA/QC Issues

Data quality issues encountered in 2016 were largely the result of hold time exceedances for time-sensitive water quality parameters such as nitrate-N, nitrite-N, turbidity, and total suspended solids. The majority of these hold time exceedances occurred in June and July which corresponds to the period when Teck is collecting the most samples. A summary of data quality per analyte affected is listed below, with a detailed summary per water sampling site presented in Appendix D.

- Nitrate-N: 85 of 2581 data points affected (3.3%)
- Nitrite-N: 51 of 2222 data points affected (2.3%)

² Clark, M.J.R. (editor). 2002. British Columbia Field Sampling Manual. Water, Air and Climate Change Branch, Ministry of Water, Land and Air Protection, Victoria, BC, Canada. 312 pp.

- Turbidity: 191 of 2676 data points affected (7.1%)
- Total Suspended Solids: 50 of 2736 data points affected (1.8 %)
- Total Dissolved Solids: 74 of 1588 data points affected (4.7 %)
- Ortho-Phosphate: 29 of 1603 data points affected (1.8%)
- Phosphorous: 2 of 1821 data points affected (0.1 %)
- BOD: 1 of 447 data points affected (0.2%)

In addition to the above-listed, the precision of laboratory results were evaluated using duplicate samples. RDP calculations as described in Section 3.2 were performed on all duplicate samples taken. Throughout 2016 there was a total of 323 duplicate samples conducted, resulting in 22,025 parameters being evaluated for RPD. Of the 22,025 parameters that were evaluated 135 did not to meet acceptable RPD assessment criteria. This represents 0.6% of the analyses completed.

A summary of 2016 RPD samples below assessment criteria is presented in Appendix D. Full evaluation tables are available upon request.

There were 28 instances in 2016 when the method detection limits for beryllium was elevated above the British Columbia approved and/or working water quality guidelines at receiving environment monitoring sites. This occurred when dilution of the sample was required due to occurrences of high suspended solids concentrations. As a result, there are uncertainties associated with actual beryllium concentrations for these instances and if the guideline was exceeded. Teck has initiated additional analysis with the lab to mitigate the detection limit uncertainty and confirmed with the lab that going forward they will apply the lower method detection limit for beryllium to reduce uncertainties associated with actual concentrations.

There were instances in 2016 when mercury detection limits were elevated above the BC FAL WQG. In 2016 Teck endeavored to resolve this issue by implementing procedures for ultra-trace mercury analysis with a method detection limit of 0.00050 µg/L in place of the standard mercury analysis. The new ultra-trace mercury sampling standard was implemented at all sites in February 2016.

In addition to the above there were several instances when issues with calibration and/ or function of field equipment occurred. A summary of issues with field equipment is provided in Appendix D.

There were no recorded issues of contamination of field or trip blanks in 2016.

On December 17, 2015, an amendment to Permit 107517 was granted to temporarily allow use of E304613 (LC_LC7DSTF) as a 'LC7 alternate location' for the collection of water samples when access to E216144 (LC_LC7) was restricted. This restriction is due to safety concerns with the progression of the MSX Short Dump and the position of MSA North (MSAN) Ponds below the potential runoff zone of the dump. As per Clause 1.1.2.1 of the amendment, paired sampling was conducted twice in 2016 for E304613 (LC_LC7DSTF) and E216144 (LC_LC7), and the results have been compared using the method of statistical evaluation (T-Test) previously provided in the Teck Memorandum on October 27, 2015 (Appendix H). As the 'LC7 alternate' monitoring site is located ~400 m downstream (in a safe sampling zone) of the original sampling location (MSAN Pond / LC_LC7), a comparison of the water quality was required to ensure there is not a significant different

between the two sites. In all cases, the P-values were less than the corresponding critical P-value, which verifies acceptance of the hypothesis that no significant difference exists between the two datasets. Appendix H provides a summary of this comparison.

In summary, despite the above-mentioned limitations, data collected in 2016 were predominantly of high quality and met requirements of the monitoring program.

3.4 Toxicity Testing Program

Acute Toxicity testing is carried-out at a number of sampling sites on a quarterly basis. Biological test methods routinely employed include:

- Acute Lethality Test using Rainbow Trout; universal method: EPS 1/RM/9
- Acute Lethality Test using *Daphnia* spp.; universal method: EPS 1/RM/11
- Toxicity Tests using Early Life Stages of Salmonid Fish (Rainbow Trout); universal method EPS 1/RM/28-1E)
- Growth Inhibition Test using a Freshwater Alga; report EPS 1/RM/25
- Test of Reproduction and Survival using the cladoceran *Ceriodaphnia dubia*; report EPS 1/RM21
- Fathead Minnow, *Pimephales promelas*, Larval Survival and Growth Test U.S. Environmental Protection Agency (EPA) Method 1000.0

In addition to the above-listed standard methods, a modified 28-day water-only test with the amphipod, *Hyaella azteca* is also completed. This test is not a standard test but rather has been modified from “Methods for measuring the toxicity and bioaccumulation of sediment-associated contaminants with freshwater invertebrates (second edition)”, EPA/600/R-99/064.

Section 10.2.4 of Permit 10517 dated May 2016 requires that Teck report annually on the Chronic Toxicity program. Chronic toxicity tests were completed in 2016 in accordance with Section 9.8 of Permit 107517.

Biological tests and associated QA/QC measures are completed in accordance with the above-listed methods by the biological testing laboratory; and are detailed in biological testing reports.

4 Spills and Incidents

There were a total of 138 reportable spills recorded at Teck Operations in the Elk Valley in 2016. Table 17 below shows a summary of spills by site. The most common substance spilled was Fuels/lubricants. Appendix G contains a detailed list of all spills that occurred in 2016 including a reference to the Provincial Emergency Program (PEP) report number. All spills were responded to as per Teck spill response procedures. For more information on the remedial actions associated with spills in 2016 refer to the reported information associated with the incident numbers referenced in Appendix G and to the annual discharge reports from each operation, submitted under separate cover.

There was one spill reported to water in 2016. Teck's Community and Aboriginal Affairs office in Sparwood received a report of dust accumulation on the surface of Grave Lake which is located south east of Line Creek Operation (LCO). The source of dust in this incident has not been determined. All operations have dust management programs.

Table 16. Summary of spills that occurred at Teck's mines in the Elk Valley in 2016.

Site	Number of Spills
CMO	7
EVO	28
FRO	35
GHO	48
LCO	20

5 Monitoring Results

Water sampling results are not only used to evaluate compliance (refer to Section 2) but are also used to evaluate water quality relative to authorized discharge limits at point source discharges, and key receiving environment sampling sites in relation to SPOs and/or approved/working water quality guidelines. These data in turn are ultimately used to evaluate the overall effectiveness of the ABMP and its implementation and contribute to Adaptive Management of water quality in the Elk Valley. The following section summarizes receiving environment monitoring results in relation to approved/working water quality guidelines. In addition and as outlined in Section 10.2.4 of Permit 107517, the following section evaluates trends for Order-defined constituents of interest (i.e., selenium, nitrate-N, sulphate, and dissolved cadmium) at significant source sites (i.e., dormant and active waste rock dumps), and key receiving environment sites (i.e., Order stations). Because selenium, nitrate-N, sulphate, and cadmium have permitted limits (refer to Section 2), they are not compared to the British Columbia approved/working freshwater aquatic life water quality guidelines. A summary of surface water quantity monitoring results is provided in Appendix C.

5.1 Surface Water Quality – Receiving Environment

In 2016 a total of 208,161 analyses were completed on water samples as required under the monitoring program; excluding analytes with specified permit limits or SPOs (i.e., selenium, nitrate-N, sulphate, and dissolved cadmium). Of those 294 (<0.2 percent) were identified as having concentrations above a British Columbia approved/working freshwater aquatic life water quality guideline (BC FAL WQG) at a site designated as a receiving environment monitoring location in Permit 107517. Figure 32 shows a summary of these instances compared to total samples taken by parameter.

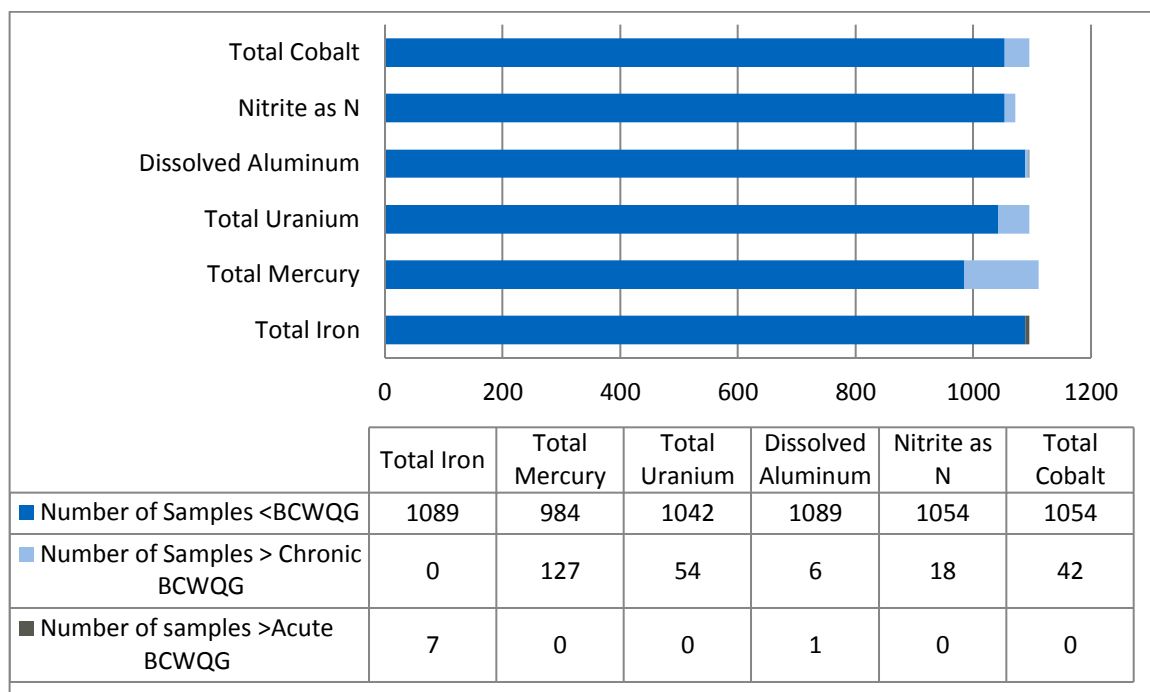


Figure 32 Summary of instances of concentrations measured above BC FAL WQG at receiving environment monitoring locations compared to total number of samples taken by parameter.

A summary of analytes and associated sampling sites in which a detected analytical concentration was measured above an approved or working water quality guideline is presented in Table 18, with a detailed list (includes samples with elevated MDLs) presented in Appendix E.

Table 17. Summary of receiving environment water sampling sites where concentrations were measured above a British Columbia Approved or Working Freshwater Aquatic Life Water Quality Guideline in 2016.

EMS ID	Location Code	Parameter	Number of Instances
0200111	EV_ER2	Iron	1
0200201	FR_FR2	Mercury - ultra trace	3
0200203	EV_MC3	Iron	2
		Mercury - ultra trace	14
0200209	CM_CC1	Cobalt	36
		Nitrite as N	22
0200251	FR_FR1	Mercury - ultra trace	2
0200378	GH_FR1	Aluminum	5
		Mercury - ultra trace	5
0200393	EV_ER1	Iron	1
		Mercury - ultra trace	9
E102714	GH_TC1	Mercury - ultra trace	2
E216777	FR_UFR1	Mercury - ultra trace	2
E258175	CM_MC1	Mercury - ultra trace	5

EMS ID	Location Code	Parameter	Number of Instances
E258937	CM_MC2	Cobalt	6
		Nitrite as N	5
		Mercury - ultra trace	1
E261958	LC_WLC	Uranium	50
E287432	GH_COUGAR	Mercury - ultra trace	3
E287437	GH_BR_F	Aluminum	1
		Mercury - ultra trace	2
E288273	LC_DC3	Mercury - ultra trace	16
E293369	LC_LCUSWLC	Nitrite as N	1
E298591	EV_FC1	Mercury - ultra trace	7
E298592	EV_BLM2	Iron	1
		Mercury - ultra trace	12
E298593	EV_TC1	Mercury - ultra trace	2
E300071	FR_FRCP1	Uranium	4
		Mercury - ultra trace	3
E300090	GH_ERC	Mercury - ultra trace	1
E300091	EV_MC2	Iron	1
		Mercury - ultra trace	16
E300097	FR_FRRD	Mercury - ultra trace	1
E305875	GH_NNC	Mercury - ultra trace	2
E305876	GH_ER1A	Mercury - ultra trace	2
E305878	GH_ERSC4	Mercury - ultra trace	2
E294312	RG_ELKORES	Aluminum	1
		Mercury - ultra trace	9
E300230	RG_DSELK	Iron	1
		Mercury - ultra trace	5
200203	EV_MC3	Mercury - ultra trace	1

The majority of instances where concentrations were measured above guideline in 2016 were for total mercury. The BC FAL WQG for mercury is based on the percent of methyl mercury present. For the purposes of revising Teck's monitoring protocol for mercury sampling and interpretation of mercury results, Teck has started sampling for methyl mercury. 48 methyl mercury samples were collected in 2016. Results for all methyl mercury samples taken in 2016 were below the method detection limit of < 0.000050 ug/L. Concurrent methyl mercury samples were not available with all of the mercury samples. Teck uses the lowest guideline to compare against measured mercury concentrations when a methyl mercury sample is not available.

Exceedances of the BC FAL WQG for mercury downstream of authorized discharges generally occurred at similar times as guideline exceedances at monitoring locations upstream of mine influence. These exceedances correlate well to instances of elevated TSS both upstream and downstream of Teck's mines indicating that the detected total mercury concentrations were from mercury in suspended solids, a portion of which originated upstream of mining operations. Figure 33

shows Mercury trends in water courses upstream (blue) and downstream (orange) of mining areas in the Elk and Fording Rivers and Michel creek.

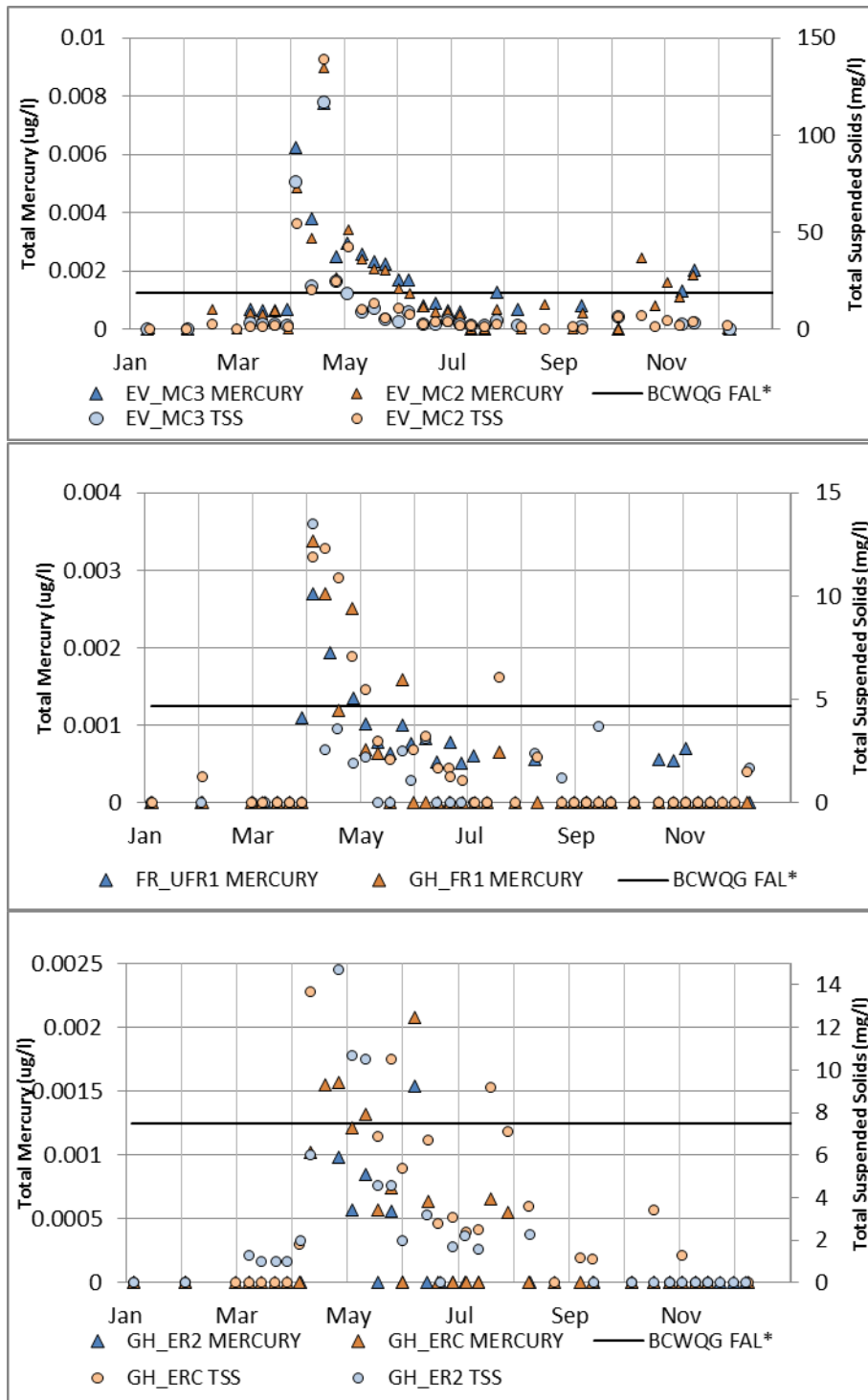


Figure 33. Mercury and TSS concentrations in the Fording River (top), Elk River (middle) and Michel Creek (bottom) results from upstream monitoring stations are shown in blue and downstream in orange.

Note: The BC FAL WQG is dependent on the content of methyl mercury. The lowest guideline is shown here.

Teck is in the process of collecting additional methyl mercury data to help identify the applicable guideline for future comparisons and revise sampling procedures.

The second most common guideline exceedance was uranium. Of the 54 observed concentrations above of the long term guideline for uranium in the receiving environment, 50 (93 percent) were recorded at E261958 (LC_WLC) with the remaining 4 (7 percent) recorded at E300071 (FR_FRCP1). The BC FAL WQG FAL for uranium is a working guideline and represents the lower fiducial limit of the Species Sensitivity Distribution developed by the Canadian Council of Ministers of the Environment (CCME).

For additional context and comparative purposes, total uranium concentrations are also compared to the short- and long-term CCME FAL guidelines see Figures 34 and 35.

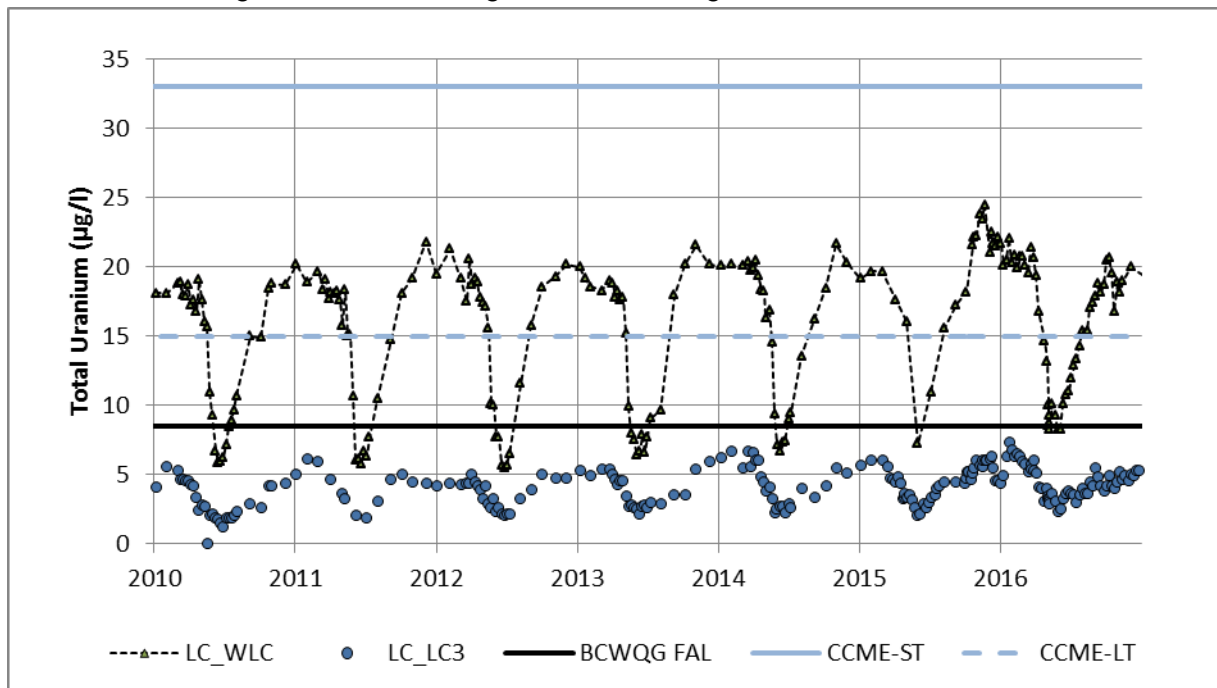


Figure 34. Total uranium concentrations recorded at water sampling site E261958 (LC_WLC)

Note: Total uranium concentrations are plotted in relation to the CCME short-term (0.033 mg/L; solid grey line) and long-term (0.015 mg/L; dashed grey line), and the BC FAL WQG working guideline (0.0085 mg/L; solid black line).

As illustrated within Figure 34, uranium concentrations recorded at E261958 (LC_WLC) routinely exceed the BC water quality working guideline, and during low-flow periods, the CCME long-term water quality guideline; while always remaining below the CCME short-term water quality guideline. Despite the fact that uranium concentrations at E261958 (LC_WLC), which is non fish bearing, are elevated relative to water quality guidelines, concentrations hydrologically down-gradient receiving environment sampling sites (i.e., 0200337 (LC_LC3)) remain below BC WQG. Additional information associated with this portion of LCO is detailed within the Local Aquatic Effects Monitoring Program for Line Creek submitted under separate cover.

Grab samples collected at E300071 (FR_FRCP1) are observed to exceed the BC working guideline in two instances in 2016. As shown in figure 35, all exceedances occur during the winter months, during

which, as discussed in Section 2.3, this location is not representative of water quality in the Fording River, but rather primarily water from local discharges. Uranium concentrations at the discharge monitoring location in Cataract creek are elevated above the BC FAL WQG FAL (Figure 35) and are representative of Cataract Creek uranium concentrations at the FRO compliance point during the low flow period.

The effect of uranium concentrations and other water quality constituents on aquatic life in the Fording River will be evaluated in the Regional Aquatic Effects Monitoring Program (RAEMP). Teck also has an ongoing chronic toxicity program in the Fording River which will provide an indication of effect of water quality constituents on aquatic life.

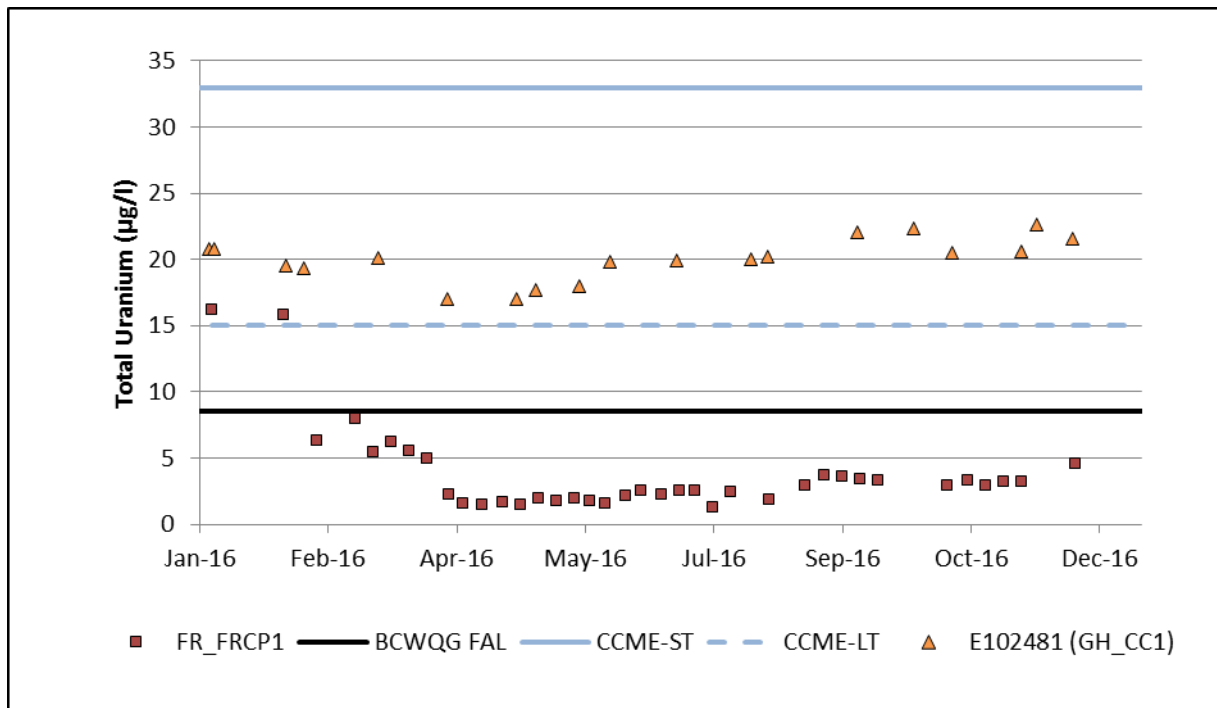


Figure 35. Total uranium concentrations recorded at water sampling sites E261958 (LC_WLC) and 0200337 (LC_LC3).

Note: Total uranium concentrations are plotted in relation to the CCME short-term (0.033 mg/L; blue dashed line) and long-term (0.015 mg/L; solid blue line), and the BC FAL WQG working guideline (0.0085 mg/L; dashed black line).

Total iron exceedances were limited to one or two samples at six monitoring locations. Exceedances of the BC FAL WQG for iron primarily occurred in the spring. Similar to mercury samples, exceedances coincided with elevated concentrations upstream of mining operations. Figure 36 shows iron concentrations in the Elk River and Michel creek upstream (blue) and downstream (orange) of mining operations. There were no observations of exceedances of the iron guideline in the Fording River.

Elevated cobalt levels were observed downstream of Coal Mountain Operation (CMO) at compliance point E258937 (CM_MC2). As shown in Figure 37, cobalt concentrations were occasionally elevated above the 30 day average guideline at the compliance point but never exceeded the maximum guideline. The main sources of cobalt are the 14 Pit horizontal drain discharge and 34 Pit dewatering. These sources both discharge to the main sedimentation ponds system (CM_SPD) which decants to Corbin Creek 0200209 (CM_CC1).

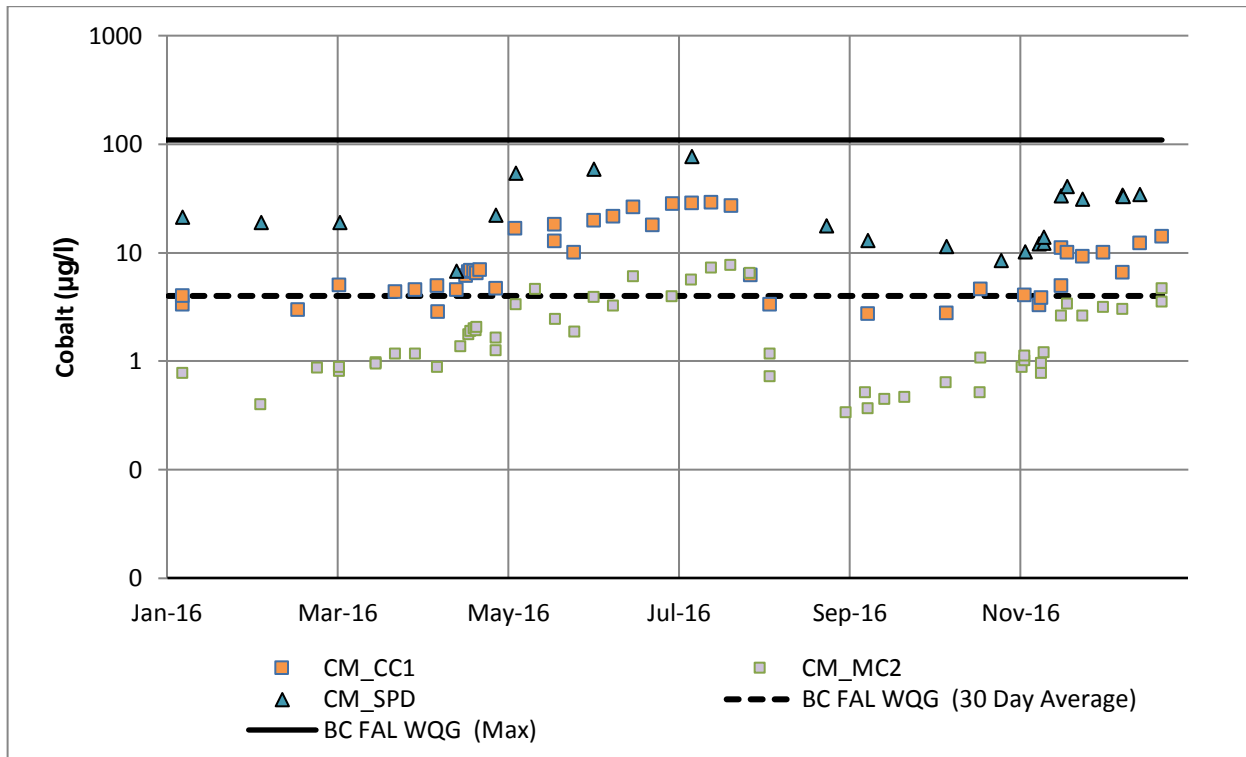


Figure 37. Cobalt concentrations at discharge E102488 (CM_SPD) and receiving stations 0200209 (CM_CC1), E25937 (CM_MC2) at Coal Mountain Operation. (Note the log scale on the y-axis).

Elevated nitrite concentrations were also observed downstream of CMO in 2016 (Figure 38). Concentrations at CMO's Compliance Point were occasionally elevated above the 30 day water quality guideline but did not exceed the maximum guideline. The main sources of nitrite are pit dewatering and plant discharges.

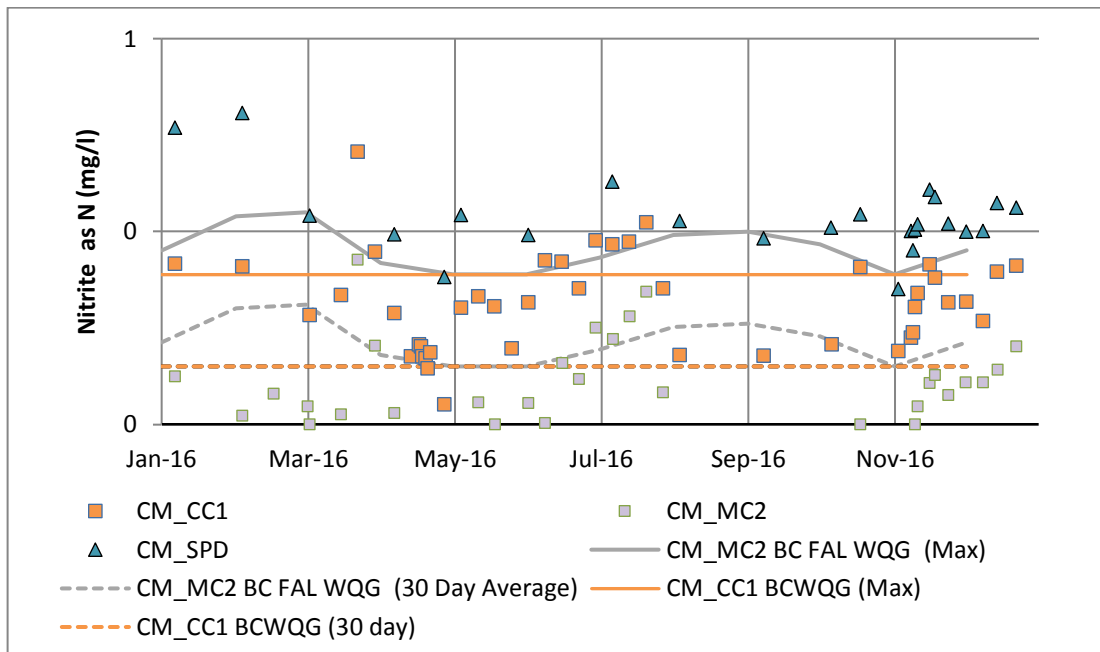


Figure 38. Nitrite concentrations at discharge E102488 (CM_SPD) and receiving stations 0200209 (CM_CC1), E25937 (CM_MC2) at Coal Mountain Operation.

Note: The BC FAL WQG for nitrite is chloride dependent. The guidelines plotted above reflect chloride concentrations at CM_CC1 and CM_MC2. Nitrite concentrations are on a logarithmic scale

Teck is in the process of developing a Water Management Plan (WMP) for CMO which will be utilized to inform water management decisions required to achieve both short- and long-term water quality objectives as CMO moves into care and maintenance and closure. The WMP will outline additional water management and mitigation activities to address water-related risks, meet permit limits and continually improve by reducing sediment and mine-related constituent loads.

In addition to the above-mentioned and as outlined within Appendix E, there were recorded exceedances for field based parameters (i.e., pH, temperature, and dissolved oxygen). There were 29 recorded exceedances out of 2063 individual field data points collected or 1.4 %. A summary of field parameters and associated sampling sites in which a concentration was identified as exceeding an approved or working water quality guideline is presented in Table 19, with a detailed list presented in Appendix E.

Table 18. Summary of field measurements that exceeded BC FAL WQG in 2016

EMS ID	Location Code	Parameter	Number of Exceedances
0200337	LC_LC3	pH	1
0200393	EV_ER1	pH	1
E102714	GH_TC1	Dissolved Oxygen	2
		Temperature	3
E216777	FR_UFR1	pH	1
E216778	FR_HC1	pH	1
E261958	LC_WLC	pH	1
E293369	LC_LCUSWLC	pH	1
E298594	EV_SPR2	Dissolved Oxygen	4
E300071	FR_FRCP1	pH	1
E300097	FR_FRRD	Dissolved Oxygen	1
E305875	GH_NNC	Dissolved Oxygen	2
E305878	GH_ERSC4	Dissolved Oxygen	1
E294312	RG_ELKORES	pH	1
E300230	RG_DSELK	Temperature	8

With the exception of temperature, field measurements rely on equipment calibration. As noted in Section 3.3, there were a number of calibration issues associated with field measurements and as such, pH measurements identified as being outside the guideline range should be considered with that context. This is supported by the fact that all laboratory determined pH values were within the BC FAL WQG range (6.5 – 9.0 standard units). As a result, it is not anticipated that field-based pH readings were accurate on those occasions. Similarly, although instantaneous measurements of dissolved oxygen were recorded to be less than the long-term BC FAL WQG (8.0 mg/L), they were consistently above the instantaneous minimum BC FAL WQG value of 5.0 mg/L.

Figure 39 shows field temperature measurements at Order Stations and Compliance Points. There are clear seasonal temperature trends at all locations. Temperatures at the Elko Reservoir (RG_ELKORES) and Lake Koocanusa (RG_DSELK) are typically higher than temperatures in the Elk and Fording Rivers.

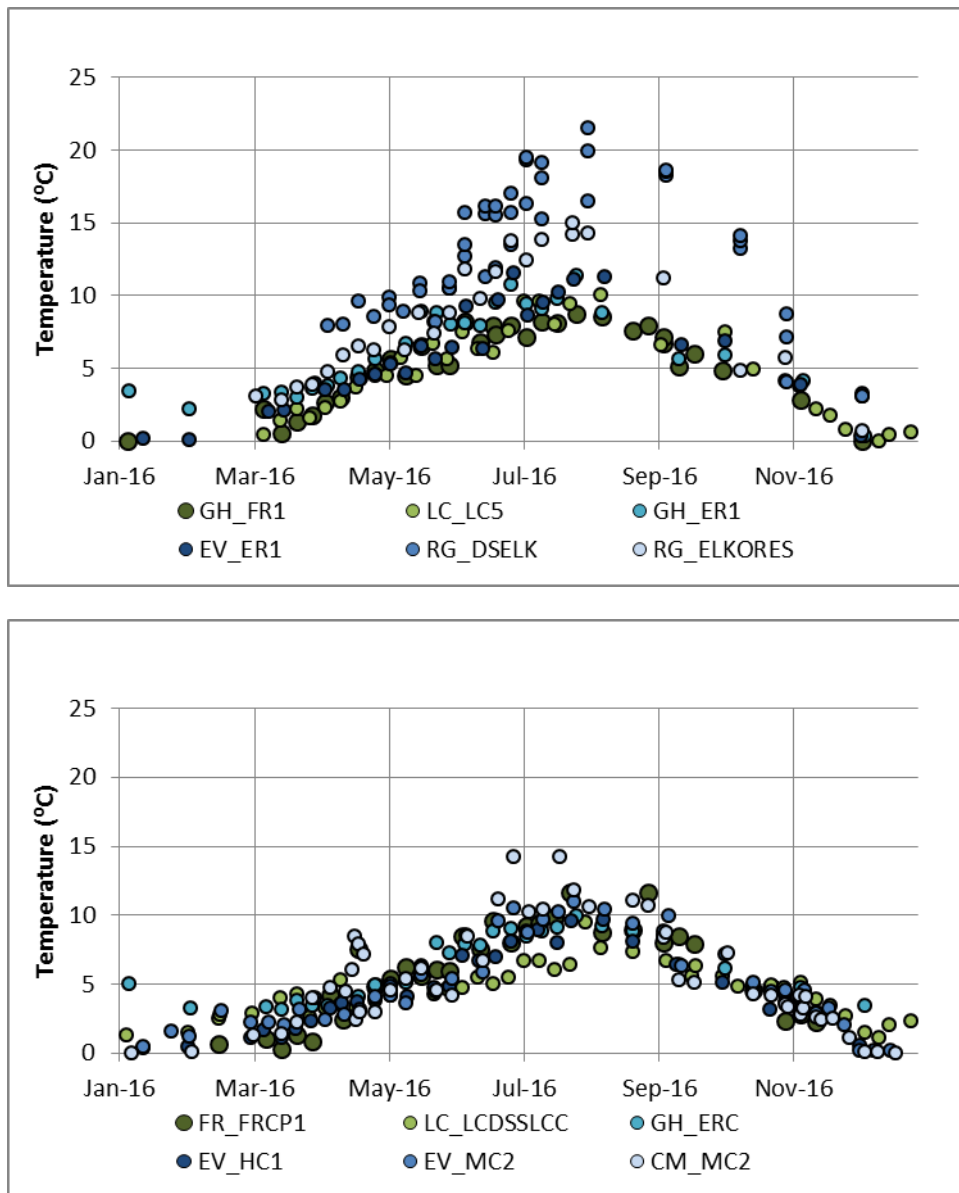


Figure 39. Field temperature measurements at Order Stations (top panel) and Compliance Points (bottom panel) in 2016.

5.2 Order-Defined Constituents of Interest

Permit 107517 takes an area based approach to authorizing and managing water quality constituents of interest, specifically selenium, nitrate, sulphate, and cadmium (i.e., the Order-constituents). The following section discusses the four Order-constituents in relation to key receiving environment sampling sites (i.e., Order stations) and source sites (i.e., waste rock dumps). Unlike Section 2.2, the following section does not evaluate compliance. Similarly, given that Order-constituents are evaluated relative to SPOs, the focus is not if BC FAL WQG are exceeded. Rather, the focus is on temporal patterns observed and how upstream source sites (i.e., waste rock dumps) may affect downstream water quality. As part of this evaluation, a distinction is made relative to waste rock dump status (i.e.,

active versus dormant). For purposes herein, a dormant waste rock dump is defined as not having any new waste deposited for a period of ≥ 1 year; while an active waste rock dump is defined as receiving or having received waste rock within the past year (i.e., < 1 year).

5.2.1 Selenium

Total selenium concentrations within the Valley have been increasing since the 1990’s and based on data collected by Environment Canada and its partners at long-term water quality monitoring station BC08NK0003 in the Elk River (at Highway 93 bridge South of Elko, BC), have been observed to exceed the BC FAL WQG ($2 \mu\text{g/L}$) since approximately 1993, see Figure 40. Selenium concentrations at BC08NK0003 steadily increased reaching a peak concentration ($\sim 8.2 \mu\text{g/L}$) in approximately late-2013/early-2014. Similar temporal patterns can be seen at upstream Order Stations, see Figure 41.

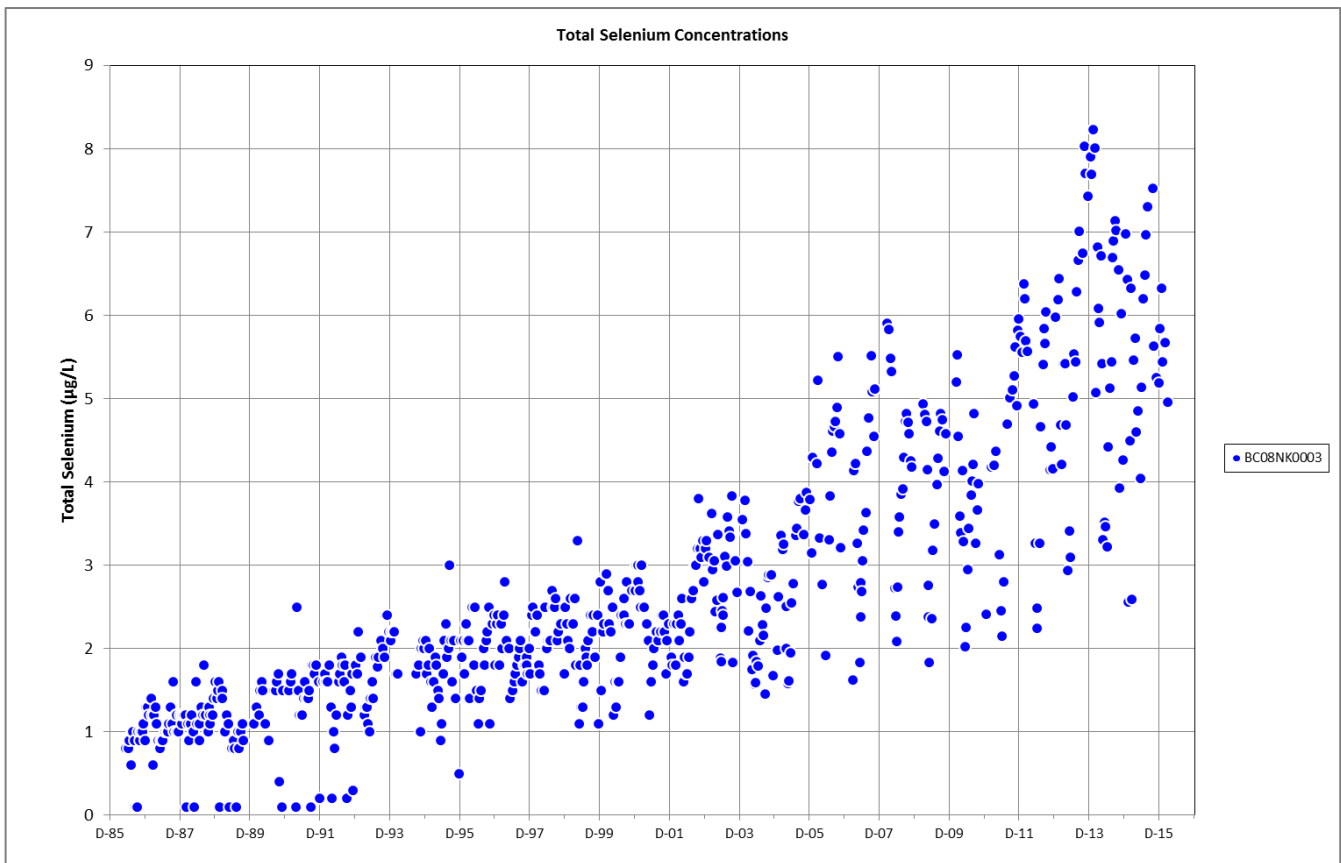


Figure 40. Total selenium concentrations recorded at water quality surveillance monitoring station BC08NK0003 in the Elk River.

Note: Data were accessed from <http://www.ec.gc.ca/eaudouce-freshwater/default.asp?lang=En&n=EFDA57C6-1> on Feb 21, 2017. At that time, data were available up to May 2016. Labels along the x-axis represent a year and are labelled with the twelfth month of that year. Therefore and as an example, December 1996 is represented as “D-96” along the x-axis, with the illustrated range being December 1985 (“D-85”) to December 2015 (“D-15”).

Based on data collected to date, selenium concentrations at Order Stations in the Fording River (at 0200378 (GH_FR1) and 0200028 (LC_LC5)) were highest in 2013–2014, see Figure 41. Similar patterns are less discernable at downstream Order stations.

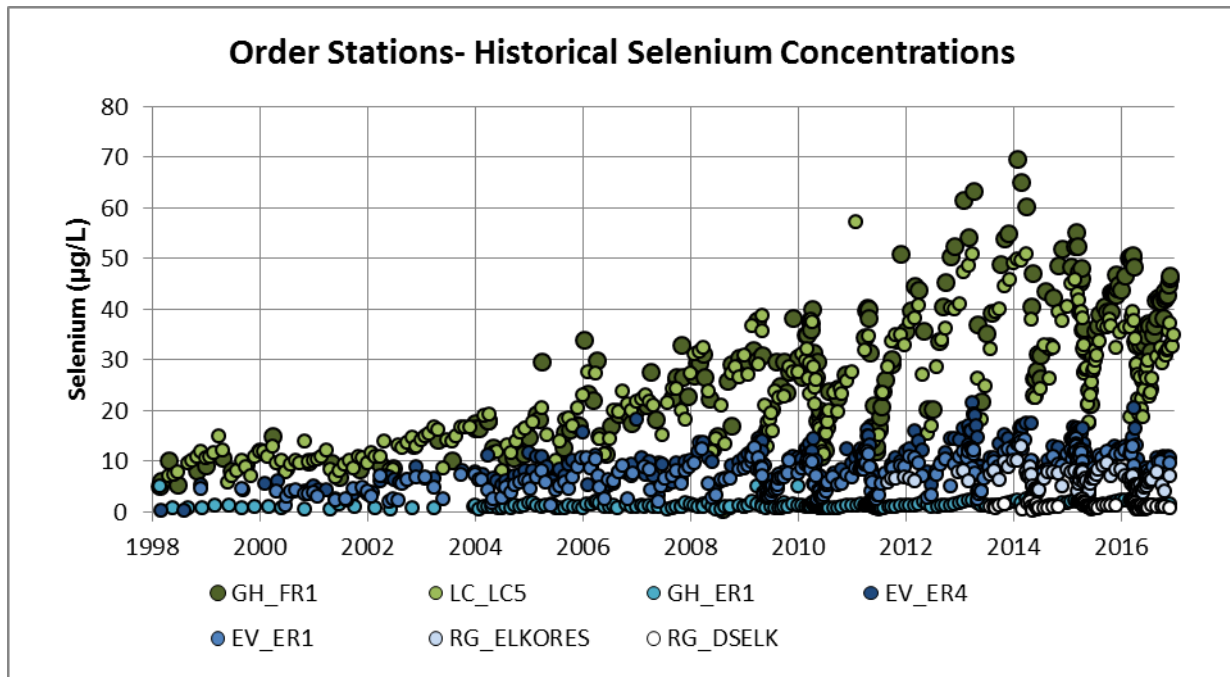


Figure 41. Total selenium concentrations recorded at order stations.

Note: Order stations include: 0200378 (GH_FR1), 0200028 (LC_LC5), E206661 (GH_ER1), 0200027 (EV_ER4), 200393 (EV_ER1), E294312 (RG_ELKORES), and E300230 (RG_DELK). With the exception of E300230 (RG_DELK) where an average concentration from three depths is plotted, data plotted herein represent instantaneous grab samples.

Selenium temporal patterns expressed at Order Stations are influenced by patterns observed at water sampling sites associated with waste rock dumps (i.e., sources).

Figure 42 is comprised of four quadrants which illustrate total selenium concentrations recorded at water sampling sites associated with the waste rock dumps compared to concentrations at relevant Compliance Points and Order stations. Water sampling sites in the upper Fording River (upstream of 0200378 (GH_FR1)) are shown in on the upper left. Water sampling sites associated with the lower Fording River (upstream of 0200028 (LC_LC5)) are shown on the upper right. Water sampling sites associated with the Elk River (upstream of 0200027 (EV_ER2)) are shown on the lower left. Water sampling sites associated with the Michel Creek (upstream of E300091 (EV_MC2)) are shown on the lower left. For purposes of illustration, active waste rock dumps have been illustrated using a triangle, dormant waste rock dumps using a square, and downstream stations a circle.

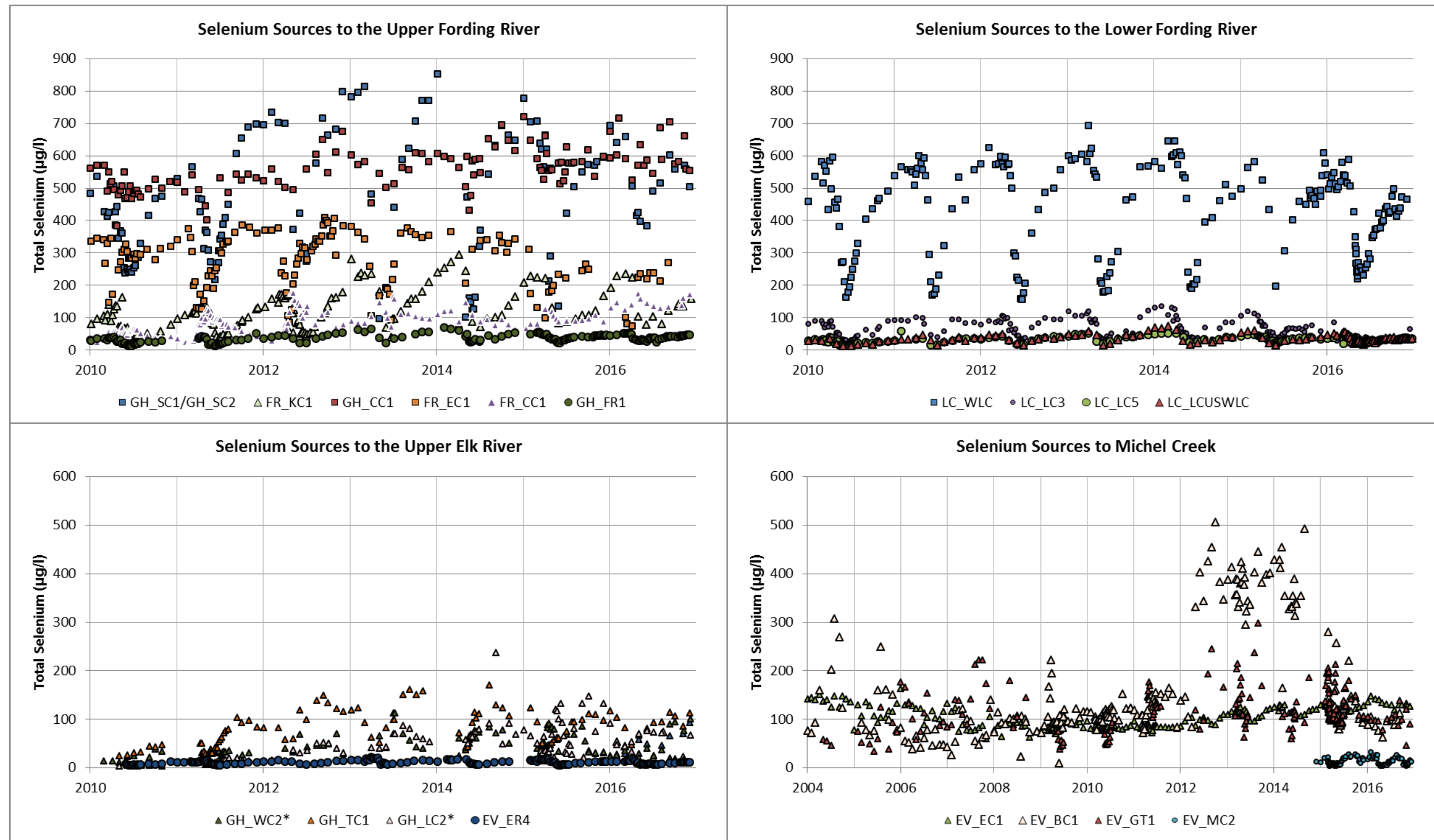


Figure 42. Total selenium concentrations at key source sites in the upper Fording River (top Left), lower Fording River (top right), upper Elk River (bottom left) and Michel Creek (bottom right) compared to relevant Order stations.

Note: Active waste rock dumps are depicted using triangles, dormant waste rock dumps with squares, and downstream monitoring locations with circles.

Monitoring at GH_LC2 and GH_WC2 is not required under 107517, however this data is included from these stations instead of GH_LC1 (E257796) and GH_WC1 (E257795) to show long term trends at Leask and Wolfram creeks.

Based on data collected to date, it does not appear that waste rock dump status (active vs. dormant) directly influences surface water selenium concentrations. However and as illustrated within Figure 42, selenium concentrations from some upstream sources have a direct effect on the patterns of selenium concentrations observed in downstream receiving environments.

5.2.2 Nitrate-N

Similar to selenium, nitrate-N concentrations have increased within the Valley. Based on data collected by Environment Canada and its partners at long-term water quality surveillance monitoring station BC08NK0003, nitrate concentrations (see Figure 43), follow a similar pattern observed for selenium at this station (refer to Figure 40). Nitrate-N data collected and presented for monitoring station BC08NK0003 is for [nitrate + nitrite]-N; and as such, slightly over-estimates actual nitrate concentrations. However, for purposes of illustrating the overall trend to date it represents the oldest and most consistent data set.

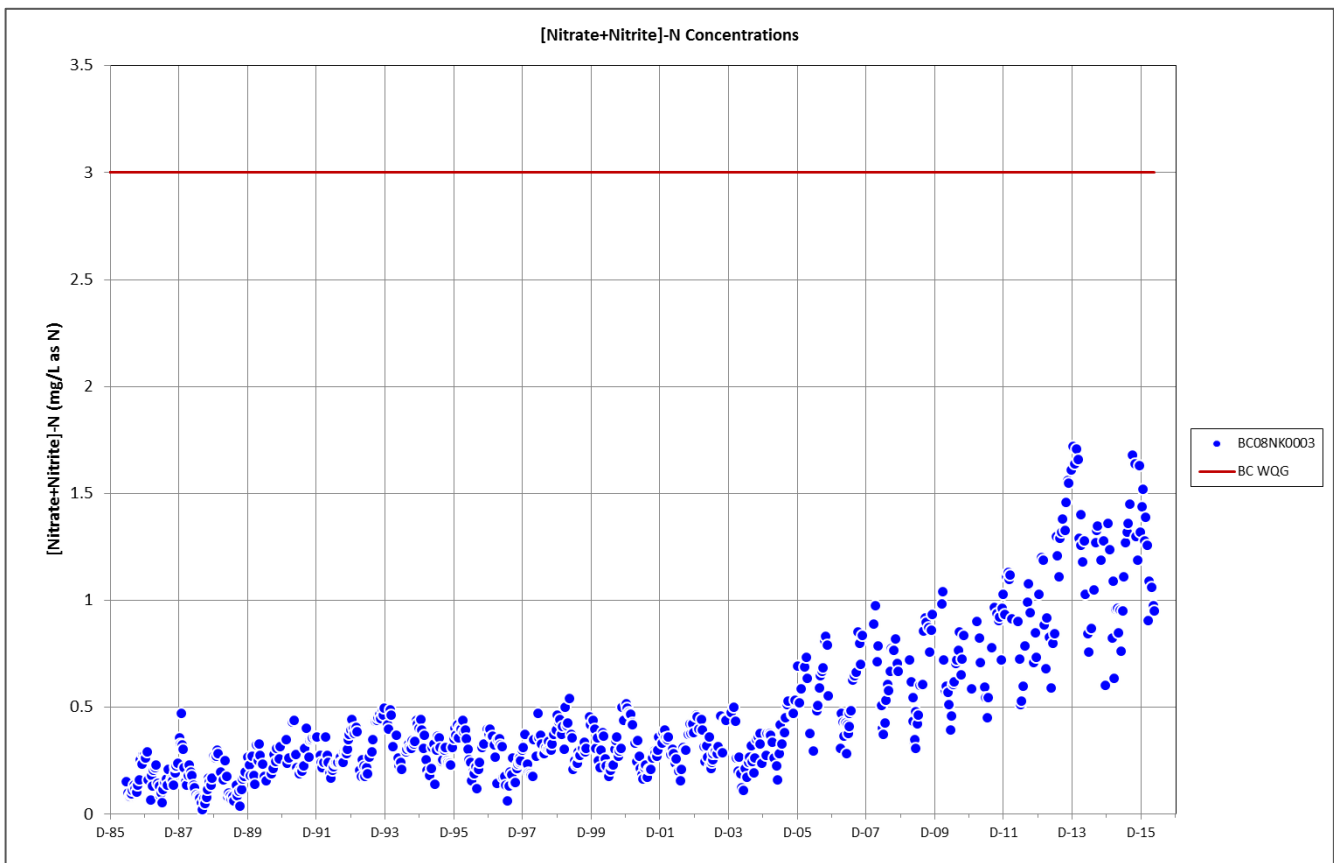


Figure 43. [Nitrate + Nitrite] Concentrations recorded at water quality surveillance monitoring station BC08NK0003 in the Elk River.

Note: Data were accessed from <http://www.ec.gc.ca/eaudouce-freshwater/default.asp?lang=En&n=EFDA57C6-1> on Feb 21, 2017. At that time, data were available up to May 2016. Labels along the x-axis represent a year and are labelled with the twelfth month of that year. Therefore and as an example, December 1996 is represented as “D-96” along the x-axis, with the illustrated range being December 1985 (“D-85”) to December 2015 (“D-15”). The BC FAL WQG for nitrate-N is for illustration purposes only as the data plotted are [nitrate + nitrite]-N.

Temporal variability observed in nitrate + nitrite data at BC08NK0003 tracks very closely to that observed in the selenium data. Similar temporal patterns can also be seen at upstream Order Stations.

Based on data collected to date, nitrate-N concentrations at 0200378 (GH_FR1) and 0200028 (LC_LC5) the highest concentration was measured in 2014, see Figure 44. Similar patterns are less distinct at downstream Order stations (e.g., 200393 (EV_ER1)) where nitrate-N concentrations are lower to begin with (e.g., E294312 (RG_ELKORES), E300230 (RG_DELK)).

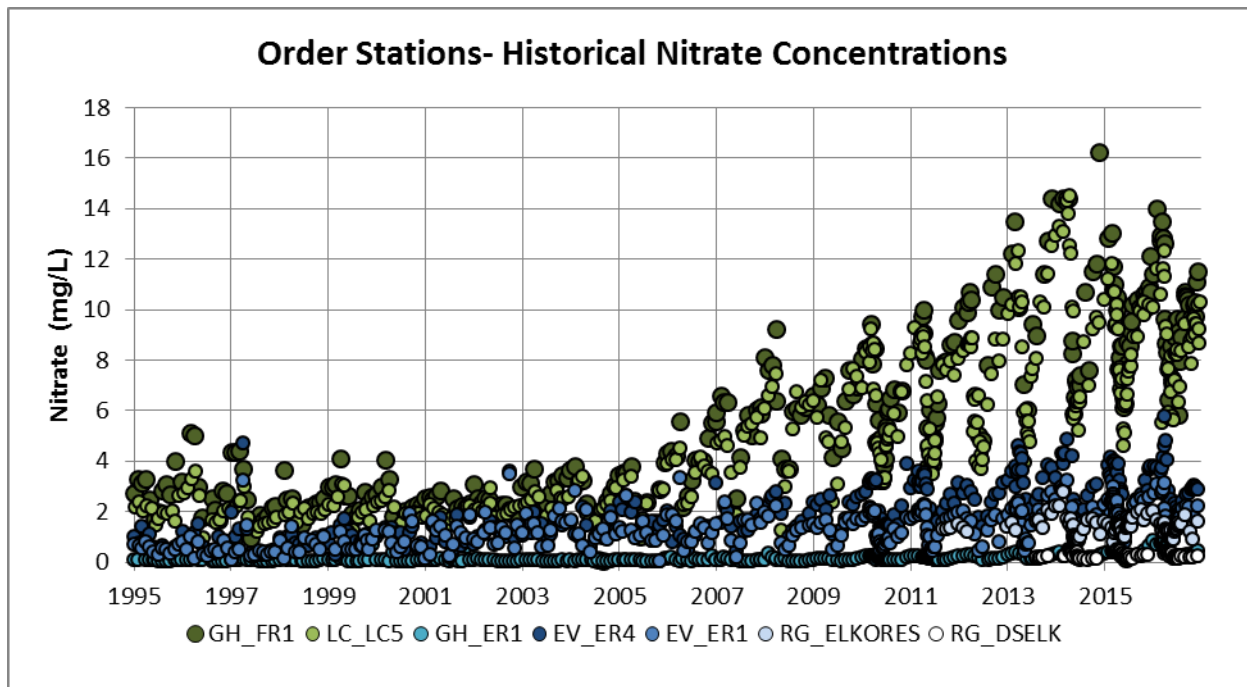


Figure 44. Nitrate-N concentrations recorded at order stations.

Note: Order stations include: 0200378 (GH_FR1), 0200028 (LC_LC5), E206661 (GH_ER1), 0200027 (EV_ER4), 200393 (EV_ER1), E294312 (RG_ELKORES), and E300230 (RG_DELK). With the exception of E300230 (RG_DELK) where an average concentration from three depths is plotted, data plotted herein represent instantaneous grab samples.

Like selenium, nitrate temporal patterns expressed at Order Stations are associated with concentrations observed at key waste rock dumps see Figure 45. Consistent with selenium data plots, water sampling sites in the upper Fording River (upstream of 0200378 (GH_FR1)) are shown in on the upper left. Water sampling sites associated with the lower Fording River (upstream of 0200028 (LC_LC5)) are shown on the upper right, Water sampling sites associated with the Elk River (upstream of 0200027 (EV_ER2)) are shown on the lower left. Water sampling sites associated with the Michel Creek (upstream of E300091 (EV_MC2)) are shown on the lower left. Active waste rock dumps are depicted using triangles, dormant waste rock dumps with squares, and Order Stations with circles.

A key difference from the selenium data above is that nitrate concentrations associated with some dormant waste rock dumps appear to have a decreasing trend, or have remained fairly constant. This

is consistent with the conceptual model for nitrate release which is that elevated nitrate concentrations in watercourses downstream of Teck's waste rock spoils are due to residual nitrogen compounds from explosives used during mining. These are expected to decrease over time via rinsing.

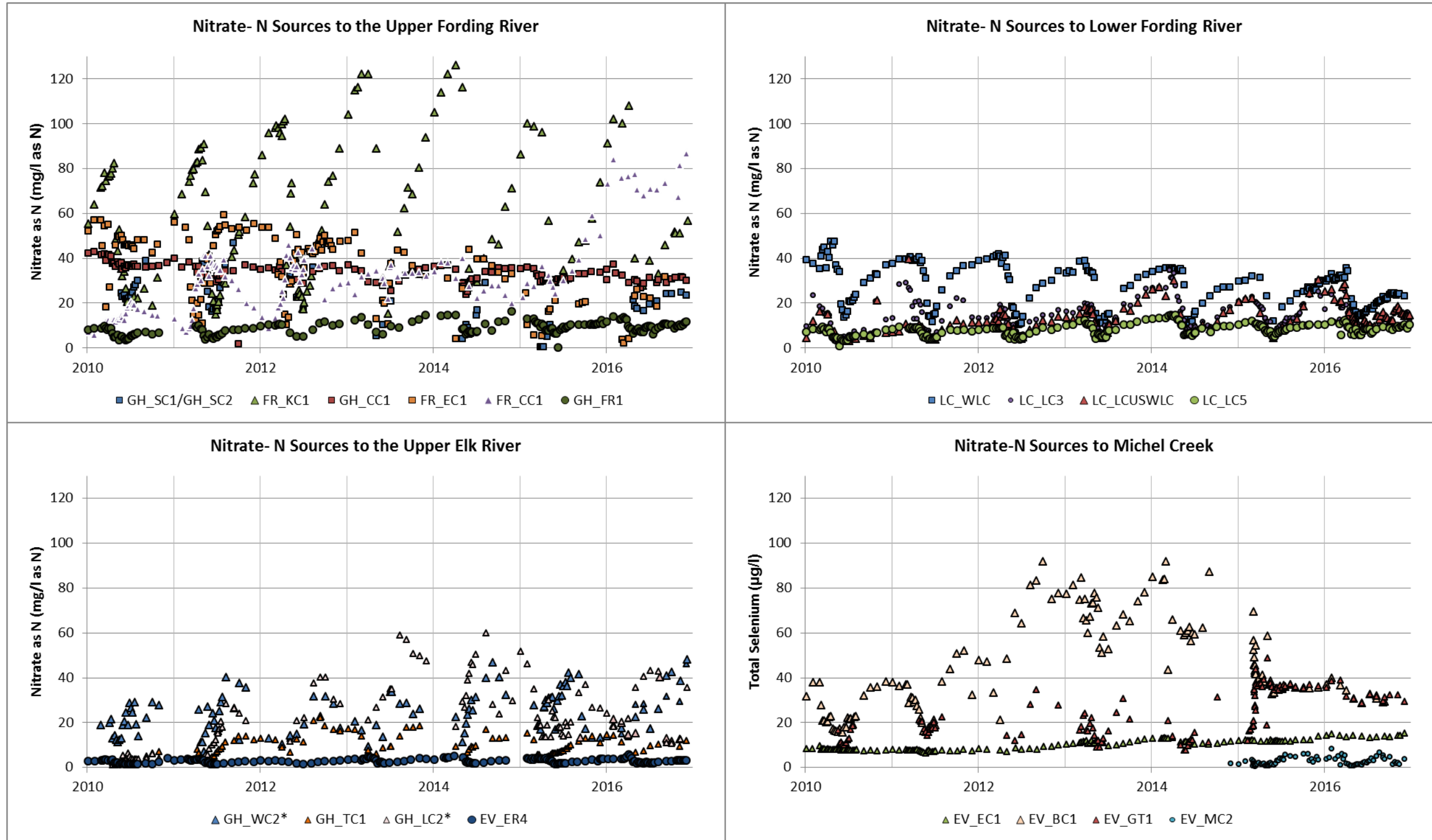


Figure 45. Nitrate- N concentrations at key source sites in the upper Fording River (top Left), lower Fording River (top right), upper Elk River (bottom left) and Michel Creek (bottom right) compared to relevant Order stations.

Note: Active waste rock dumps are depicted using triangles, dormant waste rock dumps with squares, and downstream monitoring Locations with circles.

Monitoring at GH_LC2 and GH_WC2 is not required under 107517, however this data is included from these stations instead of GH_LC1 (E257796) and GH_WC1 (E257795) to show long term trends at Leask and Wolfram creeks.

5.2.3 Sulphate and Cadmium

Concentrations of both Sulphate and Cadmium are below the thresholds for which treatment would be required under the Elk Valley Water Quality Plan, as such; no treatment is planned for Sulphate and Cadmium. There are spatial and temporal patterns observed in sulphate data that mirror those of selenium; and are understood to reflect the oxidation of sulfur-bearing minerals within the waste rock dumps (e.g., pyrite). Based on data collected to date, sulphate concentrations recorded at Order stations sites show an increasing trend peaking in 2013–2014 and then maintaining a fairly constant seasonal pattern, see Figure 46. Like selenium, sulphate temporal patterns expressed at Order Stations are associated with concentrations observed at key waste rock dumps, see Figure 47.

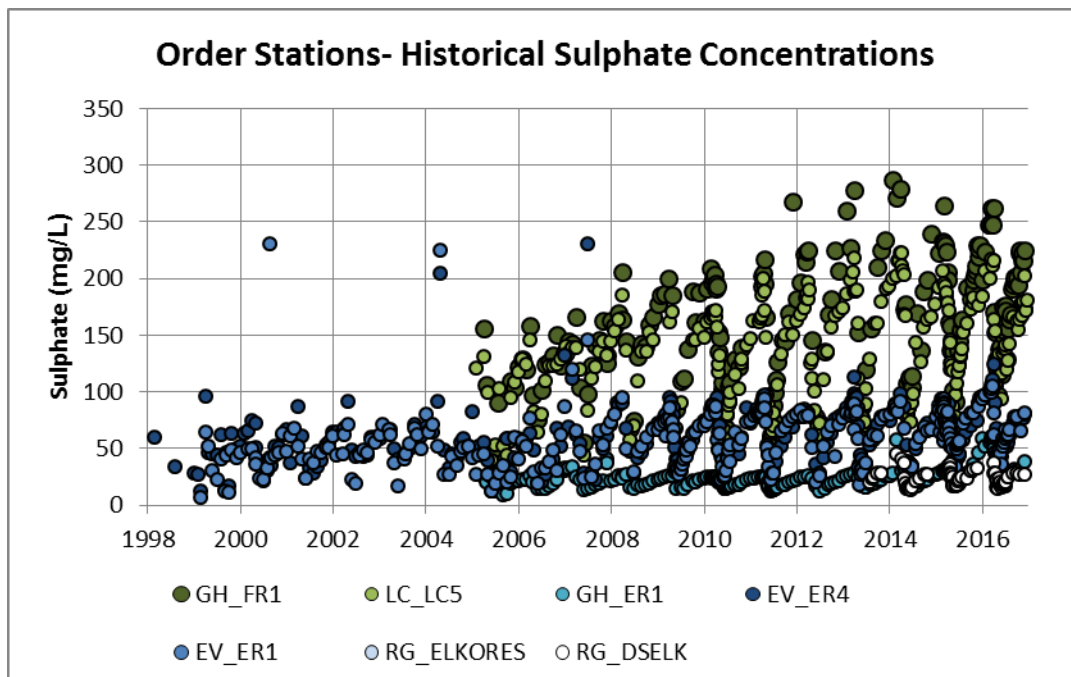


Figure 46. Sulphate concentration trends at Order Stations.

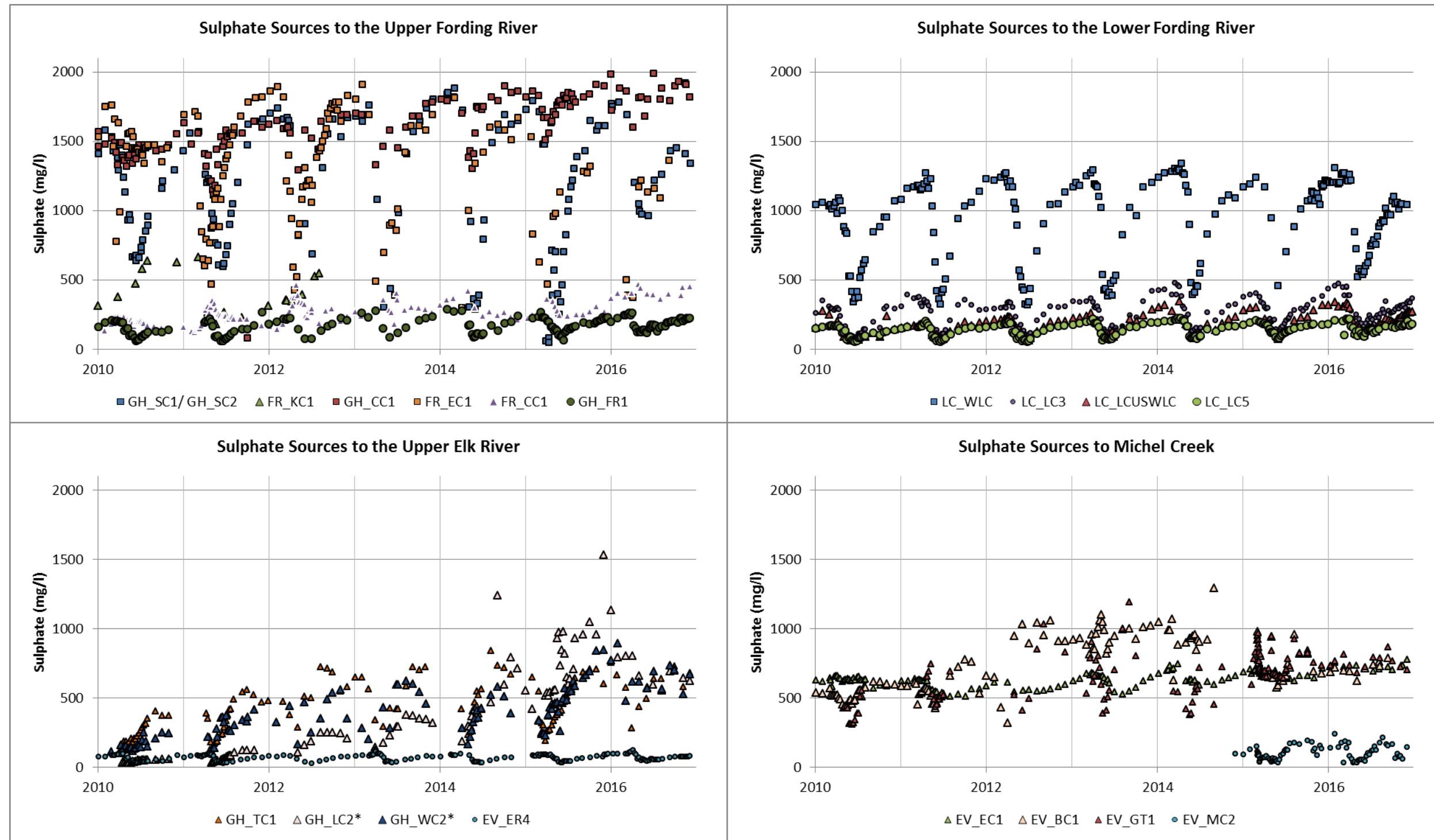


Figure 47. Sulphate concentrations at key source sites in the upper Fording River (top Left), lower Fording River (top right), upper Elk River (bottom left) and Michel Creek (bottom right) compared to relevant Order stations.

Note: Active waste rock dumps are depicted using triangles, dormant waste rock dumps with squares, and Order Stations within the Fording River with circles.

Monitoring at GH_LC2 and GH_WC2 is not required under 107517, however this data is included from these station instead of GH_LC1(E257796) and GH_WC1(E257795) to show long term trends at Leask and Wolfram creeks.

Unlike other Order-defined constituents of interest, temporal and spatial trends in cadmium data are less apparent, see Figure 48. Rather and as noted in the ABMP, seasonal cadmium trends within the receiving environment appear to be driven by background conditions. Elevated Cadmium concentrations have been observed locally in some tributaries in the valley; however, concentrations in the receiving environment have remained below SPOs. Continued surface water monitoring for this constituent will help improve clarity and ability to discern relationships and patterns.

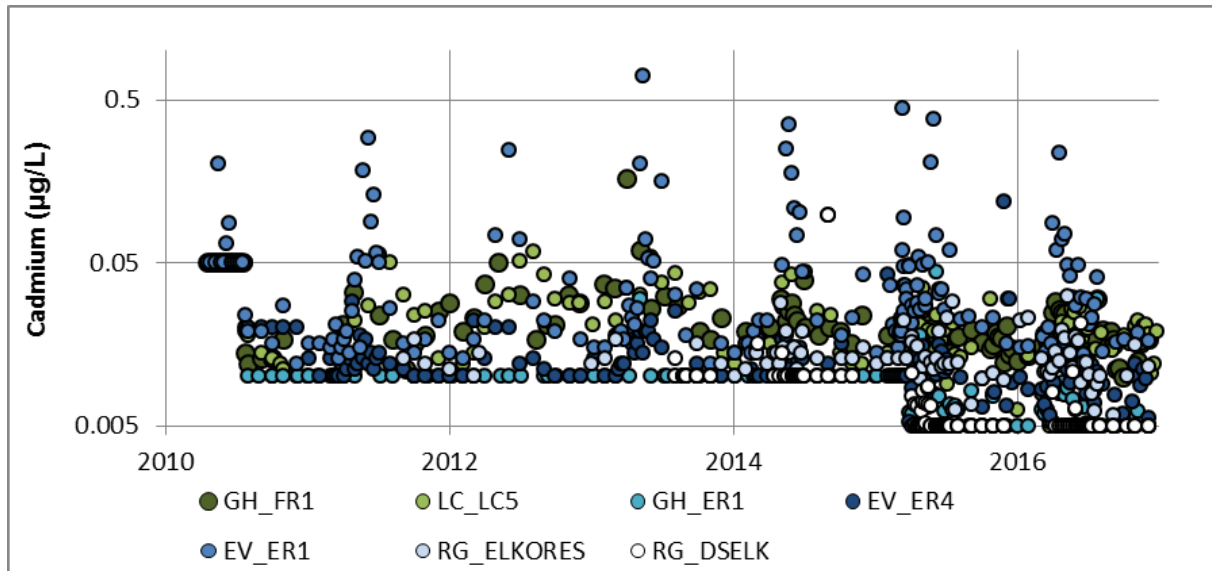


Figure 48. Dissolved cadmium concentrations at Order Stations.

Note: Active waste rock dumps are depicted using triangles, dormant waste rock dumps with squares, and Order Stations within the Fording River with circles. Note the y-axis is on a logarithmic scale.

5.3 Toxicity

5.3.1 Acute Toxicity

Four hundred and fifty one (451) acute toxicity tests were completed as part of the surface water monitoring program in 2016. Of those, seven (7) *D. magna* tests performed at 20°C were recorded as having >50% mortality and as such are considered failed test results. A summary of all test results in addition to the detailed biological test reports is provided in Appendix F.

In response to the failed toxicity testing results, Teck followed the requirements of Permit 107517 Section 10.2.2 with respect to confirmatory testing (including the completion of Toxicity Identification Evaluation (TIE) investigations), took immediate corrective action where possible and provided all follow up test information to the MOE when it became available.

The investigation into failed test results suggests that laboratory procedures of warming water samples to 20 ± 2°C (i.e., above field temperature conditions) may be influencing precipitation reactions within the test, and subsequently affecting *D. magna* survival. TIEs have been completed and indicated that a mineral precipitate was forming within test chambers and on the *D. magna*.

Mineral precipitation observations and saturation indices calculations (refer to 2015 Permit 107517 Annual Water Quality Monitoring Report) have not conclusively identified the mineral precipitate as calcite, as many carbonate minerals are affected by the laboratory methods of warming test waters.

Testing in 2016 at sample location with previous failed tests results, was completed using split-samples, with one split being assessed at the standard lab method temperature and the other split sample at the field surface water temperature measured at the time of sampling or $10^{\circ} \pm 2^{\circ}\text{C}$ whichever is higher. This minimum temperature of $10^{\circ} \pm 2^{\circ}\text{C}$ was selected because *D. magna* do not survive well in cold water. Compliance has been evaluated against test results conducted at the standard lab method temperature. Results from the tests administered at 10°C are shown for context as this temperature is considered more representative of field conditions. Table 16 summarizes the failures of acute toxicity tests that occurred in 2016 as well as the results of test performed at 10°C . One of the tests performed at 10°C resulted in $>50\%$ mortality. Field temperature measurements taken at the time of the acute toxicity samples are also shown. All field temperature measurements taken at the time of failed acute toxicity samples are well below 20°C .

Table 19. Failed acute toxicity tests and results for test performed at 20° and 10° .

EMS	Site ID	Date	Test	Acute Toxicity Tests - Percent Mortality		Field Temp $^{\circ}\text{C}$
				20°C	10°C	
E298590	EV_DC1	2/2/2016	48-Hour <i>Daphnia magna</i>	100	*	0
E261897	FR_SP1	2/4/2016	48-Hour <i>Daphnia magna</i>	63.3	0	3.9
0200384	GH_CC1	2/3/2016	48-Hour <i>Daphnia magna</i>	100	40	0.2
E291569	LC_WTF_OUT	3/28/2016	48-Hour <i>Daphnia magna</i>	80	0	4.2
0200384	GH_CC1	5/10/2016	48-Hour <i>Daphnia magna</i>	100	0	4.6
0200384	GH_CC1	8/2/2016	48-Hour <i>Daphnia magna</i>	100	53	8.4
E291569	WL_BFWB_OUT_SP21	8/15/2016	48-Hour <i>Daphnia magna</i>	90	0	10.7

Note: No acute toxicity test was performed at 10°C for the sample taken at EVO Dry Creek (EV_DC1) on February 2, 2016.

In the case of three of the seven 48-hr *Daphnia magna* toxicity test failures, follow up or duplicate analyses indicated $<50\%$ mortality. These instances and results are described below:

EV_DC1: On February 2, 2016, a 48 hr *D. magna* single concentration toxicity test was collected at the Dry Creek Sedimentation Pond Decant to Harmer Creek (EMS ID E298590) which resulted in 100% mortality for *Daphnia magna* at 20°C . EVO conducted additional sampling on February 15 and results for *Daphnia magna* were 0% mortality when analyzed at 20°C and at 10°C .

LC_WTF_OUT: On March 28, 2016, a 48 hr *D. magna* single concentration toxicity test was conducted on the WLC AWTF Effluent by Nautilus Environmental which resulted in 80% mortality at 20°C . A duplicate sample collected from this location on the same day had been saved in the refrigerator at 4°C and upon receipt of the failure notification, sample was immediately sent to the lab for *D. magna* toxicity testing. The second test was conducted at 100% concentration and as a dilution series. No mortality was observed in the second test including all dilution series. Also, additional

samples were collected on March 31 for *D. magna* toxicity tests (at 20°C and 10°C) and all passed. A toxicity identification evaluation program did not identify the original cause of toxicity.

On August 15, 2016, a 48 hr *D. magna* single concentration toxicity test was conducted on the WLC AWTF Effluent by Nautilus Environmental which resulted in 90% mortality at 20°C. An additional 48 hr *D. magna* single concentration toxicity test of the effluent at 10°C resulting in 0% mortality. The temperature of the WLC AWTF Effluent water on August 15 was 10.7°C. A duplicate sample was also tested by Maxxam at 20°C which passed the *D. magna* toxicity test with 0% mortality. Nautilus re-tested the toxicity with reserve sample at a 100% concentration and dilution series. The reanalysis (conducted within five day hold times) at 20°C resulted in 27% mortality at 100% and 0% mortalities for all dilution series. Additional samples were taken on August 18 and 19 and sent to both Nautilus and Maxxam for 48 hr *D. magna* single concentration toxicity tests and 96 hr Rainbow trout single concentration toxicity tests which resulted in all tests passing.

On both 48 hr *D. magna* toxicity test results failures from the WLC AWTF effluent there are notable discrepancies in the test results including: the different results for duplicate samples from Maxxam and Nautilus at 20°C; retests showing different results; and test results conducted at 10°C. This test phenomenon is observed throughout the Elk Valley in mine affected waters with high alkalinity and hardness. Teck is investigating the *D. magna* test results and how influent water chemistry, laboratory organism differences, and temperature differences influence *D. magna* toxicity test results. The results from these investigations may inform test protocol and aid in interpreting future results.

Three out of the remaining four *Daphnia magna* toxicity test failures were collected at Cataract Creek which is planned for treatment to improve water quality. Teck is committed to addressing the issue of precipitate/calcite management in the valley. Identification of priority tributaries for calcite management is complete as per Permit requirements and calcite management permitting is underway.

A summary of all acute toxicity samples taken is available in Appendix F as well as a copy of all lab reports and Toxicity Identification Evaluation (TIE) tests.

During review of the lab reports for the completion of this report, it was discovered that the electronic upload file that CMO received from the lab for the November 2, 2016 96 hr Rainbow Trout single concentration test at E298733 (CM_PC2) had a transcription error. The results was reported as 0% in the electronic upload file by the lab and was therefore uploaded into the EMS Database and reported in the Q4 report as such. The correct value is shown in Appendix F and the data error will be fixed in the EMS Database.

5.3.2 Chronic Toxicity

Section 10.2.4 of Permit 10517 dated May 2016 requires that Teck report annually on the Chronic Toxicity program. Chronic toxicity tests were completed in 2016 in accordance with Section 9.8 of Permit 107517. A detailed summary of test results and associated laboratory reports has been prepared and is submitted under separate cover.

5.4 West Line Creek Active Water Treatment Facility

Teck Coal Limited (Teck) West Line Creek Active Water Treatment Facility (WLC AWTF) completed commissioning and began its first year of operations on February 1, 2016. The WLC AWTF treats the entire flow from West Line Creek and augments flows as necessary with Line Creek, reducing both total selenium and nitrate in the receiving environment in accordance with Permit 107517. During the formal operational period in the 12 months from February 2016 to January 31, 2017, approximately 1,980,000 m³ of creek water was treated in the plant and 530 kg of selenium and 40,958 kg of nitrate as nitrogen (NO₃-N) was removed.

5.4.1 Selenium Speciation

As part of the review and investigation on the WLC AWTF analytical results, Teck identified that the discharge water from the facility contains selenium in different forms (i.e. species like selenite) that may be more bioavailable than selenate, which is the predominant selenium species in the receiving environment.

Due to the presence of alternative selenium species in the discharge water, the full environmental benefits of selenium removal may be compromised depending upon their relative bioavailability. Current data indicates there is no impact on acute aquatic health and enhanced monitoring is underway to confirm there is no unacceptable chronic impacts on aquatic health while the issue is addressed. In 2016, the plant successfully removed 95% of selenium and 99% of nitrate and there continues to be an overall benefit from the plant's ongoing successful removal of nitrate.

Identifying and implementing a solution to this challenge is a priority for Teck and a dedicated team of both internal and external experts have been engaged to assess solutions. In 2016 and into 2017 the following work was advanced to address the challenge, including:

- collecting selenium speciation samples within the plant process;
- reviewing plant operations, maintaining plant stability and establishing a baseline of selenium speciation;
- optimizing ballasted sand clarifier and continuous backwash sand filter performance;
- analyzing plant data to determine how operational changes correlate with a change in selenium speciation in the WLC AWTF;
- conducting enhanced monitoring of the receiving environment in conjunction with the Line Creek Local Aquatic Effects Monitoring program, to understand any potential long-term effects;
- identifying a number of potential pilot scale options and initiating bench-scale testing; and
- planning for construction and commissioning of pilot-scale options at WLC AWTF with pilot testing commencing in the summer of 2017.

Learnings from work on this issue will be incorporated into ongoing water treatment activities as the EVWQP continues to be implemented, consistent with an adaptive management approach.

6 Linkages to the Adaptive Management Plan

As required in Permit 107517 Section 11, Teck has developed an Adaptive Management Plan (AMP) to support implementation of the EVWQP, to achieve water quality targets including calcite targets, ensure that human health and the environment are protected, and where necessary, restored, and to facilitate continuous improvement of water quality in the Elk Valley.

Following an adaptive management framework, the AMP identifies six Big Questions that will be re-evaluated at regular intervals as part of AMP updates throughout the duration of EVWQP implementation. For each Big Question, the AMP describes how the Big Question will be periodically re-evaluated, and how the key uncertainties under the Big Question will be reduced.

The AMP was submitted to the Environmental Monitoring Committee and MOE Director July 31, 2016, as required. Study designs for many programs were established before the document was submitted. Teck is working to embed elements of the AMP within each program through reviews of monitoring programs at the study design and annual report stages. As the AMP is currently under review and in the process of being implemented, this is the first cycle where the monitoring programs are being explicitly reviewed to confirm all required monitoring is included. Gaps identified in review of 2016 annual reports will inform future monitoring as required.

Big Question 1 (Will water quality limits and Site Performance Objectives be met for selenium, sulphate, nitrate and cadmium?) will be re-evaluated through periodic review of RWQM projections and monitoring data. This process is in Figure 49 below. This report presents a summary of the surface water monitoring program on an annual basis and identifies results of water quality monitoring at Compliance Points and Order stations with comparison to limits (Section 1.1) and long term trends (Section 5.2). This information is used in concert with RWQM projections to confirm that SPOs are met both now and in the future.

Surface water monitoring will continue as required in permit approvals, furthering information collection regarding the achievement of SPOs in relation to the EVWQP implementation plan and thus supporting the revaluation of Big Question 1 under the AMP.

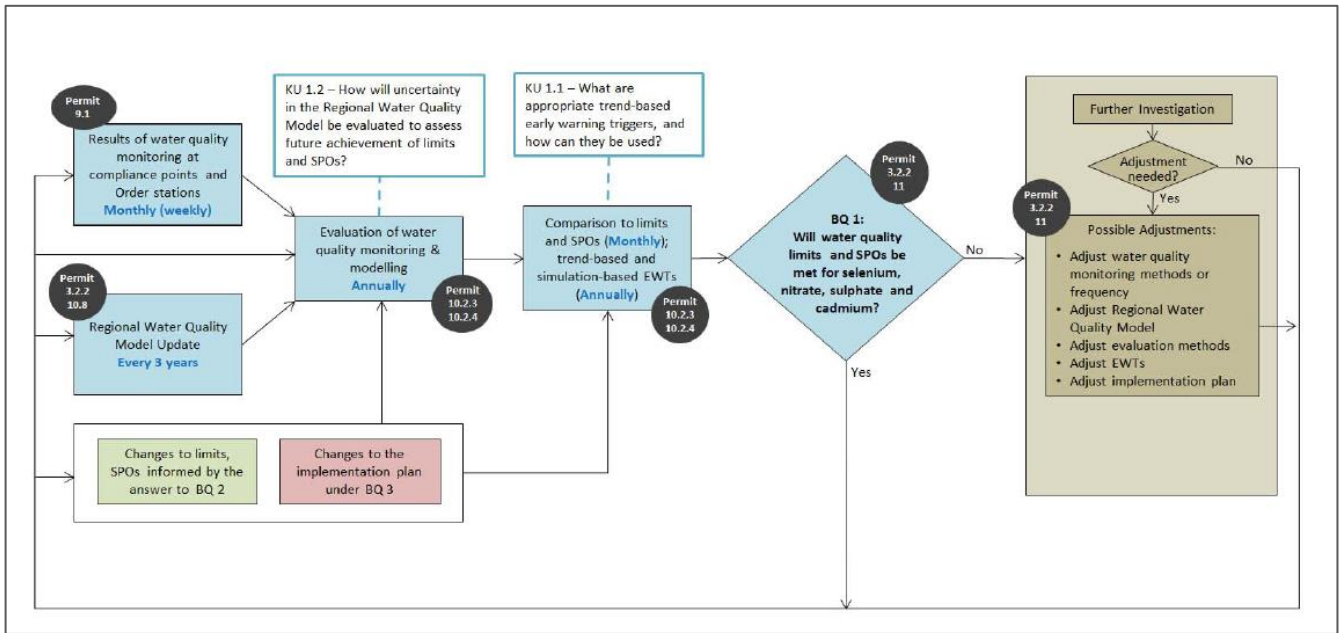


Figure 49. The process for re-evaluating the answer to Big Question 1 (Teck 2016, AMP Figure 6).

Big Question 5 (Does monitoring for mine-related effects indicate that the aquatic ecosystem is healthy?) will be re-evaluated through periodic review of the results of several ongoing programs (see Figure 50).

The surface water quality monitoring program as required by Permit 107517 Section 9 provides important supporting information for Teck’s biological monitoring programs. Identification of water quality trends helps pinpoint locations and constituents of concern. Water quality monitoring data is correlated with results of biological monitoring programs to determine effects of these identified constituents. If concerns are identified, further investigation is triggered.

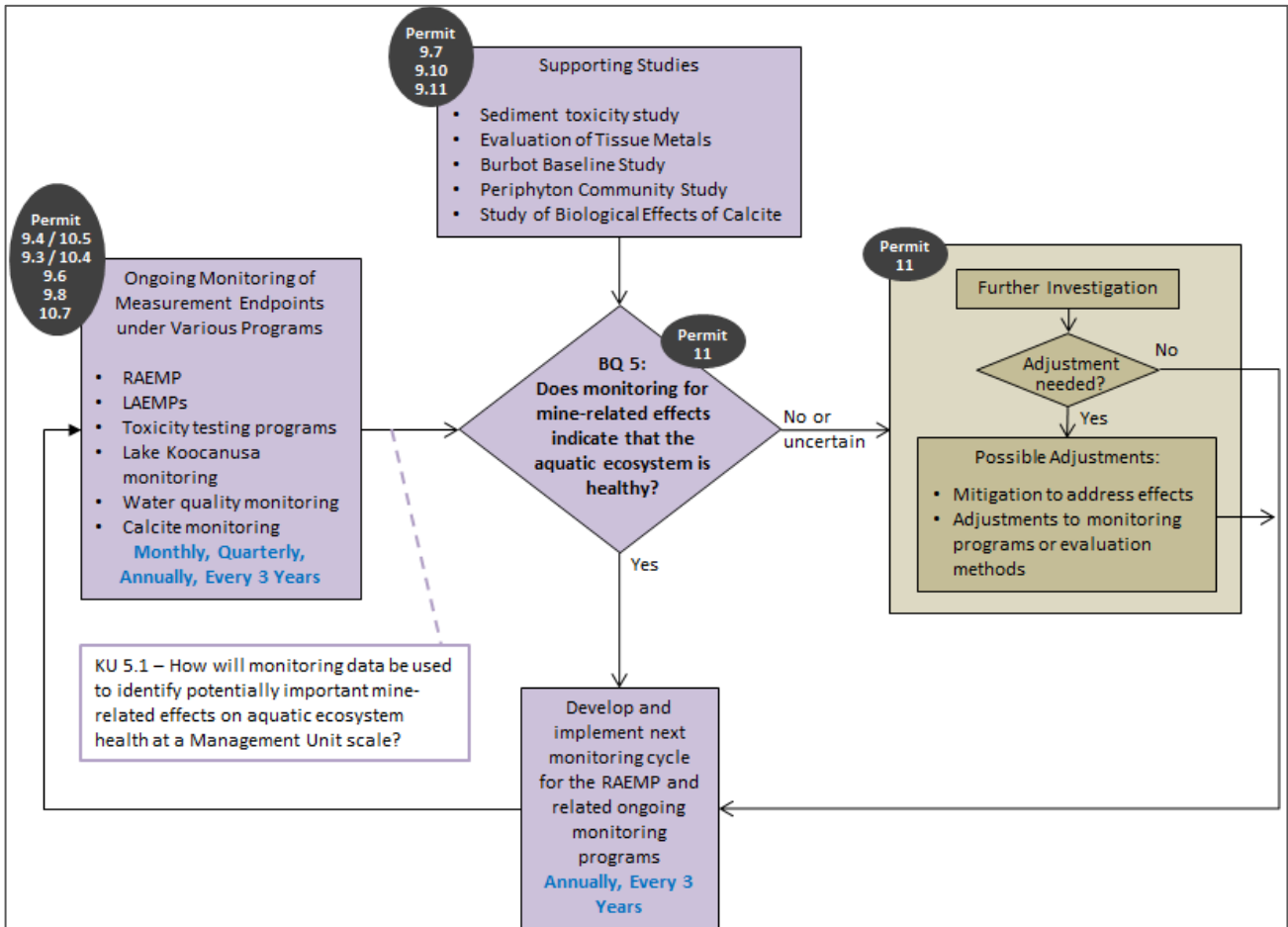


Figure 50. The process for re-evaluating the answer to Big Question 5 (Teck 2016, AMP Figure 18),

7 Discussion

Permit 107517 takes an area based approach to authorizing and managing water quality constituents of interest originating from current and historical mining activities in the Elk Valley. To do so, requires an extensive surface water monitoring program that includes 88 authorized discharge, receiving environment and other sampling sites; eight authorized discharge Compliance Points; and seven Order Stations for which Site Performance Objectives (SPO) have been established. These 88 permitted sampling locations are used to evaluate compliance, and overall effectiveness of the Area Based Management Plan. The following report is submitted in fulfillment of Section 10.2.4 of Permit No. 10517 and summarizes: non-compliances experienced in 2016; water quality/quantity measurements relative to appropriate compliance limits, Site Performance Objectives, and/or approved and working water quality guidelines; toxicity tests; and Quality Assurance/Quality Control issues during the 2016 calendar year.

There were non-compliances in 2016 associated with permit limit exceedances. A portion of permit limit exceedances recorded were hydrologic challenges associated with Fording River Operations' Compliance Point E300071 (FR_FRCP1). It has become increasingly evident that Compliance Point E300071 (FR_FRCP1) is not a representative location for compliance monitoring. As outlined within Permit 107517, Compliance Points are intended to monitor all or most of the point and non-point discharges from the mine operation. The Fording River Operations Compliance Point instead measures isolated surface water that is predominantly mine-influenced water from one creek during low flow winter conditions. Teck is committed to improving water quality within the Elk Valley, and as outlined in the Area Based Management Plan, significant improvements are targeted with proposed water treatment mitigation at Fording River Operations. Teck has also proposed an alternative Compliance Point for Fording River Operations and is working on monitoring and analysis to understand the representativeness of the proposed location and pursue a permit amendment.

Other non-compliances were associated with Line Creek Operations. On December 31, 2015, the LCO Compliance Point limits for nitrate were reduced from 14 mg/L monthly average and 20 mg/L daily maximum to 7 mg/L monthly average and 9 mg/L daily maximum. These changes in limits were initially defined based on the limited data that was available at that location at the time, modelling that included that data, and the original commissioning schedule for the West Line Creek Active Water Treatment Facility. Since this time, monitoring data indicates that the regional water quality model may not be adequately representing the nitrate loadings in Line Creek. Despite higher than projected nitrate concentrations in Line Creek as measured at the LCO Compliance Point, nitrate concentrations at the Line Creek Order Station in the Fording River (FR5, LC_LC5) have remained below the SPO during all periods to date.

Several mitigation measures are ongoing to manage nitrate concentrations at LCO. These include active management of pit dewatering, changing blasting practices, identification of passive treatment opportunities and maximizing nitrate removal by the West Line Creek Active Water Treatment Facility. Source terms for nitrate loadings in the Regional Water Quality Model are currently being updated in an effort to improve model performance. Considerable effort is being made to determine appropriate preventative and mitigation measures that will support long term permit compliance and environmental protection.

Non-compliances were also recorded in 2016 associated with *Daphnia magna* acute toxicity testing. Toxicity Identification Evaluation tests and visual observations indicate that cause for reduced survival of *D. magna* is precipitate formation on the organism during lab testing. The 2 locations that account for the majority of *Daphnia magna* toxicity test failures (5 of 7) have treatment (Line Creek) or is planned for treatment (Cataract Creek) to improve water quality. In addition, Teck is committed to addressing the issue of precipitate/ calcite management in the valley. Identification of priority tributaries for calcite management is complete as per Permit requirements and Calcite management permitting is underway.

Other non-compliances resulted from oversights or were otherwise inadvertent. Therefore improvements in planning (e.g., scheduling of sample collection/shipping around statutory holidays), internal and external communications (e.g., timely reporting), and following standard protocols are anticipated to reduce future non-compliances.

In consideration of the extensive surface water monitoring program required under Permit 107517, in conjunction with all other active monitoring programs, no additional monitoring is proposed at this time. This will continue to be evaluated to ensure that this monitoring program continues to provide information required to support Teck's Adaptive Management Plan.

Appendix A – Summary of Unattained Samples

Unattainable Data

Location Type/Operation	Date	EMS ID	Location Code	Parameters	Reason
Order Station	01/07/2016	E300230	RG_DSELK	ALL	Ice unsafe, no access to site
Order Station	02/02/2016	E300230	RG_DSELK	ALL	Ice unsafe, no access to site
Order Station	03/03/2016	E300230	RG_DSELK	ALL	Ice unsafe, no access to site
Compliance Point	Q1	E300071	FR_FRCP1	Flow	Flow Unattainable Substantially Frozen
Compliance Point	12/12/2016	E300091	EV_MC2	Flow	Flow unattainable due to upstream ice-jam resulting in manual flow being unsafe. Staff gauge unreliable due to ice build-up
Compliance Point	12/19/2016	E300091	EV_MC2	Flow	Flow unattainable due to upstream ice-jam resulting in manual flow being unsafe. Staff gauge unreliable due to ice build-up
Compliance Point	12/6/2016	E300071	FR_FRCP1	Flow	Flow unattainable due to excessive ice buildup
Fording River Operations	2016	E217403	FR_3PIT	Water Quality	No Pumping
Fording River Operations	01/04/2016	E102480	FR_EC1	Water Quality	No Discharge
Fording River Operations	02/02/2016	E102480	FR_EC1	Water Quality	No Discharge
Fording River Operations	Q-4	E102480	FR_EC1	Water Quality, Toxicity	No Discharge
Fording River Operations	Q1	0200251	FR_FR1	Water Quality	Flow Unattainable Frozen/Dry
Fording River Operations	12/7/2016	0200251	FR_FR1	Flow	Flow unattainable due to excessive ice buildup
Fording River Operations	01/05/2016	0200201	FR_FR2	Flow	Flow Unattainable Partial Frozen
Fording River Operations	02/03/2016	0200201	FR_FR2	Flow	Flow Unattainable Partial Frozen
Fording River Operations	04/19/2016	0200201	FR_FR2	Flow	Flow Unattainable - Safety High Flow
Fording River Operations	12/12/2016	0200201	FR_FR2	Flow	Flow unattainable due to excessive ice buildup
Fording River Operations	01/04/2016	E216778	FR_HC1	Flow	Flow Unattainable Partial Frozen
Fording River Operations	02/01/2016	E216778	FR_HC1	Flow	Flow Unattainable Partial Frozen
Fording River Operations	01/04/2016	E300096	FR_HC3	Flow	Flow Unattainable Partial Frozen
Fording River Operations	02/01/2016	E300096	FR_HC3	Flow	Flow Unattainable Partial Frozen
Fording River Operations	03/11/2016	E300096	FR_HC3	Flow	Flow Unattainable Partial Frozen

Location Type/Operation	Date	EMS ID	Location Code	Parameters	Reason
Fording River Operations	03/17/2016	E300096	FR_HC3	Flow	Flow Unattainable Partial Frozen
Fording River Operations	12/7/2016	E300096	FR_HC3	Flow	Flow unattainable due to excessive ice buildup
Fording River Operations	2016	E216781	FR_HP1	Water Quality, Toxicity	No Pumping
Fording River Operations	2016	E102478	FR_MS1	Water Quality, Toxicity	No Discharge
Fording River Operations	2016	E102476	FR_NL1	Water Quality, Toxicity	No Discharge
Fording River Operations	2016	E208394	FR_SKP1	Water Quality, Toxicity	No Discharge
Fording River Operations	2016	E208395	FR_SKP2	Water Quality, Toxicity	No Discharge
Fording River Operations	2016	E102475	FR_TP1	Water Quality	No Discharge
Fording River Operations	Q1	E216777	FR_UFR1	Flow	Flow Unattainable Substantially Frozen
Fording River Operations	12/7/2016	E216777	FR_UFR1	Flow	Flow unattainable due to excessive ice buildup
Fording River Operations	Q1	E221329	GH_SC1	Water Quality, Toxicity	No Discharge - sample from alternate GH_SC2
Greenhills Operations	Q1	E287437	GH_BR_F	Water Quality	No Flow
Greenhills Operations	01/05/2016	E287432	GH_COUGAR	Water Quality	No Flow
Greenhills Operations	01/05/2016	E257796	GH_LC1	Water Quality	No Flow
Greenhills Operations	02/02/2016	E287432	GH_COUGAR	Water Quality	No Flow
Greenhills Operations	02/02/2016	E207437	GH_RLP	Water Quality	No Flow
Greenhills Operations	02/02/2016	E287433	GH_WADE	Water Quality	No Flow
Greenhills Operations	04/04/2016	E207437	GH_RLP	Water Quality	No Flow
Greenhills Operations	06/07/2016	E287437	GH_BR_F	Water Quality	No Flow
Greenhills Operations	06/07/2016	E257796	GH_LC1	Water Quality	No Flow
Greenhills Operations	Q3, Q4	E287437	GH_BR_F	Water Quality	No Flow
Greenhills Operations	07/05/2016	E257796	GH_LC1	Water Quality	No Flow
Greenhills Operations	Q3, Q4	E287432	GH_COUGAR	Water Quality	No Flow
Greenhills Operations	07/06/2016	E207437	GH_RLP	Water Quality	No Flow
Greenhills Operations	09/13/2016	E305877	GH_ERSC2	Water Quality	No Flow
Greenhills Operations	10/04/2016	E305877	GH_ERSC2	Water Quality	No Flow
Greenhills Operations	10/04/2016	E257795	GH_WC1	Water Quality	No Flow
Greenhills Operations	11/07/2016	E207437	GH_RLP	Water Quality	No Flow

Location Type/Operation	Date	EMS ID	Location Code	Parameters	Reason
Greenhills Operations	12/05/2016	E207437	GH_RLP	Water Quality	No Flow
Greenhills Operations	12/07/2016	E305877	GH_ERSC2	Water Quality	No Flow
Greenhills Operations	12/07/2016	E257796	GH_LC1	Water Quality	No Flow
Greenhills Operations	12/07/2016	E287433	GH_WADE	Water Quality	No Flow
Greenhills Operations	12/07/2016	E305854	GH_WILLOW_SP1	Water Quality	No Flow
Greenhills Operations	12/07/2016	E305855	GH_WOLF_SP1	Water Quality	No Flow
Line Creek Operations	Q1	E216142	LC_LC1	Water Quality	Frozen
Line Creek Operations	Q1	E223240	LC_LC12	Water Quality	Zero Flow
Line Creek Operations	Q4	E223240	LC_LC12	Water Quality	Zero Flow
Line Creek Operations	10/3/2016	E216144	LC_LC7	Water Quality	Zero Flow
Line Creek Operations	1/4/2016	E219411	LC_LC8	Water Quality	Zero Flow
Line Creek Operations	2016	E221268	LC_LC9	Water Quality. Toxicity	Zero Flow
Elkview Operations	01/11/2016	E210369	EV_AQ1	Water Quality	No flow/discharge
Elkview Operations	02/03/2016	E210369	EV_AQ1	Water Quality	No flow/discharge
Elkview Operations	Q3	E210369	EV_AQ1	Water Quality	No flow/discharge
Elkview Operations	12/07/2016	E210369	EV_AQ1	Water Quality	No flow/discharge
Elkview Operations	Q4	E102685	EV_BC1	Water Quality, Toxicity	No flow/discharge
Elkview Operations	01/13/2016	E298592	EV_BLM2	Flow	Creek buried in ice
Elkview Operations	01/13/2016	E298591	EV_FC1	Flow	Creek buried in ice
Elkview Operations	02/01/2016	E298591	EV_FC1	Flow	Creek buried in ice
Elkview Operations	5/4/2016	E258135	EV_LC1	Water Quality	Water infiltrates to ground so no sample possible
Elkview Operations	Q2	E258135	EV_LC1	Toxicity	Water infiltrates to ground so no sample possible
Elkview Operations	7/5/2016	E258135	EV_LC1	Water Quality	Water infiltrates to ground so no sample possible
Elkview Operations	8/10/2016	E258135	EV_LC1	Water Quality	Water infiltrates to ground so no sample possible
Elkview Operations	01/11/2016	E298593	EV_TC1	Water Quality	No flow/discharge
Elkview Operations	02/02/2016	E298593	EV_TC1	Water Quality	No flow/discharge
Elkview Operations	Q3, Q4	E298593	EV_TC1	Water Quality	No flow/discharge
Coal Mountain Operations	Q1	E298733	CM_PC2	Water quality, Toxicity	Zero flow

Location Type/Operation	Date	EMS ID	Location Code	Parameters	Reason
Coal Mountain Operations	01/06/2016	E298734	CM_SOW	Water quality	The sump was frozen. Unsafe sampling conditions
Coal Mountain Operations	02/03/2016	E298734	CM_SOW	Water quality	The sump was frozen. Unsafe sampling conditions
Coal Mountain Operations	10/05/2016	E298733	CM_PC2	Water quality	Zero flow
Coal Mountain Operations	12/13/2016	E298733	CM_PC2	Water quality	Zero flow
Regional – Permit 107517 Lake Koocanusa	Q1	E300092	RG_GRASMERE	All	Ice unsafe, no access to site
Regional – Permit 107517 Lake Koocanusa	Q1	E300094	RG_BORDER	All	Ice unsafe, no access to site
Regional – Permit 107517 Lake Koocanusa	Q1	E300095	RG_KERRRD	All	Ice unsafe, no access to site
Regional – Permit 107517 Lake Koocanusa	Q1	E300093	RG_USGOLD	All	Ice unsafe, no access to site
Regional – Permit 107517 Lake Koocanusa	4/5/2016	E300095	RG_KERRRD	All	Low flow, unable to access
Regional – Permit 107517 Lake Koocanusa	4/12/2016	E300095	RG_KERRRD	All	Low flow, unable to access
Regional – Permit 107517 Lake Koocanusa	4/19/2016	E300095	RG_KERRRD	All	Low flow, unable to access
Regional – Permit 107517 Lake Koocanusa	4/26/2016	E300095	RG_KERRRD	All	Low flow, unable to access

Appendix B – Surface Water Monitoring Program Requirements

Table B-2. Summary of Surface Water Monitoring Program for Greenhills Operation

EMS ID	Site ID	Water Quality/Quantity Parameter and Associated Monitoring Frequency							
		Field Parameters ^a	Conventional Parameters ^b	Major Ions ^c	Nutrients ^d	Total and dissolved Metals Scan ⁵	Flow ^f	96-hr. LT ₅₀ for Rainbow Trout ^g	48-hr. LT ₅₀ for <i>Daphnia magna</i> ^g
Authorized Discharge Sites									
200385	GH_PC1	M	M	M	M	M	-	Q	Q
E287438	GH_TPS	-	SA	SA	SA	SA	-	-	-
E102709	GH_GH1	M	M	M	M	M	-	Q	Q
E207437	GH_RLP	M	M	M	M	M	-	-	-
E287433	GH_WADE	M	M	M	M	M	-	Q	Q
0200388	GH_MC1	M	M	M	M	M	-	-	-
E257796	GH_LC1	M	M	M	M	M	-	Q	Q
E257795	GH_WC1	M	M	M	M	M	-	Q	Q
E207436	GH_TC2	M	M	M	M	M	-	Q	Q
E305855	GH_WOLF_SP1	M	M	M	M	M	-	Q	Q
E305854	GH_WILLOW_SP1	M	M	M	M	M	-	Q	Q
EMS ID	Site ID	Water Quality/Quantity Parameter and Associated Monitoring Frequency							
		Field Parameters ¹	Conventional Parameters ²	Major Ions ³	Nutrients ⁴	Total Metals Scan ⁵	Flow ⁶	96-hr. LT ₅₀ for Rainbow Trout ⁷	48-hr. LT ₅₀ for <i>Daphnia magna</i> ⁷
Receiving Environment Sampling Sites									
E305875	GH_NNC	M	M	M	M	M	-	-	-
E305876	GH_ER1A	M	M	M	M	M	-	-	-
E305877	GH_ERSC2	M	M	M	M	M	-	-	-
E305878	GH_ERSC4	M	M	M	M	M	-	-	-
E287437	GH_BR_F	M	M	M	M	M	-	-	-
E287432	GH_COUGAR	M	M	M	M	M	-	-	-
E102714	GH_TC1	M	M	M	M	M	-	Q	Q
0200389	GH_ER2	M	M	M	M	M	-	-	-

Table B-3. Summary of Surface Water Monitoring Program for Line Creek Operations

EMS ID	Site ID	Water Quality/Quantity Parameter and Associated Monitoring Frequency									
		Field Parameters ^a	Conventional Parameters ^b	Major Ions ^c	Nutrients ^d	Total Metals Scan ^e	Flow ^f	BOD	Sulphide	96-hr. LT ₅₀ for Rainbow Trout ^g	48-hr. LT ₅₀ for <i>Daphnia magna</i> ^g
Authorized Discharge Sites											
E216144	LC_LC7	M	M	M	M	M	-	-	-	Q	Q
E221268	LC_LC9	M	M	M	M	M	-	-	-	Q	Q
E219411 ^r	LC_LC8	M	M	M	M	M	-	-	-	-	-
Receiving Environment Sampling Sites											
E288273	LC_DC3	W/M	W/M	W/M	W/M	W/M	-	-	-	-	-
E216142	LC_LC1	M	M	M	M	M	-	-	-	-	-
0200335	LC_LC2	M	M	M	M	M	C	M	-	-	-
E223240	LC_LC12	M	M	M	M	M	-	-	-	-	-
E293369	LC_LCUSWLC	M	M	M	M	M	-	M	-	-	-
E261958	LC_WLC	M	M	M	M	M	C	-	-	-	-
E282149	LC_SLC	M	M	M	M	M	M	M	-	-	-
0200337	LC_LC3	W/M	W/M	W/M	W/M	W/M(g)	C	W/M	W/M	-	-
0200044	LC_LC4	W/M	W/M	W/M	W/M	W/M(g)	C*	-	-	-	-

Table B-4. Summary of Surface Water Monitoring Program for West Line Creek Active Water Treatment Facility

EMS ID	Site ID	Water Quality/Quantity Parameter and Associated Monitoring Frequency											
		Field Parameters ^a	Conventional Parameters ^b	Major Ions ^c	Nutrients ^d	Dissolved Metals Scan ^e	Total Metals Scan ^e	Flow ^f	BOD & Total Selenium	Sulphide	TSS & Turbidity	96-hr. LT ₅₀ for Rainbow Trout ^g	48-hr. LT ₅₀ for <i>Daphnia magna</i> ^g
E293370 ^m	WL_WLCI_SP01	D	M	M	M	M	M	C	-	-	D	-	-
E293371 ^m	WL_LCI_SP02	D	M	M	M	M	M	C	-	-	D	-	-
E291569 ^m	WL_BFWB_OUT_SP21	D	M	M	M	M	M	C	3X/W	M	D	Q*	Q*

Permit 107517 Annual Report

Table B-5. Summary of Surface Water Monitoring Program for Elkview Operations

EMS ID	Site ID	Water Quality/Quantity Parameter and Associated Monitoring Frequency								
		Field Parameters ^a	Conventional Parameters ^b	Major Ions ^c	Nutrients ^d	Dissolved Metals Scan ^e	Total Metals Scan ^e	Flow ^f	96-hr. LT ₅₀ for Rainbow Trout ^g	48-hr. LT ₅₀ for <i>Daphnia magna</i> ^g
Authorized Discharge Sites										
E296311	EV_SP1	M	M	M	M	-	M	-	Q	Q
E208057	EV_MG1	M	M	M	M	-	M	-	Q	Q
E206231	EV_GT1	M	M	M	M	-	M	-	Q	Q
E102685	EV_BC1	M	M	M	M	-	M	-	Q	Q
E210369	EV_AQ1	M	M	M	M	-	M	-	Q	Q
E298590	EV_DC1	M	M	M	M	-	M	C	Q	Q
E102681	EV_SM1	M	M	M	M	-	M	-	Q	Q
E258135	EV_LC1	M	M	M	M	-	M	-	Q	Q
E296310	EV_GH1	-	SA	SA	SA	SA	-	-	-	-
E208043	EV_GC2	M	M	M	M	-	M	-	Q	Q
E102679	EV_OC1	M	M	M	M	-	M	-	Q	Q
0200097	EV_EC1	M	M	M	M	SA	M	C	Q	Q
Receiving Environment Sampling Sites										
0200203	EV_MC3	W/M	W/M	W/M	W/M	W/M	W/M	-	-	-
E298593	EV_TC1	M	M	M	M	M	M	M	-	-
E298594	EV_SPR2	M	M	M	M	M	M	M	-	-
0200027	EV_ER4	M	M	M	M	M	M	-	-	-
E298595	EV_WF_NW	SA	SA	SA	SA	SA	-	-	-	-
E298596	EV_WF_SW	SA	SA	SA	SA	SA	-	-	-	-
E298592	EV_BLM2	M	M	M	M	M	M	M	-	-
E298591	EV_FC1	M	M	M	M	M	M	M	-	-
0200111	EV_ER2	M	M	M	M	M	M	-	-	-

Permit 107517 Annual Report

Table B-6. Summary of Surface Water Monitoring Program for Coal Mountain Operations

EMS ID	Site ID	Water Quality/Quantity Parameter and Associated Monitoring Frequency							
		Field Parameters ^a	Conventional Parameters ^b	Major Ions ^c	Nutrients ^d	Total Metals Scan ^e	Flow ^f	96-hr. LT ₅₀ for Rainbow Trout ^g	48-hr. LT ₅₀ for <i>Daphnia magna</i> ^g
Authorized Discharge Sites									
E206438 ^h	CM_CCPD	M	M	M	M	M	-	Q	Q
E298733 ^h	CM_PC2	M	M	M	M	M	-	Q	Q
E298734	CM_SOW	M	M	M	M	M	-	-	-
E102488 ^h	CM_SPD	M	M	M	M	M	-	Q	Q
Receiving Environment Sampling Sites									
E258175	CM_MC1	M	M	M	M	M	M	-	-
E200209	CM_CC1	W/M	W/M	W/M	W/M	W/M	C	-	-

Table B-7. Summary of Surface Water Monitoring Program for Compliance Stations

EMS ID	Site ID	Water Quality/Quantity Parameter and Associated Monitoring Frequency													
		Field Parameters ^a	Conventional Parameters ^b	Major Ions ^c	Nutrients ^d	Total and Dissolved Metals Scans ^e	BOD	Flow ^f	Chlorophyll- <i>a</i>	Total Phosphorus	7-Day <i>Ceriodaphnia dubia</i> Chronic Toxicity Test ¹	72-hr. <i>Pseudokichneriella subcapitata</i> Toxicity Test ²	30-Day Early Life-Stage Rainbow Trout Test ³	30-Day Early Life-Stage Fathead Minnow Test ⁴	28-Day Water Exposure <i>Hyalella azteca</i> Toxicity Test ⁵
E300071	FR_FRCP1	W/M	W/M	W/M	W/M	W/M	-	W/M	-	-	Q	Q	See Note 9.	Q	Q
0200378	GH_FR1	W/M	W/M	W/M	W/M	W/M	-	W/M	-	-	Q	Q	See Note 9.	Q	Q
E300090	GH_ERC	W/M	W/M	W/M	W/M	W/M	-	W/M	-	-	Q	Q	See Note 9.	-	-
E297110	LC_LCDSSLCC	W/M	W/M	W/M	W/M	W/M	M	See Note 6.	See Note 7.	See Note 8.	Q	Q	See Note 9.	-	-
E300091	EV_MC2	W/M	W/M	W/M	W/M	W/M	-	C	-	-	Q	Q	See Note 9.	-	-
E102682	EV_HC1	W/M	W/M	W/M	W/M	W/M	-	W/M	-	-	Q	Q	See Note 9.	-	-
E258937	CM_MC2	W/M	W/M	W/M	W/M	W/M	-	W/M	-	-	Q	Q	See Note 9.	-	-

1. Seven-Day *Ceriodaphnia dubia* Chronic Toxicity Test are conducted per EPS1/RM/21. Assessment endpoints include survival and reproduction.

2. 72-hour *Pseudokichneriella subcapitata* Toxicity Test are conducted per EPS1/RM/25. Assessment endpoints include growth and inhibition.

3. 30-Day Early Life-Stage Rainbow Trout (*Oncorhynchus mykiss*) Tests are conducted per EPS1/RM/28, using <24-hour Post-Fertilization Eggs. Assessment endpoints include: survival, hatching, growth, deformity, and behavior.

4. 30-Day Early Life-Stage Fathead Minnow (*Pimphales promelas*) Tests are conducted per USEPA (2000), using <24-hour Post-Fertilization Eggs. Assessment endpoints include: survival, hatching, growth, and deformity.

5. Abbreviations include: M = Monthly, Q = Quarterly, SA = Semi-Annually (twice per year), C = Continuous, W/M = Weekly from March 15 – July 31, Monthly during other times of year.

6. Flows for E297110 are determined by calculation.

7. At Least one time between August 15 through September 30, annually.

8. Every two weeks beginning June 15 through September 30, annually.

9. Two times per year – once in Spring and once in Fall.

Permit 107517 Annual Report

Table B-8. Summary of Surface Water Monitoring Program for Order Stations

EMS ID	Site ID	Water Quality/Quantity Parameter and Associated Monitoring Frequency						
		Field Parameters ^a	Conventional Parameters ^b	Major Ions ^c	Nutrients ^d	Total and Dissolved Metals Scan ^e	Flow ^f	Secchi Depth and Chlorophyll- <i>a</i>
0200378	GH_FR1	W/M	W/M	W/M	W/M	W/M	W/M	-
0200028	LC_LC5	W/M	W/M	W/M	W/M	W/M	W/M	-
E206661	GH_ER1	W/M	W/M	W/M	W/M	W/M	W/M	-
0200027	EV_ER4	W/M	W/M	W/M	W/M	W/M	W/M	-
0200393	EV_ER1	W/M	W/M	W/M	W/M	W/M	W/M	-
E294312	RG_ELKORES	W/M	W/M	W/M	W/M	W/M	-	-
E300230	RG_DSELK	M	M/EH	M/EH	M/EH	M/EH	-	M

Table B-9. Summary of Surface Water Monitoring Program for Lake Kocanusa (wholly located on Canadian Lands and Water)

EMS ID	Site ID	Parameter and Associated Monitoring Frequency					
		Field Parameters ^a	Conventional Parameters ^b	Major Ions ^c	Nutrients ^d	Total and Dissolved Metals Scan ^e	Secchi Depth and Chlorophyll-a
E300095	RG_KERRRD	M	M/EH	M/EH	M/EH	M/EH	M
E300092	RG_GRASMERE	M	M/EH	M/EH	M/EH	M/EH	M
E300093	RG_USGOLD	M	M/EH	M/EH	M/EH	M/EH	M
E300094	RG_BORDER	M	M	M	M	M	M

List of Symbols

BW	Bi-Weekly sampling frequency from June 15 to September 30.
BW/M	Sampling monthly frequency with exception of Total Phosphorous sampling Bi-Weekly frequency from June 15 to September 30, monthly during the rest of the year.
BOD	5-day Biochemical Oxygen Demand
C	Continuous Monitoring - rating curve or rated structure required, minimum of hourly data
C*	Water Survey of Canada Station (not operated by Teck)
D	Daily frequency
EPH	Extractable Petroleum Hydrocarbons, a combination of HEPH (C19-32) & LEPH (C10-19)
F	Flow (manual)
M	Monthly Frequency
Ma	Monthly alternative sample location for Swift Creek Sed Pond. Either E221329 or E105061 is sampled, not both
M/EH	Monthly Frequency of one epilimnetic composite of water sampled from three depths (e.g. 1m, 5m, 10m) and another hypolimnetic composite of water sampled from three depths (e.g. 20m, 32m, 45m)
Q	Quarterly frequency
Q*	Toxicity testing done weekly until one year after commissioning is completed, at which time testing must be done quarterly.
SA	Semi-Annually frequency (twice per year), SA sampling schedules must coincide with the monthly sampling schedule for sampling locations where both sampling frequencies are required.
TSS	Total Suspended Solids
W/M	Weekly frequency March 15- July 31, monthly during the rest of the year

a	Field parameters must include water temperature, specific conductance, dissolved oxygen, and pH; for Lake Kootenai locations this includes vertical profiles of dissolved oxygen and temp.
b	Conventional Parameters must include specific conductance, total dissolved solids, TSS, hardness, alkalinity, DOC, TOC, turb.
c	Major Ions must include bromide, fluoride, calcium, chloride, magnesium, potassium, sodium, sulphate.
d	Nutrients must include ammonia, nitrate, nitrite, TKN, orthophosphate, total phosphorous.
e	Metals (dissolved and total fractions) include aluminum, antimony, arsenic, barium, beryllium, bismuth, boron, cadmium, chromium, cobalt, copper, iron, lead, lithium, manganese, mercury, molybdenum, nickel, selenium, silver, strontium, thallium, tin, titanium, uranium, vanadium, and zinc.
f	Flow measurements are taken in accordance with the BC Hydrometric RISC standards (2009) and to the satisfaction of the Director, Environmental Protection.
g	Acute and chronic toxicity tests must 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 and must be implemented in accordance with the toxicity testing program approved by the Director.
h	If the discharge is not decanting to the receiving environment, water quality samples must be taken just inside the decant point for all parameters, with exception of toxicity.
j (FRO)	To be sampled only when in use. First sample for each occurrence of pit water effluent to the Henretta Diversion Culverts must be taken on the day discharge commences and analyzed for all required parameters
k (FRO)	When pit water is discharged to the Fording River, Site 0200201 must be sampled weekly for dissolved chloride and 3 times weekly for Field Parameters, Conventional Parameters, Major Ions and Nutrients.
l (LCO)	Nitrate must be sampled 3 times per week
m (LCO)	total Selenium must be sampled 3 times per week.
n (LCO)	Ammonia, total phosphorous, total dissolved phosphorous must be sampled 3 times a week.
o (LCO)	Water temp, DO, pH must be continuously monitored.
p (LCO)	Once a month, selenium speciation (selenate and selenite) must be sampled.
q (LCO)	Weekly sampling required for selenium and sulphate on the same temporal schedule as described in W/M
r (LCO)	To be sampled only when in use.

Appendix C – Surface Water Quantity Monitoring Program Summary

Contents

List of Tables.....	2
List of Figures.....	2
1 Introduction.....	4
2 2016 Flow Year Summary.....	4
3 Permit 107517 Flow Monitoring Requirements.....	8
4 Summary of Instantaneous Flow Data	10
4.1 Quality Assurance/Quality Control.....	10
5 Summary of Continuous Flow Data.....	13
6 Summary of Calculated Flow Data	30
6.1 GHO Fording River Compliance Point – Upper Fording River (upstream of Josephine Falls) (EMS 0200378, GH_FR1).....	30
6.2 GHO Elk River Compliance Point – 220m downstream of Thompson Creek (EMS E300090, GH_ERC).....	31
6.3 Elk River upstream of Boivin Creek (upstream of Fording River) (EMS E206661, GH_ER1)	31
6.4 Elk River Downstream of Michel Creek (EMS 0200393, EV_ER1).....	32

List of Tables

Table C-1. Comparison of 2016 annual average flow to Mean Annual Discharge (MAD) at Order and Compliance Stations.....	7
Table C-2. Flow monitoring requirements identified in Permit 107517 (May 2016).....	8
Table C-4. Summary of Continuous Flow monitoring Stations and 2016 Data availability.....	13

List of Figures

Figure C-1. Comparison of 2016 monthly average flows to long term flow record at Elk River at Natal (08NK016). Whiskers represent the maximum and minimum average monthly values from the entire data record.	4
Figure C-2. Comparison of 2016 monthly average flows to long term flow record at Fording River at the Mouth (08NK018). Whiskers represent the maximum and minimum average monthly values from the entire data record.....	5
Figure C-3. Comparison of 2016 Monthly Precipitation to long term (1970- 2015) Sparwood climate norms. Data was obtained on March 28, 2017 from the Environment and Natural Resources Canada web site.....	6
Figure C-4. Comparison of 2016 monthly average temperature to long term (1970- 2015) Sparwood climate norms. Data was obtained on March 28, 2017 from the Environment and Natural Resources Canada web site.....	6
Figure C-5. Instantaneous flow measurements collected at Compliance Points. Note the log scale. ...	10
Figure C-6. Instantaneous flow measurements collected at Fording River Operation.....	11
Figure C-7. Instantaneous flow measurements collected at Line Creek Operation.....	11
Figure C-8. Instantaneous flow measurements collected at Elkview Operation.	12
Figure C-9. Instantaneous flow measurements collected at Elkview Coal Mountain Operation.	12
Figure C- 10. Flow at Henretta Creek at the mouth (FR_HC1, E216778).....	14
Figure C- 11. Flow at Kilmarnock Creek downstream of rock drain (FR_KC1, 0200252).	15
Figure C- 12. Daily Average flow in The Fording River upstream of North Tailings Pond (FR_FRNTP).	16
Figure C- 13. Flow at Line creek upstream of rock drain (LC_LC2, 200335).	17
Figure C- 14. Flow at West Line Creek (LC_WLC, E261958).....	18
Figure C- 15. Flow at Line Creek downstream of West Line Creek (LC_LC3, 200337).	19
Figure C- 16. Flow at Line Creek at the mouth (LC_LC4, 0200044, 08NK022).....	20
Figure C- 17. Flow at Fording River downstream of Line Creek (LC_LC5, 0200028, 08NK018).....	21
Figure C- 18. Flow at Erickson Creek at the mouth (EV_EC1, 0200097).	22
Figure C- 19. Flow at Dry Creek Sediment Pond decant (EV_DC1, E298590).	23

Figure C- 20. Flow at Michel Creek at highway 3 bridge (EV_MC2, E300091). 24

Figure C- 21. Flow at Elk River Near Natal (EV_ER4, 0200027, 08NK016)..... 25

Figure C- 22. Daily Average flow in Corbin Creek (CM_CC1, E200209). 26

Figure C- 23. Daily intake flow from Line Creek to the WLC AWTF..... 27

Figure C- 24. Daily intake flow from West Line Creek to the WLC AWTF 28

Figure C- 25. Total Outflow from the WLC AWTF..... 29

Figure C- 26 Monthly average flows at GH_FR1 prorated from downstream monitoring stations. 30

Figure C- 27 Monthly average flows at GH_ERC prorated from downstream monitoring stations. 31

Figure C- 28 Monthly average flows at GH_ER1 prorated from downstream monitoring stations..... 32

Figure C- 29 Monthly average flows at GH_ER1 prorated from downstream monitoring stations..... 32

1 Introduction

Permit 107517 requires the collection of flow information from 36 monitoring locations (see map at end of document). This appendix provides an analysis of the 2016 flow year compared to long term flow records at two Water Survey of Canada maintained hydrometric stations and summarizes instantaneous, continuous and calculated flow data compiled in 2016 to fulfill Permit 107517 (amended date May 26, 2016) reporting requirements. An updated version of Permit 107517 was issued to Teck on March 1, 2017, and contains additional flow reporting requirements in Section 10.2.4. Through review/approval of the submitted Regional Flow Monitoring Plan (Permit 107517 Section 9.1.2.2.4), Teck will make improvements to meet the new reporting requirements in the 2017 annual report (due March 31, 2018).

2 2016 Flow Year Summary

It is useful to understand the 2016 flow year in the context of long-term flow records. The Water Survey of Canada operates two upper Elk Valley relevant hydrometric stations which have long term published flow records. Elk River at Natal (08NK016) has a published flow record from 1950 to 2015 and Fording River at the mouth (08NK018) has a published flow record from 1970 to 2015. Preliminary 2016 flow data was obtained by Teck for these two stations from Environment Canada via email and calculated monthly average flows for 2016 were compared with mean monthly average, maximum monthly average and minimum monthly average flows over the period of record. Results for Elk River at Natal (08NK016) and Fording River at the mouth (08NK018) are shown in Figure C-1 and Figure C-2 respectively. Obtained 2016 flow data is subject to revision upon finalization by Environment Canada.

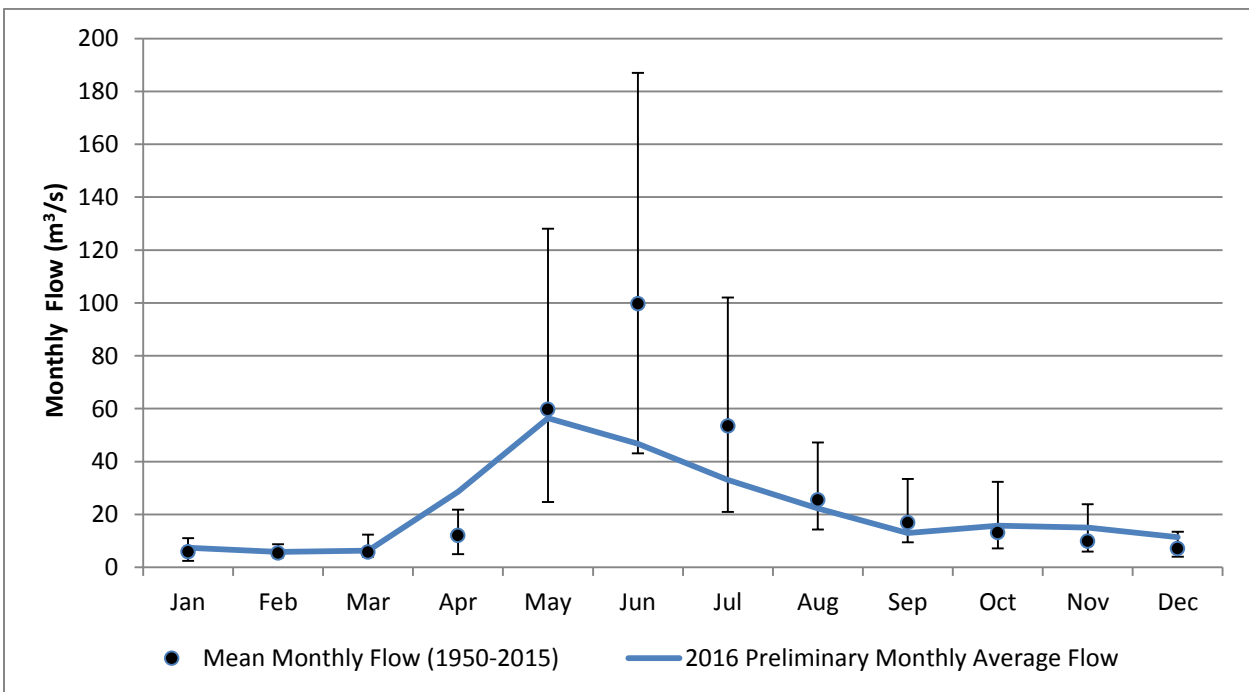


Figure C-1. Comparison of 2016 monthly average flows to long term flow record at Elk River at Natal (08NK016). Whiskers represent the maximum and minimum average monthly values from the entire data record.

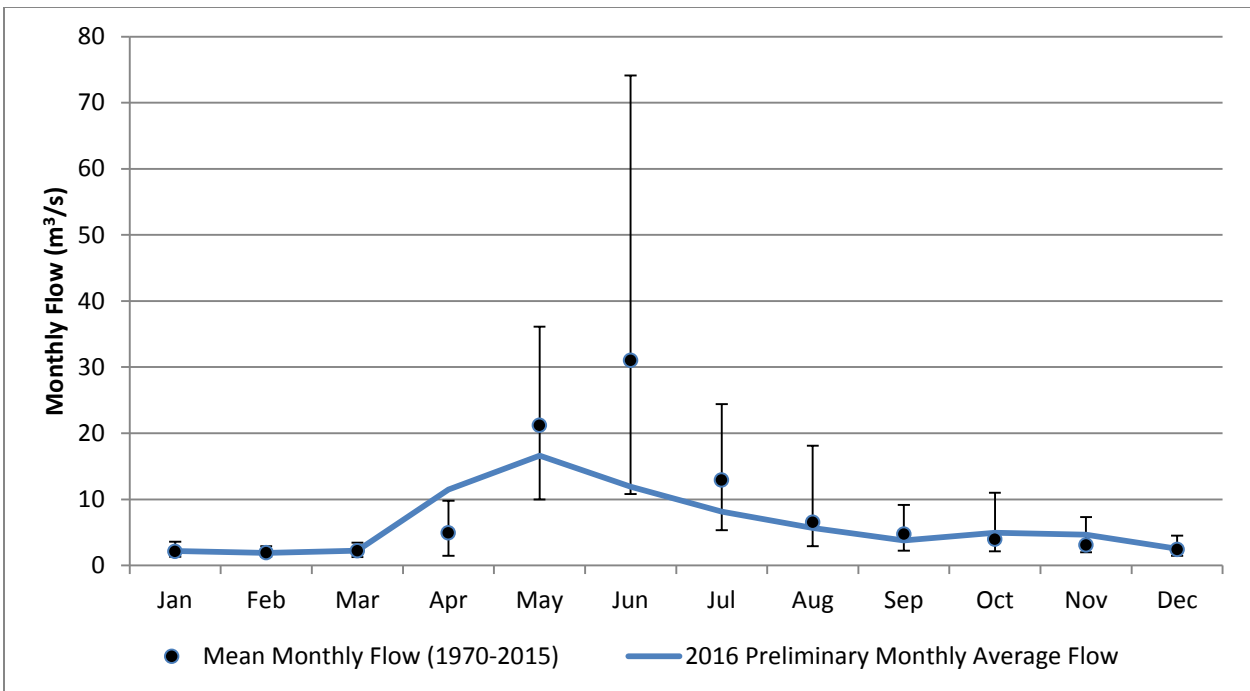


Figure C-2. Comparison of 2016 monthly average flows to long term flow record at Fording River at the Mouth (08NK018). Whiskers represent the maximum and minimum average monthly values from the entire data record

Mean annual discharges (MAD) for all Order and Compliance points were previously calculated by a qualified professional in March 2015 based on available monitoring data. This information was included in the Flow Monitoring Metadata Summary submitted March 31, 2015 as required by Permit 107517. 2016 annual average flows are compared against these calculated MAD in this Appendix.

Flows in 2016 were lower than average in the Fording River and Elk Rivers at 78% of MAD and 84% of MAD respectively. This was mostly due to lower than average peak flows at both locations. Low flow conditions (January to March and September to December) in 2016 were near or slightly above average in both rivers as indicated in Figures C-1 and C-2. Figures C-1 and C-2 also indicate that there was a very early freshet in 2016 compared to historical averages.

A review of 2016 Sparwood climate data compared to long term climate norms at Sparwood is presented in figures C-3 and C-4. These figures show that while precipitation in the period from January to April 2016 was close to or below average, temperatures were well above average (the highest on record for April) resulting a higher than usual portion of precipitation falling as rain at this time of year. Also of note is the record high precipitation in October of 2016 and temperature in November of 2016 resulting in elevated flows seen in October and November at all flow monitoring locations.

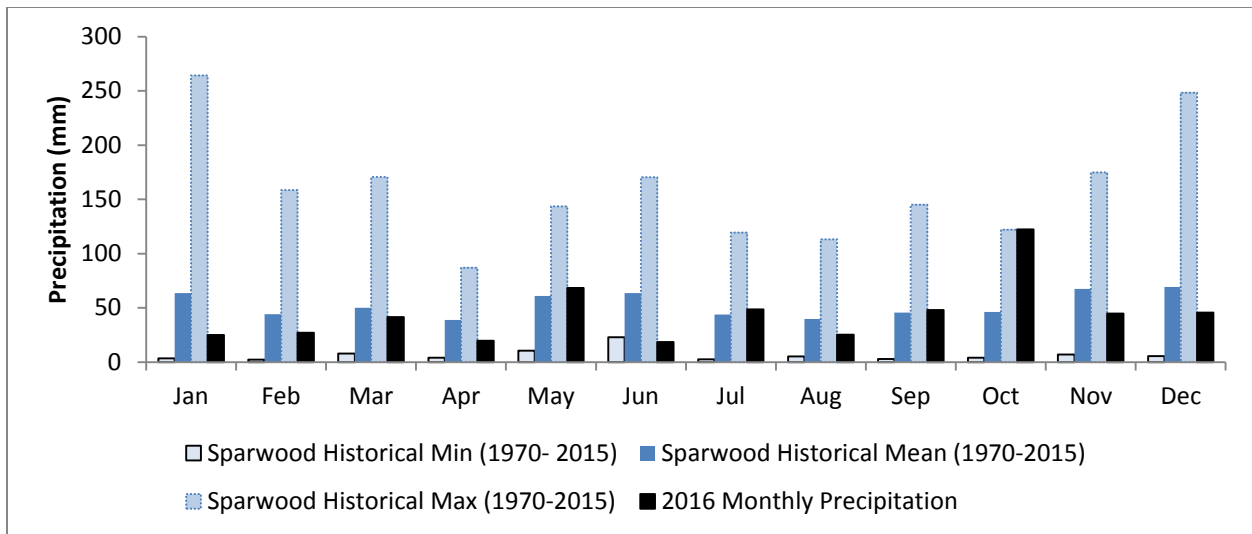


Figure C-3. Comparison of 2016 Monthly Precipitation to long term (1970- 2015) Sparwood climate norms. Data was obtained on March 28, 2017 from the Environment and Natural Resources Canada web site.

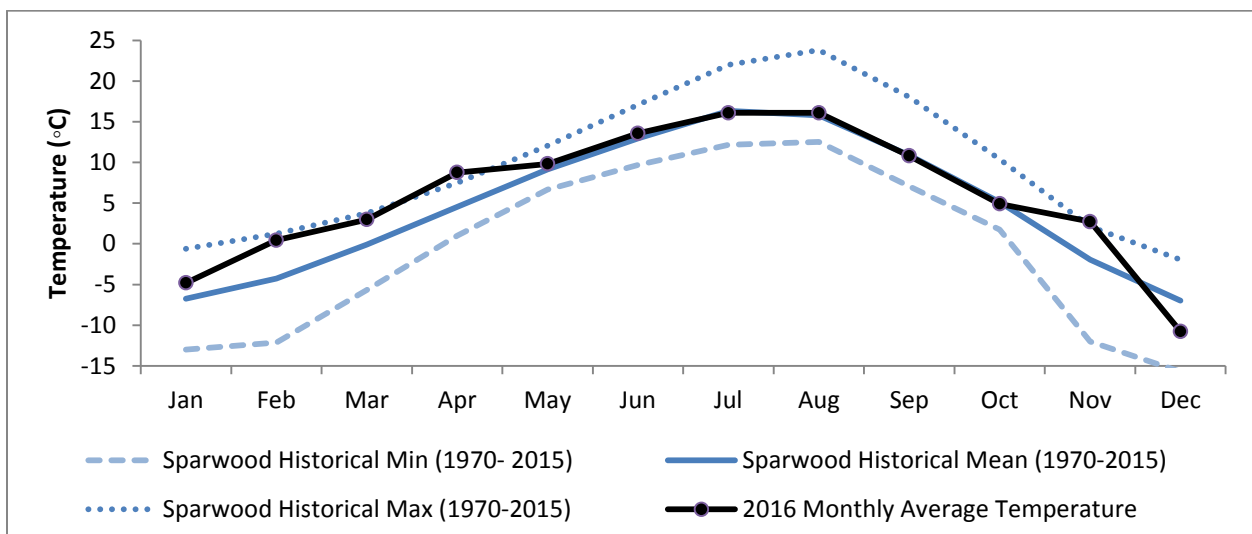


Figure C-4. Comparison of 2016 monthly average temperature to long term (1970- 2015) Sparwood climate norms. Data was obtained on March 28, 2017 from the Environment and Natural Resources Canada web site.

Flow information from the Fording and Elk Rivers, 2016 annual average flows were compared to MAD at Order and Compliance Stations as defined in Permit 107517 (Table C-1). 2016 annual average flows were below MAD at all locations.

Table C-1. Comparison of 2016 annual average flow to Mean Annual Discharge (MAD) at Order and Compliance Stations.

Name/Location	FR_FRCP1	GH_FR1	LC_LCDSSLCC	LC_LC5	GH_ERC	GH_ER1	EV_ER4	EV_HC1	CM_MC2	EV_MC2	EV_ER1
EMS Number	EMS E300071	EMS 0200278	EMS E297110	EMS 0200028	EMS E300090	EMS E206661	EMS 0200027	EMS E102682	EMS E258937	EMS E300091	EMS 0200393
Watershed Area (km ²)	192	412	117	621	903	977	1840	67.6	637	2813	3550
Monitoring Status	Teck Station	ungauged	Teck Station	Environment Canada station	ungauged	ungauged	Environment Canada Station	Teck Station	Teck Station	Teck Station	ungauged
	FR_FRCP1 Spot measurements	[08NK018 - 08NK022] x Ratio of Watershed Area	LC_LCDSSLCC instantaneous flow and continuous data.	08NK018	[08NK016 - 08NK018] x Ratio of Watershed Area	[08NK016 - 08NK018] x Ratio of Watershed Area	08NK016	EV_HC1 2016 instantaneous flows	CM_MC2 2016 instantaneous flows	EV_MC2 instantaneous flow and continuous data.	([EV_MC2]+08NK016) x ratio of watershed areas
Period of record for MAD	1917 to 2012	1972 to 2012	1971 to 2012	1970 to 2013	1970 to 2013	1970 to 2013	1950 to 2013	1992 to 1996 and 2000 to 2014	1984 to 1995	1970 to 1994	1970 to 1996
Mean Annual Discharge (MAD) (m ³ /s)	3.4	5.1	1.8	8.1	12.5	13.5	26.2	0.57	1.4	11	40
2016 Annual Average Flow (m ³ /s)	2.0	3.8	1.6	6.3	11.5	12.4	21.8	0.5	0.9	10.0	35.9

3 Permit 107517 Flow Monitoring Requirements

Permit 107517 flow monitoring requirements are summarized in Table C-2. Table C-2 also indicates where in Appendix C flow data is presented for each monitoring station.

Table C-2. Flow monitoring requirements identified in Permit 107517 (May 2016).

EMS ID	Site ID	Required Flow monitoring Frequency	Appendix C-Data Location
Compliance Points			
E300071	FR_FRCP1	W/M	Figure C-5
0200378	GH_FR1	W/M	Figure C-26 ²
E300090	GH_ERC	W/M	Figure C-27 ²
E297110	LC_LCDSSLCC	By Calculation	Figure C-5
E102682	EV_HC1	W/M	Figure C-5
E300091	EV_MC2	C	Figure C-5 and Figure C-20
E258937	CM_MC2	W/M	Figure C-5
Order Stations			
0200378	GH_FR1	W/M	Figure C-26 ²
0200028	LC_LC5	W/M	Figure C-17 ³
E206661	GH_ER1	W/M	Figure C-28 ²
0200027	EV_ER4	W/M	Figure C-21 ³
0200393	EV_ER1	W/M	Figure C-29 ²
FRO			
200201	FR_FR2	W/M	Figure C-6
200251	FR_FR1	C	Figure C-6 ¹
E216777	FR_UFR1	C	Figure C-6 ¹
E216778	FR_HC1	C	Figure C-6 and Figure C-10
E300096	FR_HC3	M	Figure C-6
E300097	FR_FRRD	M	Figure C-6
200252	FR_KC1	C	Figure C-6 and Figure C-11
-	FR_FRNTP	C	Figure C-6 and Figure C-12
LCO			
0200044	LC_LC4	C*	Figure C-16 ³
0200337	LC_LC3	C	Figure C-7 and Figure C-15
0200335	LC_LC2	C	Figure C-7 and Figure C-13
E282149	LC_SLC	M	Figure C-7
E261958	LC_WLC	C	Figure C-14
EVO			
0200097	EV_EC1	C	Figure C-8 and Figure C-18
E298590	EV_DC1	C	Figure C-8 and Figure C-19
E298592	EV_BLM2	M	Figure C-8
E298591	EV_FC1	M	Figure C-8
E298594	EV_SPR2	M	Figure C-8
E298593	EV_TC1	M	Figure C-8
CMO			
E258175	CM_MC1	M	Figure C-9
E200209	CM_CC1	C	Figure C-9 and Figure C-22

WLC			
E293370	WL_LCI_SP02	C	Figure C-23
E293371	WL_WLCI_SP01	C	Figure C-24
E291569	WL_BFWB_OUT_SP21	C	Figure C-25

¹ Not currently a continuous monitoring station. The regional flow monitoring plan submitted in 2016 recommends a W/M frequency at these two locations for consistency with water quality data collection.

² Calculated monthly from available measured data

³ Preliminary continuous data obtained from Environment Canada

Abbreviations include: M = Monthly, Q = Quarterly, C = Continuous, W/M = Weekly from March 15 – July 31, Monthly during other times of year

Compliance points are shown in bold and Order Stations are shown in italic

4 Summary of Instantaneous Flow Data

Instantaneous flow data are collected at many of Teck's flow monitoring locations. Collection of instantaneous flow data includes manual flow measurements and/or the reading of a staff gauge to calculate a flow from an established site specific stage-discharge relationship. Figures C-5 to C-9 show instantaneous flow monitoring data collected in 2016 separated by operation.

4.1 Quality Assurance/Quality Control

2016 instantaneous flow measurements were collected in accordance with Teck's *Flow Monitoring Protocol* which was developed in 2010 (Kerr Wood Leidal Associates [KWL] 2010). The protocol outlines standard procedures for flow monitoring and provides information on equipment, measurement approaches, calculations, documentation, and quality control. As required by Permit 107517 Teck submitted a Regional Flow Monitoring Plan by December 31, 2016. Pending approval of the submitted Regional Flow Monitoring Plan, Teck plans to develop an updated version of the Flow Monitoring Protocol to align with principles contained in the Regional Flow Monitoring Plan and requirements of Permit 107517 (March 1, 2017 version).

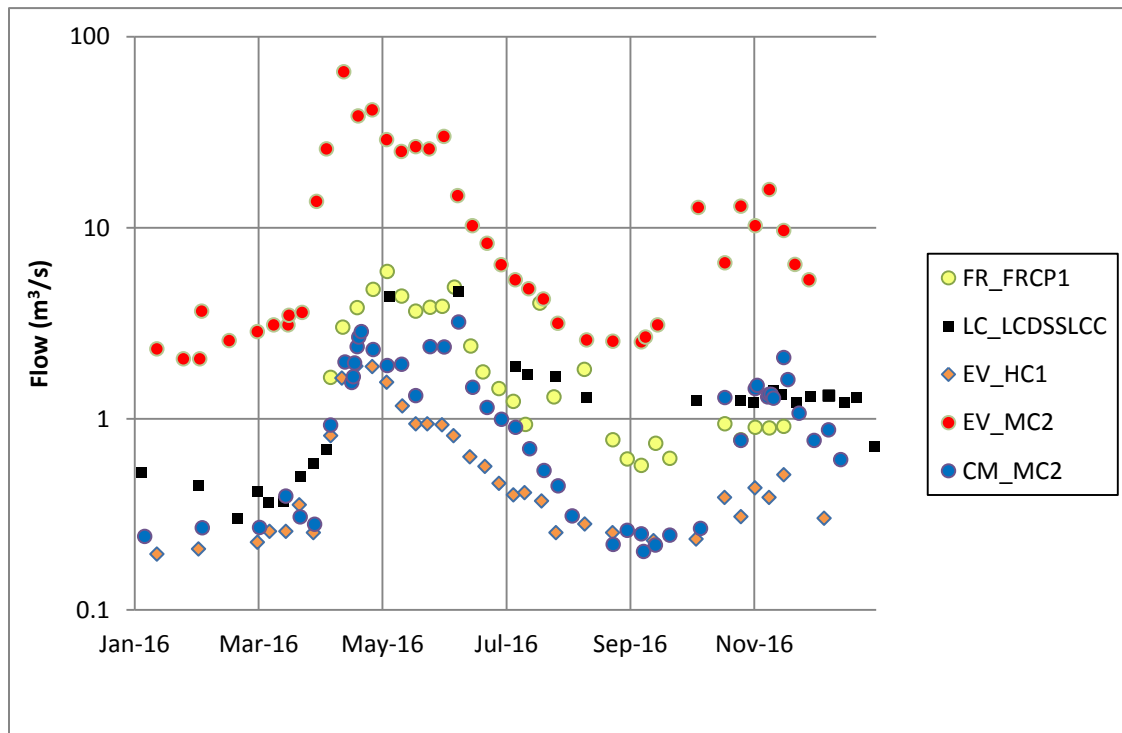


Figure C-5. Instantaneous flow measurements collected at Compliance Points. Note the log scale.

Note: Due to safety concerns no manual flows are collected at the Greenhills compliance points (GH_FR1 and GH_ERC). Flow monitoring requirements are met at these locations by calculation- (See section 6)

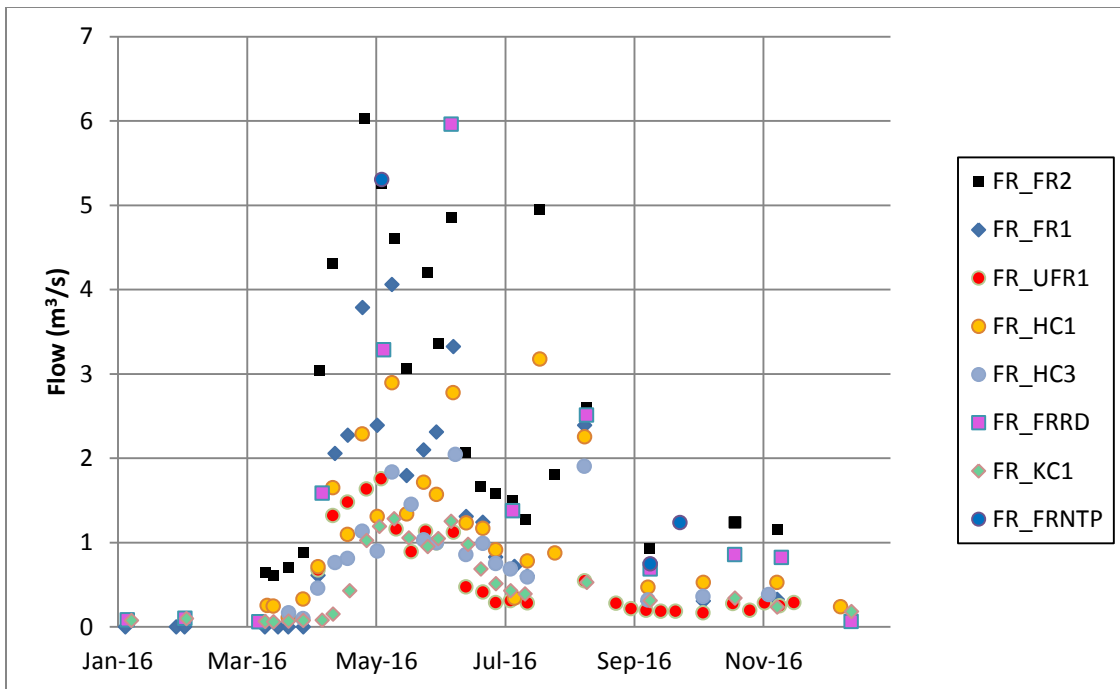


Figure C-6. Instantaneous flow measurements collected at Fording River Operation.

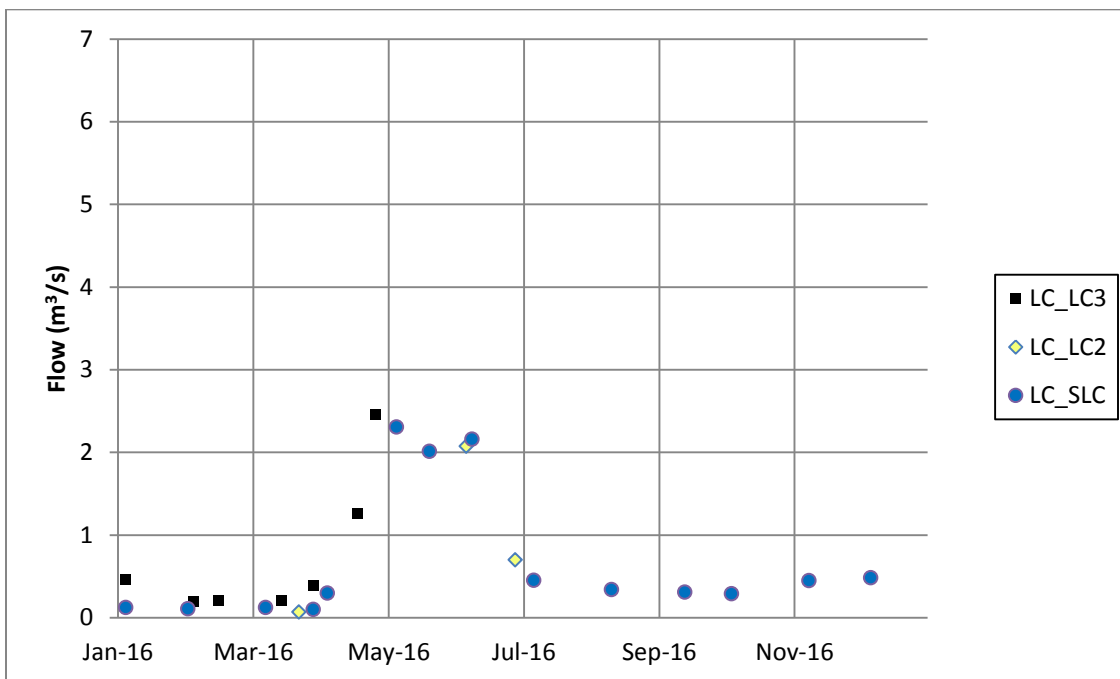


Figure C-7. Instantaneous flow measurements collected at Line Creek Operation

Note: Line Creek Operation collects continuous flow measurements at the majority of their flow monitoring stations. At these locations, manual flow measurements are collected to confirm established stage discharge relationships. See Section 5.

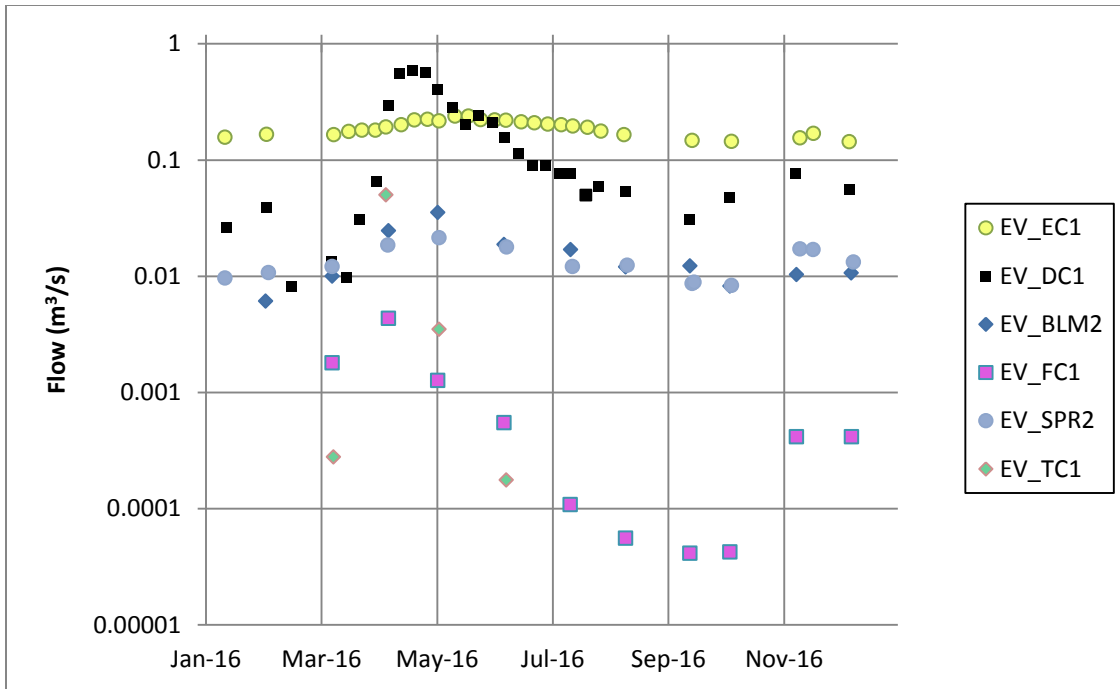


Figure C-8. Instantaneous flow measurements collected at Elkview Operation. Note Log scale.

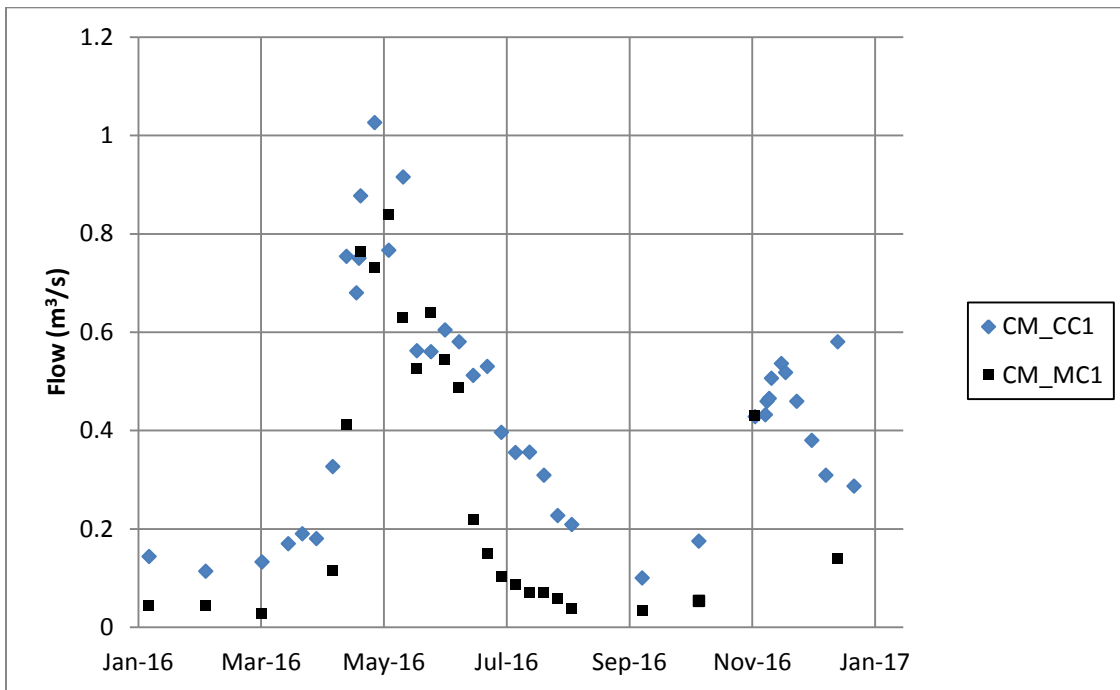


Figure C-9. Instantaneous flow measurements collected at Coal Mountain Operation.

5 Summary of Continuous Flow Data

Several permitted monitoring stations are equipped with continuous flow monitoring equipment. These stations are operated by Teck or Environment Canada. Table C-3 summarizes the monitoring stations at which continuous flow monitoring information was collected in 2016 and describes any issues or data gaps. Data from each continuous monitoring station is presented in Figures C-10 through C-24. Available instantaneous flow data is shown with continuous monitoring data for reference.

Table C-3. Summary of Continuous Flow monitoring Stations and 2016 Data availability.

EMS ID	Site ID	Operated By	2016 Data Status	Missing Data	Reason for Missed Data
E216778	FR_HC1	Teck	Final	None	N/A
200252	FR_KC1	Teck	Final	None	N/A
-	FR_FRNTP	Teck	Final	Jan 7 - Jan 31	Ice in channel
0200335	LC_LC2	Teck	Final	May 6 - May 17	Nitrogen cylinder valve issue
0200337	LC_LC3	Teck	Final	Nov 23 - Nov 30 Dec 7 - Dec 17	Ice in channel
E261958	LC_WLC	Teck	Final	None	N/A
E298590	EV_DC1	Teck	Final	Jan 1 - Feb 28	Ice in channel
				Oct 4 - Dec 31	Battery failure/ice in channel
0200097	EV_EC1	Teck	Final	Jun 30-Jul 13	Debris in weir causing backwater
				Dec 7 - Dec 31	Ice at weir causing backwater
E300091	EV_MC2	Teck	Final	Jan 1 - Feb 26 Dec 7 - Dec 31	Ice in channel
E200209	CM_CC1	Teck	Final	May 17 - Aug 10	Data removed due to bubbler issues
E293370	WL_LCI_SP02	Teck	Final	None	N/A
E293371	WL_WLCI_SP01	Teck	Final	None	N/A
E291569	WL_BFWB_OUT_SP21	Teck	Final	None	N/A

Quality Assurance/Quality Control

Teck's continuous hydrometric stations are managed by external professionally qualified consultants. Stage discharge relationships are reviewed and/or updated annually based on manual flow measurements. Generally, Teck attempts to collect hydrometric data consistent with the Resources Information Standards Committee (RISC) Grade B standard. The submitted Regional Flow Monitoring Program provides recommended RISC data grades at each location

Teck also utilizes continuous flow data collected through the Water Survey of Canada hydrometric program. Data quality at these stations is maintained in accordance with Water Survey of Canada data standard

Station: Henretta Creek at the mouth (Site ID FR_HC1, EMS E216778)

Operated by: Teck

Available Data: 2016 Final flow data

Average Monthly and Annual Flow (m³/s) (Based on continuous data):

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2016	0.22	0.20	0.20	1.37	2.16	1.70	1.28	0.88	0.51	0.55	0.48	0.33	0.82

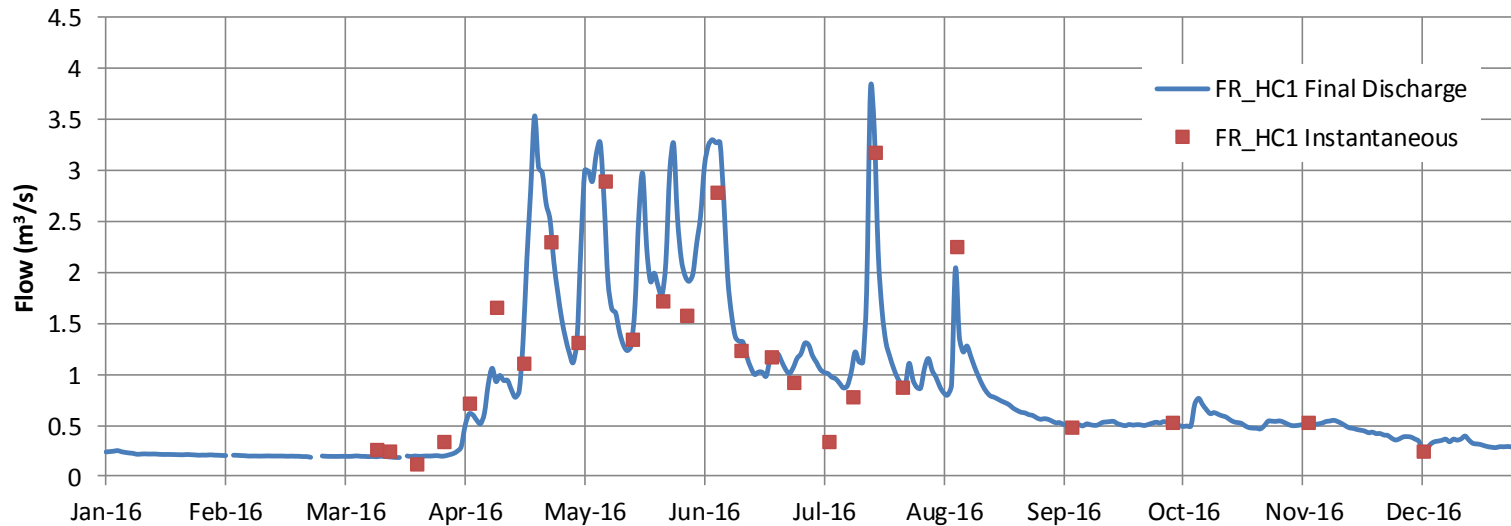


Figure C- 10. Flow at Henretta Creek at the mouth (FR_HC1, E216778)

Station: Kilmarnock Creek downstream of rock drain (Site ID FR_KC1, EMS 0200252)

Operated by: Teck

Available Data: 2016 Final flow data

Average Monthly and Annual Flow (m³/s):

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2016	0.07	0.06	0.06	0.40	1.08	0.85	0.53	0.43	0.28	0.30	0.27	0.22	0.38

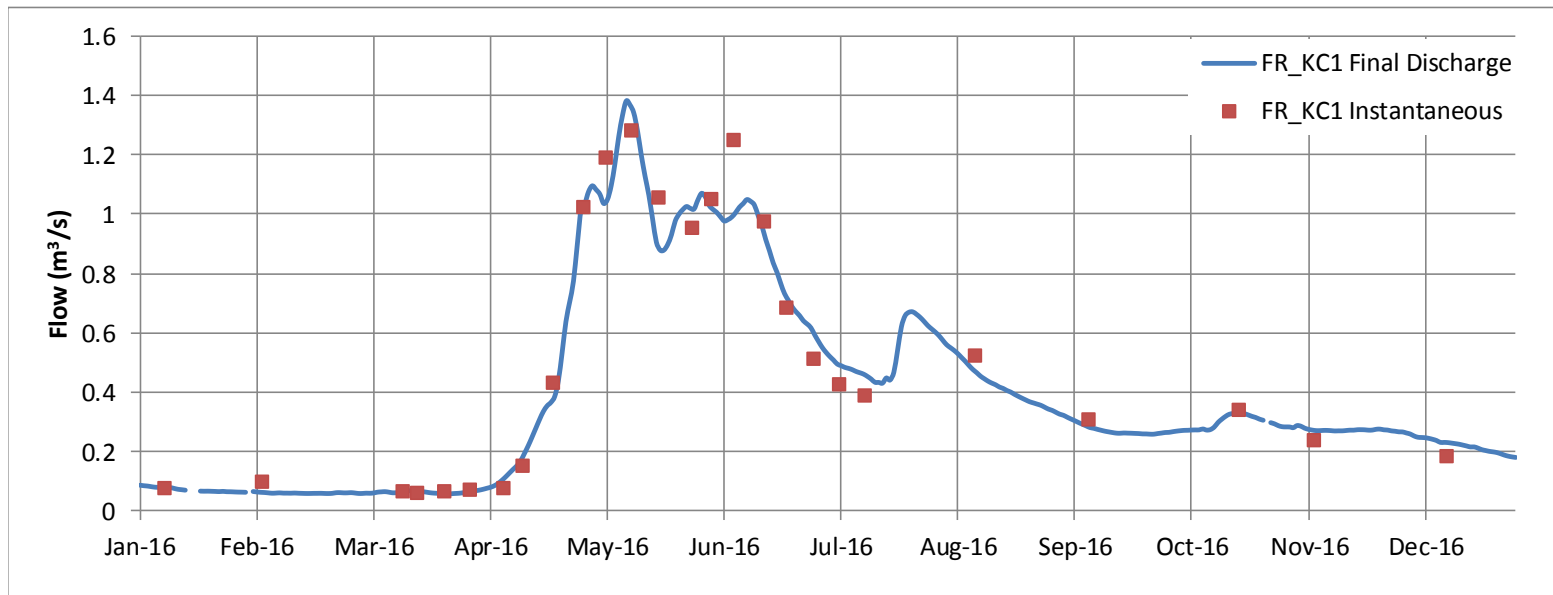


Figure C- 11. Flow at Kilmarnock Creek downstream of rock drain (FR_KC1, 0200252).

Station: Fording River upstream of North Tailings Pond (Site ID FR_FRNTP)

Operated by: Teck

Available Data: 2016 Final flow data

Average Monthly and Annual Flow (m³/s):

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2016	0.24	0.23	0.34	4.47	4.48	2.87	1.98	1.49	0.78	0.93	0.96	0.75	1.63

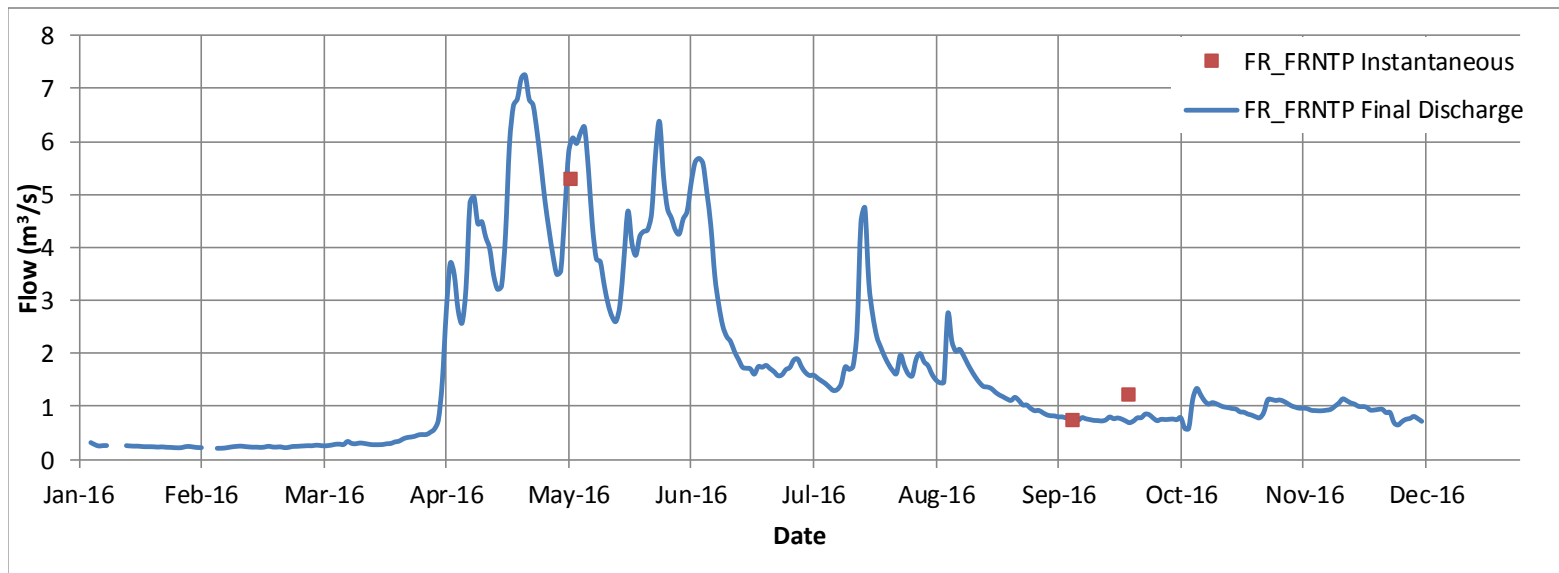


Figure C- 12. Daily Average flow in The Fording River upstream of North Tailings Pond (FR_FRNTP).

Station: Line Creek upstream of rock drain (Site ID LC_LC2, EMS 200335)

Operated by: Teck

Available Data: 2016 Final flow data

Average Monthly and Annual Flow (m³/s):

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2016	0.09	0.08	0.09	0.81	1.20	0.75	0.54	0.32	0.27	0.38	0.31	0.18	0.42

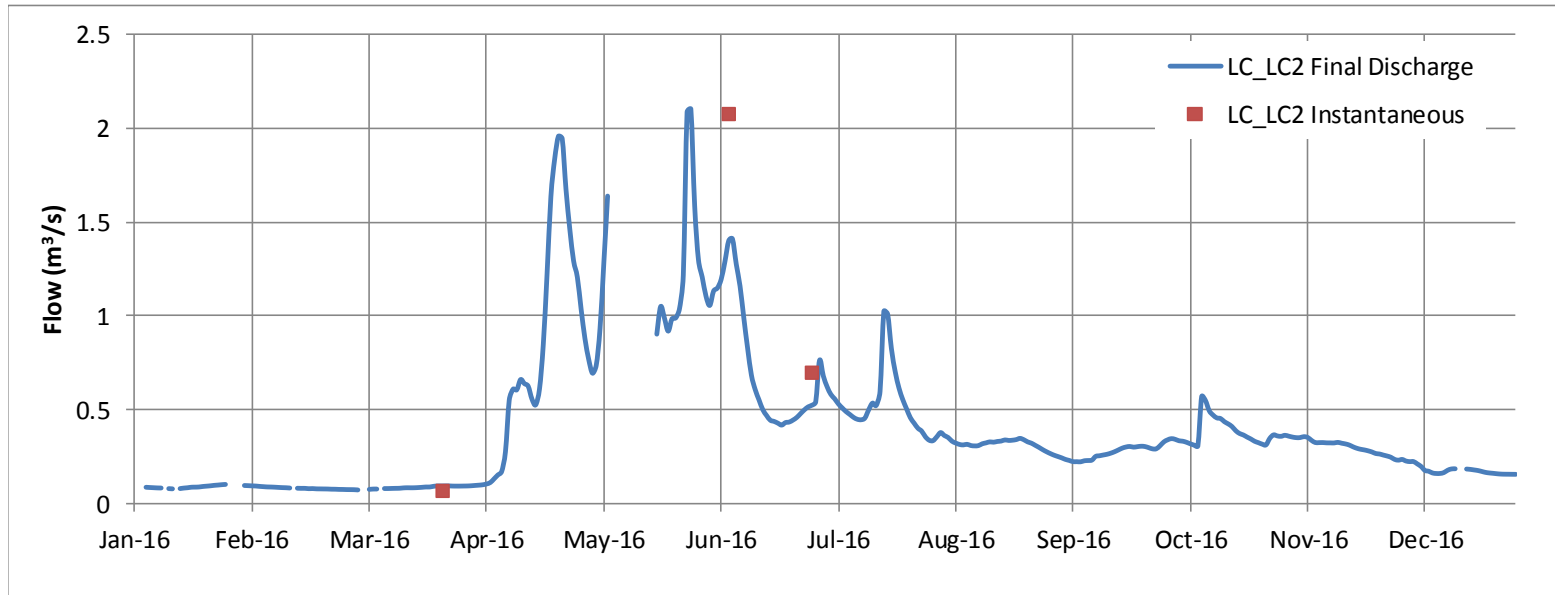


Figure C- 13. Flow at Line creek upstream of rock drain (LC_LC2, 200335).

Station: West Line Creek (Site ID LC_WLC, EMS E261958)

Operated by: Teck

Available Data: 2016 Final flow data

Average Monthly and Annual Flow (m³/s):

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2016	0.03	0.03	0.03	0.05	0.12	0.10	0.06	0.05	0.05	0.04	0.05	0.04	0.05



Figure C- 14. Flow at West Line Creek (LC_WLC, E261958).

Note: Flow at LC_WLC passes through a rated 120⁰ V-notch weir. No stage-discharge data were collected at WLC in 2016. Future monitoring will confirm that the weir equation is correctly estimating observed flow at LC_WLC.

Station: Line Creek downstream of West Line Creek (Site ID LC_LC3, EMS 200337)

Operated by: Teck

Available Data: 2016 Final flow data

Average Monthly and Annual Flow (m³/s):

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2016	0.29	0.27	0.29	1.44	2.07	1.49	0.76	0.53	0.40	0.58	0.69	0.50	0.78

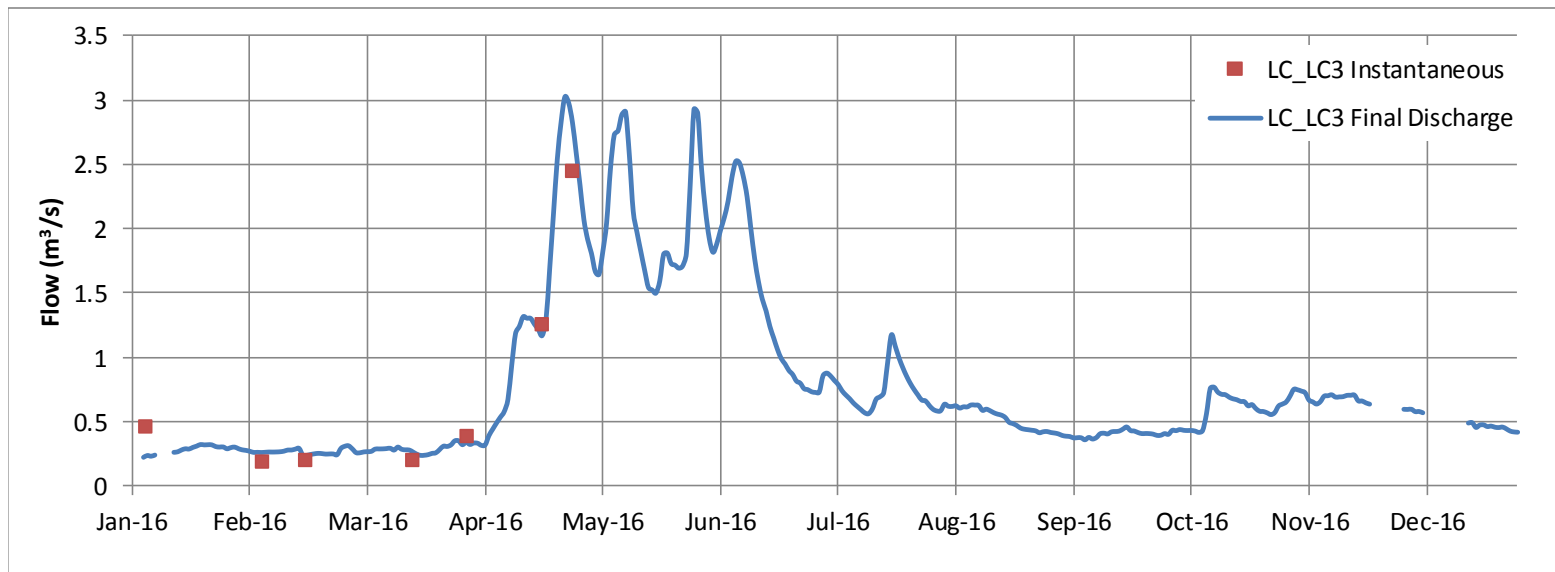


Figure C- 15. Flow at Line Creek downstream of West Line Creek (LC_LC3, 200337).

Station: Line creek at the mouth (Site ID LC_LC4, EMS 0200044, WSC 08NK022)

Operated by: Environment Canada

Available Data: 2016 preliminary daily flow data (unpublished_obtained by email from Environment Canada)

Average Monthly and Annual Flow (m³/s):

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2016	0.51	1.89	0.73	4.30	5.07	3.66	2.37	1.81	1.00	1.36	1.35	0.68	2.06



Figure C- 16. Flow at Line Creek at the mouth (LC_LC4, 0200044, 08NK022).

Note: Flow data is managed by Water Survey of Canada and thus Teck does not take manual flow instantaneous measurements.

Station: Elk River From Fording River to Michel (Site ID EV_ER4, EMS 0200027,WSC 08NK016)

Operated by: Environment Canada

Available Data: 2016 preliminary daily flow data (unpublished_obtained by email from Environment Canada on February 20, 2017)

Average Monthly and Annual Flow (m³/s):

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2016	7.34	5.87	6.34	28.56	56.38	46.72	33.08	22.31	12.94	15.77	15.01	12.15	21.87

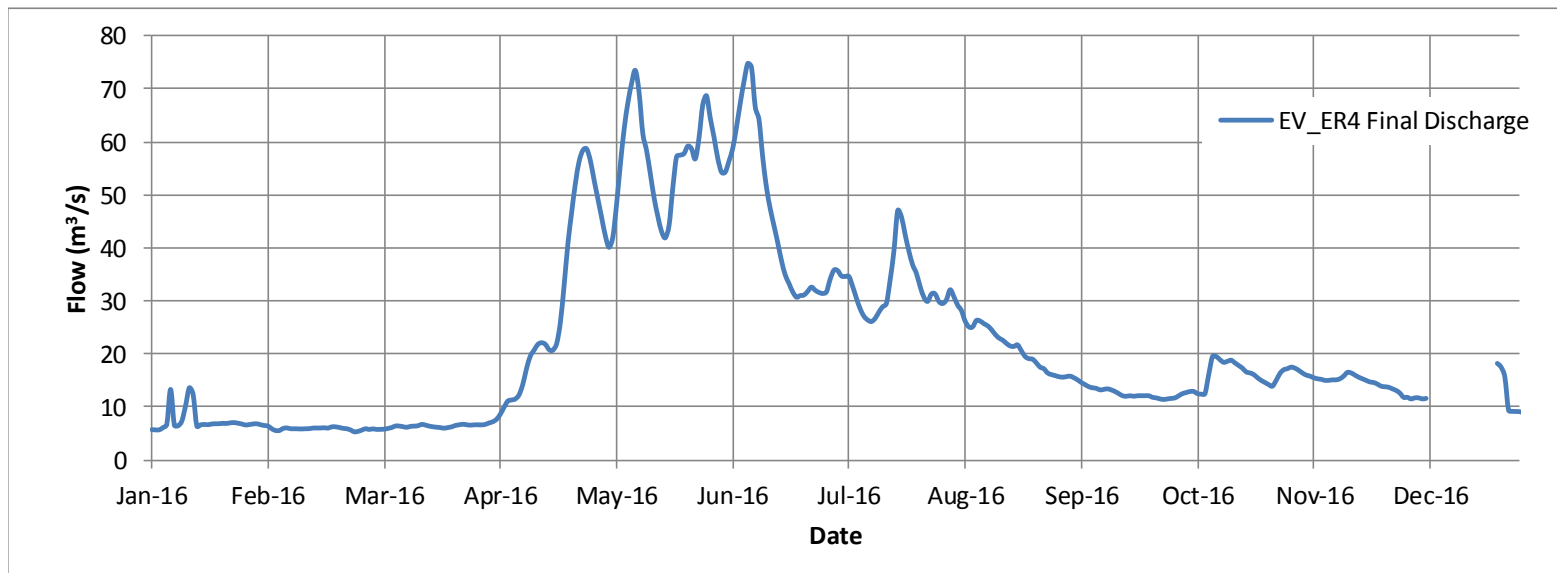


Figure C- 17. Flow at Fording River downstream of Line Creek (LC_LC5, 0200028, 08NK018).

Note: Flow data is managed by Water Survey of Canada and thus Teck does not take manual flow instantaneous measurements.
 Italic values indicate that average is calculated from <20 data points in the month

Station: Erickson Creek at the mouth (Site ID EV_EC1, EMS 0200097)

Operated by: Teck

Available Data: 2016 Final flow data

Average Monthly and Annual Flow (m³/s):

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2016	0.16	0.16	0.17	0.21	0.23	0.21	<i>0.18</i>	<i>0.16</i>	0.15	0.15	0.17	0.14	0.17

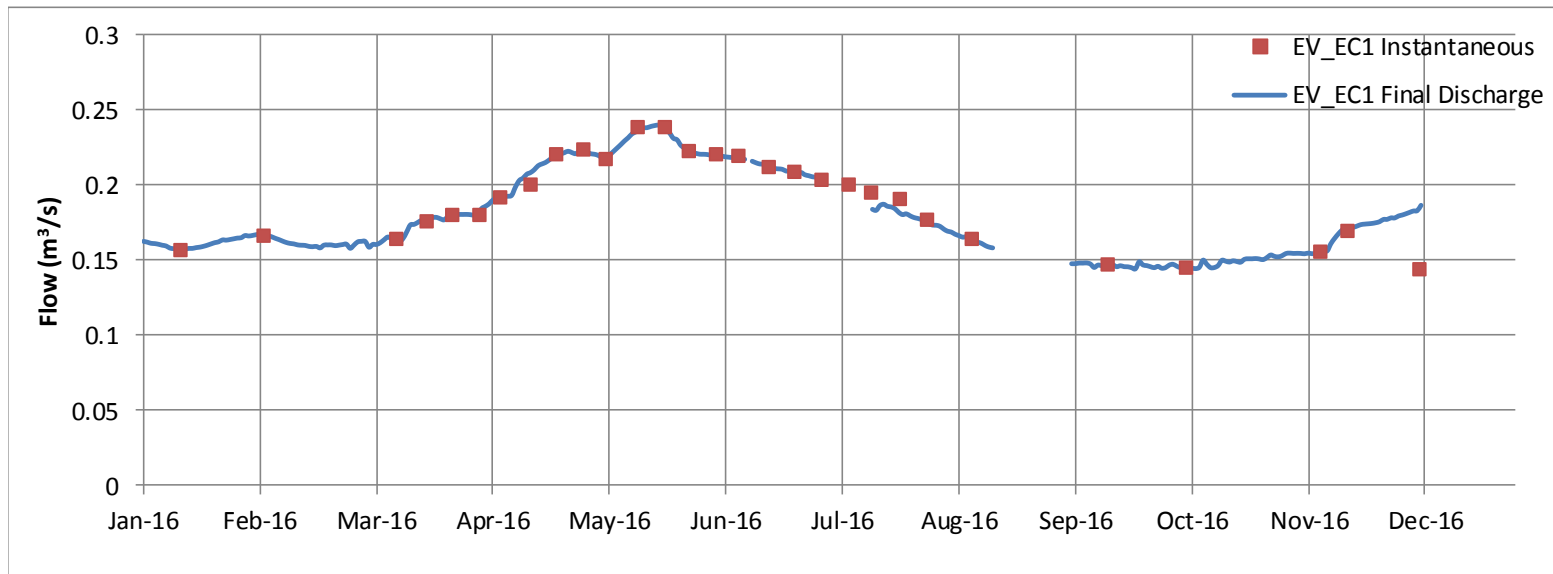


Figure C- 18. Flow at Erickson Creek at the mouth (EV_EC1, 0200097).

Note: Italic values indicate that average is calculated from <20 data points in the month.
 Values shaded in grey are calculated from instantaneous measurements.

Station: Dry Creek Sediment pond decant (Site ID EV_DC1, EMS E298590)

Operated by: Teck

Available Data: 2016 Final flow data

Average Monthly and Annual Flow (m³/s):

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2016	<i>0.03</i>	<i>0.02</i>	0.04	0.50	0.27	0.12	0.07	0.03	0.01	<i>0.05</i>	<i>0.08</i>	<i>0.06</i>	0.11

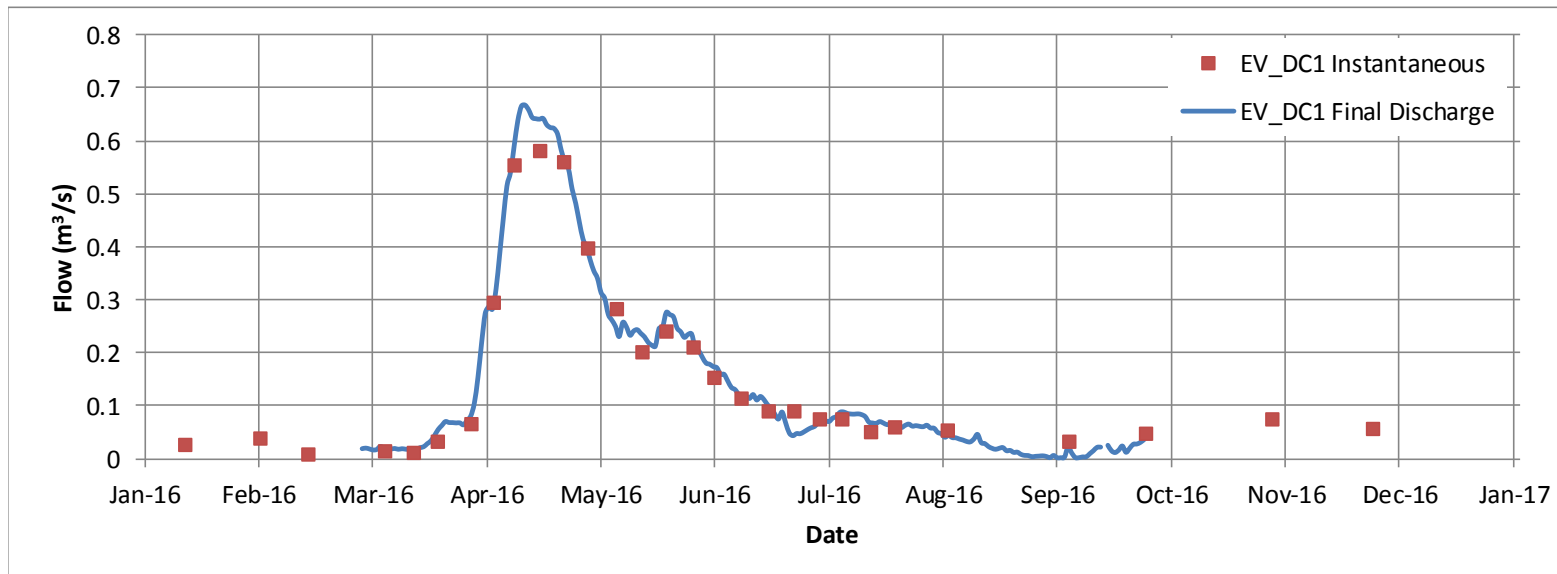


Figure C- 19. Flow at EVO Dry Creek Sediment Pond decant (EV_DC1, E298590).

Note: Italic values indicate that average is calculated from <20 data points in the month.
 Values shaded in grey are calculated from instantaneous measurements.

Station: Michel Creek at Highway 3 Bridge (Site ID EV_MC2, EMS E300091)

Operated by: Teck

Available Data: 2016 Final flow data

Average Monthly and Annual Flow (m³/s):

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2016	<i>2.31</i>	<i>2.59</i>	3.39	26.37	31.67	17.94	5.59	3.03	3.23	8.84	9.87	5.73	10.05

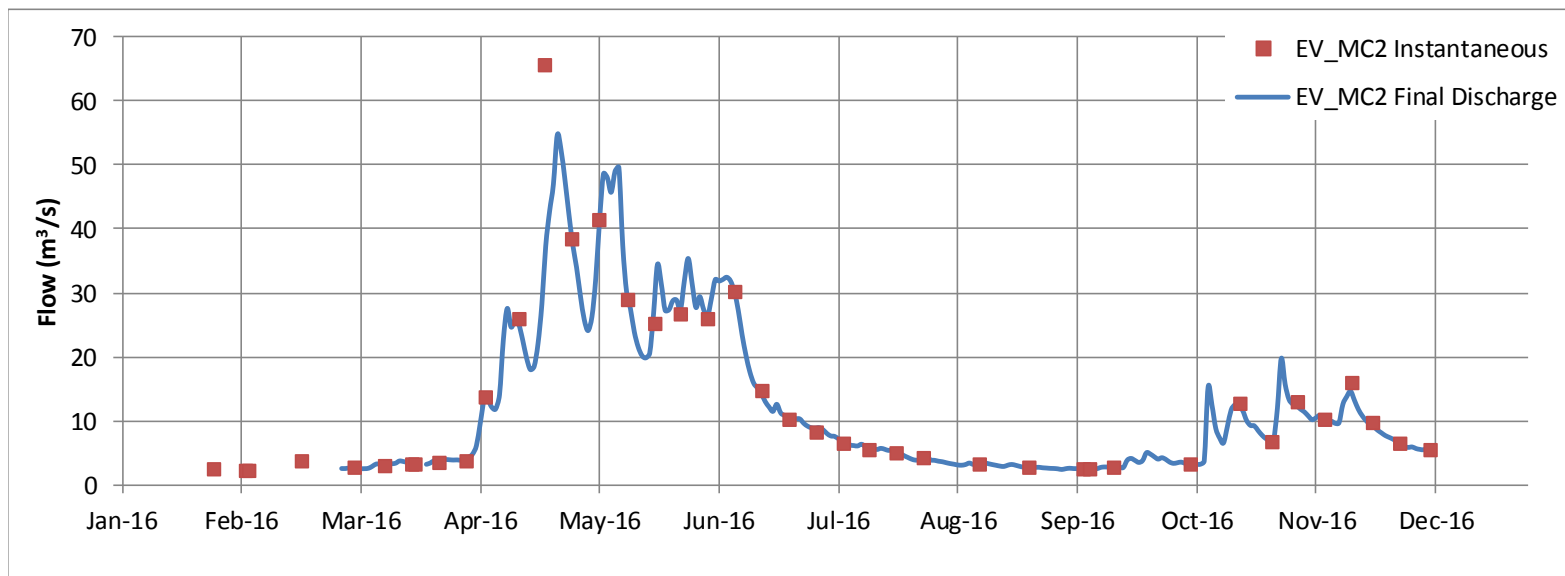


Figure C- 20. Flow at Michel Creek at highway 3 bridge (EV_MC2, E300091).

Note: Italic values indicate that average is calculated from <20 data points in the month.
 Values shaded in grey are calculated from instantaneous measurements.

Station: Elk River From Fording River to Michel (Site ID EV_ER4, EMS 0200027, WSC 08NK016)

Operated by: Environment Canada

Available Data: 2016 preliminary daily flow data (unpublished_obtained by email from Environment Canada)

Average Monthly and Annual Flow (m³/s):

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2016	7.34	5.87	6.34	28.56	56.38	46.72	33.08	22.31	12.94	15.77	15.01	<i>12.15</i>	21.87

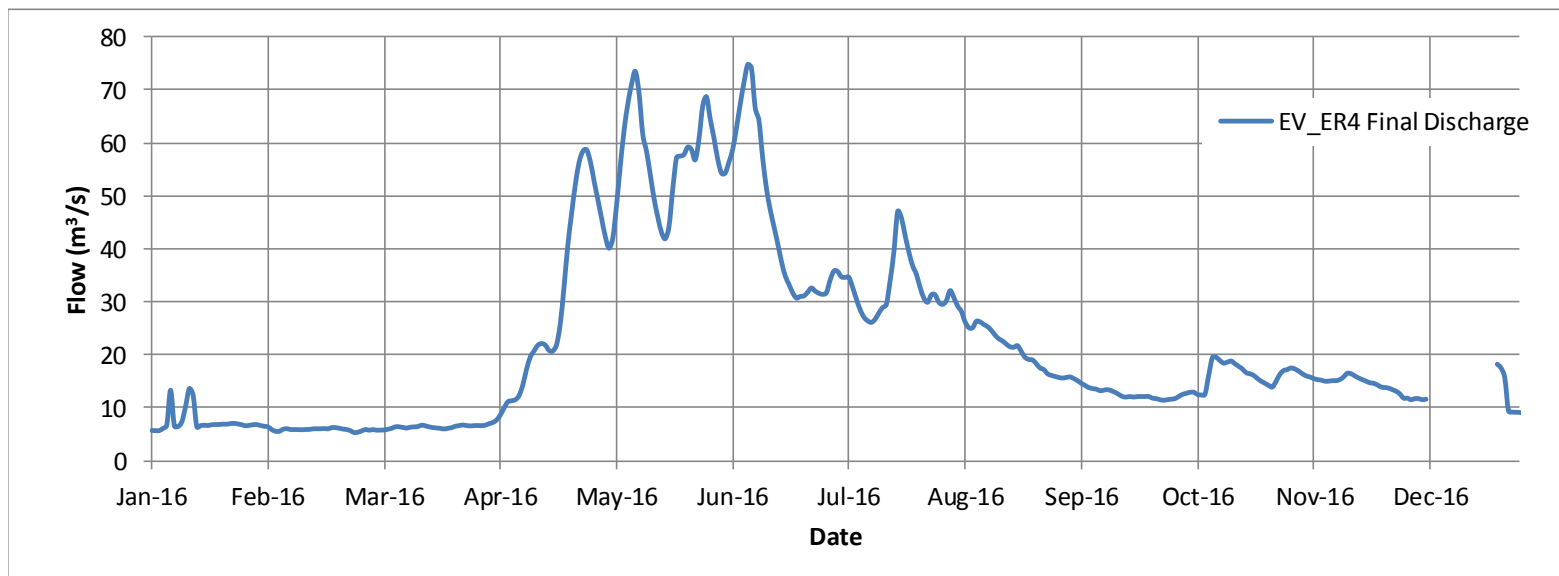


Figure C- 21. Flow at Elk River Near Natal (EV_ER4, 0200027, 08NK016).

Note: Flow data from this location is managed by Water Survey of Canada and thus Teck does not take manual flow instantaneous measurements.
 Italic values indicate that average is calculated from <20 data points in the month.

Station: Corbin Creek near confluence with Michel Creek (Site ID CM_CC1, EMS E200209)

Operated by: Teck

Available Data: 2016 Final flow data

Average Monthly and Annual Flow (m³/s):

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2016	0.11	0.14	<i>0.17</i>	<i>0.87</i>	<i>0.87</i>	<i>0.52</i>	<i>0.31</i>	0.17	0.16	0.36	0.51	0.30	0.38

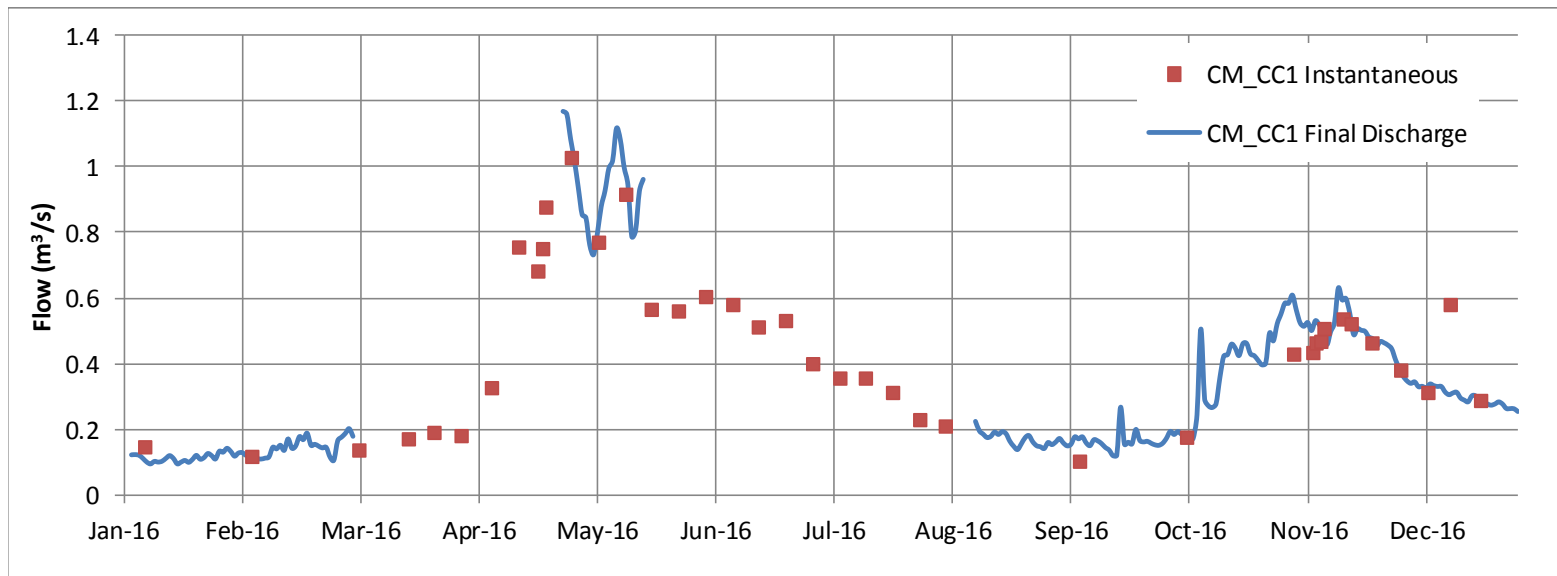


Figure C- 22. Daily Average flow in Corbin Creek (CM_CC1, E200209).

Note: Italic values indicate that average is calculated from <20 data points in the month.
 Values shaded in grey are calculated from instantaneous measurements.
 Large data gaps in continuous data due to failed bubbler. Unrealistic data were removed.

Station: AWTF Influent LC (Site ID WL_LCI_SP02)

Operated by: Teck

Available Data: 2016 Final flow data

Average Monthly and Annual Flow (m³/day):

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2016	1374	3914	2822	2167	457	35	738	1258	2071	2022	1626	1807	1691

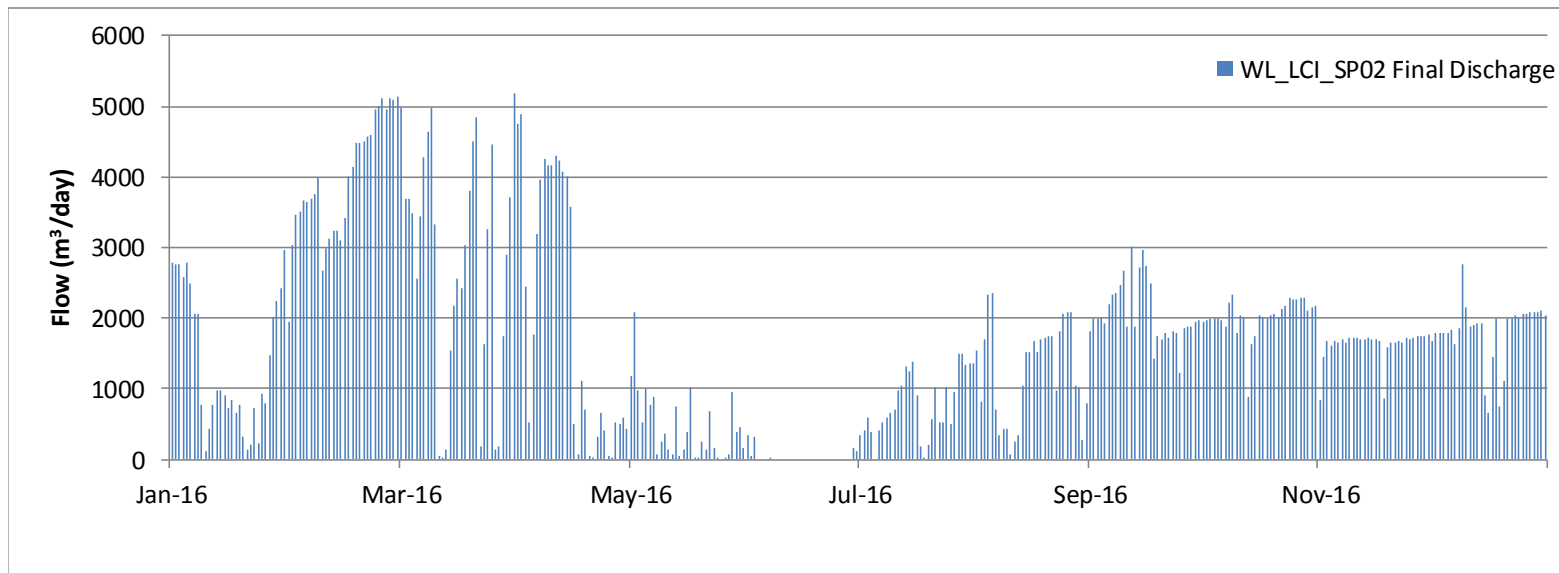


Figure C- 23. Daily intake flow from Line Creek to the WLC AWTF

Station: AWTF Influent WLC (Site ID WL_WLCI_SP01)

Operated by: Teck

Available Data: 2016 Final flow data

Average Monthly and Annual Flow (m³/day):

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2016	2229	2474	2106	3234	5429	3862	5180	3988	3729	3590	3669	3414	3575

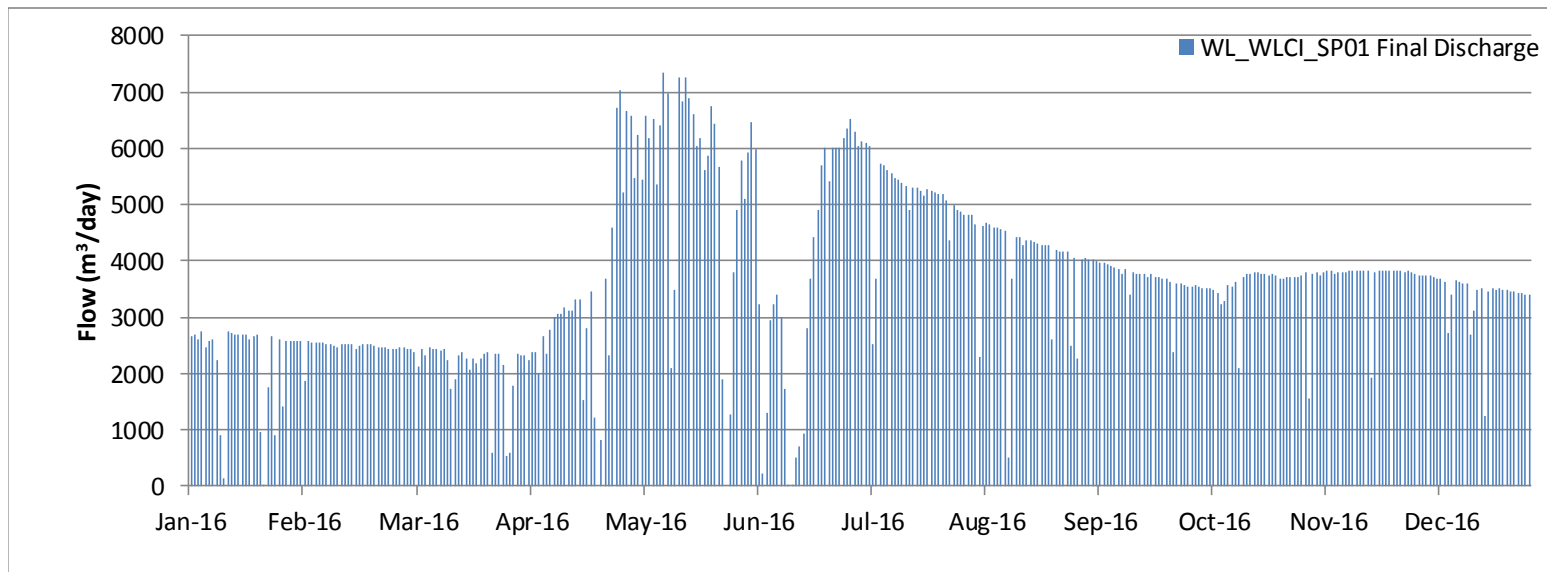


Figure C- 24. Daily intake flow from West Line Creek to the WLC AWTF

Station: AWTF Outfall (Site ID WL_BFWB_OUT_SP21)

Operated by: Teck

Available Data: 2016 Final flow data

Average Monthly and Annual Flow (m³/s):

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2016	3603	6387	4928	5401	5886	3898	5917	5247	5800	5611	5295	5222	5266

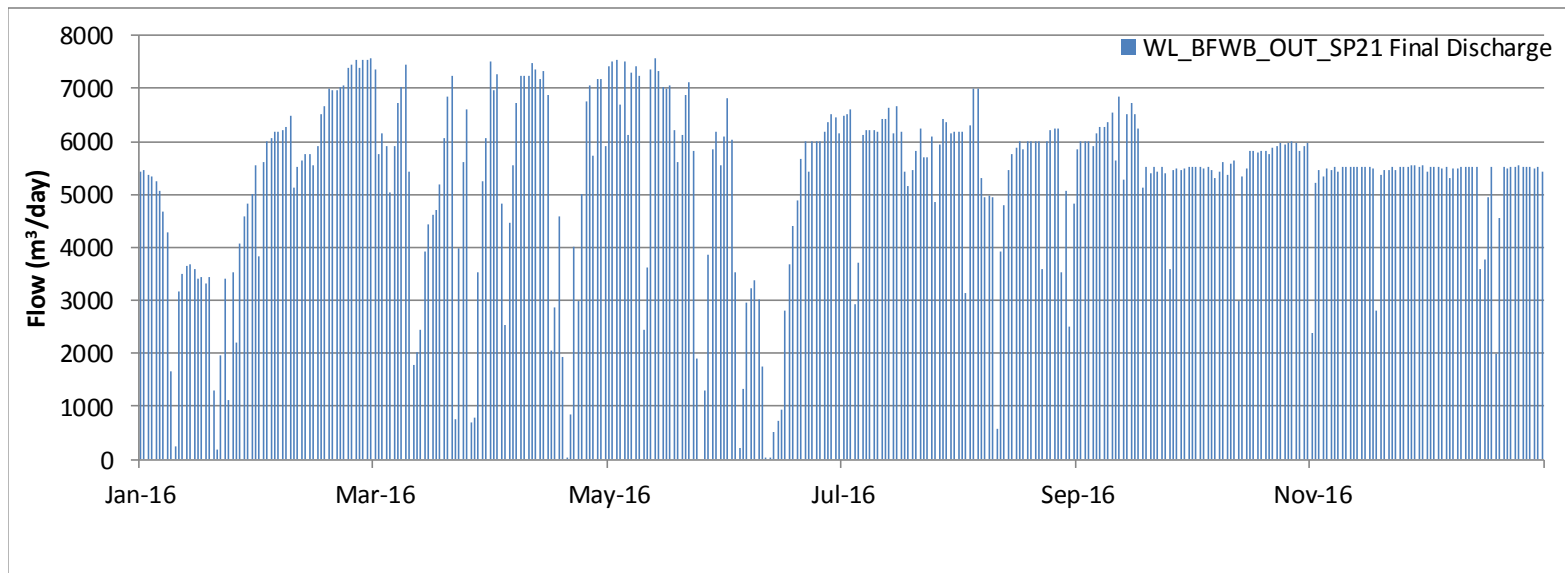


Figure C- 25. Total Outflow from the WLC AWTF

Note: Flow is measured at the outfall however the flow meter at this location was configured to account for some internal plant recycle rates in 2016, thus confounding the outflow volume. The sum of the inflows represents a more realistic outflow and is shown above.

6 Summary of Calculated Flow Data

Flow measurements cannot be taken at several permitted monitoring locations due to safety and logistical reasons. In these situations, flows are calculated using equations and/or methods developed by qualified professionals for this purpose. In 2016, monthly average flows were derived from available 2016 monitoring data and scaled using a watershed area ratio after accounting for inflows from any large gauged tributaries. A list of permitted stations for which data has been calculated is below.

- GHO Fording River Compliance Point – Upper Fording River (upstream of Josephine Falls) (EMS 0200378, GH_FR1)
- GHO Elk River Compliance Point – 220m downstream of Thompson Creek (EMS E300090, GH_ERC)
- Elk River upstream of Boivin Creek (upstream of Fording River) (EMS E206661, GH_ER1)
- Elk River Downstream of Michel Creek (EMS 0200393, EV_ER1)

Calculation methodologies for the locations listed above were developed by Golder Associates to support the flow monitoring meta data summary report submitted to the Ministry of Environment in 2015. Calculation methodology for each location is presented below with the calculated monthly average flows.

6.1 GHO Fording River Compliance Point – Upper Fording River (upstream of Josephine Falls) (EMS 0200378, GH_FR1)

2016 monthly average flows for Upper Fording River (upstream of Josephine Falls) (EMS 0200378) are estimated from Water Survey of Canada stations 08NK022 (Line Creek at the Mouth) and 08NK018 (Fording River at the Mouth) data, pro-rated by watershed area (see table C-1), as follows:

$$\text{Monthly average flow [EMS0200378]} = (\text{monthly average flow [08NK018]} - \text{monthly average flow [08NK022]}) \times [412 / (619 - 138)]$$

2016 Monthly Average Flows (m³/s):

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2016	1.42	1.16	1.27	6.14	9.84	7.03	5.21	3.64	2.38	3.04	2.80	1.58	3.79

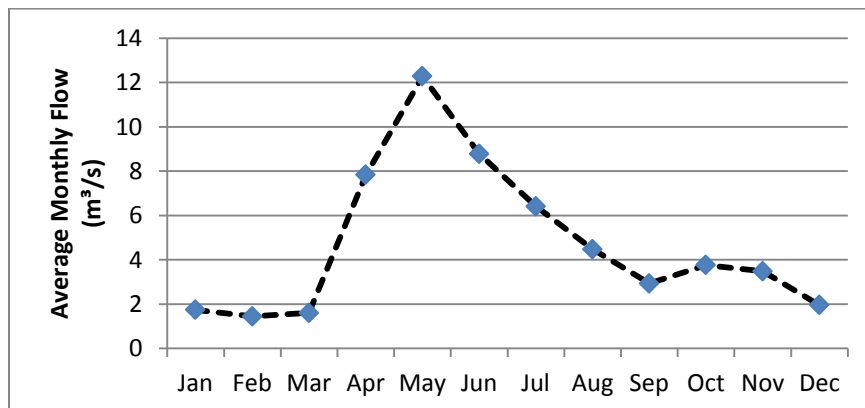


Figure C- 26 Monthly average flows at GH_FR1 prorated from downstream monitoring stations.

6.2 GHO Elk River Compliance Point – 220m downstream of Thompson Creek (EMS E300090, GH_ERC)

2016 monthly average flows at Elk River downstream of Thompson Creek (EMS E300090) are estimated from Water Survey of Canada stations 08NK018 (Fording River at the Mouth) and 08NK016 (Elk River Near Natal) data, pro-rated by watershed area, (see table C-1), as follows:

$$\text{monthly average flow [EMS E300090]} = (\text{monthly average flow [08NK016]} - \text{monthly average flow [08NK018]}) \times [903 / (1840 - 621)]$$

2016 Monthly Average Flows (m³/s):

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2016	3.83	2.95	3.05	12.63	29.47	25.79	18.47	12.33	6.78	8.04	7.69	6.52	11.46

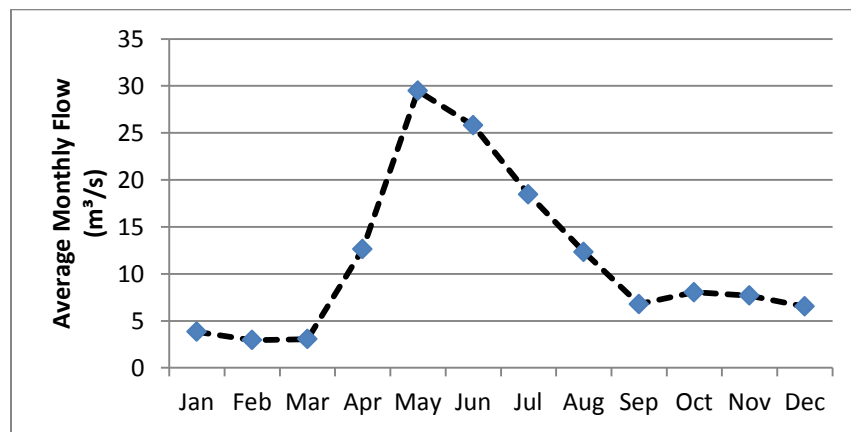


Figure C- 27 Monthly average flows at GH_ERC prorated from downstream monitoring stations.

6.3 Elk River upstream of Boivin Creek (upstream of Fording River) (EMS E206661, GH_ER1)

2016 monthly average flows at Elk River upstream of Fording River (EMS E206661) are estimated from Water Survey of Canada stations 08NK018 (Fording River at the Mouth) and 08NK016 (Elk River Near Natal) data, pro-rated by watershed area, (see table C-1), as follows:

$$\text{monthly average flow [E206661]} = (\text{monthly average flow [08NK016]} - \text{monthly average flow [08NK018]}) \times [977 / (1840 - 621)]$$

2016 Monthly Average Flows (m³/s):

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2016	5.61	4.36	4.56	19.34	43.08	37.18	26.55	17.77	9.91	11.83	11.30	9.31	16.73

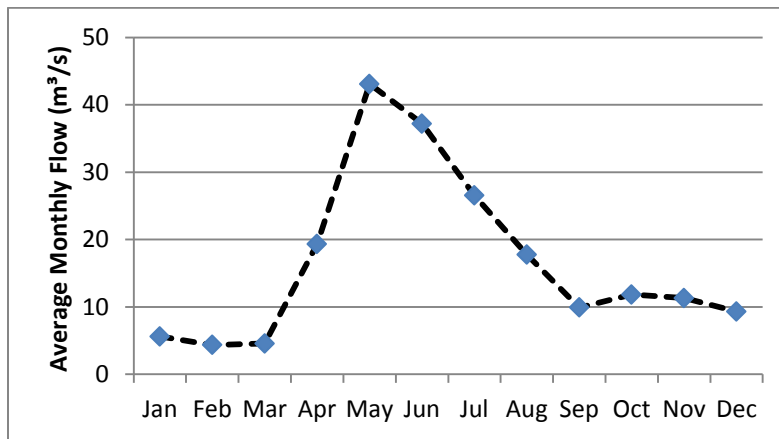


Figure C- 28 Monthly average flows at GH_ER1 prorated from downstream monitoring stations.

6.4 Elk River Downstream of Michel Creek (EMS 0200393, EV_ER1)

2016 monthly average flows at Elk River downstream of Michel Creek (EMC 0200393) are estimated from Michel Creek at Hwy 3 bridge and 08NK016 data, pro-rated by watershed area, as follows:

$$\text{monthly average flow [EMS 0200393] Michel Creek at Hwy 3 bridge} + [\text{08NK016}] \times [\text{2813-637}]/1840$$

2016 Monthly Average Flows (m³/s):

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2016	11.00	9.53	10.89	60.14	98.35	73.19	44.71	29.41	18.53	27.49	27.63	20.10	35.91

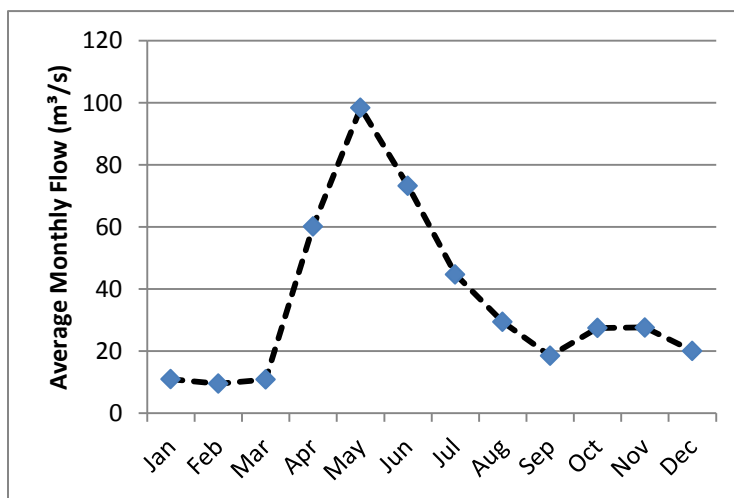
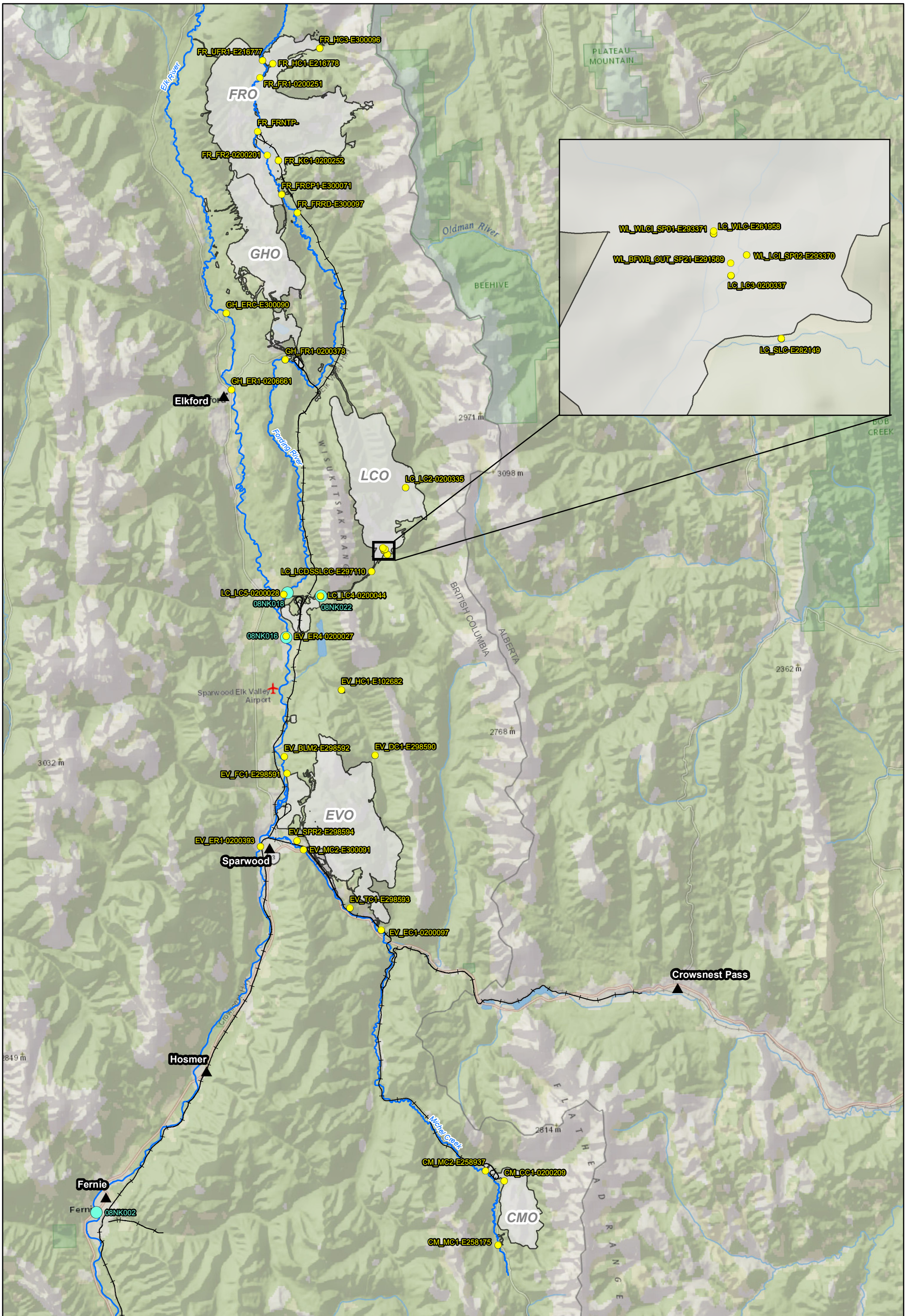


Figure C- 29 Monthly average flows at GH_ER1 prorated from downstream monitoring stations.



<p>Teck</p> <p>The maps and map data are provided 'as is' without any guarantee, representation, condition or warranty of any kind, either express, implied, or statutory. Teck Resources Limited assumes no liability with respect to any reliance the user places in the maps and map data, and the user assumes the entire risk as to the truth, accuracy, currency, or completeness of the information contained in the maps and map data.</p>	<h2>Permit 107517 Flow Monitoring Locations</h2>		<p>0 2.5 5 Kilometers</p>	
	<ul style="list-style-type: none"> ● Permit 107517 Flow Monitoring Locations ● WSC Stations ▲ Communities 	<ul style="list-style-type: none"> Railway Water Network Mine Permit Boundaries 		<p>DATE: 3/30/2017</p> <p>MINE OPERATION: Elk Valley</p>
	<p>SCALE: 1:246,000</p>	<p>COORDINATE SYSTEM: NAD 1983 UTM Zone 11N</p>		

Appendix D – Quality Assurance/Quality Control Data Issues

RPD Control Limits

Pass - RPD <= 20%

Pass-1 - RPD > 20%, Analysis results < 5 times Detection Limit

Pass-2 - RPD > 20% and RPD <= 50%, Analysis result > 5 times Detection Limit and < 999 times Detection Limit

Exceeds RPD Control Limits

				Location:	GH_SC2	GH_SC2		
				Sample ID:	GH_SC2-WS-201602031351	FD_M_01022016_010		
				Date Sampled:	2/3/2016	2/3/2016		
				Sample Type:	Primary	Secondary		
Analyte	Detection Limit Pri.	Detection Limit Dup.	Units				Primary vs. Duplicate	Category1
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	17.4	<1		178.26%	Fail

				Location:	FR_KC1	FR_KC1		
				Sample ID:	FR_KC1_M_01022016_N	FD_M_01022016_009		
				Date Sampled:	2/2/2016	2/2/2016		
				Sample Type:	Primary	Secondary		
Analyte	Detection Limit Pri.	Detection Limit Dup.	Units				Primary vs. Duplicate	Category1
CADMIUM, D	0.005	0.005	ug/l	0.101	0.316		103.12%	Fail

				Location:	FR_FR2	FR_FR2		
				Sample ID:	FR_FR2_W_20062016_N	FD_W_20062016_069		
				Date Sampled:	6/20/2016	6/20/2016		
				Sample Type:	Primary	Secondary		
Analyte	Detection Limit Pri.	Detection Limit Dup.	Units				Primary vs. Duplicate	Category1
CADMIUM, D	0.005	0.005	ug/l	0.0734	0.0243		100.51%	Fail

				Location:	FR_FR1	FR_FR1		
				Sample ID:	FR_FR1_M_02052016_N	FD_M_02052016_023		
				Date Sampled:	5/2/2016	5/2/2016		
				Sample Type:	Primary	Secondary		
Analyte	Detection Limit Pri.	Detection Limit Dup.	Units				Primary vs. Duplicate	Category1
NITROGEN, AMMONIA (AS N)	0.005	0.005	mg/l	0.0354	<0.005		150.50%	Fail

				Location:	FR_FR1	FR_FR1		
				Sample ID:	FR_FR1_M_07112016_N	FD_M_07112016_083		
				Date Sampled:	11/7/2016	11/7/2016		
				Sample Type:	Primary	Secondary		
Analyte	Detection Limit Pri.	Detection Limit Dup.	Units				Primary vs. Duplicate	Category1
TURBIDITY, LAB	0.1	0.1	ntu	1.42	0.4		112.09%	Fail
ALUMINUM, T	0.003	0.003	mg/l	0.0497	0.0167		99.40%	Fail
MANGANESE, T	0.0001	0.0001	mg/l	0.00483	0.00166		97.69%	Fail
IRON, T	0.01	0.01	mg/l	0.050	0.011		127.87%	Fail

				Location:	FR_UFR1	FR_UFR1		
				Sample ID:	FR_UFR1_M_05122016_N	FD_M_05122016_092		
				Date Sampled:	12/7/2016	12/7/2016		
				Sample Type:	Primary	Secondary		
Analyte	Detection Limit Pri.	Detection Limit Dup.	Units				Primary vs. Duplicate	Category1
ALUMINUM, T	0.003	0.003	mg/l	0.0216	0.0121		56.38%	Fail

				Location:	FR_HC1	FR_HC1		
				Sample ID:	FR_HC1_M_06062016_N	FD_M_06062016_044		
				Date Sampled:	6/7/2016	6/7/2016		
				Sample Type:	Primary	Secondary		
Analyte	Detection Limit Pri.	Detection Limit Dup.	Units				Primary vs. Duplicate	Category1
PHOSPHORUS	0.002	0.002	mg/l	0.0255	0.0092		93.95%	Fail

Location:	FR_HC1	FR_HC1
Sample ID:	FR_HC1_W_13062016_N	FD_W_13062016_064
Date Sampled:	6/13/2016	6/13/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
ALUMINUM, T	0.003	0.003	mg/l	0.0233	0.0077	100.65%	Fail

Location:	GH_FR1	GH_FR1
Sample ID:	GH_FR1_WS_2016-05-25_N	GH_FR1_WS_2016-05-25_FD
Date Sampled:	5/25/2016	5/25/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	59.6	2.1	186.39%	Fail
TURBIDITY, LAB	0.1	0.1	ntu	7.26	1.23	142.05%	Fail
ALUMINUM, T	0.003	0.003	mg/l	0.0954	0.0381	85.84%	Fail
MANGANESE, T	0.0001	0.0001	mg/l	0.00638	0.00334	62.55%	Fail
MOLYBDENUM, T	0.00005	0.00005	mg/l	0.00113	0.00201	56.05%	Fail
IRON, T	0.01	0.01	mg/l	0.113	0.048	80.75%	Fail
MANGANESE, D	0.0001	0.0001	mg/l	0.00059	0.00034	53.76%	Fail
MOLYBDENUM, D	0.00005	0.00005	mg/l	0.00109	0.00202	59.81%	Fail

Location:	GH_FR1	GH_FR1
Sample ID:	GH_FR1_WS_2016-06-07_N	GH_FR1_WS_2016-06-07_FD
Date Sampled:	6/7/2016	6/7/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TURBIDITY, LAB	0.1	0.1	ntu	0.57	1.22	72.63%	Fail

Location:	GH_FR1	GH_FR1
Sample ID:	GH_FR1_WS_2016-10-17_N	GH_FR1_WS_2016-10-17_FD
Date Sampled:	10/17/2016	10/17/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
MANGANESE, D	0.0001	0.0001	mg/l	0.00093	0.00051	58.33%	Fail

Location:	GH_FR1	GH_FR1
Sample ID:	GH_FR1_WS_2016-10-25_N	GH_FR1_WS_2016-10-25_FD
Date Sampled:	10/25/2016	10/25/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TURBIDITY, LAB	0.1	0.1	ntu	0.52	1.66	104.59%	Fail
MANGANESE, T	0.0001	0.0001	mg/l	0.00152	0.00257	51.34%	Fail

Location:	GH_FR1	GH_FR1
Sample ID:	GH_FR1_WS_2016-11-22_N	GH_FR1_WS_2016-11-22_FD
Date Sampled:	11/22/2016	11/22/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
ALUMINUM, T	0.003	0.003	mg/l	0.0705	0.0077	160.61%	Fail
MANGANESE, T	0.0001	0.0001	mg/l	0.00874	0.00194	127.34%	Fail
IRON, T	0.01	0.01	mg/l	0.122	0.017	151.08%	Fail
MANGANESE, D	0.0001	0.0001	mg/l	0.00299	0.00173	53.39%	Fail

Location:	GH_ERC	GH_ERC
Sample ID:	GH_ERC_WS_2016-04-19_N	GH_ERC_WS_2016-04-19_FD
Date Sampled:	4/19/2016	4/19/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
MANGANESE, D	0.0001	0.0001	mg/l	0.00054	<0.0001	137.50%	Fail

Location:	GH_ER1	GH_ER1
Sample ID:	GH_ER1_WS_2016-04-27_N	GH_ER1_WS_2016-04-27_FD
Date Sampled:	4/27/2016	4/27/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
MANGANESE, D	0.0001	0.0001	mg/l	0.00159	0.00269	51.40%	Fail

Location:	GH_ER1	GH_ER1
Sample ID:	GH_ER1_WS_2016-05-25_N	GH_ER1_WS_2016-05-25_FD
Date Sampled:	5/25/2016	5/25/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TURBIDITY, LAB	0.1	0.1	ntu	1.27	4.28	108.47%	Fail

Location:	GH_GH1	GH_GH1
Sample ID:	GH_GH1_WS_2016-04-04_N	GH_GH1_WS_2016-04-04_FD
Date Sampled:	4/4/2016	4/4/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
ALUMINUM, D	0.003	0.003	mg/l	0.0191	0.0109	54.67%	Fail

Location:	GH_GH1	GH_GH1
Sample ID:	GH_GH1_WS_2016-05-03_N	GH_GH1_WS_2016-05-03_FD
Date Sampled:	5/3/2016	5/3/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
CARBON, DISSOLVED ORGANIC, D	0.5	0.5	mg/l	4.22	0.94	127.13%	Fail
MANGANESE, D	0.0001	0.0001	mg/l	0.00200	0.00365	58.41%	Fail

Location:	GH_GH1	GH_GH1
Sample ID:	GH_GH1_WS_2016-08-08_N	GH_GH1_WS_2016-08-08_FD
Date Sampled:	8/8/2016	8/8/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
COPPER, T	0.5	0.5	ug/l	2.72	0.75	113.54%	Fail

Location:	GH_GH1	GH_GH1
Sample ID:	GH_GH1_WS_2016-12-05_N	GH_GH1_WS_2016-12-05_FD
Date Sampled:	12/5/2016	12/5/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
PHOSPHORUS	0.002	0.002	mg/l	0.0141	0.0253	56.85%	Fail

Location:	GH_WC1	GH_WC1
Sample ID:	GH_WC1_WS_2016-12-07_N	GH_WC1_WS_2016-12-07_FD
Date Sampled:	12/7/2016	12/7/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	77.6	35.7	73.96%	Fail
TURBIDITY, LAB	0.1	0.1	ntu	37.0	5.79	145.88%	Fail
CADMIUM, T	0.005	0.005	ug/l	0.215	0.121	55.95%	Fail
MERCURY, T	0.0005	0.0005	ug/l	0.00406	0.00234	53.75%	Fail

Location:	GH_ER1A	GH_ER1A
Sample ID:	GH_ER1A_WS_2016-07-05_N	GH_ER1A_WS_2016-07-05_FD
Date Sampled:	7/6/2016	7/6/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TURBIDITY, LAB	0.1	0.1	ntu	1.24	0.46	91.76%	Fail

Location:	LC_LC5	LC_LC5
Sample ID:	LC_LC5_WS_2016-03-28_N	FD_W_20160328_008
Date Sampled:	3/28/2016	3/28/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
CADMIUM, T	0.005	0.005	ug/l	0.0307	0.0153	66.96%	Fail

Location:	LC_LC3	LC_LC3
Sample ID:	LC_LC3_WS_2016-04-25_N	FD_W_20160425_017
Date Sampled:	4/25/2016	4/25/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
ALUMINIUM, T	0.003	0.003	mg/l	0.0322	0.0163	65.57%	Fail

Location:	LC_LC2	LC_LC2
Sample ID:	LC_LC2_WS_2016-05-30_N	FD_W_20160530_029
Date Sampled:	5/30/2016	5/30/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
MANGANESE, T	0.0001	0.0001	mg/l	0.00220	0.00118	60.36%	Fail

Location:	LC_LC2	LC_LC2
Sample ID:	LC_LC2_WS_2016-06-06_N	FD_M_20160606_022
Date Sampled:	6/6/2016	6/6/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TURBIDITY, LAB	0.1	0.1	ntu	1.49	0.88	51.48%	Fail

Location:	LC_LC2	LC_LC2
Sample ID:	LC_LC2_WS_2016-07-18_N	FD_W_20160718_044
Date Sampled:	7/18/2016	7/18/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
MANGANESE, T	0.0001	0.0001	mg/l	0.00147	0.00248	51.14%	Fail

Location:	LC_WTF_OUT	LC_WTF_OUT
Sample ID:	LC_WTF_OUT_WS_03072016_N	WL_EPCR_03072016_DUP1
Date Sampled:	3/7/2016	3/7/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
NITRATE NITROGEN (NO3), AS N	0.025	0.025	mg/l	0.138	0.077	56.74%	Fail

Location:	WL_BFWB_OUT_SP21	WL_BFWB_OUT_SP21
Sample ID:	WL_BFWB_OUT_SP21_06062016_N	WL_EPCR_06062016_DUP1
Date Sampled:	6/6/2016	6/6/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
CHROMIUM, T	0.0005	0.0005	mg/l	0.00485	<0.0005	162.62%	Fail
MOLYBDENUM, T	0.00025	0.00025	mg/l	0.00435	0.00154	95.42%	Fail
TOTAL KJELDAHL NITROGEN	0.05	0.05	mg/l	0.350	0.203	53.16%	Fail

Location:	WL_BFWB_OUT_SP21	WL_BFWB_OUT_SP21
Sample ID:	WL_BFWB_OUT_SP21_07112016_N	WL_EPCR_07112016_DUP1
Date Sampled:	7/11/2016	7/11/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
PHOSPHORUS, D	0.002	0.002	mg/l	0.0208	0.0361	53.78%	Fail

Location:	WL_BFWB_OUT_SP21	WL_BFWB_OUT_SP21
Sample ID:	WL_BFWB_OUT_SP21_08292016_N	WL_EPCR_08292016_DUP1
Date Sampled:	8/29/2016	8/29/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
NITRATE NITROGEN (NO3), AS N	0.025	0.025	mg/l	0.181	0.063	96.72%	Fail

Location:	WL_BFWB_OUT_SP21	WL_BFWB_OUT_SP21
Sample ID:	WL_BFWB_OUT_SP21_10242016_N	WL_EPCR_10242016_DUP1
Date Sampled:	10/24/2016	10/24/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
NITRATE NITROGEN (NO3), AS N	0.005	0.005	mg/l	< 0.0050	<0.005	0.00%	Pass

Location:	WL_BFWB_OUT_SP21	WL_BFWB_OUT_SP21
Sample ID:	WL_BFWB_OUT_SP21_WS_08012016_N	WL_EPCR_08012016_DUP1
Date Sampled:	8/1/2016	8/1/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
FLUORIDE, D	0.02	0.02	mg/l	0.131	0.072	58.13%	Fail

Location:	WL_BFWB_OUT_SP21	WL_BFWB_OUT_SP21
Sample ID:	WL_BFWB_OUT_SP21_WS_08182016_N	WL_EPCR_08182016_DUP1
Date Sampled:	8/18/2016	8/18/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
SELENIUM, D	0.25	0.25	ug/l	14.5	31.8	74.73%	Fail

Location:	WL_BFWB_OUT_SP21	WL_BFWB_OUT_SP21
Sample ID:	WL_BFWB_OUT_SP21_WS_08192016_N	WL_EPCR_08192016_DUP1
Date Sampled:	8/19/2016	8/19/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
SELENIUM, D	0.25	0.25	ug/l	26.7	13.1	68.34%	Fail
SELENIUM, T	0.25	0.25	ug/l	29	11.4	87.13%	Fail

Location:	WL_BFWB_OUT_SP21	WL_BFWB_OUT_SP21
Sample ID:	WL_BFWB_OUT_SP21_WS_08222016_N	WL_EPCR_08222016_DUP1
Date Sampled:	8/22/2016	8/22/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
PHOSPHORUS	0.002	0.002	mg/l	0.0292	0.0527	57.39%	Fail

Location:	WL_BFWB_OUT_SP21	WL_BFWB_OUT_SP21
Sample ID:	WL_BFWB_OUT_SP21_WS_10312016_N	WL_EPCR_10312016_DUP1
Date Sampled:	10/31/2016	10/31/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
PHOSPHORUS	0.002	0.002	mg/l	0.0325	0.0178	58.45%	Fail

Location:	WL_BFWB_OUT_SP21	WL_BFWB_OUT_SP21
Sample ID:	WL_BFWB_OUT_SP21_WS_11072016_N	WL_EPCR_11072016_DUP1
Date Sampled:	11/7/2016	11/7/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
NITRATE NITROGEN (NO3), AS N	0.025	0.025	mg/l	0.208	0.06	110.45%	Fail

Location:	LC_WLC	LC_WLC
Sample ID:	LC_WLC_WS_20160125_NP	WL_WS_20160125_FD
Date Sampled:	1/25/2016	1/25/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
ION BALANCE	0	0	%	3.6	6	50.00%	Fail

Location:	EV_HC1	EV_HC1
Sample ID:	EV_HC1_WS_2016-02-01_N	EV_ER6_WS_2016-02-01_FD
Date Sampled:	2/1/2016	2/1/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
ALUMINUM, T	0.003	0.003	mg/l	0.0586	0.0309	61.90%	Fail

Location:	EV_HC1	EV_HC1
Sample ID:	EV_HC1_WS_2016-04-19_N	EV_ER5_WS_2016-04-19_FD
Date Sampled:	4/19/2016	4/19/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
NITROGEN, AMMONIA (AS N)	0.005	0.005	mg/l	0.137	<0.005	185.92%	Fail

Location:	EV_HC1	EV_HC1
Sample ID:	EV_HC1_WS_2016-06-14_N	EV_ER5_WS_2016-06-14_N
Date Sampled:	6/14/2016	6/14/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
NICKEL, T	0.5	0.5	ug/l	65.7	0.86	194.83%	Fail

Location:	EV_HC1	EV_HC1
Sample ID:	EV_HC1_WS_2016-06-28_N	EV_ER5_WS_2016-06-28_N
Date Sampled:	6/28/2016	6/28/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	15	15	mg/l	744	426	54.36%	Fail

Location:	EV_MC2	EV_MC2
Sample ID:	EV_MC2_WS_2016-04-20_N	EV_MC5_WS_2016-04-20_FB
Date Sampled:	4/20/2016	4/20/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
ALUMINUM, D	0.003	0.003	mg/l	0.0277	0.219	155.09%	Fail
MANGANESE, D	0.0001	0.0001	mg/l	0.00068	0.00713	165.17%	Fail

Location:	EV_MC2	EV_MC2
Sample ID:	EV_MC2_WS_2016-05-18_N	EV_MC5_WS_2016-05-18_N
Date Sampled:	5/18/2016	5/18/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TURBIDITY, LAB	0.1	0.1	ntu	2.36	4.13	54.55%	Fail

Location:	EV_MC2	EV_MC2
Sample ID:	EV_MC2_WS_2016-06-01_N	EV_MC5_WS_2016-06-01_N
Date Sampled:	6/1/2016	6/1/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	11.0	4.4	85.71%	Fail

Location:	EV_MC2	EV_MC2
Sample ID:	EV_MC2_WS_2016-07-06_N	EV_MC5_WS_2016-07-06_N
Date Sampled:	7/6/2016	7/6/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
PHOSPHORUS	0.002	0.002	mg/l	0.0164	0.0055	99.54%	Fail

Location:	EV_MC2	EV_MC2
Sample ID:	EV_MC2_WS_2016-12-05_N	EV_MC5_WS_2016-12-05_N
Date Sampled:	12/5/2016	12/5/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
CADMIUM, D	0.005	0.005	ug/l	0.0439	0.0135	105.92%	Fail

Location:	EV_ER4	EV_ER4
Sample ID:	EV_ER4_WS_2016-05-10_N	EV_ER5_WS_2016-05-10_N
Date Sampled:	5/10/2016	5/10/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
MANGANESE, D	0.0001	0.0001	mg/l	0.00059	0.00346	141.73%	Fail

Location:	EV_ER4	EV_ER4
Sample ID:	EV_ER4_WS_2016-05-17_N	EV_ER5_WS_2016-05-17_N
Date Sampled:	5/17/2016	5/17/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TURBIDITY, LAB	0.1	0.1	ntu	1.32	0.76	53.85%	Fail

Location:	EV_ER1	EV_ER1
Sample ID:	EV_ER1_WS_2016-03-30_N	EV_MC5_WS_2016-03-30_FD
Date Sampled:	3/30/2016	3/30/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
MANGANESE, D	0.0001	0.0001	mg/l	0.00075	0.00023	106.12%	Fail

Location:	EV_GT1	EV_GT1
Sample ID:	EV_GT1_WS_2016-03-09_N	EV_MC6_WS_2016-03-09_N
Date Sampled:	3/9/2016	3/9/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TURBIDITY, LAB	0.1	0.1	ntu	21.6	12.2	55.62%	Fail

Location:	EV_GT1	EV_GT1
Sample ID:	EV_GT1_WS_2016-05-04_N	EV_MC9_WS_2016-05-04_N
Date Sampled:	5/4/2016	5/4/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
MANGANESE, T	0.0001	0.0001	mg/l	0.00118	0.00212	56.97%	Fail
SELENIUM, D	0.05	0.05	ug/l	75.9	52.2	37.00%	Fail

Location:	EV_GT1	EV_GT1
Sample ID:	EV_GT1_WS_2016-07-13_N	EV_ER9_WS_2016-07-13_N
Date Sampled:	7/13/2016	7/13/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
CADMIUM, D	0.005	0.005	ug/l	0.0320	0.221	149.41%	Fail
MANGANESE, D	0.0001	0.0001	mg/l	0.00060	0.00156	88.89%	Fail

Location:	EV_GT1	EV_GT1
Sample ID:	EV_GT1_WS_2016-12-05_N	EV_MC6_WS_2016-12-05_N
Date Sampled:	12/5/2016	12/5/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
BARIUM, T	0.00005	0.00005	mg/l	0.0174	0.17	162.86%	Fail
MANGANESE, D	0.0001	0.0001	mg/l	0.00084	0.00178	71.76%	Fail
SELENIUM, D	0.05	0.05	ug/l	66.6	94.3	34.43%	Fail

Location:	EV_GC2	EV_GC2
Sample ID:	EV_GC2_WS_2016-01-13_N	EV_ER6_WS_2016-01-13_N
Date Sampled:	1/13/2016	1/13/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
ALUMINIUM, T	0.003	0.003	mg/l	0.0528	0.0301	54.76%	Fail

Location:	EV_GC2	EV_GC2
Sample ID:	EV_GC2_WS_2016-03-08_N	EV_ER5_WS_2016-03-08_N
Date Sampled:	3/8/2016	3/8/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TURBIDITY, LAB	0.1	0.1	ntu	7.78	4.16	60.64%	Fail

Location:	EV_GC2	EV_GC2
Sample ID:	EV_GC2_WS_2016-05-04_N	EV_ER9_WS_2016-05-04_N
Date Sampled:	5/4/2016	5/4/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
SELENIUM, D	0.05	0.05	ug/l	78.7	59.4	27.95%	Fail

Location:	EV_SM1	EV_SM1
Sample ID:	EV_SM1_WS_2016-06-06_N	EV_ER5_WS_2016-06-06_N
Date Sampled:	6/6/2016	6/6/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
ALUMINIUM, T	0.003	0.003	mg/l	0.0476	0.0798	50.55%	Fail

Location:	EV_SM1	EV_SM1
Sample ID:	EV_SM1_WS_2016-07-11_N	EV_ER5_WS_2016-07-11_N
Date Sampled:	7/11/2016	7/11/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
PHOSPHORUS	0.002	0.002	mg/l	0.0384	0.006	145.95%	Fail

Location:	EV_BLM2	EV_BLM2
Sample ID:	EV_BLM2_WS_2016-09-12_N	EV_ER5_WS_2016-09-12_N
Date Sampled:	9/12/2016	9/12/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
ORTHO-PHOSPHATE	0.001	0.001	mg/l	0.0331	<0.001	188.27%	Fail
ALUMINUM, T	0.003	0.003	mg/l	0.0477	0.084	55.13%	Fail
MANGANESE, D	0.0001	0.0001	mg/l	0.00056	<0.0001	139.39%	Fail

Location:	EV_SPR2	EV_SPR2
Sample ID:	EV_SPR2_WS_2016-02-03_N	EV_MCS_WS_2016-02-03_FD
Date Sampled:	2/3/2016	2/3/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
MOLYBDENUM, T	0.00005	0.00005	mg/l	0.000681	0.00114	50.41%	Fail

Location:	EV_WF_SW	EV_WF_SW
Sample ID:	EV_WF_SW_WG_2016-05-18_N	EV_EC5GW_WG_2016-05-18_NP
Date Sampled:	5/18/2016	5/18/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
COBALT, T	0.1	0.1	ug/l	0.83	1.97	81.43%	Fail
TOTAL ORGANIC CARBON, T	0.5	0.5	mg/l	12.8	2.3	139.07%	Fail
ALUMINUM, D	0.003	0.003	mg/l	0.0282	0.0145	64.17%	Fail
ANTIMONY, D	0.1	0.1	ug/l	0.61	0.22	93.98%	Fail
COBALT, D	0.1	0.1	ug/l	0.89	0.29	101.69%	Fail
IRON, D	0.01	0.01	mg/l	1.59	0.761	70.52%	Fail
LEAD, D	0.05	0.05	ug/l	1.22	0.66	59.57%	Fail

Location:	EV_WF_SW	EV_WF_SW
Sample ID:	EV_WF_SW_WG_2016-08-16_N	EV_EC5GW_WG_2016-08-16_NP
Date Sampled:	8/16/2016	8/16/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	66.6	36.1	59.40%	Fail
TURBIDITY, LAB	0.1	0.1	ntu	88.9	41.1	73.54%	Fail
ALKALINITY, TOTAL (As CaCO3)	1	1	mg/l	283	147	63.26%	Fail

Location:	EV_WF_SW	EV_WF_SW
Sample ID:	EV_WF_SW_WG_2016-10-26_N	EV_EC5GW_WG_2016-10-26_NP
Date Sampled:	10/26/2016	10/26/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	14.2	7.5	61.75%	Fail
LEAD, T	0.05	0.05	ug/l	1.95	3.8	64.35%	Fail
IRON, D	0.01	0.01	mg/l	0.723	0.151	130.89%	Fail

Location:	CM_CC1	CM_CC1
Sample ID:	CM_CC1_WKLY_WS_20160420_N	CM_NNP_WS_2016_04_20_061
Date Sampled:	4/20/2016	4/20/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
ALUMINUM, T	0.015	0.015	mg/l	0.099	0.055	57.14%	Fail

Location:	CM_MC2	CM_MC2
Sample ID:	CM_MC2_WS_20160416_N	CM_NNP_WS_20160416_N
Date Sampled:	4/16/2016	4/16/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
PHOSPHORUS	0.002	0.002	mg/l	0.0191	0.0072	90.49%	Fail

Location:	RG_DSELK	RG_DSELK
Sample ID:	RG_DSELK_WS_2016-04-19_N-U1	RG_DUPLICATERES_WS_2016-04-19_FD
Date Sampled:	4/19/2016	4/19/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	41.4	15.8	89.51%	Fail
TURBIDITY, LAB	0.1	0.1	ntu	31.3	12.5	85.84%	Fail
CHLORIDE, D	0.1	0.1	mg/l	2.47	1.12	75.21%	Fail
NITRATE NITROGEN (NO3), AS N	0.005	0.005	mg/l	0.369	0.877	81.54%	Fail
SELENIUM, T	0.05	0.05	ug/l	1.27	3.79	99.60%	Fail
SODIUM, T	0.05	0.05	mg/l	2.98	1.68	55.79%	Fail
BARIUM, T	0.00005	0.00005	mg/l	0.0511	0.081	45.27%	Fail
LEAD, T	0.05	0.05	ug/l	0.545	0.266	68.80%	Fail
MANGANESE, T	0.0001	0.0001	mg/l	0.0303	0.0138	74.83%	Fail
MANGANESE, D	0.0001	0.0001	mg/l	0.0134	0.00216	144.47%	Fail
SELENIUM, D	0.05	0.05	ug/l	1.35	4.26	103.74%	Fail

Location:	RG_DSELK	RG_DSELK
Sample ID:	RG_DSELK_WS_2016-04-26_N-U1	RG_DUPLICATERES_WS_2016-04-26_FD
Date Sampled:	4/26/2016	4/26/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
SELENIUM, T	0.05	0.05	ug/l	0.384	0.133	97.10%	Fail
SELENIUM, D	0.05	0.05	ug/l	0.431	0.119	113.45%	Fail

Location:	RG_KERRRD	RG_KERRRD
Sample ID:	RG_KERRRD_WS_2016-06-07_N-U1	RG_DUPLICATERES_WS_2016-06-07_FD
Date Sampled:	6/7/2016	6/7/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	10.8	1.4	154.10%	Fail
TURBIDITY, LAB	0.1	0.1	ntu	6.13	0.91	148.30%	Fail
NITRATE NITROGEN (NO3), AS N	0.005	0.005	mg/l	0.0757	0.206	92.51%	Fail
ALUMINUM, T	0.003	0.003	mg/l	0.195	0.0246	155.19%	Fail
MANGANESE, T	0.0001	0.0001	mg/l	0.00840	0.00183	128.45%	Fail
PHOSPHORUS	0.002	0.002	mg/l	0.0109	0.0039	94.59%	Fail
IRON, T	0.01	0.01	mg/l	0.236	0.018	171.65%	Fail
MANGANESE, D	0.0001	0.0001	mg/l	0.00318	0.00083	117.21%	Fail

Location:	RG_BORDER	RG_BORDER
Sample ID:	RG_BORDER_WS_2016-04-05_N-U1	RG_DUPLICATERES_WS_2016-04-05_FD
Date Sampled:	4/5/2016	4/5/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
MANGANESE, D	0.0001	0.0001	mg/l	0.00056	0.0014	85.71%	Fail

Location:	RG_BORDER	RG_BORDER
Sample ID:	RG_BORDER_WS_2016-05-03_N-U1	RG_DUPLICATERES_WS_2016-05-03_FD
Date Sampled:	5/3/2016	5/3/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TIN, D	0.0001	0.0001	mg/l	0.00103	0.00021	132.26%	Fail

Location:	RG_BORDER	RG_BORDER
Sample ID:	RG_BORDER_WS_2016-05-31_N-U1	RG_DUPLICATERES_WS_2016-05-31_FD
Date Sampled:	5/31/2016	5/31/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
PHOSPHORUS	0.002	0.002	mg/l	0.0138	0.005	93.62%	Fail

Location:	RG_BORDER	RG_BORDER
Sample ID:	RG_BORDER_WS_2016-09-07_N-U1	RG_DUPLICATERES_WS_2016-09-07_FD
Date Sampled:	9/7/2016	9/7/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
ALUMINUM, T	0.003	0.003	mg/l	0.0270	0.0145	60.24%	Fail

Location:	RG_ELKORES	RG_ELKORES
Sample ID:	RG_ELKORES_WS_2016-03-29_N	RG_DUPLICATERIV_WS_2016-03-29_FD
Date Sampled:	3/29/2016	3/29/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TIN, D	0.0001	0.0001	mg/l	0.00150	0.00013	168.10%	Fail
ZINC, D	3	3	ug/l	44.3	13.9	104.47%	Fail

Location:	RG_ELKORES	RG_ELKORES
Sample ID:	RG_ELKORES_WS_2016-06-07_N	RG_DUPLICATERIV_WS_2016-06-07_FD
Date Sampled:	6/7/2016	6/7/2016
Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	14.4	25.3	54.91%	Fail
TURBIDITY, LAB	0.1	0.1	ntu	6.57	11.5	54.57%	Fail
PHOSPHORUS	0.002	0.002	mg/l	0.0160	0.032	66.67%	Fail

RPD Control Limits

Pass - RPD <= 20%

Pass-1 - RPD > 20%, Analysis results < 5 times Detection Limit

Pass-2 - RPD > 20% and RPD <= 50%, Analysis result > 5 times Detection Limit and < 999 times Detection Limit

Exceeds RPD Control Limits

Appendix E – Summary of Receiving Environment Samples at or Above Approved/Working Water Quality Guidelines

Summary of Water Quality Guideline Exceedances in 2016

Date	EMS ID	Location Code	Parameter	Result	Unit	Criteria (Max)	Criteria (Min)	Criteria or Guideline
1/4/2016	E261958	LC_WLC	URANIUM	22.1	ug/l	8.5		BCWQG Working Average
1/5/2016	E300071	FR_FRCP1	URANIUM	10.825	ug/l	8.5		BCWQG Working Average
1/6/2016	0200209	CM_CC1	NITRITE NITROGEN (NO2), AS N	0.068	mg/l	0.06		BCWQG Approved Average
1/11/2016	E261958	LC_WLC	URANIUM	21.375	ug/l	8.5		BCWQG Working Average
1/18/2016	E261958	LC_WLC	URANIUM	21.075	ug/l	8.5		BCWQG Working Average
1/25/2016	E261958	LC_WLC	URANIUM	21.225	ug/l	8.5		BCWQG Working Average
1/28/2016	E298592	EV_BLM2	MERCURY - Ultra Trace	0.00194	ug/l	0.00125		BCWQG Approved Average
2/1/2016	E298592	EV_BLM2	MERCURY - Ultra Trace	0.00138	ug/l	0.00125		BCWQG Approved Average
2/1/2016	E261958	LC_WLC	URANIUM	21	ug/l	8.5		BCWQG Working Average
2/2/2016	E300071	FR_FRCP1	URANIUM	16.05	ug/l	8.5		BCWQG Working Average
2/3/2016	0200209	CM_CC1	NITRITE NITROGEN (NO2), AS N	0.067	mg/l	0.06		BCWQG Approved Average
2/8/2016	E261958	LC_WLC	URANIUM	20.9	ug/l	8.5		BCWQG Working Average
2/15/2016	E300071	FR_FRCP1	URANIUM	11.12	ug/l	8.5		BCWQG Working Average
2/15/2016	E293369	LC_LCUSWLC	NITRITE NITROGEN (NO2), AS N	0.044	mg/l	0.04		BCWQG Approved Average
2/15/2016	E261958	LC_WLC	URANIUM	20.1	ug/l	8.5		BCWQG Working Average
2/22/2016	E261958	LC_WLC	URANIUM	21.2667	ug/l	8.5		BCWQG Working Average
2/29/2016	E261958	LC_WLC	URANIUM	20.8333	ug/l	8.5		BCWQG Working Average
3/1/2016	E300071	FR_FRCP1	pH, Field	9.2	ph units	9	6.5	BCWQG Approved Max
3/1/2016	E300071	FR_FRCP1	URANIUM	10.07	ug/l	8.5		BCWQG Working Average
3/2/2016	0200209	CM_CC1	COBALT	4.025	ug/l	4		BCWQG Approved Average
3/3/2016	E294312	RG_ELKORES	ALUMINUM	0.0545	mg/l	0.05		BCWQG Approved Average
3/7/2016	E300097	FR_FRRD	DISSOLVED OXYGEN, FIELD	6.37	mg/l		8	BCWQG Approved Average
3/7/2016	E261958	LC_WLC	URANIUM	20	ug/l	8.5		BCWQG Working Average
3/7/2016	E298592	EV_BLM2	MERCURY - Ultra Trace	0.00181	ug/l	0.00125		BCWQG Approved Average
3/7/2016	E298591	EV_FC1	MERCURY - Ultra Trace	0.00171	ug/l	0.00125		BCWQG Approved Average
3/8/2016	E216777	FR_UFR1	pH, Field	9.1	ph units	9	6.5	BCWQG Approved Max
3/14/2016	E216778	FR_HC1	pH, Field	9.6	ph units	9	6.5	BCWQG Approved Max
3/14/2016	E261958	LC_WLC	URANIUM	19.8667	ug/l	8.5		BCWQG Working Average
3/15/2016	0200209	CM_CC1	COBALT	4.71	ug/l	4		BCWQG Approved Average
3/16/2016	0200393	EV_ER1	pH, Field	9.1	ph units	9	6.5	BCWQG Approved Max
3/21/2016	E261958	LC_WLC	URANIUM	20.3667	ug/l	8.5		BCWQG Working Average
3/22/2016	0200209	CM_CC1	COBALT	4.65333	ug/l	4		BCWQG Approved Average
3/22/2016	0200209	CM_CC1	NITRITE NITROGEN (NO2), AS N	0.114333	mg/l	0.08		BCWQG Approved Average
3/22/2016	0200209	CM_CC1	NITRITE NITROGEN (NO2), AS N	0.259	mg/l	0.24		BCWQG Approved Max
3/28/2016	E261958	LC_WLC	URANIUM	20.45	ug/l	8.5		BCWQG Working Average

3/29/2016	0200209	CM_CC1	COBALT	4.7425	ug/l	4		BCWQG Approved Average
3/29/2016	0200209	CM_CC1	NITRITE NITROGEN (NO2), AS N	0.105375	mg/l	0.08		BCWQG Approved Average
4/4/2016	0200203	EV_MC3	IRON	1.16	mg/l	1		BCWQG Approved Max
4/4/2016	0200203	EV_MC3	MERCURY - Ultra Trace	0.001774	ug/l	0.00125		BCWQG Approved Average
4/4/2016	0200378	GH_FR1	ALUMINUM	0.057	mg/l	0.05		BCWQG Approved Average
4/4/2016	0200378	GH_FR1	ALUMINUM	0.273	mg/l	0.1		BCWQG Approved Max
4/4/2016	E300091	EV_MC2	MERCURY - Ultra Trace	0.001414	ug/l	0.00125		BCWQG Approved Average
4/4/2016	0200111	EV_ER2	IRON	1.16	mg/l	1		BCWQG Approved Max
4/4/2016	E261958	LC_WLC	URANIUM	20.24	ug/l	8.5		BCWQG Working Average
4/4/2016	0200251	FR_FR1	MERCURY - Ultra Trace	0.00161	ug/l	0.00125		BCWQG Approved Average
4/5/2016	E298593	EV_TC1	MERCURY - Ultra Trace	0.001985	ug/l	0.00125		BCWQG Approved Average
4/5/2016	E102714	GH_TC1	MERCURY - Ultra Trace	0.0017	ug/l	0.00125		BCWQG Approved Average
4/5/2016	E287432	GH_COUGAR	MERCURY - Ultra Trace	0.00579	ug/l	0.00125		BCWQG Approved Average
4/5/2016	E287437	GH_BR_F	ALUMINUM	0.0607	mg/l	0.05		BCWQG Approved Average
4/5/2016	E287437	GH_BR_F	MERCURY - Ultra Trace	0.00639	ug/l	0.00125		BCWQG Approved Average
4/5/2016	E288273	LC_DC3	MERCURY - Ultra Trace	0.001904	ug/l	0.00125		BCWQG Approved Average
4/6/2016	E298591	EV_FC1	MERCURY - Ultra Trace	0.00507	ug/l	0.00125		BCWQG Approved Average
4/6/2016	E298592	EV_BLM2	MERCURY - Ultra Trace	0.00562	ug/l	0.00125		BCWQG Approved Average
4/6/2016	0200209	CM_CC1	COBALT	4.1925	ug/l	4		BCWQG Approved Average
4/6/2016	0200209	CM_CC1	NITRITE NITROGEN (NO2), AS N	0.1056	mg/l	0.08		BCWQG Approved Average
4/11/2016	0200378	GH_FR1	ALUMINUM	0.05766	mg/l	0.05		BCWQG Approved Average
4/11/2016	0200378	GH_FR1	MERCURY - Ultra Trace	0.001512	ug/l	0.00125		BCWQG Approved Average
4/11/2016	E261958	LC_WLC	URANIUM	19.58	ug/l	8.5		BCWQG Working Average
4/12/2016	E288273	LC_DC3	MERCURY - Ultra Trace	0.00307	ug/l	0.00125		BCWQG Approved Average
4/13/2016	0200393	EV_ER1	MERCURY - Ultra Trace	0.00144	ug/l	0.00125		BCWQG Approved Average
4/13/2016	E300091	EV_MC2	MERCURY - Ultra Trace	0.001926	ug/l	0.00125		BCWQG Approved Average
4/13/2016	0200203	EV_MC3	MERCURY - Ultra Trace	0.0024	ug/l	0.00125		BCWQG Approved Average
4/13/2016	0200209	CM_CC1	COBALT	4.272	ug/l	4		BCWQG Approved Average
4/13/2016	0200209	CM_CC1	NITRITE NITROGEN (NO2), AS N	0.08898	mg/l	0.08		BCWQG Approved Average
4/14/2016	E216777	FR_UFR1	MERCURY - Ultra Trace	0.001348	ug/l	0.00125		BCWQG Approved Average
4/14/2016	0200251	FR_FR1	MERCURY - Ultra Trace	0.001315	ug/l	0.00125		BCWQG Approved Average
4/16/2016	0200209	CM_CC1	COBALT	4.626	ug/l	4		BCWQG Approved Average
4/17/2016	0200209	CM_CC1	COBALT	4.96667	ug/l	4		BCWQG Approved Average
4/18/2016	0200209	CM_CC1	COBALT	5.23857	ug/l	4		BCWQG Approved Average
4/19/2016	E288273	LC_DC3	MERCURY - Ultra Trace	0.004488	ug/l	0.00125		BCWQG Approved Average
4/19/2016	0200378	GH_FR1	ALUMINUM	0.05766	mg/l	0.05		BCWQG Approved Average
4/19/2016	0200378	GH_FR1	MERCURY - Ultra Trace	0.001652	ug/l	0.00125		BCWQG Approved Average
4/19/2016	0200201	FR_FR2	MERCURY - Ultra Trace	0.001312	ug/l	0.00125		BCWQG Approved Average
4/19/2016	0200209	CM_CC1	COBALT	5.43	ug/l	4		BCWQG Approved Average
4/20/2016	0200203	EV_MC3	IRON	1.61	mg/l	1		BCWQG Approved Max

4/20/2016	0200393	EV_ER1	IRON	1.86	mg/l	1		BCWQG Approved Max
4/20/2016	E300091	EV_MC2	IRON	2.15	mg/l	1		BCWQG Approved Max
4/20/2016	0200393	EV_ER1	MERCURY - Ultra Trace	0.002846	ug/l	0.00125		BCWQG Approved Average
4/20/2016	E300091	EV_MC2	MERCURY - Ultra Trace	0.003614	ug/l	0.00125		BCWQG Approved Average
4/20/2016	0200203	EV_MC3	MERCURY - Ultra Trace	0.00382	ug/l	0.00125		BCWQG Approved Average
4/20/2016	0200209	CM_CC1	COBALT	5.55333	ug/l	4		BCWQG Approved Average
4/21/2016	0200209	CM_CC1	COBALT	5.82	ug/l	4		BCWQG Approved Average
4/25/2016	E261958	LC_WLC	URANIUM	17.9	ug/l	8.5		BCWQG Working Average
4/26/2016	E288273	LC_DC3	MERCURY - Ultra Trace	0.005172	ug/l	0.00125		BCWQG Approved Average
4/26/2016	0200201	FR_FR2	MERCURY - Ultra Trace	0.001416	ug/l	0.00125		BCWQG Approved Average
4/26/2016	E300230	RG_DSELK	IRON	1.16	mg/l	1		BCWQG Approved Max
4/27/2016	0200378	GH_FR1	ALUMINUM	0.05766	mg/l	0.05		BCWQG Approved Average
4/27/2016	0200393	EV_ER1	MERCURY - Ultra Trace	0.003262	ug/l	0.00125		BCWQG Approved Average
4/27/2016	E300091	EV_MC2	MERCURY - Ultra Trace	0.003844	ug/l	0.00125		BCWQG Approved Average
4/27/2016	0200203	EV_MC3	MERCURY -	0.004198	ug/l	0.00125		BCWQG Approved
4/27/2016	0200378	GH_FR1	MERCURY -	0.002054	ug/l	0.00125		BCWQG Approved
4/27/2016	E216777	FR_UFR1	MERCURY -	0.001518	ug/l	0.00125		BCWQG Approved
4/27/2016	0200209	CM_CC1	COBALT	5.708	ug/l	4		BCWQG Approved
4/27/2016	E300071	FR_FRCP1	MERCURY -	0.001302	ug/l	0.00125		BCWQG Approved
5/2/2016	E298591	EV_FC1	MERCURY -	0.003155	ug/l	0.00125		BCWQG Approved
5/2/2016	E298592	EV_BLM2	IRON	6.11	mg/l	1		BCWQG Approved Max
5/2/2016	E298592	EV_BLM2	MERCURY -	0.00941	ug/l	0.00125		BCWQG Approved
5/2/2016	E261958	LC_WLC	URANIUM	16.025	ug/l	8.5		BCWQG Working
5/3/2016	E298593	EV_TC1	MERCURY -	0.002095	ug/l	0.00125		BCWQG Approved
5/3/2016	0200203	EV_MC3	MERCURY -	0.004648	ug/l	0.00125		BCWQG Approved
5/3/2016	E288273	LC_DC3	MERCURY -	0.005398	ug/l	0.00125		BCWQG Approved
5/4/2016	0200393	EV_ER1	MERCURY -	0.003645	ug/l	0.00125		BCWQG Approved
5/4/2016	E300091	EV_MC2	MERCURY -	0.00432	ug/l	0.00125		BCWQG Approved
5/4/2016	E258175	CM_MC1	MERCURY -	0.001405	ug/l	0.00125		BCWQG Approved
5/4/2016	0200209	CM_CC1	COBALT	6.877	ug/l	4		BCWQG Approved
5/4/2016	E102714	GH_TC1	MERCURY -	0.001745	ug/l	0.00125		BCWQG Approved
5/4/2016	E300071	FR_FRCP1	MERCURY -	0.001418	ug/l	0.00125		BCWQG Approved
5/4/2016	0200378	GH_FR1	MERCURY -	0.00177	ug/l	0.00125		BCWQG Approved
5/4/2016	0200201	FR_FR2	MERCURY -	0.001468	ug/l	0.00125		BCWQG Approved
5/4/2016	E287432	GH_COUGAR	MERCURY -	0.00378	ug/l	0.00125		BCWQG Approved
5/4/2016	E287437	GH_BR_F	MERCURY -	0.004375	ug/l	0.00125		BCWQG Approved
5/5/2016	E261958	LC_WLC	URANIUM	13.675	ug/l	8.5		BCWQG Working
5/5/2016	E300097	FR_FRRD	MERCURY -	0.001255	ug/l	0.00125		BCWQG Approved
5/6/2016	E261958	LC_WLC	URANIUM	12.652	ug/l	8.5		BCWQG Working
5/7/2016	E261958	LC_WLC	URANIUM	11.9233	ug/l	8.5		BCWQG Working
5/8/2016	E261958	LC_WLC	URANIUM	11.5429	ug/l	8.5		BCWQG Working
5/9/2016	E261958	LC_WLC	URANIUM	11.1875	ug/l	8.5		BCWQG Working
5/10/2016	E288273	LC_DC3	MERCURY -	0.00435	ug/l	0.00125		BCWQG Approved
5/11/2016	0200393	EV_ER1	MERCURY -	0.00325	ug/l	0.00125		BCWQG Approved
5/11/2016	E300091	EV_MC2	MERCURY -	0.003938	ug/l	0.00125		BCWQG Approved
5/11/2016	0200378	GH_FR1	MERCURY -	0.0012575	ug/l	0.00125		BCWQG Approved
5/11/2016	E300071	FR_FRCP1	MERCURY -	0.00131	ug/l	0.00125		BCWQG Approved
5/11/2016	0200203	EV_MC3	MERCURY -	0.003918	ug/l	0.00125		BCWQG Approved
5/11/2016	E300090	GH_ERC	MERCURY -	0.0014125	ug/l	0.00125		BCWQG Approved
5/11/2016	E258175	CM_MC1	MERCURY -	0.00177	ug/l	0.00125		BCWQG Approved
5/11/2016	0200209	CM_CC1	COBALT	8.411	ug/l	4		BCWQG Approved
5/12/2016	E261958	LC_WLC	pH, Field	10	ph units	9	6.5	BCWQG Approved Max
5/12/2016	0200337	LC_LC3	pH, Field	11	ph units	9	6.5	BCWQG Approved Max
5/12/2016	E293369	LC_LCUSWLC	pH, Field	11	ph units	9	6.5	BCWQG Approved Max
5/16/2016	E261958	LC_WLC	URANIUM	10.35	ug/l	8.5		BCWQG Working
5/17/2016	E288273	LC_DC3	MERCURY -	0.003298	ug/l	0.00125		BCWQG Approved
5/18/2016	0200393	EV_ER1	MERCURY -	0.003056	ug/l	0.00125		BCWQG Approved
5/18/2016	E258175	CM_MC1	MERCURY -	0.00161667	ug/l	0.00125		BCWQG Approved
5/18/2016	E300091	EV_MC2	MERCURY -	0.003728	ug/l	0.00125		BCWQG Approved
5/18/2016	0200209	CM_CC1	COBALT	10.3929	ug/l	4		BCWQG Approved
5/18/2016	E258937	CM_MC2	MERCURY -	0.00136714	ug/l	0.00125		BCWQG Approved
5/18/2016	0200203	EV_MC3	MERCURY -	0.003622	ug/l	0.00125		BCWQG Approved
5/23/2016	E261958	LC_WLC	URANIUM	10.2378	ug/l	8.5		BCWQG Working
5/24/2016	E294312	RG_ELKORES	MERCURY -	0.00151	ug/l	0.00125		BCWQG Approved
5/24/2016	E288273	LC_DC3	MERCURY -	0.002082	ug/l	0.00125		BCWQG Approved
5/25/2016	0200393	EV_ER1	MERCURY -	0.001796	ug/l	0.00125		BCWQG Approved
5/25/2016	E300091	EV_MC2	MERCURY -	0.002336	ug/l	0.00125		BCWQG Approved
5/25/2016	0200203	EV_MC3	MERCURY -	0.002518	ug/l	0.00125		BCWQG Approved
5/25/2016	E258175	CM_MC1	MERCURY -	0.0015425	ug/l	0.00125		BCWQG Approved
5/25/2016	0200209	CM_CC1	COBALT	12.52	ug/l	4		BCWQG Approved

5/30/2016	E261958	LC WLC	URANIUM	9.52333	ug/l	8.5		BCWQG Working
5/31/2016	E288273	LC DC3	MERCURY -	0.001992	ug/l	0.00125		BCWQG Approved
5/31/2016	E294312	RG ELKORES	MERCURY -	0.00135333	ug/l	0.00125		BCWQG Approved
6/1/2016	0200393	EV ER1	MERCURY -	0.001456	ug/l	0.00125		BCWQG Approved
6/1/2016	E300091	EV MC2	MERCURY -	0.002262	ug/l	0.00125		BCWQG Approved
6/1/2016	E258175	CM MC1	MERCURY -	0.001444	ug/l	0.00125		BCWQG Approved
6/1/2016	0200209	CM CC1	COBALT	15.56	ug/l	4		BCWQG Approved
6/1/2016	0200203	EV MC3	MERCURY -	0.002354	ug/l	0.00125		BCWQG Approved
6/6/2016	E298591	EV FC1	MERCURY -	0.00149	ug/l	0.00125		BCWQG Approved
6/6/2016	E298592	EV BLM2	MERCURY -	0.00136	ug/l	0.00125		BCWQG Approved
6/6/2016	E261958	LC WLC	URANIUM	8.995	ug/l	8.5		BCWQG Working
6/7/2016	E102714	GH TC1	DISSOLVED	7.65	mg/l		8	BCWQG Approved
6/7/2016	E305878	GH ERSC4	MERCURY -	0.0023	ug/l	0.00125		BCWQG Approved
6/7/2016	E102714	GH TC1	TEMPERATURE	20	deg c	15		BCWQG Approved Max
6/7/2016	E305876	GH ER1A	MERCURY -	0.00226	ug/l	0.00125		BCWQG Approved
6/7/2016	E294312	RG ELKORES	MERCURY -	0.00171	ug/l	0.00125		BCWQG Approved
6/7/2016	E300230	RG DSELK	TEMPERATURE	15.7	deg c	15		BCWQG Approved Max
6/7/2016	0200203	EV MC3	MERCURY -	0.002104	ug/l	0.00125		BCWQG Approved
6/7/2016	E287432	GH COUGAR	MERCURY -	0.00134	ug/l	0.00125		BCWQG Approved
6/7/2016	E298594	EV SPR2	DISSOLVED	7.72	mg/l		8	BCWQG Approved
6/7/2016	E288273	LC DC3	MERCURY -	0.00215	ug/l	0.00125		BCWQG Approved
6/7/2016	E305875	GH NNC	MERCURY -	0.00166	ug/l	0.00125		BCWQG Approved
6/8/2016	0200393	EV ER1	MERCURY -	0.001288	ug/l	0.00125		BCWQG Approved
6/8/2016	E300091	EV MC2	MERCURY -	0.001822	ug/l	0.00125		BCWQG Approved
6/8/2016	0200209	CM CC1	COBALT	16.58	ug/l	4		BCWQG Approved
6/8/2016	0200209	CM CC1	NITRITE	0.0452	mg/l	0.04		BCWQG Approved
6/13/2016	E261958	LC WLC	URANIUM	9.222	ug/l	8.5		BCWQG Working
6/14/2016	E288273	LC DC3	MERCURY -	0.002032	ug/l	0.00125		BCWQG Approved
6/14/2016	E294312	RG ELKORES	MERCURY -	0.00269	ug/l	0.00125		BCWQG Approved
6/15/2016	E300091	EV MC2	MERCURY -	0.001494	ug/l	0.00125		BCWQG Approved
6/15/2016	0200203	EV MC3	MERCURY -	0.001748	ug/l	0.00125		BCWQG Approved
6/15/2016	0200209	CM CC1	COBALT	18.24	ug/l	4		BCWQG Approved
6/15/2016	0200209	CM CC1	NITRITE	0.04996	mg/l	0.04		BCWQG Approved
6/16/2016	E300230	RG DSELK	MERCURY -	0.00463909	ug/l	0.00125		BCWQG Approved
6/16/2016	E300230	RG DSELK	TEMPERATURE	15.6	deg c	15		BCWQG Approved Max
6/20/2016	E261958	LC WLC	URANIUM	9.362	ug/l	8.5		BCWQG Working
6/21/2016	E288273	LC DC3	MERCURY -	0.002024	ug/l	0.00125		BCWQG Approved
6/21/2016	E294312	RG ELKORES	MERCURY -	0.002584	ug/l	0.00125		BCWQG Approved
6/21/2016	E300230	RG DSELK	MERCURY -	0.00377071	ug/l	0.00125		BCWQG Approved
6/21/2016	E300230	RG DSELK	TEMPERATURE	15.5	deg c	15		BCWQG Approved Max
6/22/2016	0200203	EV MC3	MERCURY -	0.001456	ug/l	0.00125		BCWQG Approved
6/22/2016	0200209	CM CC1	COBALT	19.26	ug/l	4		BCWQG Approved
6/27/2016	E261958	LC WLC	URANIUM	9.714	ug/l	8.5		BCWQG Working
6/28/2016	E288273	LC DC3	MERCURY -	0.00192	ug/l	0.00125		BCWQG Approved
6/28/2016	E294312	RG ELKORES	MERCURY -	0.002286	ug/l	0.00125		BCWQG Approved
6/28/2016	E300230	RG DSELK	MERCURY -	0.00345	ug/l	0.00125		BCWQG Approved
6/28/2016	E300230	RG DSELK	TEMPERATURE	15.7	deg c	15		BCWQG Approved Max
6/29/2016	0200209	CM CC1	COBALT	22.94	ug/l	4		BCWQG Approved
6/29/2016	0200209	CM CC1	NITRITE	0.0904	mg/l	0.04		BCWQG Approved
6/29/2016	E258937	CM MC2	COBALT	4.574	ug/l	4		BCWQG Approved
6/29/2016	E258937	CM MC2	NITRITE	0.0318	mg/l	0.02		BCWQG Approved
7/4/2016	E261958	LC WLC	URANIUM	10.46	ug/l	8.5		BCWQG Working
7/5/2016	E294312	RG ELKORES	MERCURY -	0.002178	ug/l	0.00125		BCWQG Approved
7/5/2016	E305875	GH NNC	MERCURY -	0.00145	ug/l	0.00125		BCWQG Approved
7/5/2016	E300230	RG DSELK	MERCURY -	0.003378	ug/l	0.00125		BCWQG Approved
7/5/2016	E300230	RG DSELK	TEMPERATURE	16.3	deg c	15		BCWQG Approved Max
7/5/2016	E288273	LC DC3	MERCURY -	0.001438	ug/l	0.00125		BCWQG Approved
7/6/2016	E305876	GH ER1A	MERCURY -	0.00142	ug/l	0.00125		BCWQG Approved
7/6/2016	E305878	GH ERSC4	MERCURY -	0.001455	ug/l	0.00125		BCWQG Approved
7/6/2016	E102714	GH TC1	TEMPERATURE	16.7	deg c	15		BCWQG Approved Max
7/6/2016	0200209	CM CC1	COBALT	24.7	ug/l	4		BCWQG Approved
7/6/2016	0200209	CM CC1	NITRITE	0.0695	mg/l	0.04		BCWQG Approved
7/6/2016	E258937	CM MC2	COBALT	5.24	ug/l	4		BCWQG Approved
7/11/2016	E298592	EV BLM2	MERCURY -	0.00137	ug/l	0.00125		BCWQG Approved
7/11/2016	E261958	LC WLC	URANIUM	11.38	ug/l	8.5		BCWQG Working
7/12/2016	E298594	EV SPR2	DISSOLVED	7.66	mg/l		8	BCWQG Approved
7/12/2016	E294312	RG ELKORES	MERCURY -	0.001722	ug/l	0.00125		BCWQG Approved
7/12/2016	E300230	RG DSELK	MERCURY -	0.00332	ug/l	0.00125		BCWQG Approved
7/12/2016	E300230	RG DSELK	TEMPERATURE	15.2	deg c	15		BCWQG Approved Max
7/13/2016	0200209	CM CC1	COBALT	26.14	ug/l	4		BCWQG Approved
7/13/2016	0200209	CM CC1	NITRITE	0.074	mg/l	0.04		BCWQG Approved
7/13/2016	E258937	CM MC2	COBALT	6.13	ug/l	4		BCWQG Approved
7/13/2016	E258937	CM MC2	NITRITE	0.025525	mg/l	0.02		BCWQG Approved
7/18/2016	E261958	LC WLC	URANIUM	12.04	ug/l	8.5		BCWQG Working
7/20/2016	0200209	CM CC1	COBALT	26.28	ug/l	4		BCWQG Approved
7/20/2016	0200209	CM CC1	NITRITE	0.0845	mg/l	0.06		BCWQG Approved
7/20/2016	E258937	CM MC2	COBALT	6.228	ug/l	4		BCWQG Approved
7/20/2016	E258937	CM MC2	NITRITE	0.0325	mg/l	0.02		BCWQG Approved
7/25/2016	E261958	LC WLC	URANIUM	12.74	ug/l	8.5		BCWQG Working
7/27/2016	0200209	CM CC1	COBALT	23.92	ug/l	4		BCWQG Approved
7/27/2016	0200209	CM CC1	NITRITE	0.0845	mg/l	0.04		BCWQG Approved
7/27/2016	E258937	CM MC2	COBALT	5.67	ug/l	4		BCWQG Approved
7/27/2016	E258937	CM MC2	NITRITE	0.031875	mg/l	0.02		BCWQG Approved

8/1/2016	E261958	LC_WLC	URANIUM	13.6	ug/l	8.5		BCWQG Working
8/2/2016	E300230	RG_DSELK	TEMPERATURE	16.5	deg c	15		BCWQG Approved Max
8/3/2016	0200209	CM_CC1	COBALT	18.894	ug/l	4		BCWQG Approved
8/3/2016	0200209	CM_CC1	NITRITE	0.0722	mg/l	0.06		BCWQG Approved
8/3/2016	E258937	CM_MC2	COBALT	4.678	ug/l	4		BCWQG Approved
8/3/2016	E258937	CM_MC2	NITRITE	0.0265	mg/l	0.02		BCWQG Approved
8/8/2016	E261958	LC_WLC	URANIUM	14.24	ug/l	8.5		BCWQG Working
8/9/2016	E298592	EV_BLM2	MERCURY -	0.0013	ug/l	0.00125		BCWQG Approved
8/9/2016	E305875	GH_NNC	DISSOLVED	7.44	mg/l		8	BCWQG Approved
8/9/2016	E102714	GH_TC1	DISSOLVED	7.47	mg/l		8	BCWQG Approved
8/9/2016	E102714	GH_TC1	TEMPERATURE	17.6	deg c	15		BCWQG Approved Max
8/10/2016	E298594	EV_SPR2	DISSOLVED	7.37	mg/l		8	BCWQG Approved
8/15/2016	E261958	LC_WLC	URANIUM	14.74	ug/l	8.5		BCWQG Working
8/22/2016	E261958	LC_WLC	URANIUM	15.48	ug/l	8.5		BCWQG Working
8/29/2016	E261958	LC_WLC	URANIUM	16.1	ug/l	8.5		BCWQG Working
9/5/2016	E261958	LC_WLC	URANIUM	16.6	ug/l	8.5		BCWQG Working
9/7/2016	E300230	RG_DSELK	TEMPERATURE	18.2	deg c	15		BCWQG Approved Max
9/12/2016	E298591	EV_FC1	MERCURY -	0.00152	ug/l	0.00125		BCWQG Approved
9/12/2016	E298592	EV_BLM2	MERCURY -	0.0023	ug/l	0.00125		BCWQG Approved
9/12/2016	E261958	LC_WLC	URANIUM	18.8	ug/l	8.5		BCWQG Working
9/13/2016	E305875	GH_NNC	DISSOLVED	7.7	mg/l		8	BCWQG Approved
9/19/2016	E261958	LC_WLC	URANIUM	17.65	ug/l	8.5		BCWQG Working
9/26/2016	E261958	LC_WLC	URANIUM	18.05	ug/l	8.5		BCWQG Working
10/3/2016	E298591	EV_FC1	MERCURY -	0.00269	ug/l	0.00125		BCWQG Approved
10/3/2016	E298592	EV_BLM2	MERCURY -	0.002085	ug/l	0.00125		BCWQG Approved
10/3/2016	E261958	LC_WLC	URANIUM	18.825	ug/l	8.5		BCWQG Working
10/10/2016	E261958	LC_WLC	URANIUM	19.525	ug/l	8.5		BCWQG Working
10/11/2016	E294312	RG_ELKORES	pH, Field	6.3	ph units	9	6.5	BCWQG Approved Max
10/17/2016	E261958	LC_WLC	URANIUM	19.54	ug/l	8.5		BCWQG Working
10/17/2016	E300091	EV_MC2	MERCURY -	0.00148	ug/l	0.00125		BCWQG Approved
10/17/2016	0200209	CM_CC1	NITRITE	0.0657	mg/l	0.06		BCWQG Approved
10/24/2016	E261958	LC_WLC	URANIUM	19.26	ug/l	8.5		BCWQG Working
10/25/2016	E300091	EV_MC2	MERCURY -	0.00126	ug/l	0.00125		BCWQG Approved
10/31/2016	E261958	LC_WLC	URANIUM	19.3	ug/l	8.5		BCWQG Working
11/1/2016	E294312	RG_ELKORES	MERCURY -	0.00164	ug/l	0.00125		BCWQG Approved
11/1/2016	E300091	EV_MC2	MERCURY -	0.00135	ug/l	0.00125		BCWQG Approved
11/7/2016	E298592	EV_BLM2	MERCURY -	0.00148	ug/l	0.00125		BCWQG Approved
11/7/2016	E298591	EV_FC1	MERCURY -	0.00146	ug/l	0.00125		BCWQG Approved
11/7/2016	E261958	LC_WLC	URANIUM	18.84	ug/l	8.5		BCWQG Working
11/7/2016	0200209	CM_CC1	COBALT	4.01	ug/l	4		BCWQG Approved
11/8/2016	E300091	EV_MC2	MERCURY -	0.001505	ug/l	0.00125		BCWQG Approved
11/8/2016	E288273	LC_DC3	MERCURY -	0.00263	ug/l	0.00125		BCWQG Approved
11/9/2016	0200203	EV_MC3	MERCURY -	0.0013	ug/l	0.00125		BCWQG Approved
11/9/2016	0200209	CM_CC1	COBALT	4.172	ug/l	4		BCWQG Approved
11/9/2016	E305878	GH_ERSC4	DISSOLVED	6.73	mg/l		8	BCWQG Approved
11/14/2016	E261958	LC_WLC	URANIUM	18.5	ug/l	8.5		BCWQG Working
11/15/2016	0200209	CM_CC1	COBALT	5.34333	ug/l	4		BCWQG Approved
11/15/2016	E300091	EV_MC2	MERCURY -	0.001576	ug/l	0.00125		BCWQG Approved
11/16/2016	0200203	EV_MC3	MERCURY -	0.001665	ug/l	0.00125		BCWQG Approved
11/16/2016	E298594	EV_SPR2	DISSOLVED	7.32	mg/l		8	BCWQG Approved
11/17/2016	0200209	CM_CC1	COBALT	6.25333	ug/l	4		BCWQG Approved
11/17/2016	0200209	CM_CC1	NITRITE	0.0444833	mg/l	0.04		BCWQG Approved
11/23/2016	0200209	CM_CC1	COBALT	6.69429	ug/l	4		BCWQG Approved
11/23/2016	0200209	CM_CC1	NITRITE	0.0442857	mg/l	0.04		BCWQG Approved
11/30/2016	0200209	CM_CC1	COBALT	7.12	ug/l	4		BCWQG Approved
11/30/2016	0200209	CM_CC1	NITRITE	0.044175	mg/l	0.04		BCWQG Approved
12/5/2016	E261958	LC_WLC	URANIUM	19.0667	ug/l	8.5		BCWQG Working
12/6/2016	E288273	LC_DC3	MERCURY -	0.00225	ug/l	0.00125		BCWQG Approved
12/6/2016	E298592	EV_BLM2	MERCURY -	0.001715	ug/l	0.00125		BCWQG Approved
12/6/2016	200203	EV_MC3	MERCURY -	0.00127667	ug/l	0.00125		BCWQG Approved
12/7/2016	0200209	CM_CC1	COBALT	8.03143	ug/l	4		BCWQG Approved
12/7/2016	0200209	CM_CC1	NITRITE	0.0479429	mg/l	0.04		BCWQG Approved
12/13/2016	0200209	CM_CC1	COBALT	9.94833	ug/l	4		BCWQG Approved
12/13/2016	0200209	CM_CC1	NITRITE	0.062	mg/l	0.04		BCWQG Approved
12/21/2016	0200209	CM_CC1	COBALT	10.498	ug/l	4		BCWQG Approved
12/21/2016	0200209	CM_CC1	NITRITE	0.04695	mg/l	0.04		BCWQG Approved
4/16/2016	0200209	CM_CC1	BERYLLIUM	< 0.50	ug/l		0.13	BCWQG Working
4/17/2016	0200209	CM_CC1	BERYLLIUM	< 0.50	ug/l		0.13	BCWQG Working
4/18/2016	0200209	CM_CC1	BERYLLIUM	< 0.50	ug/l		0.13	BCWQG Working
4/16/2016	E300091	CM_MC2	BERYLLIUM	< 0.50	ug/l		0.13	BCWQG Working
4/17/2016	E300091	CM_MC2	BERYLLIUM	< 0.50	ug/l		0.13	BCWQG Working
4/18/2016	E300091	CM_MC2	BERYLLIUM	< 0.50	ug/l		0.13	BCWQG Working
2/15/2016	0200337	LC_LC3	BERYLLIUM	< 0.50	ug/l		0.13	BCWQG Working
3/21/2016	0200337	LC_LC3	BERYLLIUM	< 0.50	ug/l		0.13	BCWQG Working
2/16/2016	E297110	LC_LCDSSLCC	BERYLLIUM	< 0.50	ug/l		0.13	BCWQG Working
3/31/2016	E297110	LC_LCDSSLCC	BERYLLIUM	< 0.50	ug/l		0.13	BCWQG Working
2/15/2016	E293369	LC_LCUSWLC	BERYLLIUM	< 0.50	ug/l		0.13	BCWQG Working
3/14/2016	E293369	LC_LCUSWLC	BERYLLIUM	< 0.50	ug/l		0.13	BCWQG Working
3/21/2016	E293369	LC_LCUSWLC	BERYLLIUM	< 0.50	ug/l		0.13	BCWQG Working
2/15/2016	E282149	LC_SLC	BERYLLIUM	< 0.50	ug/l		0.13	BCWQG Working
3/14/2016	E282149	LC_SLC	BERYLLIUM	< 0.50	ug/l		0.13	BCWQG Working
3/21/2016	E282149	LC_SLC	BERYLLIUM	< 0.50	ug/l		0.13	BCWQG Working
1/11/2016	E261958	LC_WLC	BERYLLIUM	< 0.50	ug/l		0.13	BCWQG Working

1/18/2016	E261958	LC_WLC	BERYLLIUM	< 0.50	ug/l	0.13	BCWQG Working
1/25/2016	E261958	LC_WLC	BERYLLIUM	< 0.50	ug/l	0.13	BCWQG Working
2/8/2016	E261958	LC_WLC	BERYLLIUM	< 0.50	ug/l	0.13	BCWQG Working
2/15/2016	E261958	LC_WLC	BERYLLIUM	< 0.50	ug/l	0.13	BCWQG Working
2/22/2016	E261958	LC_WLC	BERYLLIUM	< 0.50	ug/l	0.13	BCWQG Working
2/29/2016	E261958	LC_WLC	BERYLLIUM	< 0.50	ug/l	0.13	BCWQG Working
3/14/2016	E261958	LC_WLC	BERYLLIUM	< 0.50	ug/l	0.13	BCWQG Working
3/21/2016	E261958	LC_WLC	BERYLLIUM	< 0.50	ug/l	0.13	BCWQG Working
3/28/2016	E293369	LC_LCUSWLC	BERYLLIUM	< 1.0	ug/l	0.13	BCWQG Working
3/28/2016	E282149	LC_SLC	BERYLLIUM	< 1.0	ug/l	0.13	BCWQG Working
3/28/2016	E261958	LC_WLC	BERYLLIUM	< 1.0	ug/l	0.13	BCWQG Working

Appendix F – Surface Water Monitoring Program: Acute Toxicity Test Results (includes Biological Tests Reports)

	96-h rainbow trout 100% Single Concentration Acute Toxicity	48-h Daphnia magna Single Concentration Acute Toxicity (20°C)	48-h Daphnia magna Single Concentration Acute Toxicity (10°C)	48-h Daphnia Magna LC50 Toxicity	48-h Daphnia Magna LC50 Toxicity
Location/Date	% Mortality	% Mortality	% Mortality	% Mortality	%v/v
0200209 (CM_CC1)					
11/15/2016	0	0			
11/23/2016	20	0			
11/30/2016	0	0			
12/21/2016	0	0			
E206438 (CM_CCPD)					
2/3/2016	0	46.7			
2/23/2016		0	0		
6/1/2016	0	0			
8/3/2016	0	0			
11/2/2016	0	3			
11/15/2016	0	0			
11/30/2016	0	0			
E298733 (CM_PC2)					
6/1/2016	0	0			
11/2/2016	20	0			
E102488 (CM_SPD)					
2/3/2016	0	13.3			
6/1/2016	0	0			
8/3/2016	0	0			
11/2/2016	0	0			
11/15/2016	0	0			
11/23/2016	30	0			
11/30/2016	0	0			
12/21/2016	10	0			
E210369 (EV_AQ1)					
3/7/2016	0	0			
6/7/2016	0	0			
7/12/2016	0	0			
10/17/2016	0	0			
E102685 (EV_BC1)					
2/2/2016	0	0			
6/8/2016	0	0			
7/13/2016	0	0			
8/8/2016	0	0			
E298590 (EV_DC1)					
2/2/2016	0	100			
2/15/2016	0	0		0	
6/6/2016	0	0			
7/11/2016	0	0			
10/3/2016	0	0			
0200097 (EV_EC1)					
2/2/2016	0	0			
6/7/2016	0	0			
7/12/2016	0	0			
10/4/2016	0	0			
E208043 (EV_GC2)					
2/2/2016	0	0			
6/8/2016	0	0			
7/13/2016	0	0			
10/3/2016	0	3			
E206231 (EV_GT1)					
2/2/2016	0	0			
6/8/2016	0	0			
7/13/2016	0	0			
10/4/2016	10	0			
E258135 (EV_LC1)					
2/2/2016	0	0			
9/26/2016	10	0			
10/3/2016	0	0			
E208057 (EV_MG1)					
2/2/2016	0	0			
6/7/2016	0	0			
7/12/2016	0	0			
10/4/2016	0	0			
E102679 (EV_OC1)					
2/2/2016	0	0			
6/6/2016	0	0			
7/11/2016	0	0			
10/3/2016	0	0			

	96-h rainbow trout 100% Single Concentration Acute Toxicity	48-h Daphnia magna Single Concentration Acute Toxicity (20°C)	48-h Daphnia magna Single Concentration Acute Toxicity (10°C)	48-h Daphnia Magna LC50 Toxicity	48-h Daphnia Magna LC50 Toxicity
Location/Date	% Mortality	% Mortality	% Mortality	% Mortality	%v/v
E102681 (EV_SM1)					
2/2/2016	0	0			
6/6/2016	0	0			
7/11/2016	0	0			
10/3/2016	0	0			
E296311 (EV_SP1)					
2/2/2016	0	0			
6/7/2016	0	3.3			
7/12/2016	0	0			
10/4/2016	0	0			
E102481 (FR_CC1)					
2/3/2016	0	3.3			
5/10/2016	0	0			
8/3/2016	0	0			
10/5/2016	0	0			
E102480 (FR_EC1)					
3/15/2016	0	0			
5/10/2016	0	0			
8/2/2016	0	0			
E261897 (FR_SP1)					
2/4/2016	0	63	0		
2/11/2016					77.1
5/10/2016	0	0	0		
8/3/2016	0	13.3	0		
11/15/2016	0	37	3		
0200384 (GH_CC1)					
2/3/2016	0	100	40		
2/10/2016					66
5/10/2016	0	100	0		
5/27/2016		10			
8/2/2016	0	100	53.3		82
8/8/2016			20		77.1
11/15/2016	0	100	10		
11/21/2016					89.1
E287432 (GH_COUGAR)					
6/7/2016	0	0			
E102709 (GH_GH1)					
3/7/2016	0	3.3			
6/6/2016	0	0			
8/8/2016	0	0			
12/5/2016	0	0			
E257796 (GH_LC1)					
8/15/2016	0	0			
0200388 (GH_MC1)					
3/8/2016	0	0			
6/7/2016	0	0			
0200385 (GH_PC1)					
2/3/2016	0	0			
5/10/2016	0	0			
8/2/2016	0	0			
11/15/2016	0	17			
E221329 (GH_SC1)					
5/10/2016	0	0	0		
8/2/2016	0	0	23.3		
11/15/2016	0	0			
E102714 (GH_TC1)					
3/8/2016	0	0			
6/7/2016	0	0			
8/9/2016	0	13.3			
12/7/2016	0	0			
E207436 (GH_TC2)					
3/8/2016	0	0			
6/7/2016	0	0			
8/9/2016	0	3.3			
12/7/2016	0	0			
E287433 (GH_WADE)					
3/8/2016	0	0			
6/7/2016	0	0			
8/15/2016	0	0			
E257795 (GH_WC1)					

	96-h rainbow trout 100% Single Concentration Acute Toxicity	48-h Daphnia magna Single Concentration Acute Toxicity (20°C)	48-h Daphnia magna Single Concentration Acute Toxicity (10°C)	48-h Daphnia Magna LC50 Toxicity	48-h Daphnia Magna LC50 Toxicity
Location/Date	% Mortality	% Mortality	% Mortality	% Mortality	%v/v
6/7/2016	0	0			
8/9/2016	0	0			
12/7/2016	0	0			
200028 (LC LC5)					
11/15/2016	0	0			
12/19/2016	0	0			
E216144 (LC LC7)					
3/7/2016	0	6.7			
5/2/2016	0	0			
12/5/2016	10	0			
E293369 (LC_LCDSSLCC)					
10/31/2016	0	0	0		
11/15/2016	0	0			
12/19/2016	0	0			
E291569 (LC_WTF_OUT)					
1/4/2016	0	0			
1/11/2016	0	0			
1/18/2016	0	0			
1/26/2016	0				
1/26/2016		0			
2/2/2016	0	0			
2/8/2016	0	0			
2/16/2016	0			0	
2/22/2016	0	0			
2/29/2016	0	0			
3/7/2016	0				
3/14/2016	0	0			
3/21/2016	0	0			
3/28/2016	0	80			0
3/31/2016		10	3.3		
3/31/2016	10	20			
4/4/2016	0	13	3		
4/11/2016	0	3	0		
4/18/2016	0	3	0		
4/25/2016	0	10	0		
5/2/2016	0	0	0		
E291569 (WL_BFWB_OUT_SP21)					
5/9/2016	0	27	7		
5/16/2016	0	47	50		
5/19/2016			0		
5/25/2016		0			
5/25/2016	0	0	0		
5/30/2016		0			
5/30/2016	0	0	0		
6/6/2016		0			
6/6/2016	0	0	0		
6/8/2016		20			
6/13/2016		0			
6/13/2016	0	0	0		
6/20/2016		0			
6/20/2016	0	0	0		
6/27/2016		0			
6/27/2016	0	10	0		
7/4/2016		6.67			
7/4/2016	0	0	0		
7/11/2016		0			
7/11/2016	0	0	0		
7/18/2016		0			
7/18/2016	0	0	0		
7/25/2016		0			
7/25/2016	0				
7/25/2016	20	0	0		
8/1/2016		0			
8/1/2016	0	0	0		
8/8/2016		0			
8/8/2016	0	0	0		
8/15/2016		0			
8/15/2016	0	90	0		82
8/18/2016		0			
8/18/2016	0	0	0		

	96-h rainbow trout 100% Single Concentration Acute Toxicity	48-h Daphnia magna Single Concentration Acute Toxicity (20°C)	48-h Daphnia magna Single Concentration Acute Toxicity (10°C)	48-h Daphnia Magna LC50 Toxicity	48-h Daphnia Magna LC50 Toxicity
Location/Date	% Mortality	% Mortality	% Mortality	% Mortality	%v/v
8/19/2016		0			
8/19/2016	0	0	0		
8/22/2016	0	43	0		
8/22/2016		0			
8/29/2016		0			
8/29/2016	0	17	3		
9/6/2016		0			
9/6/2016	10	23	0		
9/12/2016		26			
9/12/2016	20	17	3		
9/17/2016	0	0	0		
9/19/2016		0			
9/19/2016	0	0	0		
9/26/2016		0			
9/26/2016	0	0	0		
10/3/2016		0			
10/3/2016	0	7	0		
10/11/2016		0			
10/11/2016	0	10	0		
10/17/2016		0			
10/17/2016	0	0	0		
10/24/2016		0			
10/24/2016	0	0	0		
10/31/2016		0			
10/31/2016	0	0	0		
11/7/2016		0			
11/7/2016	0	0	0		
11/14/2016		0			
11/14/2016	0	0	0		
11/21/2016		0			
11/21/2016	0	0	0		
11/28/2016		0			
11/28/2016	0	0	0		
12/5/2016		0			
12/5/2016	0	0	0		
12/12/2016		0			
12/12/2016	0	0	0		
12/19/2016		0			
12/19/2016	0	0	0		
12/27/2016		0			
12/27/2016	0	0	0		



Teck Coal / Fording River
ATTN: Lee Wilm
P.O. Box 100
Elkford, BC
VOB 1H0

Report Date: February 18, 2016
Work Order: 16157 - 16158

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. with 2007 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000)

Table 1. Results for the 96-h rainbow trout acute toxicity test.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
FR_SP1_Q_04012016_N	February 4, 2016 @ 1310h	0

Table 2. Results for the 48-h *Daphnia magna* acute toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
FR_SP1_Q_04012016_N [tested at 20°C]	February 4, 2016 @ 1310h	63.3
FR_SP1_Q_04012016_N [tested at 10°C]	February 4, 2016 @ 1310h	0

The standard tests met all control performance criteria and no deviations from protocols were observed.

As requested by client, an additional *D. magna* test was also conducted concurrently on the sample, but at a different exposure temperature of 10°C. The results of this latter test showed improvement in *Daphnia* survival after 48-h exposure (Table 2), and also met control performance passing criterion as the standard test. The results presented in this report relate only to the sample tested.



Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck-Fording River Operation Start Date/Time: Feb 7/16 @ 1040h

Work Order No.: 16158 Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: FR-SPI-Q-04012016-N
Sample Date: Feb 4/16
Date Received: Feb 6/16
Sample Volume: 1x20L
Other: -

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 6

Test Organism Information:

Batch No.: 122915
Source: Aqua Farms
No. Fish/Volume (L): 10/15L
Loading Density (g/L): 0.372
Mean Length ± SD (mm): 30 ± 3 Range: 24 - 34
Mean Weight ± SD (g): 0.47 ± 0.10 Range: 0.30 - 0.63

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn33
Stock Solution ID: 15Zn05
Date Initiated: Jan 20/16
96-h LC50 (95% CL): 80.5 (59.8 - 109.5) mg/L Zn
Reference Toxicant Mean and Historical Range: 71.0 (33.9 - 148.4) mg/L Zn
Reference Toxicant CV (%): 44.6%

Test Results: 100% survival at 96 hours in the 100% (v/v) undiluted sample
0% mortality at 96 hours in the 100% (v/v) undiluted sample

Reviewed by: [Signature] Date reviewed: Feb. 17, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck - Fording River Operation
 Sample I.D. FR-SPI-Q-04012016-N
 W.O. # 16158
 RBT Batch #: 122915
 Date Collected/Time: Feb 4 / 16 @ 1310h
 Date Setup/Time: Feb 7 / 16 @ 1040h
 Sample Setup By: As

Number Fish/Volume: 10/15L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Yes

D.O. meter: DO-2
 pH meter: pH-1
 Cond. Meter: X-1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
pH	7.4	/	7.5
D.O. (mg/L)	10.1	/	10.0
Cond. (µS/cm)	1526	/	1527

Concentration (% v/v)	# Survivors							Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
Control				10	10	10	10	14.0	14.0	14.5	14.5	14.0	10.1	9.8	9.8	9.8	10.1	6.7	6.8	6.8	6.6	6.7	25	27
100				10	10	10	10	14.0	14.0	14.5	14.5	14.0	10.0	9.8	9.9	9.9	9.9	7.5	8.0	8.0	8.1	8.1	1527	1297
Initials				EMM	EC	EC	EL	EMM	EL	EL	EL	EMM	EL	EL	EL	EL	EMM	EL	EL	EL	EL	EMM	EL	EL

WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Sample Description/Comments: ^{slight white colour} no color ~~colorless~~, Opaque, Odourless, ppt present

Fish Description at 96 h OK Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: [Signature]

Date Reviewed: Feb 17, 2016

Daphnia magna Summary Sheet

Client: Teck - FRO
Work Order No.: 16157

Start Date/Time: February 9, 2016 @ 1100h
Test Species: Daphnia magna
Set up by: EMM

Sample Information:

Sample ID: FR_SPI-Q_04012016-N
Sample Date: February 4, 2016
Date Received: February 6, 2016
Sample Volume: 1 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 012016A+B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 18
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC27
Stock Solution ID: ISNa03
Date Initiated: February 1, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 63.3% mortality at 48h in the 100% (v/v) undiluted sample, tested at 20°C

Reviewed by: [Signature]

Date reviewed: Feb 17, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: FR-SP1-a (20°C)
 Work Order No.: 16157 04012016-N

Start Date/Time: Feb 9/16 @ 1100h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: EMM

Thermometer: temp-5 DO meter: DO-213 pH meter: pH=113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	No. Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	18.0	19.5	19.0	8.9	8.6	8.6	7.8	7.7	7.6	349	356
	B	10	10	0											
	C	10	10	0											
	D	µL													
100 (20°C)	A	6 ⁰	5 ⁰	1	20.0	19.5	19.0	9.0	8.7	8.8	7.6	7.6	7.7	1503	1352
	B	7 ⁰	4 ⁰	0											
	C	7 ⁰	2 ⁰	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		MML		YML	EMM	MML	MML	MML	MML	MML	MML	MML	MML	MML	MML

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO ₃)	
Control (MHW)	98	72
Highest conc.	1020	498
Hardness adjusted	—	

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		/
DO (mg/L)	9.0		/
pH	7.6		/
Cond (µS/cm)	1503		/

Comments: ① debris on bodies, white film on surface Mortality: Heartbeat checked under microscope yes

Sample Description: faint white colour, slightly opaque, no odour, slight particulates

Batch#: 012016A+B 7-d previous # young/brood: 118 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: EMM Date reviewed: Feb. 17, 2016

Daphnia magna Summary Sheet

Client: Teck - FRO
Work Order No.: 16157

Start Date/Time: February 9, 2016 @ 1100h
Test Species: Daphnia magna
Set up by: EMM

Sample Information:

Sample ID: FR_SPLA_04012016_N
Sample Date: February 4, 2016
Date Received: February 6, 2016
Sample Volume: 1x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 012016 A + B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 18
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC27
Stock Solution ID: ISNa03
Date Initiated: February 1, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample, -tested at 10°C

Reviewed by: 

Date reviewed: Feb 17, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: TECK
 Sample ID: FL-SPI- (10°C)
 Work Order No.: 16157 Q-04012016-N

Start Date/Time: Feb 9/16 @ 11:00h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: EMM

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	10.5	10.5	9.0	10.9	10.8	11.0	7.8	7.7	7.6	350	348
	B	10	10	0											
	C	10	10	0											
	D														
100 (10°C)	A	10	100	0	10.0	10.5	9.0	11.0	10.9	11.1	7.7	7.8	7.8	1510	1458
	B	10	100	0											
	C	10	100	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	EMM	YML	YML	EMM	YML	YML	EMM	YML	YML	EMM	YML

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO3)	
Control (MHW)	96	70
Highest conc.	980	504
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	10.0		
DO (mg/L)	11.0		
pH	7.7		
Cond (µS/cm)	1510		

Comments: debris on bottles, swimming slowly on container bottom Mortality: Heartbeat checked under microscope 1/9

Sample Description: slight white no colour, slightly opaque, no odour, slight particulates

Batch#: 012016 ATB 7-d previous # young/brood: 18 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: EMM Date reviewed: Feb. 17, 2016

COC ID:	20160204-1354	TURNAROUND TIME:		RUSH:		
PROJECT/CLIENT INFO		LABORATORY			OTHER INFO	
Facility Name / Job#	Fording River Operation	Lab Name	Nautilus Environmental			Report Format / Distribution
Project Manager	Lee Wilm	Lab Contact				Excel
Email		Email				PDF
Address	PO Box 100	Address	8664 Commerce Court			EDD
City	Elkford	City	Burnaby	Province	BC	PO number
Postal Code	V0B 1H0	Postal Code	V5A 4N7	Country	Canada	
Phone Number	1-250-865-5289	Phone Number	604-420-8773			

SAMPLE DETAILS								ANALYSIS REQUESTED												
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	48 hr Daphnia Single Conc. Pass/Fail	96 Hr Rainbow Trout Single Conc. Pass/Fail	48 hr Daphnia Single Conc. Pass/Fail @ 10 deg C										
FR_SPI_Q_04012016_N	FR_SPI	WS		2016/02/04	13:10	G	3	1	1	1										

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Sample Description: <i>slightly white, colorless, opaque, Odourless, ppt present.</i>	<i>N. Macdonald</i>	<i>FEB 4 2016</i>		

NO. OF BOTTLES RETURNED/DESCRIPTION	Sampler's Name	Mobile #
Regular (default) <input checked="" type="checkbox"/>	<i>N. Macdonald</i>	<i>250 865 5204</i>
Priority (2-3 business days) - 50% surcharge		
Emergency (1 Business Day) - 100% surcharge		
For Emergency <1 Day, ASAP or Weekend - Contact ALS		

rec'd Feb 6/16 @ 1058L by ASD @ 7.9°C



Teck Coal/ Fording River
 ATTN: Lee Wilm/Neil Macdonald/Aita Bezzola
 P.O. Box 100
 Elkford, BC
 V0B 1H0

Report Date: February 18, 2016
 Work Order: 16159 - 16160

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
 Protocol: EPS 1/RM/13 (Second Ed. with 2007 amendments)

Species: *Daphnia magna*
 Protocol: EPS 1/RM/14 (Second Ed. 2000)

Table 1. Results for the 96-h rainbow trout acute toxicity tests.

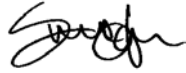
Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
FR_CC1_Q_04012016_N	February 3, 2016 @ 0932h	0
GH_CC1_Q_04012016_N	February 3, 2016 @ 1324h	0

Table 2. Results for the 48-h *Daphnia magna* acute toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
FR_CC1_Q_04012016_N	February 3, 2016 @ 0932h	3.3
GH_CC1_Q_04012016_N [tested at 20°C]	February 3, 2016 @ 1324h	100
GH_CC1_Q_04012016_N [tested at 10°C]	February 3, 2016 @ 1324h	40

The standard tests met all control performance criteria and no deviations from protocols were observed.

As requested by client, an additional *D. magna* test was also conducted concurrently on the sample, but at a different exposure temperature of 10°C. The results of this latter test showed improvement in Daphnia survival after 48-h exposure (Table 2), and also met control passing criterion as the standard test. The results presented in this report relate only to the sample tested.



Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck-Fording River Operation Start Date/Time: Feb 7/16 @ 1025h

Work Order No.: 16159 Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: FR-CCI-Q-04012016-N
Sample Date: Feb 3/16
Date Received: Feb 6/16
Sample Volume: 1 x 20L
Other: ✓

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 6

Test Organism Information:

Batch No.: 122915
Source: Aqua Farms
No. Fish/Volume (L): 10/15L
Loading Density (g/L): 0.40
Mean Length ± SD (mm): 32 ± 3 Range: 26-35
Mean Weight ± SD (g): 0.61 ± 0.15 Range: 0.33-0.80

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn33
Stock Solution ID: 15Zn05
Date Initiated: Jan 20/16
96-h LC50 (95% CL): 80.5 (59.8-109.5) mg/L Zn
Reference Toxicant Mean and Historical Range: 71.0 (33.9-148.4) mg/L Zn
Reference Toxicant CV (%): 44.6%

Test Results: 100% survival at 96 hours in the 100% (v/v) undiluted sample
0% mortality at 96 hours in the 100% (v/v) undiluted sample

Reviewed by: [Signature] Date reviewed: Feb. 18, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck - Fording River Operation
 Sample I.D. FR-221 - Q-0401296-N
 W.O. # 76159
 RBT Batch #: 122915
 Date Collected/Time: Feb 3 /16 @ 0932h
 Date Setup/Time: Feb 7 /16 @ 1025h
 Sample Setup By: As

Number Fish/Volume: 10/15L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Yes

D.O. meter: DO-2
 pH meter: pH-1
 Cond. Meter: K-1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
pH	7.7	/	7.8
D.O. (mg/L)	10.1	/	10.0
Cond. (µS/cm)	1514	/	1516

Concentration (% v/v)	# Survivors						Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)		
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
Control				10	10	10	10	14.0	14.0	14.5	14.5	14.0	10.1	9.7	9.8	9.7	10.1	6.7	6.8	6.8	6.6	6.7	25	30
100				10	10	10	10	14.0	14.0	14.5	14.5	14.0	10.0	9.9	9.9	9.8	9.9	7.8	8.1	8.1	8.1	8.0	1516	1581
Initials				EMM	EC	EC	EC	as	EMM	EC	EC	EC	as	EMM	EC	EC	EC	as	EMM	EC	EC	EC	as	EC

WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Sample Description/Comments: clear, colorless, odorless, ^{some} particulates

Fish Description at 96 h OK Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: [Signature]

Date Reviewed: Feb 18, 2016

Rainbow Trout Summary Sheet

Client: Teck-Fording River Operation Start Date/Time: Feb 7/16 @ 1030h

Work Order No.: 16159 Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-CC1-Q-04012016.N
Sample Date: Feb 3/16
Date Received: Feb 6/16
Sample Volume: 1x20L
Other: -

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 6

Test Organism Information:

Batch No.: 122915
Source: Aqua Farms
No. Fish/Volume (L): 10/15L
Loading Density (g/L): 0.35
Mean Length ± SD (mm): 30 ± 3 Range: 25-34
Mean Weight ± SD (g): 0.52 ± 0.17 Range: 0.33-0.81

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn33
Stock Solution ID: 15Zn05
Date Initiated: Jan 20/16
96-h LC50 (95% CL): 80.5 (59.5^u - 109.5) mg/L Zn
Reference Toxicant Mean and Historical Range: 71.0 (33.9 - 148.4) mg/L Zn
Reference Toxicant CV (%): 44.6%

Test Results: 100% survival at 96 hours in the 100% (v/v) undiluted sample
0% mortality at 96 hours in the 100% (v/v) undiluted sample

Reviewed by: [Signature] Date reviewed: Feb. 18, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck - Fording River Operation
 Sample I.D. GH-CR-Q-04012016-N
 W.O. # 16159
 RBT Batch #: 122915
 Date Collected/Time: Feb 3 / 16 @ 1324h
 Date Setup/Time: Feb 7 / 16 @ 1030h
 Sample Setup By: AS

Number Fish/Volume: 10/15L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Yes

D.O. meter: DO-2
 pH meter: pH-1
 Cond. Meter: X-1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
pH	7.8	/	7.9
D.O. (mg/L)	10.2	/	10.1
Cond. (µS/cm)	3400	/	3410

Concentration (% v/v)	# Survivors						Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)			
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
Control				10	10	10	10	14.0	14.0	14.5	14.5	14.0	10.1	9.8	9.8	9.7	10.1	6.7	6.8	6.8	6.6	6.7	25	26	
100				10	10	10	10	14.0	14.0	14.5	14.5	14.0	10.1	9.9	9.9	9.8	9.9	7.9	7.9	8.0	8.0	7.9	3410	3130	
Initials				FM	EL	EL	EL	FM	EL	EL	EL	FM	EL	EL	EL	FM	EL	EL	EL	FM	EL	EL	EL	FM	EL

WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Sample Description/Comments: colorless slightly gray EL clear, Odourless, Slightly opaque, ppt present

Fish Description at 96 h OK Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: [Signature]

Date Reviewed: Feb 18, 2016

Daphnia magna Summary Sheet

Client: Teck - FRO
Work Order No.: 16160

Start Date/Time: February 8, 2016 @ 0800h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: FR-CC1-Q-04012016-N
Sample Date: February 3, 2016
Date Received: February 6, 2016
Sample Volume: 1 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 012016B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC27
Stock Solution ID: 15Na03
Date Initiated: February 1, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 3.3% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: 

Date reviewed: Feb. 18, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: FR-CC1-Q-04012016-N
 Work Order No.: 16160

Start Date/Time: February 8, 2016 @ 0800h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	18.0	18.5	19.5	8.9	8.8	8.6	7.8	7.7	7.7	353	357
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	18.5	18.5	19.5	9.2	8.9	8.7	7.6	7.6	7.9	1512	1482
	B	10	10	0											
	C	10	9	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO ₃)	
Control (MHW)	98	72
Highest conc.	770	228
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.5		
DO (mg/L)	9.2		
pH	7.6		
Cond (µS/cm)	1512		

Comments: _____ Mortality: Heartbeat checked under microscope yes

Sample Description: clear, no colour, no odour, slight particulates

Batch#: 012016B 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: [Signature] Date reviewed: Feb. 18, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 16160

Start Date/Time: February 8, 2016 @ 0810 h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: GHCCI-Q-04012016-N
Sample Date: February 3, 2016
Date Received: February 6, 2016
Sample Volume: 12 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 012016A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 2.0
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC27
Stock Solution ID: ISNa03
Date Initiated: February 1, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 100% mortality at 48h in the 100% (v/v) undiluted sample, tested at 20°C.

Reviewed by: _____

Date reviewed: _____

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck Start Date/Time: February 9, 2016 @ 08101
 Sample ID: GH-cc1-Q-04012016-N (20°C) No. Organisms/volume: 10/200mL
 Work Order No.: 16160 Test Organism: D.magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		48		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		0	24	48	0		24	48	0	24	48	0	24	48	0	48	
Control	A	10	10			0	18.0	18.5	19.5	8.9	8.7	8.5	7.8	7.8	7.6	353	361
	B	10	10			0											
	C	10	10			0											
	D																
100 (20°C)	A	00	00				18.5	18.5	-	9.1	8.8	-	7.5	7.4	-	3390	-
	B	00	00														
	C	00	00														
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO ₃)	
Control (MHW)	98	72
Highest conc.	2280	482
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.5		/
DO (mg/L)	9.1		/
pH	7.5		/
Cond (µS/cm)	3390		/

Comments: opaque bodies, debris attached to bodies Mortality: Heartbeat checked under microscope YES
 Sample Description: slight grey colour, slightly opaque, no odour, slight particulates
 Batch#: 012016A 7-d previous # young/brood: 20 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10
 Reviewed by: [Signature] Date reviewed: Feb 18, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 16160

Start Date/Time: February 8, 2016 @ 0815h
Test Species: Daphnia magna
Set up by: ML

Sample Information:

Sample ID: GLCC Q-04012016-N
Sample Date: February 3, 2016
Date Received: February 6, 2016
Sample Volume: 1 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 012016A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 20
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC27
Stock Solution ID: 15Na03
Date Initiated: February 1, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 40% mortality at 48h in the 100% (v/v) undiluted sample, tested at 10°C

Reviewed by: [Signature]

Date reviewed: Feb. 18, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: GH-CC1-Q-040(2016)N
 Work Order No.: 16160

Start Date/Time: February 8, 2016 @ 0815 h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		48	No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)		
		0	24	48		0	24	48	0	24	48	0	24	48	0	48	
Control	A	10	10	10	0	10.5	11.0	10.5	10.6	10.8	10.9	7.6	7.7	7.6	365	388	
	B	10	10	10	0												
	C	10	10	10	0												
	D																
100 (10°C)	A	70	50	2	2	10.0	11.0	10.5	10.8	10.6	10.8	7.7	7.6	7.7	3400	3360	
	B	90	50	3	3												
	C	90	80	5	5												
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
Technician Initials		FMM/YML		YML		YML		FMM/YML		YML		FMM/YML		YML		YML	

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO ₃)	
Control (MHW)	96	70
Highest conc.	2560	462
Hardness adjusted	←	

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	10.0		
DO (mg/L)	10.8		
pH	7.7		
Cond (µS/cm)	3400		

Comments: ① organisms at bottom of vessel; Mortality: Heartbeat checked under microscope 95
slow swimming ② some debris on bodies, white film on surface
 Sample Description: slightly gray, slightly opaque, no odour, slight periculates
 Batch#: 012016A 7-d previous # young/brood: 20 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: [Signature] Date reviewed: Feb-18, 2016

COC ID:

20160204-1021

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			
City	Elkford	State	BC	City	Burnaby	State	BC	Shipping Company			
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Tracking Number			
Phone Number	1-250-865-5289			Phone Number	604-420-8773			Cooler Count			
Project Manager				Quote Number				Cooler Description			
Email Address				PO Number				Sampler 2			
								Sampler 3			

SAMPLE DETAILS							ANALYSIS REQUESTED														
Sample ID	Sample Location	Field Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	48 hr Single Concentration - Daphnia m.	96hr Single Concentration - R.Trout	48 hr Single Concentration @ 10 degrees -Daphnia m.												
1) FR_CCI_Q_04012016_N	FR_CCI	WS	2016/02/03	09:32	G	2	1	1													
2) GH_CCI_Q_04012016_N	GH_CCI	WS	2016/02/03	13:24	G	3	1	1	1												
							16/16	WJH 16/159	16/16												

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Sample Description: ① Clear, colorless, odourless, some particulates ② Clear, colorless, slightly opaque, odourless, ppt present. or slightly grey				

NB OF BOTTLES RETURNED/DESCRIPTION	Sampler's Name	Mobile #	Sampler's Signature	Date/Time
	AMACOURD W.	250 865 5204		FEB 3 2016

Rec'd by AW Feb 6/16 @ 1050h



Teck Coal / Fording River
ATTN: Lee Wilm
P.O. Box 100
Elkford, BC
VOB 1H0

Report Date: February 23, 2016
Work Order: 16180

Data Report

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000)

Table 1. Results for the 48-h *Daphnia magna* acute toxicity test.

Sample ID	Collection Date and Time	48-h LC50 [with 95% confidence limits] (v/v%)
GH_CC1-WS-201602101258	February 10, 2016 @ 1258h	66.0 [57.8 - 75.2]

The tests met all control performance criteria and no deviations from protocols were observed. The results presented in this report relate only to the sample tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Daphnia magna Summary Sheet

Client: Toek
Work Order No.: 16180

Start Date/Time: February 12, 2016 @ 1635h
Test Species: Daphnia magna
Set up by: JML/AWD

Sample Information:

Sample ID: GH-CC1-WS-201602101258
Sample Date: February 10, 2016
Date Received: February 12, 2016
Sample Volume: 1 x 20 L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 012016B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC27
Stock Solution ID: ISNa03
Date Initiated: February 1, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results:

The 48h LC50 is estimated to be 66.0% (v/v)
with 95% confidence limits at 57.8% to 75.2% (v/v)

Reviewed by: [Signature]

Date reviewed: Feb 23, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck Start Date/Time: Feb 12/16 @ 1630h
 Sample ID: 011-CC1-WS-201602101258 No. Organisms/volume: 10/200mL
 Work Order No.: 16180 Test Organism: D. magna
 Set up by: TYC/MS
 Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	20.0	18.5	18.5	8.7	8.6	8.7	7.7	7.8	7.8	352	368
	B														
	C														
	D														
6.25	A	10	10	0	20.0	18.5	18.5	8.8	8.7	8.8	7.7	7.8	7.7	668	673
	B														
	C														
	D														
12.5	A	10	10	0	19.5	18.5	18.5	8.9	8.6	8.8	7.7	7.7	7.8	874	857
	B														
	C														
	D														
25	A	10	10	0	19.5	18.5	18.5	9.0	8.6	8.7	7.7	7.7	7.8	1376	1370
	B														
	C														
	D														
50	A	10	9	0	19.0	18.5	18.5	9.1	8.7	8.8	7.6	7.7	7.7	2170	2140
	B														
	C														
	D														
100	A	0 ¹	—	0	18.5	18.5	—	9.2	8.8	—	7.5	7.5	—	3400	—
	B														
	C														
	D														
Technician Initials		A	A	A	VMW	A	A	VMW	A	A	VMW	A	A	VMW	A

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO ₃)	
Control (MHW)	98	70
Highest conc.	3800	504
Hardness adjusted	—	—

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.5		
DO (mg/L)	9.2		
pH	7.5		
Cond (µS/cm)	3400		

Comments: ¹ dead on beaker bottom covered in white ppt Mortality: Heartbeat checked under microscope ye

Sample Description: clean, colorless, no ppt, odorless

Batch#: 012016 B 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: VMW Date reviewed: Feb 23, 2016

CETIS Analytical Report

Report Date: 18 Feb-16 14:30 (p 1 of 2)
 Test Code: 16180 | 14-7204-3519

Daphnia magna 48-h Acute Survival Test

Nautilus Environmental

Analysis ID: 02-5136-6102	Endpoint: 48h Survival Rate	CETIS Version: CETISv1.8.7
Analyzed: 18 Feb-16 14:30	Analysis: Untrimmed Spearman-Kärber	Official Results: Yes
Batch ID: 01-7001-7592	Test Type: Survival (48h)	Analyst: Yvonne Lam
Start Date: 12 Feb-16 16:35	Protocol: EC/EPS 1/RM/14	Diluent: Mod-Hard Synthetic Water
Ending Date: 14 Feb-16 16:30	Species: Daphnia magna	Brine:
Duration: 48h	Source: In-House Culture	Age:
Sample ID: 06-5181-5060	Code: 26D9E894	Client: Teck Coal
Sample Date: 10 Feb-16 12:58	Material: Effluent	Project:
Receive Date: 12 Feb-16 14:10	Source: Teck Coal (TECK COAL)	
Sample Age: 52h (6.6 °C)	Station: GH_CC1-WS-201602101258	

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0	0.00%	1.819	0.02856	65.98	57.84	75.25

48h 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	1	1	1	1	0	0	0.0%	0.0%	10	10
6.25		1	1	1	1	0	0	0.0%	0.0%	10	10
12.5		1	1	1	1	0	0	0.0%	0.0%	10	10
25		1	1	1	1	0	0	0.0%	0.0%	10	10
50		1	0.9	0.9	0.9	0	0	0.0%	10.0%	9	10
100		1	0	0	0	0	0		100.0%	0	10

48h Survival Rate Detail

C-%	Control Type	Rep 1
0	Negative Control	1
6.25		1
12.5		1
25		1
50		0.9
100		0

48h Survival Rate Binomials

C-%	Control Type	Rep 1
0	Negative Control	10/10
6.25		10/10
12.5		10/10
25		10/10
50		9/10
100		0/10

EW
 Feb. 23/16

CETIS Analytical Report

Report Date: 18 Feb-16 14:30 (p 2 of 2)
Test Code: 16180 | 14-7204-3519

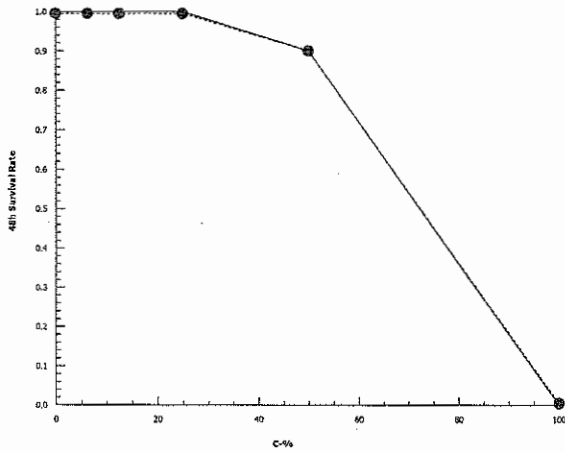
Daphnia magna 48-h Acute Survival Test

Nautilus Environmental

Analysis ID: 02-5136-6102 Endpoint: 48h Survival Rate
Analyzed: 18 Feb-16 14:30 Analysis: Untrimmed Spearman-Kärber

CETIS Version: CETISv1.8.7
Official Results: Yes

Graphics



EW
Feb-23/16

COC ID:	20160210-1420	TURNAROUND TIME:		RUSH:	
----------------	----------------------	-------------------------	--	--------------	--

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental			Report Format / Distribution	Excel	PDF	EDD
Project Manager	Lee Wilm			Lab Contact				Email 1:	Lee.Wilm@teck.com	x	x
Email				Email				Email 2:	Nell.Macdonald@teck.com	x	x
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	teckdal@equilonline.com		x
City	Elkford	Province	BC	City	Burnaby	Province	BC	PO number			
Postal Code	V0B 1H0		Country	Canada	Postal Code	V5A 4N7		Country	Canada		
Phone Number	1-250-865-5289			Phone Number	604-420-8773						

SAMPLE DETAILS								ANALYSIS REQUESTED				
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	48 hr LC50 for Daphnia m.				
GH_CCI-WS-201602101258	GH_CCI	WS		2016/02/10	12:58	G	1	1				
							#NAM E?					
							#NAM E?					
							#NAM E?					
							#NAM E?					
							#NAM E?					
							#NAM E?					
							#NAM E?					
							#NAM E?					
							#NAM E?					

wo # 16180

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
			<i>Nautilus NY - Nan Yamamoto 1x20L Temp - 6.6°C</i>	<i>Feb 12/16 @ 14:10</i>

NB OF BOTTLES RETURNED/DESCRIPTION		Samplers Name	Mobile #
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		Samplers Signature	Date/Time

① sample was sent to ALS by mistake.



Teck Coal / Fording River
ATTN: Lee Wilm
P.O. Box 100
Elkford, BC
VOB 1H0

Report Date: February 23, 2016
Work Order: 16184

Data Report

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000)

Table 1. Results for the 48-h *Daphnia magna* acute toxicity test.

Sample ID	Collection Date and Time	48-h LC50 [with 95% confidence limits] (v/v%)
FR_SP1-WS-201602111439	February 11, 2016 @ 1439h	77.1 [67.2 - 88.4]

The tests met all control performance criteria and no deviations from protocols were observed. The results presented in this report relate only to the sample tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 16184

Start Date/Time: February 16, 2016 @ 1040h
Test Species: Daphnia magna
Set up by: YLC

Sample Information:

Sample ID: FR_SPI-WS-201602111439
Sample Date: February 11, 2016
Date Received: February 15, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 020216B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 18
Mortality (%) in previous 7 d: 0
Days to first brood: 8

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC27
Stock Solution ID: ISNa03
Date Initiated: February 1, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: The 48h LC50 is estimated to be 77.1% (v/v) with 95% confidence limits at 67.2% and 88.4% (v/v).

Reviewed by: [Signature]

Date reviewed: Feb. 23, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: FR SPI-WS-20160211439
 Work Order No.: 16184

Start Date/Time: February 16, 2016 @ 1040h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	18.5	20.5	19.5	8.8	8.5	8.4	7.6	7.7	7.7	356	361
	B														
	C														
	D														
6.25	A	10	10	0	18.5	20.5	19.5	8.9	8.5	8.4	7.6	7.8	7.8	451	455
	B														
	C														
	D														
12.5	A	10	10	0	18.5	20.5	19.5	8.9	8.5	8.4	7.6	7.8	7.9	533	537
	B														
	C														
	D														
25	A	10	10	0	18.5	20.5	19.5	8.9	8.6	8.3	7.6	7.8	7.9	670	676
	B														
	C														
	D														
50	A	10	10	0	19.0	20.5	19.5	9.0	8.6	8.4	7.5	7.9	8.0	968	954
	B														
	C														
	D														
100	A	6 ⁰	20	0	19.0	20.5	19.5	9.2	8.6	8.1	7.4	7.8	7.7	1512	1348
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO ₃)	
Control (MHW)	98	70
Highest conc.	1020	530
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.0		
DO (mg/L)	9.2		
pH	7.4		
Cond (µS/cm)	1512		

Comments: debris on bodies, white film on surface Mortality: Heartbeat checked under microscope yes

Sample Description: clear, no colour, no particulates, no odour.

Batch#: 020216B 7-d previous # young/brood: 18 Previous 7-d Mortality (%): 0 Day of 1st Brood: 8

Reviewed by: [Signature] Date reviewed: Feb. 23, 2016

CETIS Analytical Report

Report Date: 18 Feb-16 14:34 (p 1 of 2)
 Test Code: 16184 | 17-2452-1153

Daphnia magna 48-h Acute Survival Test

Nautilus Environmental

Analysis ID: 07-5210-3968	Endpoint: 48h Survival Rate	CETIS Version: CETISv1.8.7
Analyzed: 18 Feb-16 14:34	Analysis: Trimmed Spearman-Kärber	Official Results: Yes
Batch ID: 08-2970-8492	Test Type: Survival (48h)	Analyst: Yvonne Lam
Start Date: 16 Feb-16 10:40	Protocol: EC/EPS 1/RM/14	Diluent: Mod-Hard Synthetic Water
Ending Date: 18 Feb-16 10:30	Species: Daphnia magna	Brine:
Duration: 48h	Source: In-House Culture	Age:
Sample ID: 14-1159-4159	Code: 542337AF	Client: Teck Coal
Sample Date: 11 Feb-16 14:39	Material: Effluent	Project:
Receive Date: 15 Feb-16 10:20	Source: Teck Coal (TECK COAL)	
Sample Age: 4d 20h (4.5 °C)	Station: FR_SP1-WS-201602111439	

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0	20.00%	1.887	0.02975	77.11	67.24	88.43

48h 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	1	1	1	1	0	0	0.0%	0.0%	10	10
6.25		1	1	1	1	0	0	0.0%	0.0%	10	10
12.5		1	1	1	1	0	0	0.0%	0.0%	10	10
25		1	1	1	1	0	0	0.0%	0.0%	10	10
50		1	1	1	1	0	0	0.0%	0.0%	10	10
100		1	0.2	0.2	0.2	0	0	0.0%	80.0%	2	10

48h Survival Rate Detail

C-%	Control Type	Rep 1
0	Negative Control	1
6.25		1
12.5		1
25		1
50		1
100		0.2

48h Survival Rate Binomials

C-%	Control Type	Rep 1
0	Negative Control	10/10
6.25		10/10
12.5		10/10
25		10/10
50		10/10
100		2/10

EW
 Feb-23/16

CETIS Analytical Report

Report Date: 18 Feb-16 14:34 (p 2 of 2)
Test Code: 16184 | 17-2452-1153

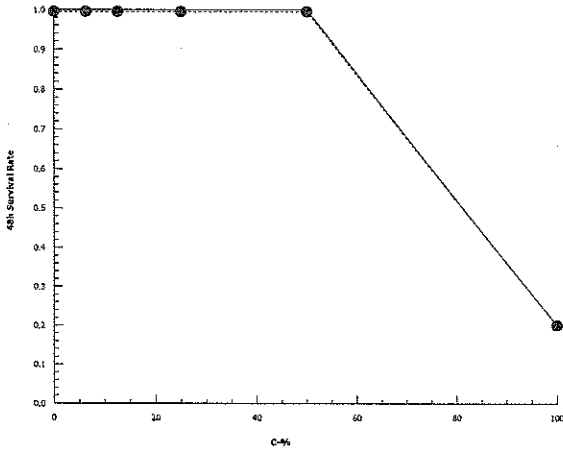
Daphnia magna 48-h Acute Survival Test

Nautilus Environmental

Analysis ID: 07-5210-3968 Endpoint: 48h Survival Rate
Analyzed: 18 Feb-16 14:34 Analysis: Trimmed Spearman-Kärber

CETIS Version: CETISv1.8.7
Official Results: Yes

Graphics



EC
Feb-23/16

COC ID: **20160211-1503** TURNAROUND TIME: RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Ebrding River Operation			Lab Name	Nautilus Environmental			Report Format / Distribution	Excel	PDF	EDD	
Project Manager	Lee Wilm			Lab Contact				Email 1:	Lee.Wilm@teck.com	x	x	x
Email				Email				Email 2:	Neil.Macdonald@teck.com	x	x	x
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	teckcoal@equisonline.com			x
City	Elkford	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-865-5289			Phone Number	604-420-8773							

SAMPLE DETAILS							ANALYSIS REQUESTED															
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	48 hr LC50 for Daphnia m.														
FR_SP1-WS-201602111439	FR_SP1	WS		2016/02/11	14:39	G	1	1														
WO # 16184																						

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	<i>Neil Macdonald</i>	Feb 11 2016	Paul	5K 13 Feb 4:45 pm

NB OF BOTTLES RETURNED/DESCRIPTION		SAMPLER INFORMATION	
Regular (default)	X	Sampler's Name	<i>Neil Macdonald</i>
Priority (2-3 business days) - 50% surcharge		Sampler's Signature	<i>[Signature]</i>
Emergency (1 Business Day) - 100% surcharge		Mobile #	250 865 5204
For Emergency <1 Day, ASAP or Weekend - Contact ALS		Date/Time	Feb 11 2016

Received by Nautilus - NY-Nai Yamame
Feb 15/16 @ 10:20
1.001



Teck Coal / Fording River
ATTN: Lee Wilm
P.O. Box 100
Elkford, BC
V0B 1H0

Report Date: March 29, 2016
Work Order: 16326 - 16327

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 96-h rainbow trout acute toxicity test.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
FR_EC1_Q_04012016_N	March 15, 2016 @ 1043h	0

Table 2. Results for the 48-h *Daphnia magna* acute toxicity test.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
FR_EC1_Q_04012016_N	March 15, 2016 @ 1043h	0

The tests met performance criteria and there were no deviations from the protocol. The results presented in this report relate only to the sample tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Julianna Kalocai, M.Sc., R.P.Bio
QA Officer

Rainbow Trout Summary Sheet

Client: Telk Coal (FRO)

Start Date/Time: Mar 17 / 16 @ 1035h

Work Order No.: 16327

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: ^{EL} FRO-FR-EL1-Q-04012016-N
Sample Date: Mar 15 / 16
Date Received: Mar 16 / 16
Sample Volume: 1x20L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 12
Alkalinity (mg/L CaCO₃): 10

Test Organism Information:

Batch No.: 020816
Source: Aqua Farms
No. Fish/Volume (L): 10 / 15L
Loading Density (g/L): 0.46
Mean Length ± SD (mm): 38 ± 1
Mean Weight ± SD (g): 0.69 ± 0.02

Range: 36-40 ⁰
Range: 0.45-0.73
_{EL}

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn35
Stock Solution ID: 15Zn05
Date Initiated: Mar 4 / 16
96-h LC50 (95% CL): 87.1 (71.2 - 106.4) µg/L Zn

Reference Toxicant Mean and Historical Range: 71.7 (34.0 - 151.5) µg/L Zn
Reference Toxicant CV (%): 45%

Test Results: 0% mortality at 96 hr in the undiluted 100% (v/v) sample.

Reviewed by: JGH

Date reviewed: March 29 / 16

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal (FRO)
 Sample I.D. EC FRO-FR-EC1-Q-041012016-N
 W.O. # 16327
 RBT Batch #: 020816
 Date Collected/Time: Mar 15 / 16 @ 1043 h
 Date Setup/Time: Mar 17 / 16 @ 1035 h
 Sample Setup By: EC

Number Fish/Volume: 10/15 L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 30 mins
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

D.O. meter: 2 ^{EC} _{Tem}
 pH meter: 1 _{Thermometer = CER #2}
 Cond. Meter: 2

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
pH	7.8		7.9
D.O. (mg/L)	10.0		10.0
Cond. (µS/cm)	1063		1067
Salinity (PPT)	0.5		0.5

Concentration	# Survivors						Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)		
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
(% v/v)																								
+1				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.0	9.9	9.7	9.6	9.6	6.5	6.3	6.9	7.0	6.6	30	35
100				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.0	9.8	9.8	9.7	9.7	7.9	8.1	8.0	8.1	8.1	1067	1073
Initials				EC	MS	A	EL	EL	EL	AS	MS	EL	EL	EL	AS	MS	EL	EL	EL	MS	MS	EL	EL	EL

WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Sample Description/Comments: Slightly Grey, Slightly opaque, Odourless, No particulates

Fish Description at 96 h fish appear healthy Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: Jon

Date Reviewed: March 24/16

Daphnia magna Summary Sheet

Client: Teck (FRO)
Work Order No.: 16326

Start Date/Time: March 16, 2016 @ 1605h
Test Species: Daphnia magna
Set up by: YUL/EC

Sample Information:

Sample ID: FR-EC1-Q-04012016-N
Sample Date: March 15, 2016
Date Received: March 16, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 030216A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC29
Stock Solution ID: 15Na03
Date Initiated: March 15, 2016
48-h LC50 (95% CL): 5.2 (4.2-6.4) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: JOU

Date reviewed: March 29/16

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (FRO)
 Sample ID: FR-EC1-Q-04@2016-N
 Work Order No.: 16326

Start Date/Time: March 16, 2016 @ 1605h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: MM | EC

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.0	19.5	19.0	8.6	8.4	8.4	7.7	7.7	7.8	345	348
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	20.0	19.5	19.0	8.5	8.3	8.5	8.1	8.2	8.4	1076	1081
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		MM	MM	MM	MM	MM	MM	MM	MM	MM	MM	MM	MM	MM	MM

Concentration	Hardness* (mg/L as CaCO3)	Alkalinity* (mg/L as CaCO3)
Control (MHW)	98	68
Highest conc.	528	238
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		20.0
DO (mg/L)	9.7	(3 min aeration)	8.5
pH	8.0		8.1
Cond (µS/cm)	1077		1076
Salinity (ppt)	0.5		0.5

Comments: _____ Mortality: Heartbeat checked under microscope not noted

Sample Description: slight grey colour, slightly opaque, no colour, no particulates.

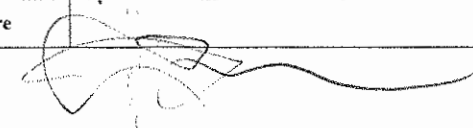
Batch#: 030216A 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: JGU Date reviewed: March 24/16

COC ID: 20160315-1401		TURNAROUND TIME:				RUSH:						
PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental			Report Format / Distribution	Excel	PDF	EDD	
Project Manager	Lee Wilm			Lab Contact				Email 1:	lee.wilm@teck.com	x	x	x
Email				Email				Email 2:	Neil.Macdonald@teck.com	x	x	x
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	teckcoal@equisonline.com			x
City	Elkford	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	VOB 1H0		Country	Canada	Postal Code	V5A 4N7		Country	Canada			
Phone Number	1-250-865-5289			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED				OTHER INFO			
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	48 hr Daphnia Single Conc. Pass/Fail	96 Hr Rainbow Trout Single Conc. Pass/Fail	28 Day H. azteca Pass/Fail	30 d FHM P/F	Temp °C			
FR_EC1_Q_04012016_N	FR_EC1	WS		2016/03/15	10:43	G	1	X	1			1.3			
FR_FRCPL_QR_11012016_N	FR_FRCPL	WS		2016/03/15	11:40	G	1			1	X	2.5			
FR_UFR1_QR_11012016_N	FR_UFR1	WS		2016/03/15	09:54	G	1			1	X	2.5			

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS		RELINQUISHED BY/AFFILIATION		DATE/TIME		ACCEPTED BY/AFFILIATION		DATE/TIME	
① refresh sample		N Macdonald		2016/03/15		Nautilus NY - Nan Yamamoto		Mar 16/16 @ 09:50	
						3x20L			
NB OF BOTTLES RETURNED/DESCRIPTION		Sampler's Name		Mobile #		Date/Time			
Regular (default) X		N Macdonald		250 865 5204		March 15 2016			
Priority (2-3 business days) - 50% surcharge		Sampler's Signature							
Emergency (1 Business Day) - 100% surcharge									
For Emergency <1 Day, ASAP or Weekend - Contact ALS									





Teck Coal / Fording River Operations
ATTN: Lee Wilm
P.O. Box 100
Elkford, BC
VOB 1H0

Report Date: May 26, 2016
Work Order: 16541 - 16542

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 96-h rainbow trout acute toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
FR_CC1_Q_04042016_N	May 10, 2016 @ 1042h	0
FR_EC1_Q_04042016_N	May 10, 2016 @ 1100h	0
FR_SP1_Q_04042016_N	May 10, 2016 @ 0915h	0
GH_CC1_Q_04042016_N	May 10, 2016 @ 0925h	0
GH_SC1_Q_04042016_N	May 10, 2016 @ 0955h	0

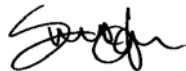
Table 2. Results for the 48-h *Daphnia magna* acute toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
FR_CC1_Q_04042016_N	May 10, 2016 @ 1042h	0
FR_EC1_Q_04042016_N	May 10, 2016 @ 1100h	0
FR_SP1_Q_04042016_N [tested at 20°C]	May 10, 2016 @ 0915h	0
FR_SP1_Q_04042016_N [tested at 10°C]	May 10, 2016 @ 0915h	0
GH_CC1_Q_04042016_N [tested at 20°C]	May 10, 2016 @ 0925h	100
GH_CC1_Q_04042016_N [tested at 10°C]	May 10, 2016 @ 0925h	0
GH_SC1_Q_04042016_N [tested at 20°C]	May 10, 2016 @ 0955h	0
GH_SC1_Q_04042016_N [tested at 10°C]	May 10, 2016 @ 0955h	0

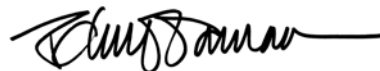
Samples FR_SP1, GH_CC1, and GH_SC1 were also tested with *D. magna* at 10°C, which were concurrently initiated with the standard test (20°C), as requested by the client. No additional rainbow trout tests were conducted.

The temperature treatments appeared to have an effect in sample GH_CC1, with all the organisms surviving at 10°C and none surviving at 20°C. Test results from samples FR_SP1 and GH_SC1 indicated similar responses in the different test treatments.

All control performance criteria were met and no deviations from the test protocols were observed. The results presented in this report relate only to the samples tested.



Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck Coal (FRO)

Start Date/Time: May 13/16 @ 1050h

Work Order No.: 16542

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: FR-CCI-Q-04042016-N
Sample Date: May 10/16
Date Received: May 12/16
Sample Volume: 1X20L
Other: -

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 042716
Source: Aqua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.31
Mean Length ± SD (mm): 26 ± 1
Mean Weight ± SD (g): 0.31 ± 0.03

Range: 25-27
Range: 0.26-0.36

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn40
Stock Solution ID: 15Zn05
Date Initiated: May 12/16

96-h LC50 (95% CL): 25.0 (20.1-31.8) mg/L Zn (outside of 2SD but w/in 3SD of historical range)

Reference Toxicant Mean and Historical Range: 69.6 (34.0-142.3) mg/L Zn
Reference Toxicant CV (%): 43.0%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: May 24, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal (FRO)
 Sample I.D.: FR-CC1-Q-04042016-N
 W.O. #: 16542
 RBT Batch #: 042716
 Date Collected/Time: May 10/16 @ 1042h
 Date Setup/Time: May 13/16 @ 1050h
 Sample Setup By: EC

Number Fish/Volume: 10/10 L
 7-d % Mortality: 0.1
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER# 2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
pH	8.0	/	8.0
D.O. (mg/L)	10.3	/	10.3
Cond. (µS/cm)	1568	/	1568
Salinity (ppt)	0.8	/	0.8

Concentration	# Survivors							Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	(% v/v)	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0
(+1)				10	10	10	10	15.0	15.0	15.0	15.0	15.0	10.0	9.7	9.9	9.8	10.0	6.7	6.8	6.9	7.0	6.9	28	31
100				10	10	10	10	14.0	15.0	16.0	15.0	15.0	10.3	9.9	9.8	9.6	9.9	8.0	8.1	8.1	8.3	8.3	1568	1528
Initials				Amo	Amo	UML	EL	EC	Amo	Amo	UML	EL	EC	Amo	Amo	UML	EL	EC	Amo	Amo	UML	EL	EC	EL

Sample Description/Comments: Slightly yellow, clear, odourless, no particulates

Fish Description at 96 h: All fish appear healthy Number of Stressed Fish at 96 h: 0

Other Observations: _____

Reviewed by:  Date Reviewed: May 24, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (FRO)

Start Date/Time: May 13/16 @ 1050h

Work Order No.: 16542

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: FR-EC1-Q-04042016-N
Sample Date: May 10/16
Date Received: May 12/16
Sample Volume: 1x20L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 042716
Source: Aqua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.31
Mean Length ± SD (mm): 27 ± 2
Mean Weight ± SD (g): 0.31 ± 0.05

Range: 24-30
Range: 0.26-0.41

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn40
Stock Solution ID: 15Zn05
Date Initiated: May 12/16
96-h LC50 (95% CL): 25.0 (20.1-31.81) mg/L Zn

(note: outside of 2SD but w/in 3SD of historical range)

Reference Toxicant Mean and Historical Range: 69.6 (34.0-142.3) mg/L Zn
Reference Toxicant CV (%): 43.0%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: May 24, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (FRO)

Start Date/Time: May 13/16 @ 1050h

Work Order No.: 16542

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: FR-SPI-Q-04042016-N
Sample Date: May 10/16
Date Received: May 12/16
Sample Volume: 2X20L
Other: -

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 042716
Source: Aqua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.31
Mean Length ± SD (mm): 26 ± 2
Mean Weight ± SD (g): 0.31 ± 0.04

Range: 23 - 30
Range: 0.26 - 0.36

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn40
Stock Solution ID: 15Zn05
Date Initiated: May 12/16
96-h LC50 (95% CL): 25.0 (20.1 - 31.81) mg/L Zn

(note: outside of 2SD but w/in 3SD of historical range)

Reference Toxicant Mean and Historical Range: 69.6 (34.0 - 142.3) mg/L Zn
Reference Toxicant CV (%): 43.0%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: May 24, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (GHO)

Start Date/Time: May 13/16 @ 1050h

Work Order No.: 16542

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-CC1-Q-04042016-N
Sample Date: May 10/16
Date Received: May 12/16
Sample Volume: 2x20L
Other: /

Test Validity Criteria:

≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 042716
Source: Aqua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.33
Mean Length ± SD (mm): 28 ± 1 Range: 26-30
Mean Weight ± SD (g): 0.33 ± 0.04 Range: 0.28-0.41

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn40
Stock Solution ID: 15Zn05
Date Initiated: May 12/16
96-h LC50 (95% CL): 25.0 (20.1-31.8) mg/L Zn (note: outside of 2SD but w/in 3SD of historical range)
Reference Toxicant Mean and Historical Range: 69.6 (34.0-142.3) mg/L Zn
Reference Toxicant CV (%): 43.0%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: May 24, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (GHO)

Start Date/Time: May 13/16 @ 1050h

Work Order No.: 16542

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-SCI-Q-04042016-N
Sample Date: May 10/16
Date Received: May 12/16
Sample Volume: 1X20L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 042716
Source: Aqua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.31
Mean Length ± SD (mm): 26 ± 2
Mean Weight ± SD (g): 0.31 ± 0.05

Range: 24-30
Range: 0.23-0.41

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn40
Stock Solution ID: 15Zn05
Date Initiated: May 12/16

96-h LC50 (95% CL): 25.0 (20.1-31.81) mg/L Zn (note: outside of 2SD but w/in 3SD of historical range)

Reference Toxicant Mean and Historical Range: 69.6 (34.0-142.3) mg/L Zn
Reference Toxicant CV (%): 43.0%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: May 24, 2016

Daphnia magna Summary Sheet

Client: Teck (FRO)
Work Order No.: 16541

Start Date/Time: May 14, 2016 @ 1120h
Test Species: Daphnia magna
Set up by: AWD

Sample Information:

Sample ID: FR CCI-Q-04042016-N
Sample Date: May 10, 2016
Date Received: May 12, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 041916A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 10
Days to first brood: 8

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC33
Stock Solution ID: 16NaCl
Date Initiated: May 18, 2016
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: CW

Date reviewed: May 24, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Tea Start Date/Time: May 19/16 @ 11:20
 Sample ID: FC-CC-Q No. Organisms/Volume: 10/200mL
 Work Order No.: 16541 04042016-N Test Organism: D. magna
 Set up by: AM

Thermometer: Temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	20.0	20.5	20.5	8.5	8.3	8.2	8.0	8.1	7.9	352	369
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	20.0	20.5	20.5	8.5	8.6	8.2	8.2	8.3	8.0	1568	1551
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		A	YWL	YWL	AS	A	YWL	A	A	YWL	A	A	YWL	A	YWL

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO ₃)	
Control (MHW)	100	70
Highest conc.	780	196
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		
DO (mg/L)	8.75		
pH	8.2		
Cond (µS/cm)	1568		
Salinity (ppt)	0.8		

Comments: _____ Mortality: Heartbeat checked under microscope not yes

Sample Description: clear, slight yellow colour, no odour, no particulates.

Batch#: 041916 A 7-d previous # young/brood: 12 Previous 7-d Mortality (%): 10 Day of 1st Brood: 8

Reviewed by: [Signature] Date reviewed: May 24, 2016

Daphnia magna Summary Sheet

Client: Teck (FRO)
Work Order No.: 16541

Start Date/Time: May 14, 2016 @ 11:0h
Test Species: Daphnia magna
Set up by: AK AWD
Yue

Sample Information:

Sample ID: FR-SCI-Q-04 042016-N
Sample Date: May 10, 2016
Date Received: May 12, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 041916A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 10
Days to first brood: 0

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC33
Stock Solution ID: 16NaCl
Date Initiated: May 18, 2016
48-h LC50 (95% CL): 4.2 (3.7 - 4.8) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: ECU

Date reviewed: May 24, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Test Start Date/Time: May 19/16 @ 11:06
 Sample ID: FR-ECL-0-04042016-N No. Organisms/volume: 10/200mL
 Work Order No.: 16541 Test Organism: D.magna
 Set up by: AM

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% V/V)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
		Control	A		10	10	0	20.0	20.5	20.5	8.5	8.4	8.2	8.0	8.0
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	100	1	20.0	20.5	20.5	8.7	8.6	8.2	8.1	8.2	8.0	2300	2280
	B	10	100	0											
	C	10	100	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		A	MUL	MUL	AS	A	MUL	A	A	MUL	A	A	MUL	A	MUL

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	100	70
Highest conc.	1420	242
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		
DO (mg/L)	8.7		
pH	8.1		
Cond (µS/cm)	2300		
Salinity (ppt)	1.2		

Comments: 0 precipitate on organisms, white precipitate on container bottom. Mortality: Heartbeat checked under microscope not req'd

Sample Description: clear, slight yellow colour, no odour, no particulates.

Batch#: 041916 A 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 10 Day of 1st Brood: 8

Reviewed by: [Signature] Date reviewed: May 24, 2016

Daphnia magna Summary Sheet

Client: Teck (FRO)
Work Order No.: 16541

Start Date/Time: May 13, 2016 @ 1510h
Test Species: Daphnia magna
Set up by: NL

Sample Information:

Sample ID: FR-SPI-Q-04042016-N
Sample Date: May 10, 2016
Date Received: May 12, 2016
Sample Volume: 2 x 20 L

Test Validity Criteria:
≥ 90% mean control survival (no more than 2 mortalities in any control replicate)
WQ Ranges:
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5


Test Organism Information:

Broodstock No.: 042716A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC33
Stock Solution ID: 10NaCl
Date Initiated: May 18, 2016
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample, tested at 20°C.

Reviewed by: 

Date reviewed: May 24, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: FR SP1-Q-04042016-N
 Work Order No.: 16541

Start Date/Time: MAY 13, 2016 @ 1510h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: UML

Thermometer: Temp-5 DO meter: DO-113 pH meter: pH-113 Cond./Salinity: C-113

Concentration (% V/V)	Number of Live Organisms Rep	24		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	20.0	20.5	20.5	8.7	8.5	8.4	7.8	8.0	8.1	356	364
	B	10	10	0											
	C	10	10	0											
	D														
100 (20°C)	A	10	10 ⁰	0	20.0	20.5	20.5	8.7	8.4	8.5	7.2	7.8	8.0	1182	1080
	B	10	10 ⁰	0											
	C	10	10 ⁰	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		~	~	~	UML	~	~	UML	~	~	UML	~	~	UML	~

Concentration	Hardness* (mg/L as CaCO3)	Alkalinity* (mg/L as CaCO3)
Control (MHW)	100	70
Highest conc.	610	320
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		
DO (mg/L)	8.7		
pH	7.2		
Cond (µS/cm)	1182		
Salinity (ppt)	0.6		

Comments: 1 ~~organisms~~ organisms observed Mortality: Heartbeat checked under microscope yes

Sample Description: slight yellow colour, clear, no odour, no particulates

Batch#: 042716A 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: [Signature] Date reviewed: May 24, 2016

Daphnia magna Summary Sheet

Client: Teck (FRO)
Work Order No.: 16541

Start Date/Time: May 13, 2016 @ 1525h
Test Species: Daphnia magna
Set up by: NL

Sample Information:

Sample ID: FRSP1-Q-04042016-N
Sample Date: May 10, 2016
Date Received: May 12, 2016
Sample Volume: 2 x 20L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 042716A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC33
Stock Solution ID: 16NaCl
Date Initiated: May 18, 2016
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample, tested at 10°C.

Reviewed by: 

Date reviewed: May 29, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: FR SPI-Q-04042016-N
 Work Order No.: 16541

Start Date/Time: MAY 13, 2016 @ 1525h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: Temp-S DO meter: DO-113 pH meter: pH-113 Cond./Salinity: C-113

Concentration (% V/V)	Number of Live Organisms Rep	24		48		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48	0	24		48	0	24	48	0	24	48	0	48		
Control	A	10	10	0	10.0	10.0	10.0	9.6	10.7	10.4	7.7	7.8	8.1	357	349		
	B	10	10	0											349		
	C	10	10	0													
	D																
100 in 20°C (10°C)	A	10	10	0	11.5	10.0	10.0	10.4	10.8	10.6	7.2	7.7	8.1	1173	1140		
	B	10	10	0													
	C	10	10	0													
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
Technician Initials		A	A	A	YML	A	A	YML	P	A	YML	A	A	YML	A		

Concentration	Hardness* (mg/L as CaCO3)	Alkalinity* (mg/L as CaCO3)
Control (MHW)	100	68
Highest conc.	760	396
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	11.5		
DO (mg/L)	10.4		
pH	7.2		
Cond (µS/cm)	1173		
Salinity (ppt)	0.6		

Comments: 1 organism covered in debris Mortality: Heartbeat checked under microscope no

Sample Description: slight yellow colour, clear, no odour, no particulates

Batch#: 042716A 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: [Signature] Date reviewed: May 24, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 16541

Start Date/Time: May 13, 2016 @ 1515h
Test Species: Daphnia magna
Set up by: YNL

Sample Information:

Sample ID: GH-CC1-Q-04042016-N
Sample Date: May 10, 2016
Date Received: May 12, 2016
Sample Volume: 2 x 20L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 042716B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC33
Stock Solution ID: 16NaCl
Date Initiated: May 18, 2016
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 100% mortality at 48h in the 100% (v/v) undiluted sample, tested at 20°C

Reviewed by: [Signature]

Date reviewed: May 24, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: GH-CC-0-04042016-N
 Work Order No.: 16541

Start Date/Time: MAY 13, 2016 @ 1515h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: Temp-5 DO meter: DO-113 pH meter: pH-113 Cond./Salinity: C-113

Concentration (% V/V)	Number of Live Organisms Rep	No. Immobilized		Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)		
		24	48	0	24	48	0	24	48	0	24	48	0	48	
Control	A	10	10	0	20.0	20.5	20.6	8.7	8.7	8.5	7.8	8.0	8.1	356	364
	B	10	10	0											
	C	10	10	0											
	D														
100 (20°C)	A	10 ⁰	0 ⁰	0	20.0	20.6	20.5	9.0	8.6	8.4	7.7	8.0	8.1	3190	2970
	B	10 ⁰	0 ⁰	0											
	C	10 ⁰	0 ⁰	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		A	A	A	YML	A	A	YML	A	A	YML	A	A	YML	A

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO ₃)	
Control (MHW)	100	70
Highest conc.	2020	328
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		
DO (mg/L)	9.0		
pH	7.7		
Cond (µS/cm)	3190		
Salinity (ppt)	1.7		

Comments: 0 organisms covered w/ ppt Mortality: Heartbeat checked under microscope yes

Sample Description: clear, slight yellow colour, no odour, no particulates

Batch#: 0A2716B 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: [Signature] Date reviewed: May 24, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 16541

Start Date/Time: May 13, 2016 @ 1530h
Test Species: Daphnia magna
Set up by: YHL

Sample Information:

Sample ID: GH-CC1-Q-04042016-N
Sample Date: May 10, 2016
Date Received: May 12, 2016
Sample Volume: 2 x 20L

Test Validity Criteria:
≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 04271613
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC33
Stock Solution ID: 16NaCl
Date Initiated: May 18, 2016
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample, tested at 10°C

Reviewed by: [Signature]

Date reviewed: May 24, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: GHCC1-Q-04042016-N
 Work Order No.: 16541

Start Date/Time: MAY 13, 2016 @ 1530h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: Temp-5 DO meter: DO-113 pH meter: pH-113 Cond./Salinity: C-113

Concentration (% V/V)	Number of Live Organisms Rep	24		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	10.0	10.0	10.0	9.6	10.8	10.7	7.7	8.0	8.1	357	352
	B	10	10	0											
	C	10	10	0											
	D														
100 (10°C)	A	10	10 ⁰	0	11.0	10.0	10.0	9.9	10.8	10.7	7.8	8.0	8.1	3160	3050
	B	10	10 ⁰	0											
	C	10	10 ⁰	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		A	A	A	YML	A	A	YML	A	A	YML	A	A	YML	A

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	100	68
Highest conc.	2150760	141396426
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	11.0		
DO (mg/L)	9.9		
pH	7.8		
Cond (µS/cm)	3160		
Salinity (ppt)	1.6		

Comments: 0 organisms covered in white ppt Mortality: Heartbeat checked under microscope yes

Sample Description: clear, slight yellow colour, no odour, no particulates

Batch#: 042716 B 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: [Signature] Date reviewed: May 24, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 16541

Start Date/Time: May 13, 2016 @ 1520h
Test Species: Daphnia magna
Set up by: NL

Sample Information:

Sample ID: GH_SCI_Q-04042016-N
Sample Date: May 10, 2016
Date Received: May 12, 2016
Sample Volume: 1420L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 042716A+B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: PMTC33
Stock Solution ID: 16NaCl
Date Initiated: May 18, 2016
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample, tested at 20°C.

Reviewed by: [Signature]

Date reviewed: May 29, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: GH-SCI-Q-04042016-N
 Work Order No.: 16541

Start Date/Time: MAY 13, 2016 @ 1520h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: YMC

Thermometer: Temp-S DO meter: DO-113 pH meter: pH-113 Cond./Salinity: C-113

Concentration (% v/v)	Number of Live Organisms Rep	No. Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	20.0	20.5	20.5	8.7	8.6	8.5	7.8	8.0	8.1	356	362
	B	10	10	0											
	C	10	10	0											
	D														
100 (20°C)	A	10	10	0	19.5	20.5	20.5	9.1	8.6	8.5	7.9	8.1	8.1	1976	1958
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		A	A	A	YMC	A	A	YMC	A	A	YMC	A	A	YMC	A

Concentration	Hardness* (mg/L as CaCO ₃)	Alkalinity* (mg/L as CaCO ₃)
Control (MHW)	130	70
Highest conc.	1160	268
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		
DO (mg/L)	9.1		
pH	7.9		
Cond (µS/cm)	1976		
Salinity (ppt)	1.0		

Comments: _____ Mortality: Heartbeat checked under microscope no

Sample Description: clear, slight yellow colour, no odour, no particulates.

Batch#: 042716 AHS 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: [Signature] Date reviewed: May 24, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 16541

Start Date/Time: May 13, 2016 @ 1535h
Test Species: Daphnia magna
Set up by: YL

Sample Information:

Sample ID: GH_SCI_2-04042016-N
Sample Date: May 10, 2016
Date Received: May 12, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 042716 A+B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 0
Days to first brood: 16

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC33
Stock Solution ID: 16NaCl
Date Initiated: May 18, 2016
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample, tested at 10°C

Reviewed by: [Signature]

Date reviewed: May 24, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: GH SCI - 0-04042016-N
 Work Order No.: 16541

Start Date/Time: MAY 13, 2016 @ 1535h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: Temp-S DO meter: DO-113 pH meter: pH-113 Cond./Salinity: C-113

Concentration (% V/V)	Number of Live Organisms Rep	24		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	10.0	10.0	10.0	9.6	10.7	10.8	7.7	8.0	8.1	357	351
	B	10	10	0											
	C	10	10	0											
	D														
100 (10°C)	A	10	10	0	11.5	10.0	10.0	10.3	10.6	10.8	7.8	8.0	8.1	1975	1942
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		~	~	~	YML	~	~	YML	~	~	YML	~	~	YML	~

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO3)	
Control (MHW)	100	68
Highest conc.	1340	274
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	11.5		
DO (mg/L)	10.3		
pH	7.8		
Cond (µS/cm)	1975		
Salinity (ppt)	1.0		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: clear, slight yellow colour, no odour, no particulates

Batch#: 042716 ARB 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: May [Signature] Date reviewed: May 24, 2016

Client: Teck

W.O.#: 16541

Hardness and Alkalinity Datasheet

Sample ID	Sample Date	Alkalinity				Hardness			Technician
		Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO 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)	
FR_CCL-Q-04042016-N	May 14/16	50	10.0	10.2	196	10 ⁰	7.8	780	J5
FR_ECL-Q-04042016-N	May 14/16	50	12.3	12.5	242	10 ⁰	14.2	1420	J
FR_SPL-Q-04042016-N	May 13/16	50	16.2	16.4	320	10 ⁰	6.1	610	↓
(20°C)			J5	J5			J5 7.6		
FR_SPL-Q-04042016-N	May 13/16	50	16.7 20.1	17.0 20.4	396	10 ⁰	20.2	760	J5
(10°C)									
GH_CCL-Q-04042016-N	May 13/16	50	16.7	17.0	328	10 ⁰	20.2	2020	J5
(20°C)									
GH_CCL-Q-04042016-N	May 13/16	50	21.5	21.7	426	10 ⁰	21.5	2150	J5
(10°C)									
GH_SCL-Q-04042016-N	May 13/16	50	13.6	13.8	268	10 ⁰	11.6	1160	J5
(20°C)			J5	J5					
GH_SCL-Q-04042016-N	May 13/16	50	21.5 13.9	21.7 14.1	274	10 ⁰	13.4	1340	J5
(10°C)									
MHW (20°C)	May 13/16	50	3.6	3.7	70	50	5.0	100	YML
MHW (10°C)	May 13/16	50	3.5	3.6	68	50	5.0	100	YML

Notes: ⁰Diluted to 100 mL w/ DI water

Reviewed by: 

Date Reviewed: May 24, 2016

COC ID:	20160511-1244			TURNAROUND TIME:		RUSH:	
PROJECT/CLIENT INFO				LABORATORY		OTHER INFO	
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental		Report Format / Distribution
Project Manager	Lee Wilm			Lab Contact			Excel
Email				Email			PDF
Address	PO Box 100			Address	8664 Commerce Court		EDD
City	Elkford	Province	BC	City	Burnaby	Province	BC
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada
Phone Number	1-250-865-5289			Phone Number	604-420-8773		

SAMPLE DETAILS								ANALYSIS REQUESTED									
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	48 hr single conc Daphnia m. @ 10 deg cel	48 HR SINGLE CONCENTRATION - DAPNIA M.	96HR SINGLE CONCENTRATION - R.TROUT	30 DAY RAINBOW TROUT EMBRYO ALEVIN P/F	48 hr Daphnia Sinigle Conc. Pass/Fail	96 Hr Rainbow Trout Single Conc. Pass/Fail	28 Day H. azteca Pass/Fail	30d FHM P/F conducted in Calgary	Temp °C	
201 FR_CCI_Q_04042016_N (2)	FR_CCI	WS		2016/05/10	10:42	G	1					X	I			9.2	
201 FR_ECI_Q_04042016_N (3)	FR_ECI	WS		2016/05/10	11:00	G	1					X	I			9.0	
201 FR_SPI_Q_04042016_N (4)	FR_SPI	WS		2016/05/10	09:15	G	2	I				X	I			8.5	
201 GH_CCI_Q_04042016_N (5)	GH_CCI	WS		2016/05/10	09:25	G	2	I	X	I						8.0	
201 GH_SCI_Q_04042016_N (6)	GH_SCI	WS		2016/05/10	09:55	G	1	X	X	I						8.0	
201 FR_FRCPI_QR_11042016_N (7)	FR_FRCPI	WS		2016/05/11	10:40	G	4				3			I	X	8.3	
201 FR_UFRI_QR_11042016_N (8)	FR_UFRI	WS		2016/05/11	09:00	G	4				3			I	X	6.9	

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
① refresh sample	MACDONALD	MAY 11 2016	Nautilus NY - Nan Yamamoto	May 12/16 @ 08:00

NB OF BOTTLES RETURNED/DESCRIPTION	Sampler's Name	Mobile #
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	N. Macdonald	250 865 5204
	Sampler's Signature	Date/Time
	[Signature]	MAY 11 2016

Sample Description:

- ② Slightly yellow, clear, odorless, no particulates.
- ③ Slightly yellow, clear, odorless, no particulates.
- ④ Slightly yellow, clear, odorless, no particulates.
- ⑤ Slightly yellow, clear, odorless, no particulates.



Teck Coal / Fording River Operations
ATTN: Lee Wilm
P.O. Box 100
Elkford, BC
VOB 1H0

Report Date: June 8, 2016
Work Order: 16590

Data Report

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 48-h *Daphnia magna* acute toxicity test.

Sample ID	Collection Date and Time	48-h LC50 (%v/v)
GH_CC1-WS-201605271000	May 27, 2016 @ 1000h	>100

The tests met performance criteria and no deviations from protocols were observed. The results presented in this report relate only to the sample tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 16590

Start Date/Time: May 31, 2016 @ 1545h
Test Species: Daphnia magna
Set up by: YHL

Sample Information:

Sample ID: GH-CCF-WS-201605271000
Sample Date: May 27, 2016
Date Received: May 30, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 050416A+B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC33
Stock Solution ID: 16Na01
Date Initiated: May 18, 2016
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: The 48h LC50 is estimated to be >100% (v/v)

Reviewed by: [Signature]

Date reviewed: June 7, 2016

**Freshwater Acute
48 Hour Toxicity Test Data Sheet**

Client: Teck
 Sample ID: GH-CC1-W3-201605271000
 Work Order No.: 16590

Start Date/Time: May 30, 2016 @ 1545h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: YML

Thermometer: Temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	20.0	20.5	8.5	8.4	8.3	7.8	7.7	7.7	352	360
	B														
	C														
	D														
6.25	A	10	10	0	19.5	20.0	20.5	8.5	8.4	8.3	7.9	7.7	7.8	615	627
	B														
	C														
	D														
12.5	A	10	10	0	19.5	20.0	20.5	8.6	8.5	8.3	7.9	7.7	7.9	774	783
	B														
	C														
	D														
25	A	10	10	0	19.5	20.0	20.5	8.5	8.4	8.3	7.9	7.8	8.1	1192	1212
	B														
	C														
	D														
50	A	10	10	0	19.0	20.0	20.5	8.6	8.4	8.2	7.9	7.9	8.1	1850	1871
	B														
	C														
	D														
100	A	10 ⁰	9 ⁰	0	19.5	20.0	20.5	9.0	8.4	8.2	7.8	7.9	7.9	3060	2960
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO3)	
Control (MHW)	96	64
Highest conc.	2080	422
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.0		18.5
DO (mg/L)	9.9		9.0
pH	7.8	(3 min aeration)	7.8
Cond (µS/cm)	3060		3060
Salinity (ppt)	1.6		1.6

Comments: white film on surface Mortality: Heartbeat checked under microscope Yes

Sample Description: clear, no colour, no odour, no particulates

Batch#: 050416A4B 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: June 7, 2016

COC ID:	20160527-1112			TURNAROUND TIME:				RUSH:				
PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation#			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Lee Wilm			Lab Contact				Email 1:	Lee.Wilm@teck.com	X	X	X
Email				Email				Email 2:	Neil.Macdonald@teck.com	X	X	X
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	teckcoal@equisonline.com			X
City	Elkford	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-865-5289			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED															
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS															
GH_CCI-WS-201605271000	GH_CCI	WS		2016/05/27	10:00	G	1	48 hr LC50 for Daphnia m.	1														

Wot# 16590

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	MARTIN WILSON	May 27/16	Nautilus YUL	May 30/16 @ 1125h 13.9°C 1 x 20L rec'd

NB OF BOTTLES RETURNED/DESCRIPTION		Sampler's Name	Mobile #
Regular (default) X	Priority (2-3 business days) - 50% surcharge	Martin Wilson	
Emergency (1 Business Day) - 100% surcharge	For Emergency <1 Day, ASAP or Weekend - Contact ALS		
		Sampler's Signature	Date/Time



Teck Coal/ Fording River Operation
 ATTN: Lee Wilm
 P.O. Box 100
 Elkford, BC
 V0B 1H0

Report Date: August 17, 2016
 Work Order: 16818 – 16819

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 96-h rainbow trout acute single-concentration screening toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
FR_EC1_Q_04072016_N	August 2, 2016 @ 1022h	0
GH_CC1_Q_04072016_N	August 2, 2016 @ 1235h	0
GH_SC1_Q_04072016_N	August 2, 2016 @ 1251h	0

Table 2. Results for the 48-h *Daphnia magna* acute single-concentration screening toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
FR_EC1_Q_04072016_N	August 2, 2016 @ 1022h	0
GH_CC1_Q_04072016_N [tested at 20°C]	August 2, 2016 @ 1235h	100
GH_CC1_Q_04072016_N [tested at 10°C]	August 2, 2016 @ 1235h	53.3
GH_SC1_Q_04072016_N [tested at 20°C]	August 2, 2016 @ 1251h	0
GH_SC1_Q_04072016_N [tested at 10°C]	August 2, 2016 @ 1251h	23.3

Samples GH_CC1 and GH_SC1 were also tested with *D. magna* at 10°C, which were concurrently initiated with the standard test (20°C), as requested by the client. No additional rainbow trout tests were conducted.

All control performance criteria were met and no deviations from the test protocols were observed. The results presented in this report relate only to the samples tested.



Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck Coal (FRO)

Start Date/Time: Aug 05 116 @ 1030h

Work Order No.: 16819

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: FR-EC1-Q-04072016-N
Sample Date: Aug 08 2/16
Date Received: Aug 04/16
Sample Volume: 1 X 20 L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 11
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 071816a
Source: Aqua Farms
No. Fish/Volume (L): 10/10
Loading Density (g/L): 0.34
Mean Length ± SD (mm): 29 ± 1
Mean Weight ± SD (g): 0.34 ± 0.04
Range: 27 - 30
Range: 0.25 - 0.40

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn 45
Stock Solution ID: 15 Zn05
Date Initiated: Aug 1/16
96-h LC50 (95% CL): 30.9 (23.3 - 40.9) µg/L Zn

Reference Toxicant Mean and Historical Range: 58.0 (29.4 - 114.4) µg/L Zn
Reference Toxicant CV (%): 40%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: Aug 16, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal (FRO)
 Sample I.D.: FR-EL-Q-04072016-N
 W.O. #: 168189
 RBT Batch #: 071816A
 Date Collected/Time: Aug 02/16 @ 1022h
 Date Setup/Time: Aug 05/16 @ 1030h
 Sample Setup By: EC

Number Fish/Volume: 10/10 L
 7-d % Mortality: 0.1
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER#2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	15.0	/	15.0
pH	8.4	/	8.3
D.O. (mg/L)	9.4	/	9.7
Cond. (µS/cm)	1916	/	1916
Salinity (ppt)	1.0	/	1.0

Concentration (% v/v)	# Survivors								Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
(+1)				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.9	9.8	9.8	9.9	9.8	6.9	7.0	7.0	7.0	6.9	29	37	
100				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.7	9.7	9.9	9.9	9.9	8.3	8.2	8.2	8.0	8.0	1916	1987	
Initials				Am	Am	EL	EL	EC	Am	Am	EL	EL	EC	Am	Am	EL	EL	EC	Am	Am	EL	EL	EC	EL	

Sample Description/Comments: pale green, clear, no particulates, odourless.

Fish Description at 96 h All fish appear healthy Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by:

Date Reviewed: Aug 16, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (GHO)

Start Date/Time: Aug 05 116 @ 1030h

Work Order No.: 16819

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-CC1-Q-04072016-N
Sample Date: Aug 02 / 16
Date Received: Aug 04 / 16
Sample Volume: 2 X 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 11
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 071816a
Source: Aqua Farms
No. Fish/Volume (L): 10/10
Loading Density (g/L): 0.38
Mean Length ± SD (mm): 28 ± 2
Mean Weight ± SD (g): 0.38 ± 0.07

Range: 25 - 31
Range: 0.29 - 0.54

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn 45
Stock Solution ID: 15 Zn 05
Date Initiated: Aug 1 / 16
96-h LC50 (95% CL): 30.9 (23.3 - 40.9) µg/L Zn

Reference Toxicant Mean and Historical Range: 58.0 (29.4 - 114.4) µg/L Zn
Reference Toxicant CV (%): 40%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: Aug 16, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (GHO) Start Date/Time: Aug 05 116 @ 1030h

Work Order No.: 16819 Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-SCI-Q-04072016-N
Sample Date: Aug 02 / 16
Date Received: Aug 04 / 16
Sample Volume: 2 x 20 L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 11
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 071816a
Source: Aqua Farms
No. Fish/Volume (L): 10/10
Loading Density (g/L): 0.34
Mean Length ± SD (mm): 28 ± 3 Range: 24 - 31
Mean Weight ± SD (g): 0.34 ± 0.08 Range: 0.21 - 0.46

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn 45
Stock Solution ID: 15 ZnOS
Date Initiated: Aug 1 / 16
96-h LC50 (95% CL): 30.9 (23.3 - 40.9) µg/L Zn

Reference Toxicant Mean and Historical Range: 58.0 (29.4 - 114.4) µg/L Zn
Reference Toxicant CV (%): 40%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature] Date reviewed: Aug 16, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal (GH0)
 Sample I.D.: GH-SCI-2-04072016-N
 W.O. #: 16819
 RBT Batch #: 071816a
 Date Collected/Time: Aug 02/16 @ 1251h
 Date Setup/Time: Aug 05/16 @ 1030h
 Sample Setup By: EC

Number Fish/Volume: 10/10 L
 7-d % Mortality: 0.1
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER# 2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	15.0	/	15.0
pH	7.8	/	7.9
D.O. (mg/L)	9.4	/	9.6
Cond. (µS/cm)	2350	/	2350
Salinity (ppt)	1.2	/	1.2

Concentration (% v/v)	# Survivors								Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
(+)				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.9	9.6	9.8	9.9	9.8	6.9	7.0	7.1	7.0	6.9	29	33	
100				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.6	9.7	9.8	9.9	9.9	7.9	8.0	8.1	8.3	8.3	2350	2260	
Initials				Ans	Ans	EC	EC	EC	Ans	Ans	EC	EC	EC	Ans	Ans	EC	EC	EC	Ans	Ans	EC	EC	EC	EC	EC

Sample Description/Comments: EL # pale green, clear, no particulates, odourless

Fish Description at 96 h All fish appear healthy Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: [Signature]

Date Reviewed: Aug-16, 2016

Daphnia magna Summary Sheet

Client: Teck (FRO)
Work Order No.: 16818

Start Date/Time: August 5, 2016 @ 1420h
Test Species: Daphnia magna
Set up by: YHL

Sample Information:

Sample ID: FR-ECL-Q-04072016-N
Sample Date: August 2, 2016
Date Received: August 4, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 071316B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 18
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16Na01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9 - 4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Aug 16, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: FR-ECI-2-04072016-N
 Work Order No.: 16818

Start Date/Time: August 5, 2016 @ 1420h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YK

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	No. Immobilized		Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)		
		24	48	0	24	48	0	24	48	0	24	48	0	48	
Control	A	10	10	0	20.0	20.0	20.0	8.8	9.0	8.9	7.6	7.9	7.9	354	370
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	20.5	20.0	20.0	9.0	8.9	9.0	8.1	8.2	8.0	1934	1991
	B	10	10	0											
	C	10	10	1000											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		<u>AS</u>	<u>AS</u>	<u>AS</u>	<u>YK</u>	<u>AS</u>	<u>AS</u>	<u>YK</u>	<u>AS</u>	<u>AS</u>	<u>YK</u>	<u>AS</u>	<u>AS</u>	<u>YK</u>	<u>AS</u>

Concentration	Hardness* (mg/L as CaCO3)	Alkalinity* (mg/L as CaCO3)
Control (MHW)	96	68
Highest conc.	960	92
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.5		
DO (mg/L)	9.0		
pH	8.1		
Cond (µS/cm)	1934		
Salinity (ppt)	1.0		

Comments: _____ Mortality: Heartbeat checked under microscope ND

Sample Description: slight green colour, clear, no odour, no particulates

Batch#: 071316B 7-d previous # young/brood: 18 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: YK Date reviewed: Aug 16, 2016

Daphnia magna Summary Sheet

Client: Teck (FRO)
Work Order No.: 16818

Start Date/Time: August 5, 2016 @ 1335h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: GH-CCI_Q_04072016_N
Sample Date: August 2, 2016
Date Received: August 4, 2016
Sample Volume: 2 x 20L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 071316A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 24
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16Na01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9 - 4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 100% mortality at 48h in the 100% (v/v) undiluted sample, tested at 20°C.

Reviewed by: [Signature]

Date reviewed: Aug 16, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: GH-CC1-Q-04072016-N
 Work Order No.: 10818

Start Date/Time: Aug 5/16 @ 1335h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YGL

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	20.0	20.0	20.0	8.8	8.7	8.8	7.6	7.7	7.9	354	349
	B	10	10	0											
	C	10	10	0											
	D														
100% (20°C)	A	10 ⁰	0 ⁰	0	20.0	20.0	20.0	9.0	8.7	9.0	7.4	8.1	7.9	3230	3160
	B	10 ⁰	0 ⁰	0											
	C	10 ⁰	0 ⁰	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		A	MS	AS	YML	AS	AS	YML	AS	AS	YML	AS	AS	YML	AS

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	96	68
Highest conc.	2340	502
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		
DO (mg/L)	9.0		
pH	7.4		
Cond (µS/cm)	3230		
Salinity (ppt)	1.7		

Comments: ① amphipods covered in ppt on bottom Mortality: Heartbeat checked under microscope yes

Sample Description: slight grey colour, slightly turbid, no odour, no particulates

Batch#: 071316A 7-d previous # young/brood: 24 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Aug 16, 2016

Daphnia magna Summary Sheet

Client: Teck (FRO)
Work Order No.: 16818

Start Date/Time: August 5, 2016 @ 1345h
Test Species: Daphnia magna
Set up by: YHL

Sample Information:

Sample ID: GH-CC1-Q-04072016-N
Sample Date: August 2, 2016
Date Received: August 4, 2016
Sample Volume: 2 x 20 L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 071316 A+B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 21
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16Na01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9 - 4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 53.3% mortality at 48h in the 100% (v/v) undiluted sample, tested at 10°C.

Reviewed by: [Signature]

Date reviewed: Aug. 16, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: GH-CC1-0407Q-04072016-N
 Work Order No.: 10818 JW

Start Date/Time: Aug 5/16 @ 1345h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YKL

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	11.0	11.0	11.0	9.4	10.3	10.5	7.6	7.9	7.8	350	359
	B	10	10	0											
	C	10	10	0											
	D														
100% (10°C)	A	10 ⁰	3 ⁰	3	11.0	11.0	11.0	9.8	10.5	12.8	7.4	7.9	8.0	3240	3240
	B	10 ⁰	7 ⁰	7											
	C	10 ⁰	4 ⁰	4											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		<u>AS</u>	<u>MS</u>	<u>AS</u>	<u>UML</u>	<u>AS</u>	<u>AS</u>	<u>UML</u>	<u>AS</u>	<u>AS</u>	<u>UML</u>	<u>AS</u>	<u>AS</u>	<u>UML</u>	<u>AS</u>

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO ₃)	
Control (MHW)	96	66
Highest conc.	2180	502
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	11.0		
DO (mg/L)	9.8		
pH	7.4		
Cond (µS/cm)	3240		
Salinity (ppt)	1.7		

Comments: ① some ppt buildup present on daphnials Mortality: Heartbeat checked under microscope Yes

Sample Description: slight grey colour, slightly turbid, no odour, no particulates

Batch#: 071316 7-d previous # young/brood: 21 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Aug 16, 2016

Daphnia magna Summary Sheet

Client: Teck (FRO)
Work Order No.: 16818

Start Date/Time: August 5, 2016 @ 1340h
Test Species: Daphnia magna
Set up by: ML

Sample Information:

Sample ID: GH-SCI-Q-04072016-N
Sample Date: August 2, 2016
Date Received: August 4, 2016
Sample Volume: 2 x 20L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 071316A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 24
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16Na01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9 - 4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample, tested at 20°C.

Reviewed by: 

Date reviewed: Aug 16, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: GH-SCI-R-04072016-N
 Work Order No.: 10818

Start Date/Time: Aug 5/16 @ 1340h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: YGL

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	20.0	20.0	20.0	8.8	8.9	8.7	7.6	7.9	7.8	354	370
	B	10	10	0	20.0										
	C	10	10	0											
	D														
100 * (20C)	A	10	10	0	20.0	20.0	20.0	9.1	8.9	8.8	7.7	8.1	7.9	2370	2360
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YGL	YGL	YGL	YGL	YGL	YGL	YGL	YGL	YGL	YGL	YGL	YGL	YGL	YGL

@ 20 °C

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO3)	
Control (MHW)	96	68
Highest conc.	1520	328
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		
DO (mg/L)	9.1		
pH	7.7		
Cond (µS/cm)	2370		
Salinity (ppt)	1.2		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: slight green colour, clear, no odour, no particulates.

Batch#: 071216A 7-d previous # young/brood: YGL 24 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: YGL Date reviewed: Aug 16, 2016

Daphnia magna Summary Sheet

Client: Teck (FRO)
Work Order No.: 16818

Start Date/Time: August 5, 2016 @ 1350h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: GH-Q1-Q-04072016-N
Sample Date: August 2, 2016
Date Received: August 4, 2016
Sample Volume: 2 x 20L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 071316A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 24
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16Na01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9 - 4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 23.3% mortality at 48h in the 100% (v/v) undisturbed sample, tested at 10°C.

Reviewed by: [Signature]

Date reviewed: Aug 16, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: CH SCI - 8 - 04072016 - N
 Work Order No.: 10818

Start Date/Time: Aug 5/16 @ 1350h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YGL

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	No. Immobilized		Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)		
		24	48	0	24	48	0	24	48	0	24	48	0	48	
Control	A	10	10	0	11.0	11.0	11.0	9.9	10.2	10.5	7.6	7.7	7.7	350	362
	B	10	10	0											
	C	10	10	0											
	D														
100 (10°C)	A	100	80	0	11.0	11.0	11.0	9.9	10.4	10.7	7.7	7.7	7.7	2380	2430
	B	100	80	0											
	C	100	70	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		A	AK	AD	YGL	AD	AD	YGL	AD	AD	YGL	AD	AD	YGL	AD

@ 10 °C

Concentration	Hardness* (mg/L as CaCO3)	Alkalinity* (mg/L as CaCO3)
Control (MHW)	96	66
Highest conc.	1460	306
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	11.0		
DO (mg/L)	9.9		
pH	7.7		
Cond (µS/cm)	2380		
Salinity (ppt)	1.2		

Comments: ① Leptinids on surface Mortality: Heartbeat checked under microscope Yes

Sample Description: slight green colour, clear, no odour, no particulates.

Batch#: 071316A 7-d previous # young/brood: 24 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Aug 16, 2016

Client: Teck

W.O.#: 16818

Hardness and Alkalinity Datasheet

Sample ID	Sample Date	Alkalinity				Hardness			Technician
		Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO 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)	
FR-EC1-a-04072016-N	Aug 5/16	50	45.8	5.0	92	100	9.6	960	KL
AH-CC1-a-e 10°C	↓	50	25.66	26.1	502	100	21.8	2180	↓
04072016-N e 20°C	↓	50	25.6	26.1	502	100	23.4	2340	↓
AH-SC1-a-e 10°C	↓	50	15.7	16.1	306	100	14.6	1460	↓
04072016-N e 20°C	↓	50	16.7	17.0	328	100	15.2	1520	↓
MHW (20°C)	Aug 5/16	50	3.5	3.6	68	50	4.8	96	YML
MHW (10°C)	↓	↓	3.4	3.5	66	↓	4.8	96	YML

Notes: ① Diluted to 100ml w/ DI water

Reviewed by: 

Date Reviewed: Aug 16, 2016

COC ID: **20160802-1413** TURNAROUND TIME: RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental			Report Format / Distribution	Excel	PDF	EDD	
Project Manager	Lee Wilm			Lab Contact				Email 1:	Lee.Wilm@teck.com	x	x	x
Email				Email				Email 2:	Neil.Macdonald@teck.com	x	x	x
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	teckcoal@equisonline.com			x
City	Elkford	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-865-5289			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED						
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	48 hr Daphnia Single Conc. Pass/Fail	48 hr Daphnia Single Conc. 10 deg C Pass/Fail	96 Hr Rainbow Trout Single Conc. Pass/Fail				
FR_ECI_Q_04072016_N	FR_ECI	WS		2016/08/02	10:21	G	1	1	x					1 x 20L - 17.1
GH_CCI_Q_04072016_N	GH_CCI	WS		2016/08/02	12:35	G	2	1	1	x				2 x 20L - 15.8
GH_SCI_Q_04072016_N	GH_SCI	WS		2016/08/02	12:51	G	2	1	1	x				2 x 20L - 15.8

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS: RELINQUISHED BY/AFFILIATION: DATE/TIME: ACCEPTED BY/AFFILIATION: DATE/TIME:

Neil Macdonald *Nautilus* *2016/08/02* *Neil Macdonald* *Aug 04/16 @ 10:10*

NY - Nan Yamamoto

(5x20L)

NB OF BOTTLES RETURNED/DESCRIPTION		Sampler's Name	Mobile #
Regular (default)	X	<i>Neil Macdonald</i>	<i>250 865 5204</i>
Priority (2-3 business days) - 50% surcharge			
Emergency (1 Business Day) - 100% surcharge			
For Emergency <1 Day, ASAP or Weekend - Contact ALS			
		Sampler's Signature	Date/Time
		<i>Neil Macdonald</i>	<i>Aug 12 2016</i>

Sample Description:

- ① Pale green, clear, no particulates, odourless
- ② Grey, slightly turbid, odourless, no particulates.
- ③ Pale green, clear, no particulates, odourless



Teck Coal / Fording River Operation
ATTN: Lee Wilm
P.O. Box 100
Elkford, BC
VOB 1H0

Report Date: August 18, 2016
Work Order: 16818b

Data Report

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 48-h *Daphnia magna* acute LC50 toxicity tests.

Sample ID	Collection Date and Time	48-h LC50 (%v/v) [95% CL]
GH_CC1_Q_04072016_N [tested at 20°C]	August 2, 2016 @ 1235h	82 [66.8 - 100]
GH_CC1_Q_04072016_N [tested at 10°C]	August 2, 2016 @ 1235h	>100

CL = Confidence Limits.

Sample GH_CC1 was retested with *D. magna* at 10°C and 20°C, as requested by the client, although the sample already exceeded the allowable 5-day holding period at the time of request and test initiation.

The control performance criteria of these retests were met and no other deviations from the test protocols were observed. The results presented in this report relate only to the sample tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Daphnia magna Summary Sheet

Client: Teck (FRO)
Work Order No.: 168185

Start Date/Time: August 9, 2016 @ 1525h
Test Species: Daphnia magna
Set up by: YHL

Sample Information:

Sample ID: GLCC1-Q_04072016-N
Sample Date: August 2, 2016
Date Received: August 4, 2016
Sample Volume: 2x 20L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 072016A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 24
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16Na01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results:

The 48h LC50 is estimated to be 82.0% (v/v), with 95% confidence limits of 66.8 to 100% (v/v), tested at 20°C

Reviewed by: 

Date reviewed: Aug 17, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (FRO)
 Sample ID: GH-CC1-Q-04072016-N
 Work Order No.: 1681806

Start Date/Time: August 9, 2016 @ 1520h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (20°C) (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	20.0	20.0	20.0	8.6	8.7	8.6	7.7	7.7	7.8	352	362
	B														
	C														
	D														
6.25	A	10	10	0	20.0	20.0	20.0	8.7	8.7	8.5	7.8	7.7	7.8	616	627
	B														
	C														
	D														
12.5	A	10	10	0	20.0	20.0	20.0	8.7	8.6	8.5	7.8	7.8	7.9	824	837
	B														
	C														
	D														
25	A	10	10	0	19.5	20.0	20.0	8.8	8.7	8.5	7.8	7.8	7.9	1167	1182
	B														
	C														
	D														
50	A	10	10 ^①	0	19.5	20.0	20.0	8.8	8.6	8.6	7.8	7.8	7.9	1928	1911
	B														
	C														
	D														
100	A	9	3 ^②	3	19.0	20.0	20.0	9.2	8.7	8.5	7.8	7.9	7.8	3210	3100
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO3)	
Control (MHW)	100	76
Highest conc.	2350	288
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.0		
DO (mg/L)	9.2		
pH	7.8		
Cond (µS/cm)	3210		
Salinity (ppt)	1.7		

Comments: ^①precipitate on surface ^②precipitate on surface + diatom bodies Mortality: Heartbeat checked under microscope Y-ES

Sample Description: slight grey colour, slightly turbid, no odour, no particulates

Batch#: 072016A 7-d previous # young/brood: 24 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Aug. 17, 2016

CETIS Analytical Report

Report Date: 17 Aug-16 13:35 (p 2 of 2)
Test Code: 16818b-20 | 14-9335-1637

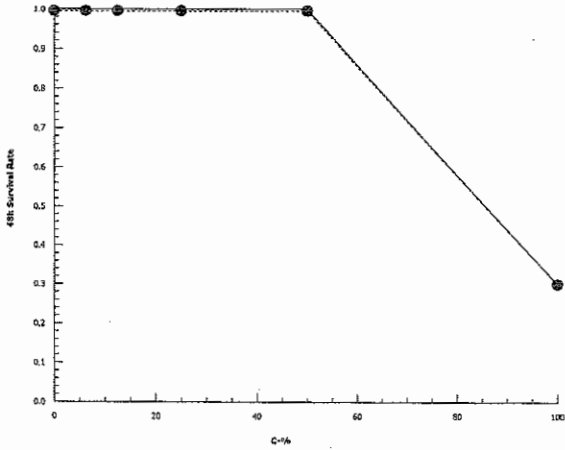
Daphnia magna 48-h Acute Survival Test

Nautilus Environmental

Analysis ID: 02-3321-3277 Endpoint: 48h Survival-Rate
Analyzed: 17 Aug-16 13:34 Analysis: Trimmed Spearman-Kärber

CETIS Version: CETISv1.8.7
Official Results: Yes

Graphics



[Signature]
Aug 17/16

Daphnia magna Summary Sheet

Client: Took (FRO)
Work Order No.: 168186

Start Date/Time: August 15, 2016 @ 1110h
Test Species: Daphnia magna
Set up by: YLC

Sample Information:

Sample ID: GHCCI_Q-04072016-N
Sample Date: August 2, 2016
Date Received: August 4, 2016
Sample Volume: 2 x 20L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 072716A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 28
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16NaCl
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: The 48h LC50 is estimated to be > 100% (v/v), tested at 10°C.

Reviewed by: [Signature]

Date reviewed: Aug 17/16

**Freshwater Acute
48 Hour Toxicity Test Data Sheet**

Client: Teck (FRO)
 Sample ID: WH-CC1-Q-04012016-N
 Work Order No.: 160186

Start Date/Time: August 15, 2016 @ 11:04h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (10°C) (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	11.0	10.5	11.0	10.6	10.7	10.8	7.6	7.6	7.6	350	355
	B														
	C														
	D														
6.25	A	10	10	0	11.0	10.5	11.0	10.7	10.8	10.9	7.6	7.6	7.7	570	586
	B														
	C														
	D														
12.5	A	10	10	0	11.0	10.5	11.0	10.7	10.8	10.9	7.7	7.6	7.8	784	818
	B														
	C														
	D														
25	A	10	10	0	11.0	10.5	11.0	10.8	10.7	10.8	7.7	7.7	7.9	1183	1216
	B														
	C														
	D														
50	A	10	10	0	11.0	10.5	11.0	10.7	10.8	10.9	7.6	7.8	8.0	1858	1918
	B														
	C														
	D														
100	A	9	6	6	11.0	10.3	11.0	10.9	10.7	10.9	7.6	7.9	7.9	3090	3130
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO3)	
Control (MHW)	98	74
Highest conc.	2310	372
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	11.0		
DO (mg/L)	10.9		
pH	7.6		
Cond (µS/cm)	3090		
Salinity (ppt)	1.6		

Comments: ① slight particulate on surface Mortality: Heartbeat checked under microscope yes

Sample Description: slight grey colour, slightly turbid, no odour, no particulates

Batch#: 072116A 7-d previous # young/brood: 28 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Aug 17, 2016

COC ID: **20160802-1413** TURNAROUND TIME: RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental			Report Format / Distribution	Excel	PDF	EDD	
Project Manager	Lee Wilm			Lab Contact				Email 1:	Lee.Wilm@teck.com	x	x	x
Email				Email				Email 2:	Neil.Macdonald@teck.com	x	x	x
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	teckcoal@equisonline.com			x
City	Elkford	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-865-5289			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED						
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	48 hr Daphnia Single Conc. Pass/Fail	48 hr Daphnia Single Conc. 10 deg C Pass/Fail	96 Hr Rainbow Trout Single Conc. Pass/Fail				
FR_ECI_Q_04072016_N	FR_ECI	WS		2016/08/02	10:21	G	1	1	x					1 x 20L - 17.1
GH_CCI_Q_04072016_N	GH_CCI	WS		2016/08/02	12:35	G	2	1	1	x				2 x 20L - 15.8
GH_SCI_Q_04072016_N	GH_SCI	WS		2016/08/02	12:51	G	2	1	1	x				2 x 20L - 15.8

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS: RELINQUISHED BY/AFFILIATION: *N. Macdonald* DATE/TIME: *2016/08/02* ACCEPTED BY/AFFILIATION: *Nautilus NY - Nan Yamamoto* DATE/TIME: *Aug 04/16 @ 10:10*

(5x20L)

NB OF BOTTLES RETURNED/DESCRIPTION		Sampler's Name	Mobile #
Regular (default)	X	<i>N. Macdonald</i>	250 865 5204
Priority (2-3 business days) - 50% surcharge			
Emergency (1 Business Day) - 100% surcharge			
For Emergency <1 Day, ASAP or Weekend - Contact ALS		Sampler's Signature	Date/Time
		<i>[Signature]</i>	<i>Aug 12 2016</i>

Sample Description:

- ① Pale green, clear, no particulates, odourless
- ② Grey, slightly turbid, odourless, no particulates.
- ③ Pale green, clear, no particulates, odourless



Teck Coal/ Fording River Operations
 ATTN: Lee Wilm
 P.O. Box 100
 Elkford, BC
 V0B 1H0

Report Date: August 17, 2016
 Work Order: 16825 – 16826

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 96-h rainbow trout acute single-concentration screening toxicity tests.

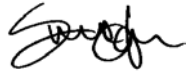
Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
FR_CC1_Q_04072016_N	August 3, 2016 @ 1059h	0
FR_SP1_Q_04072016_N	August 3, 2016 @ 0958h	0

Table 2. Results for the 48-h *Daphnia magna* acute single-concentration screening toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
FR_CC1_Q_04072016_N	August 3, 2016 @ 1059h	0
FR_SP1_Q_04072016_N [tested at 20°C]	August 3, 2016 @ 0958h	13.3
FR_SP1_Q_04072016_N [tested at 10°C]	August 3, 2016 @ 0958h	0

Sample FR_SP1 was also tested with *D. magna* at 10°C, which were concurrently initiated with the standard test (20°C), as requested by the client. No additional rainbow trout tests were conducted.

All control performance criteria were met and no deviations from the test protocols were observed. The results presented in this report relate only to the samples tested.



Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck

Start Date/Time: Aug 8 116 @ 0900h

Work Order No.: 16825

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: FR-CLQ-04072016-N
Sample Date: Aug 3 /16
Date Received: Aug 5 /16
Sample Volume: 1 X20 L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 11
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 071816a
Source: Aqua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.44
Mean Length ± SD (mm): 31 ± 1
Mean Weight ± SD (g): 0.44 ± 0.04

Range: 30 - 32
Range: 0.37 - 0.52

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn 45
Stock Solution ID: 15 Zn05
Date Initiated: Aug 1 /16
96-h LC50 (95% CL): 30.9 (23.3 - 40.9) µg/L Zn

Reference Toxicant Mean and Historical Range: 58.0 (29.4 - 114.4) µg/L Zn
Reference Toxicant CV (%): 40%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: 

Date reviewed: Aug 16, 2016

Rainbow Trout Summary Sheet

Client:

Teck

Start Date/Time:

Aug 8 116 @ 0900h

Work Order No.:

168265^{FR}

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID:

FR_SPI-Q-04072016-N

Sample Date:

Aug 3 /16

Date Received:

Aug 5 /16

Sample Volume:

2 X 20 L

Other:

/

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type:

Dechlorinated Municipal Tap Water

Hardness (mg/L CaCO₃):

11

Alkalinity (mg/L CaCO₃):

11

Test Organism Information:

Batch No.:

071816a

Source:

Aqua Farms

No. Fish/Volume (L):

10/10

Loading Density (g/L):

0.44

Mean Length ± SD (mm):

30 ± 1

Mean Weight ± SD (g):

0.44 ± 0.09

Range:

28 - 31

Range:

0.27 - 0.55

Zinc Reference Toxicant Results:

Reference Toxicant ID:

RTZn 45

Stock Solution ID:

15 ZnDS

Date Initiated:

Aug 1 /16

96-h LC50 (95% CL):

30.9 (23.3 - 40.9) µg/L Zn

Reference Toxicant Mean and Historical Range:

58.0 (29.4 - 114.4) µg/L Zn

Reference Toxicant CV (%):

40%

Test Results:

0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by:

[Signature]

Date reviewed:

Aug 16, 2016

Daphnia magna Summary Sheet

Client: Teck (FRO)
Work Order No.: 16826

Start Date/Time: August 8, 2016 @ 09:15h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: FR_CCI-Q-04072016-N
Sample Date: August 3, 2016
Date Received: August 5, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 072016A+B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 25
Mortality (%) in previous 7 d: 10
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16NaCl
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9 - 4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Aug 16, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: FR-CC1-Q-04072016-N
 Work Order No.: 16826

Start Date/Time: August 8, 2016 @ 0915h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YU

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	20.0	20.0	20.0	8.8	8.7	8.6	7.8	7.7	7.7	355	368
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	20.5	20.0	20.0	8.9	8.7	8.5	7.8	7.9	8.0	1476	1459
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YU	YU	YU	YU	YU	YU	YU	YU	YU	YU	YU	YU	YU	YU

Concentration	Hardness* (mg/L as CaCO ₃)	Alkalinity* (mg/L as CaCO ₃)
Control (MHW)	96	68
Highest conc.	820	232
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.5		
DO (mg/L)	8.9		
pH	7.8		
Cond (µS/cm)	1476		
Salinity (ppt)	0.7		

Comments: _____ Mortality: Heartbeat checked under microscope not req'd

Sample Description: clear, no colour, no odour, no particulates.

Batch#: 072016 A+B 7-d previous # young/brood: 25 Previous 7-d Mortality (%): 10 Day of 1st Brood: 9

Reviewed by: YU Date reviewed: Aug 16, 2016

Daphnia magna Summary Sheet

Client: Teck (FRO)
Work Order No.: 16826

Start Date/Time: August 8, 2016 @ 0920h
Test Species: Daphnia magna
Set up by: YHL

Sample Information:

Sample ID: FR SP1-Q 04072016-N
Sample Date: August 3, 2016
Date Received: August 5, 2016
Sample Volume: 2 x 20L

Test Validity Criteria:
≥ 90% mean control survival (no more than 2 mortalities in any control replicate)
WQ Ranges:
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 072016B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 26
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16Na01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9 - 4.1) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 13.3% mortality at 48h in the 100% (v/v) undiluted sample, tested at 20°C

Reviewed by: [Signature]

Date reviewed: Aug 16, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (FRO)
 Sample ID: FR SPI Q-04072016N
 Work Order No.: 16826

Start Date/Time: August 8, 2016 @ 0920h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	No. Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	20.0	20.0	20.0	8.8	8.7	8.5	7.8	7.7	7.7	355	373
	B	10	10	0											
	C	10	10	0											
	D														
100 (20°C)	A	100	100	0	20.0	20.0	20.0	8.7	8.8	8.6	7.2	7.7	7.8	1807	1195
	B	100	100	0										1343	
	C	100	60	1											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

Concentration	Hardness* (mg/L as CaCO ₃)	Alkalinity* (mg/L as CaCO ₃)
Control (MHW)	96	68
Highest conc.	730	470
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		
DO (mg/L)	8.7		
pH	7.2		
Cond (µS/cm)	1343		
Salinity (ppt)	0.7		

Comments: ① slight precipitate on organisms Mortality: Heartbeat checked under microscope YES

Sample Description: clear, no colour, no odour, no particulates.

Batch#: 072016B 7-d previous # young/brood: 26 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Aug. 16, 2016

Daphnia magna Summary Sheet

Client: Teck (FRO)
Work Order No.: 16826

Start Date/Time: August 8, 2016 @ 0925h
Test Species: Daphnia magna
Set up by: ML

Sample Information:

Sample ID: FR-SPI-12-04072016-N
Sample Date: August 3, 2016
Date Received: August 5, 2016
Sample Volume: 2 x 20 L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 072016B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 26
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16Na01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9 - 4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample, tested at 10°C

Reviewed by: 

Date reviewed: Aug 16, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (FRO)
 Sample ID: FR-SPI-G-04072016-N
 Work Order No.: 16826

Start Date/Time: August 8, 2016 @ 0925h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: YML

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	11.0	11.0	10.5	10.7	10.9	10.9	7.8	7.7	7.7	352	312
	B	10	10	0											
	C	10	10	0											
	D														
100 (10°C)	A	10	10 ⁰	0	11.0	11.0	10.5	10.9	10.8	10.9	7.1	7.8	7.9	1322	1251
	B	10	10 ⁰	0											
	C	10	10 ⁰	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

Concentration	Hardness* (mg/L as CaCO3)	Alkalinity* (mg/L as CaCO3)
Control (MHW)	96	66
Highest conc.	780	474
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	11.0		
DO (mg/L)	10.9		
pH	7.1		
Cond (µS/cm)	1322		
Salinity (ppt)	0.7		

Comments: Slight debris on organisms bodies, Mortality: Heartbeat checked under microscope not req'd
some organisms clumped together

Sample Description: clear, no colour, no odour, no particulates.

Batch#: 072016B 7-d previous # young/brood: 26 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Aug 16, 2016

COC ID: 20160803-1323

TURNAROUND TIME:

RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental			Report Format / Distribution	Excel	PDF	EDD	
Project Manager	Lee Wilm			Lab Contact				Email 1:	Lee.Wilm@teck.com	x	x	x
Email				Email				Email 2:	Neil.Macdonald@teck.com	x	x	x
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	teckcoal@equisonline.com			x
City	Elkford	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-865-5289			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED															
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	48 hr Daphnia Sinige Conc. Pass/Fail	48 hr Daphnia Sinige Conc. 10 deg C Pass/Fail	96 Hr Rainbow Trout Single Conc. Pass/Fail													
① FR_CCI_Q_04072016_N	FR_CCI	WS		2016/08/03	10:59	G	1	x		I												1x 20L	15.0
② FR_SPI_Q_04072016_N	FR_SPI	WS		2016/08/03	09:58	G	2	x	I	I												2x 20L	13.8
								wo # 16826		16825													Temp °C

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
sample description - ① clear, no colour, no odour, no particulates ② clear, no colour, no odour, no particulates	<i>[Signature]</i>	2016/08/03	Nautilus NY-Nain Yamamoto	Aug 05/16 @ 15:45
NB OF BOTTLES RETURNED/DESCRIPTION	Sampler's Name	Mobile #	Date/Time	
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	<i>[Signature]</i>	750 865 5204	2016/08/03	



Teck Coal / Fording River Operation
ATTN: Lee Wilm
P.O. Box 100
Elkford, BC
VOB 1H0

Report Date: August 18, 2016
Work Order: 16830

Data Report

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 48-h *Daphnia magna* acute LC50 toxicity tests.

Sample ID	Collection Date and Time	48-h LC50 (%v/v) [95% CL]
GH_CC1-WS-201608081334 [tested at 20°C]	August 8, 2016 @ 1334h	77.1 [67.2 - 88.4]
GH_CC1-WS-201608081334 [tested at 10°C]	August 8, 2016 @ 1334h	>100

CL = Confidence Limits.

Sample GH_CC1 was tested with *D. magna* at 10°C, which were concurrently initiated with the standard test (20°C), as requested by the client.

All control performance criteria were met and no deviations from the test protocols were observed. The results presented in this report relate only to the sample tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Daphnia magna Summary Sheet

Client: Teck (FRO)
Work Order No.: 16830

Start Date/Time: August 9, 2016 @ 1535h
Test Species: Daphnia magna
Set up by: ML

Sample Information:

Sample ID: GHCC1-WS-201608081334
Sample Date: August 8, 2016
Date Received: August 9, 2016
Sample Volume: 4 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 072016A+B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 25
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16Na01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results:

The 48h LC50 is estimated to be 77.1 % (v/v), with 95% confidence limits between 67.2 to 88.4 % (v/v), tested at 20°C

Reviewed by: ML

Date reviewed: Aug 17, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (FRO)
 Sample ID: GH-CC1-WS-201608081334
 Work Order No.: 16830

Start Date/Time: August 9, 2016 @ 1535h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (@ 20°C) (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	20.0	20.0	20.0	8.6	8.5	8.5	7.7	7.7	7.7	352	363
	B														
	C														
	D														
6.25%	A	10	10	0	20.0	20.0	20.0	8.6	8.4	8.4	7.8	7.7	7.8	619	629
	B														
	C														
	D														
12.5	A	10	10	0	20.0	20.0	20.0	8.7	8.5	8.5	7.9	7.8	7.9	832	855
	B														
	C														
	D														
25	A	10	10	0	20.0	20.0	20.0	8.6	8.5	8.4	8.0	7.8	8.1	1245	1257
	B														
	C														
	D			2											
50	A	10	10 ²	1	19.5	20.0	20.0	8.7	8.6	8.5	8.0	7.9	8.0	1971	1938
	B														
	C														
	D														
100	A	10 ⁰	2 ⁰	2	19.0	20.0	20.0	9.1	8.6	8.5	8.0	7.9	7.8	3270	3150
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO3)	
Control (MHW)	100	76
Highest conc.	2170	498
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.0		19.0
DO (mg/L)	9.9	(8 min)	9.1
pH	7.85	(aerated)	8.0
Cond (µS/cm)	3300		3270
Salinity (ppt)	1.7		1.7

Comments: ⁰ precipitate on bodies ⁰ precipitate on surface and oxygen bodies Mortality: Heartbeat checked under microscope yes

Sample Description: clear, no colour, no odour, no particulates

Batch#: 072016A13 7-d previous # young/brood: 25 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: YML Date reviewed: Aug 17, 2016

CETIS Analytical Report

Report Date: 17 Aug-16 13:26 (p 1 of 2)
 Test Code: 16830 | 17-9681-0436

Daphnia magna 48-h Acute Survival Test			Nautilus Environmental		
Analysis ID: 05-8997-5710	Endpoint: 48h Survival Rate	CETIS Version: CETISv1.8.7			
Analyzed: 17 Aug-16 13:26	Analysis: Trimmed Spearman-Kärber	Official Results: Yes			
Batch ID: 02-0431-4964	Test Type: Survival (48h)	Analyst: Yvonne Lam			
Start Date: 09 Aug-16 15:35	Protocol: EC/EPS 1/RM/14	Diluent: Mod-Hard Synthetic Water			
Ending Date: 11 Aug-16 15:15	Species: Daphnia magna	Brine:			
Duration: 48h	Source: In-House Culture	Age:			
Sample ID: 11-8687-5577	Code: 46BE48B9	Client: Teck Coal			
Sample Date: 08 Aug-16 13:34	Material: Water Sample	Project:			
Receive Date: 09 Aug-16 12:10	Source: Teck Coal (TECK COAL)				
Sample Age: 26h (14.8 °C)	Station: GH_CC1-WS-201608081334				

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0	20.00%	1.887	0.02975	77.11	67.24	88.43

48h Survival Rate Summary

C-%	Control Type	Count	Calculated Variate(A/B)								
			Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	1	1	1	1	0	0	0.0%	0.0%	10	10
6.25		1	1	1	1	0	0	0.0%	0.0%	10	10
12.5		1	1	1	1	0	0	0.0%	0.0%	10	10
25		1	1	1	1	0	0	0.0%	0.0%	10	10
50		1	1	1	1	0	0	0.0%	0.0%	10	10
100		1	0.2	0.2	0.2	0	0	0.0%	80.0%	2	10

48h Survival Rate Detail

C-%	Control Type	Rep 1
0	Negative Control	1
6.25		1
12.5		1
25		1
50		1
100		0.2

48h Survival Rate Binomials

C-%	Control Type	Rep 1
0	Negative Control	10/10
6.25		10/10
12.5		10/10
25		10/10
50		10/10
100		2/10

Yvonne Lam
 Aug 17/16

CETIS Analytical Report

Report Date: 17 Aug-16 13:26 (p 2 of 2)
Test Code: 16830 | 17-9681-0436

Daphnia magna 48-h Acute Survival Test

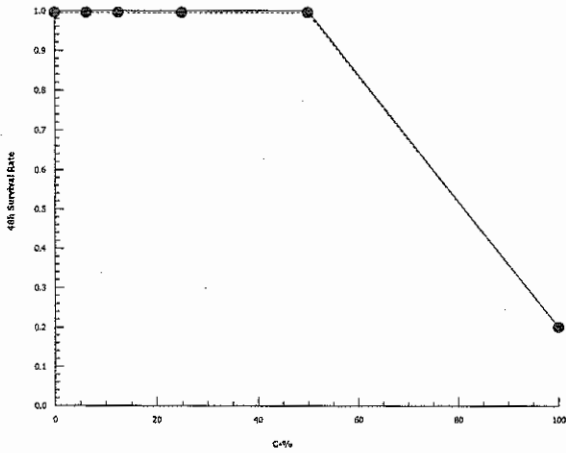
Nautilus Environmental

Analysis ID: 05-8997-5710
Analyzed: 17 Aug-16 13:26

Endpoint: 48h Survival Rate
Analysis: Trimmed Spearman-Kärber

CETIS Version: CETISv1.8.7
Official Results: Yes

Graphics



[Signature]
Aug 17/16

Daphnia magna Summary Sheet

Client: Teck (FRO)
Work Order No.: 16830

Start Date/Time: August 9, 2016 @ 1540h
Test Species: Daphnia magna
Set up by: YHL

Sample Information:

Sample ID: GH_LCCI_WS-201608081334
Sample Date: August 8, 2016
Date Received: August 9, 2016
Sample Volume: 4 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 072016B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 26
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16NA01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: The 48h LC50 is estimated to be >100% CVL, tested at 10°C.

Reviewed by: [Signature]

Date reviewed: Aug 17, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (FRO)
 Sample ID: GH-CC1-ws-201608081334
 Work Order No.: 16830

Start Date/Time: August 9, 2016 @ 1540h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YMC

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (@ 10°C) (% v/v)	Number of Live Organisms Rep	Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	11.5	10.5	10.5	10.3	10.8	11.0	7.6	7.7	7.7	348	352
	B														
	C														
	D														
6.25	A	10	10	0	11.5	10.5	10.5	10.2	10.7	10.9	7.6	7.7	7.8	605	612
	B														
	C														
	D														
12.5	A	10	10	0	11.5	10.5	10.5	10.2	10.8	11.0	7.7	7.8	7.9	830	845
	B														
	C														
	D														
25	A	10	10	0	11.5	10.5	10.5	10.2	10.7	11.0	7.8	7.8	8.0	1242	1257
	B														
	C														
	D														
50	A	10	10	0	11.5	10.5	10.5	10.2	10.8	10.9	7.9	7.9	8.1	1982	1999
	B														
	C														
	D														
100	A	10 ⁰	8 ⁰	8	11.5	10.5	10.5	10.3	10.7	10.8	7.9	7.9	7.9	3310	3270
	B														
	C														
	D														
Technician Initials		YMC	YMC	YMC	YMC	YMC	YMC	YMC	YMC	YMC	YMC	YMC	YMC	YMC	YMC

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO3)	
Control (MHW)	100	74
Highest conc.	2430	488
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	11.5		
DO (mg/L)	10.3		
pH	7.9		
Cond (µS/cm)	3310		
Salinity (ppt)	1.7		

Comments: ¹precipitate on bodies organisms near bottom Mortality: Heartbeat checked under microscope Yes
²precipitate on bodies on surface.

Sample Description: clear, no colour, no odour, no particulates.

Batch#: 072016B 7-d previous # young/brood: 26 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Aug 17, 2016

COC ID: 20160808-1406

TURNAROUND TIME:

RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental			Report Format / Distribution	Excel	PDF	EDD	
Project Manager	Lee Wilm			Lab Contact				Email 1:	Lee.Wilm@teck.com	x	x	x
Email				Email				Email 2:	Neil.Macdonald@teck.com	x	x	x
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	teckcoal@equisonline.com			x
City	Elkford	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-865-5289			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED													
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PH	PRECIP	ANALYSIS											
GH_CCI-WS-201608081334	GH_CCI	WS		2016/08/08	13:34	G	4			48 hr LCSO for Daphnia m. 10 deg	2										
										48 hr LCSO for Daphnia m. 20 deg	2										148
										WO # 16830											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	REINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	<i>[Signature]</i>	2016/08/08	Nautilus NY - Nain Yamamoto	Aug 09/16 @ 12:10 4x1L Temp - 14.8°C

NO. OF BOTTLES RETURNED/DESCRIPTION	Sampler's Name	Mobile #	Date/Time
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	<i>[Signature]</i>	250 865 5204	Aug 8 2016



Acute Toxicity Test Results

Sample collected October 5, 2016

Final Report

March 29, 2017

Submitted to: **Teck Coal / Fording River Operations**
Elkford, BC

SAMPLE INFORMATION

Sample ID	Dates				Receipt temp.
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> test initiation	
FR_CC1_Q_03102016_N	05-Oct-16 at 1205h	06-Oct-16 at 1225h	06-Oct-16 at 1545h	06-Oct-16 at 1400h	11.6°C

TESTS

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test

RESULTS

Toxicity test results

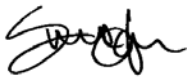
Sample ID	Percent mortality in 100% (v/v) sample	
	Rainbow trout	<i>Daphnia magna</i>
FR_CC1_Q_03102016_N	0	0

Data for all samples listed on the chain of custody have been provided in a separate report.

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CI)	70.7 (52.0 – 96.3) µg/L Zn ¹	4.2 (3.7 – 4.8) g/L NaCl ²
Reference toxicant historical mean (2 SD range)	63.9 (25.2 – 162.1) µg/L Zn	4.1 (3.0 – 5.4) g/L NaCl
Reference toxicant CV	59%	16%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹ Test date: September 28, 2016; ² Test Date: October 12, 2016, LC = Lethal Concentration, SD = Standard Deviation, CV = Coefficient of Variation



Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio
Senior Analyst

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) single concentration test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquarium
Test volume	10 to 20 L (depending on size of fish)
Test solution depth	≥15 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tapwater
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Zinc (added as ZnCl ₂)

Table 2. Summary of test conditions: 48-h *Daphnia magna* single concentration test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: Teck Coal (FRO)

Start Date/Time: Oct 6 116 @ 1345h

Work Order No.: 161078

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: FR-CC1-Q-03102016-N
Sample Date: Oct 5 / 16
Date Received: Oct 6 / 16
Sample Volume: 1 x 20L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 091416
Source: Miracle Springs
No. Fish/Volume (L): 10/12
Loading Density (g/L): 0.30
Mean Length ± SD (mm): 29 ± 3
Mean Weight ± SD (g): 0.37 ± 0.13

Range: 24 - 34
Range: 0.19 - 0.63

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn50
Stock Solution ID: 16Zn02
Date Initiated: Sept 28/16
96-h LC50 (95% CL): 70.7 (52.0 - 96.3) mg/L Zn

Reference Toxicant Mean and Historical Range: 63.9 (25.2 - 162.1) mg/L Zn
Reference Toxicant CV (%): 59%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: A. Terry

Date reviewed: October 20, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Telck Coal (FRO)
 Sample I.D.: FR-CCI-Q-03102016-N
 W.O. #: 161078
 RBT Batch #: 091416
 Date Collected/Time: Oct 5/16 @ 1205h
 Date Setup/Time: Oct 6/16 @ 1345h
 Sample Setup By: EC

Number Fish/Volume: 10/12 L
 7-d % Mortality: 1.4
 Total Pre-aeration Time (mins): 45
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER# 2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	15.0	/	15.0
pH	7.1	/	7.9
D.O. (mg/L)	10.4	/	10.1
Cond. (µS/cm)	1209	/	1209
Salinity (ppt)	0.6	/	0.6

Concentration (% v/v)	# Survivors								Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
C+1				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.9	9.7	9.8	9.8	9.9	7.0	7.1	6.9	7.0	7.0	32	38	
100				10	10	10	10	15.0	15.0	15.0	15.0	15.0	10.0	9.9	9.9	9.9	9.9	7.9	8.0	8.1	8.2	8.2	1209	1230	
Initials				UNW	AS	AS	EL	EC	UNW	AS	AS	EL	EC	UNW	AS	AS	EL	EC	UNW	AS	AS	EL	EC	EL	

Sample Description/Comments: Grey, turbid, some particulates, odorless

Fish Description at 96 h: All fish appear normal Number of Stressed Fish at 96 h: 0

Other Observations: _____

Reviewed by: A. Tong

Date Reviewed: October 20, 2016

Daphnia magna Summary Sheet

Client: Teck (FRO)
Work Order No.: 161077

Start Date/Time: October 6, 2016 @ 1400h
Test Species: Daphnia magna
Set up by: NL/AWD

Sample Information:

Sample ID: FR-CC1-Q-03102016-N
Sample Date: October 5, 2016
Date Received: October 6, 2016
Sample Volume: 2 x 20L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 092116A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 25
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC40
Stock Solution ID: 16NaO2
Date Initiated: October 12, 2016
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.0-5.4) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: A. Terry

Date reviewed: October 20, 2016

**Freshwater Acute
48 Hour Toxicity Test Data Sheet**

Client: TRUCK (FRD)
 Sample ID: FR-CC1-a-03102016-N
 Work Order No.: 161077

Start Date/Time: October 6, 2016 @ 1400h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: MCL/AWD

Thermometer: CER#5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	20.0	19.5	19.5	8.6	8.5	8.0	7.6	7.6	7.7	355	380
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	20.5	19.5	19.5	9.1	8.5	8.2	7.7	7.9	7.9	661	1241
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		MCL	AWD	A	MCL	MCL	A	MCL	MCL	A	MCL	MCL	A	MCL	A

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO3)	
Control (MHW)	100	68
Highest conc.	780	232
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.5		
DO (mg/L)	9.1		
pH	7.7		
Cond (µS/cm)	661		
Salinity (ppt)	0.3		

Comments: _____ Mortality: Heartbeat checked under microscope ND

Sample Description: slight grey colour, turbid, no odour, some particulates

Batch#: 092116A 7-d previous # young/brood: 25 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: A. Terry Date reviewed: October 20, 2016

Client: Teck

W.O.#: 161077

Hardness and Alkalinity Datasheet

Sample ID	Alkalinity						Hardness			
	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO 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-CL-Q-03102016-N	Oct. 5/16	Oct. 6/16	50	12.1	12.6	232	10 ^①	7.8	780	YWL
FR-EC1-Q-03102016-N	Oct. 5/16	Oct. 6/16	50	11.9	12.2	232	10 ^①	15.8	1580	YWL
MHW	Oct. 6/16	Oct. 6/16	50	3.5	3.6	68	50	5.0	100	YWL

Notes: ① Diluted to 100 mL w/ DI water

Reviewed by: A. Teng

Date Reviewed: October 20, 2016

APPENDIX C – Chain-of-custody form

COC ID: 20161005-1528

TURNAROUND TIME:

RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	Nautilis Environmental			Report Format / Distribution #	Excel	PDF	EDD	
Project Manager	Lee Wilm			Lab Contact				Email 1:	lee.wilm@teck.com	x	x	x
Email				Email				Email 2:	Nell.Macdonald@teck.com	x	x	x
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	teckcoal@equisonline.com			x
City	Elkford	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-865-5289			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED													
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	48 hr Daphnia Single Conc. Pass/Fail	96 Hr Rainbow Trout Single Conc. Pass/Fail												
1) FR_CC1_Q_03102016_N	FR_CC1	WS		2016/10/05	12:05	G	1	x	1												11.6
2) FR_EC1_Q_03102016_N	FR_EC1	WS		2016/10/05	12:35	G	1	x	1												11.6

wo # 161077
161078

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
1) Grey turbid, some particulates, odourless 2) Clear, colorless, no particulates, odourless.	Nell Macdonald	2016/10/05	Nautilis NY - Nan Ya Manoh 2X20L	Oct 06/16 @ 12:25

NB OF BOTTLES RETURNED/DESCRIPTION	Sampler's Name	Mobile #
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	Nell Macdonald	250 865 5204
	Sampler's Signature	Date/Time
		2016/10/05

END OF REPORT



Acute Toxicity Test Results

Samples collected November 15, 2016

Final Report

November 30, 2016

Submitted to: **Teck Coal / Fording River Operations**
Elkford, BC

SAMPLE INFORMATION

Sample ID	Dates				Receipt temp.
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> test initiation	
FR_SP1_Q_03102016_N	15-Nov-16 at 1005h	16-Nov-16 at 1000h	17-Nov-16 at 1340h	16-Nov-16 at 1615h	4.8°C
GH_CC1_Q_03102016_N	15-Nov-16 at 1113h	16-Nov-16 at 1000h	17-Nov-16 at 1340h	16-Nov-16 at 1620h ¹ / 21-Nov-16 at 1610h ²	4.5°C
GH_SC1_Q_03102016_N	15-Nov-16 at 1125h	16-Nov-16 at 1000h	18-Nov-16 at 1545h	16-Nov-16 at 1605h	4.5°C

¹ Single-concentration tests; ² LC50 test

TESTS

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test – samples FR_SP1 and GH_CC1 also tested with *D. magna* at 10°C as requested by the client, and initiated concurrently with standard test exposure of 20°C
- *Daphnia magna* 48-h LC50 test

RESULTS

Toxicity test results

Sample ID	Percent mortality in 100% (v/v) sample		
	Rainbow trout	<i>Daphnia magna</i>	
		20°C	10°C
FR_SP1_Q_03102016_N	0	37	3
GH_CC1_Q_03102016_N	0	100	10
GH_SC1_Q_03102016_N	0	0	n/a

n/a = not applicable

Based on the preliminary results, the client requested an additional *D. magna* LC50 test on the same GH_CC1 sample tested earlier. Consequently, the LC50 toxicity test was initiated on the sample past the required five-day sample hold time required under the protocol.

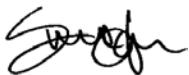
Sample ID	48-h LC50 (% v/v) <i>Daphnia magna</i>
GH_CC1_Q_03102016_N	>100

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CI)	40.6 (34.1 – 48.4) µg/L Zn ¹	3.9 (2.8 – 5.5) g/L NaCl ²
Reference toxicant historical mean (2 SD range)	60.8 (22.0 – 167.6) µg/L Zn	4.1 (3.1 – 5.5) g/L NaCl
Reference toxicant CV	66%	16%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None for standard screening tests ³
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹ Test date November 14, 2016; ² Test date November 23, 2016

³ Additional screening test is normally conducted at 10±2°C as part of the project study. An LC50 test was performed on the GH_CC1_Q_03102016_N sample, as requested by client, with confirmation that the sample holding time requirement would be exceeded by a day at the time of test initiation.



Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio
Senior Analyst

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) single concentration test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquarium
Test volume	10 to 20 L (depending on size of fish)
Test solution depth	≥15 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tapwater
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Zinc (added as ZnCl ₂)

Table 2. Summary of test conditions: 48-h *Daphnia magna* single concentration test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C ¹
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

¹ Additional test is normally conducted at 10±2°C as part of a particular study plan for the client.

Table 3. Summary of test conditions: 48-h *Daphnia magna* LC50 test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	Five concentrations, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Statistical software	CETIS Version 1.8.7
Test endpoints	Survival (48-hour LC50)
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: Teck Coal

Start Date/Time: Nov 17, 116 @ 1340h

Work Order No.: 161244a

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: FR_SPL_Q-03102016_N
Sample Date: Nov 15 116
Date Received: Nov 16 116
Sample Volume: 2 X 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 4

Test Organism Information:

Batch No.: 110116
Source: AK Vancouver Island Trout Hatchery
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.26
Mean Length ± SD (mm): 31 ± 1 Range: 30 - 32
Mean Weight ± SD (g): 0.31 ± 0.02 Range: 0.27 - 0.33

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn54
Stock Solution ID: 16Zn02
Date Initiated: Nov 14/116
96-h LC50 (95% CL): 40.6 (34.1-48.4) µg/L

Reference Toxicant Mean and Historical Range: 60.8 (22.0-167.6) µg/L Zn
Reference Toxicant CV (%): 66.1%

Test Results: 100% survival at 96 hours in the undiluted
100% (v/v) sample. 0% mortality at 96h in the
undiluted 100% (v/v) sample.

Reviewed by: [Signature] Date reviewed: Nov-28, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal
 Sample I.D. FR-SPI-Q-03102016-N
 W.O. # 1612449
 RBT Batch #: 110116
 Date Collected/Time: Nov 15/16 @ 1005h
 Date Setup/Time: Nov 17/16 @ 1340h
 Sample Setup By: EC

Number Fish/Volume: 10/12L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER#2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
D.O. (mg/L)	10.2	/	10.3
pH	7.4	/	7.6
Cond. (µS/cm)	1356	/	1356
Salinity (ppt)	0.7	/	0.7

Concentration (% v/v)	# Survivors							Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
6.1				10	10	10	10	14.0	15.0	14.5	14.5	15.0	10.1	9.8	9.8	9.7	9.8	6.8	6.9	6.9	7.0	6.9	26	31
100				10	10	10	10	14.0	15.0	14.5	14.5	15.0	10.3	9.8	9.9	9.8	9.9	7.6	8.5	8.4	8.4	8.2	1356	1098
Initials				EL	AS	AS	EL	EC	EL	AS	AS	EL	EC	EL	AS	AS	EL	EL	EL	EL	AS	AS	EL	EL

Sample Description/Comments: clear, colorless, no odour, no particulate

Fish Description at 96 h All fish appear normal Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: [Signature] Date Reviewed: Nov. 28, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal

Start Date/Time: Nov 17, 116 @ 1340h

Work Order No.: 161244a

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-CC1-Q-03102016-N
Sample Date: Nov 15 116
Date Received: Nov 16 116
Sample Volume: 2 x 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 4

Test Organism Information:

Batch No.: 110116
Source: AK Vancouver Island Trout Hatchery
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.28
Mean Length ± SD (mm): 32 ± 1 Range: 30 - 34
Mean Weight ± SD (g): 0.33 ± 0.05 Range: 0.28 - 0.43

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn54
Stock Solution ID: 16Zn02
Date Initiated: Nov 14 116
96-h LC50 (95% CL): 40.6 (34.1-48.4) µg/L

Reference Toxicant Mean and Historical Range: 60.8 (22.0-167.6) µg/L Zn
Reference Toxicant CV (%): 66.1%

Test Results: 100% survival at 96 hours in the undiluted 100% (v/v) sample - 0% mortality at 96h in the undiluted 100% (w/w) sample.

Reviewed by: [Signature]

Date reviewed: Nov. 28, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Telec Coal
 Sample I.D.: GH-CC1-Q-03102016-N
 W.O. #: 161249
 RBT Batch #: 110116
 Date Collected/Time: Nov 15/16 @ 113h
 Date Setup/Time: Nov 17/16 @ 1340h
 Sample Setup By: EC

Number Fish/Volume: 10/12 L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 70
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER#2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
D.O. (mg/L)	10.1	/	10.0
pH	7.8	/	7.9
Cond. (µS/cm)	3350	/	3350
Salinity (ppt)	1.7	/	1.7

Concentration (% v/v)	# Survivors								Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
41				10	10	10	10	14.0	15.0	14.5	14.5	15.0	9.9	9.9	9.8	9.8	9.9	6.8	6.9	6.9	7.0	7.0	26	31	
100				10	10	10	10	14.0	15.0	14.5	14.5	15.0	10.0	9.8	9.7	9.8	9.8	7.9	8.2	8.3	8.4	8.4	3350	3050	
Initials				EC	AS	AS	EC	EC	EC	AS	AS	EC	EC	EC	AS	AS	EC	EC	EC	EC	AS	AS	EC	EC	EC

Sample Description/Comments: Clear, colorless, No particulates, odorless

Fish Description at 96 h: All fish appear normal! Number of Stressed Fish at 96 h: 0

Other Observations: _____

Reviewed by: [Signature] Date Reviewed: Nov 28, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal

Start Date/Time: Nov 18 116 @ 1545h

Work Order No.: 161244a

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-SCL-2-05102016-N
Sample Date: Nov 15 116
Date Received: Nov 16 116
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 4

Test Organism Information:

Batch No.: 110116
Source: AK Vancouver Island Trout Hatchery
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.26
Mean Length ± SD (mm): 31 ± 1 Range: 30 - 31
Mean Weight ± SD (g): 0.31 ± 0.03 Range: 0.27 - 0.35

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn54
Stock Solution ID: 16Zn02
Date Initiated: Nov 14/16
96-h LC50 (95% CL): 40.6 (34.1 - 48.4) µg/L

Reference Toxicant Mean and Historical Range: 60.8 (22.0 - 167.6) µg/L Zn
Reference Toxicant CV (%): 66.1%

Test Results: 100% survival
100% mortality at 96 hours in the undiluted 100% (v/v) sample. 0% mortality at 96h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature] Date reviewed: Nov 28, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal
 Sample I.D.: GH-SCI-a-03102016-N
 W.O. #: 1612443
 RBT Batch #: 110116
 Date Collected/Time: Nov 12/16 @ 1125h
 Date Setup/Time: Nov 16/16 @ 1545h
 Sample Setup By: EC

Number Fish/Volume: 10/12 L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER#2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
D.O. (mg/L)	9.9	/	10.0
pH	8.1	/	8.1
Cond. (µS/cm)	2560	/	2560
Salinity (ppt)	1.2	/	1.3

Concentration (% v/v)	# Survivors								Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
CT1				10	10	10	10	14.0	14.0	14.0	15.0	15.0	10.0	9.9	9.7	9.9	9.8	6.7	6.7	6.9	6.9	6.8	27	31	
100				10	10	10	10	14.0	14.0	14.0	15.0	15.0	10.0	9.8	9.9	9.7	9.9	8.1	8.2	8.3	8.4	8.1	2560	252450	
Initials				Am	Am	EL	EL	EC	Am	Am	EL	EL	EC	Am	Am	EL	EL	EL	Am	Am	EL	EL	EL	EC	EC

Sample Description/Comments: Grey, slightly turbid, some particulates, no odor

Fish Description at 96 h: All fish appear normal Number of Stressed Fish at 96 h: 0

Other Observations: _____

Reviewed by: [Signature] Date Reviewed: Nov 28, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 161245 a

Start Date/Time: November 16, 2016 e/1615h
Test Species: Daphnia magna
Set up by: YAL

Sample Information:

Sample ID: FRI-SPL-Q-03102016-N
Sample Date: November 15, 2016
Date Received: November 16, 2016
Sample Volume: 2 x 20L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 102616B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 19
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC4X2
Stock Solution ID: 16NaO2
Date Initiated: November 23, 2016
48-h LC50 (95% CL): 4.5 (2.8 - 5.4) g/L NaCl
3.9 (2.8 - 5.5)
Reference Toxicant Mean and Historical Range: 4.1 (3.1 - 5.5) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: 36.7% mortality at 40h in the 100% (v/v) undiluted sample, tested at 20°C.

Reviewed by: [Signature]

Date reviewed: Nov-28, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: FR-SA-Q-03102016-N
 Work Order No.: 161245a

Start Date/Time: November 16, 2016 @ 16:5h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: ML

Thermometer: temp-5 DO meter: DO-3 pH meter: pH-3 Cond./Salinity: C-3

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	19.0	19.0	18.5	8.6	8.4	8.3	7.6	7.6	7.7	352	359
	B	10	10	0											
	C	10	10	0											
	D														
100 (20°C)	A	100	80	18	18.5	19.0	18.5	9.0	8.3	8.2	7.3	7.7	8.0	1374	1258
	B	100	60	6											
	C	100	50	5											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		ML	ML	ML	ML	ML	ML	ML	ML	ML	ML	ML	ML	ML	ML

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	96	66
Highest conc.	770	300
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.5		18.5
DO (mg/L)	9.8	(5 min aeration)	9.0
pH	7.3		7.3
Cond (µS/cm)	1370		1374
Salinity (ppt)	0.7		0.7

Comments: 0 organisms on surface 0 precipitate Mortality: Heartbeat checked under microscope Yes
at organisms bodies

Sample Description: clear, no colour, no odour, no particulates.

Batch#: 102616B 7-d previous # young/brood: 19 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: ML Date reviewed: Nov-28, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 161245a

Start Date/Time: November 16, 2016 @ 1615h
Test Species: Daphnia magna
Set up by: YAC

Sample Information:

Sample ID: FR-911-Q-03102016-N
Sample Date: November 15, 2016
Date Received: November 16, 2016
Sample Volume: 2 x 20L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 102616B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 19
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC4X2
Stock Solution ID: 16NaO2
Date Initiated: November 23, 2016
48-h LC50 (95% CL): 4.5 (3.8 - 5.4) g/L NaCl
3.9 (2.8 - 5.5)
Reference Toxicant Mean and Historical Range: 4.1 (3.1 - 5.5) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: 3% mortality at 48h in the 100% (v/v) undiluted sample, tested at 10°C

Reviewed by: [Signature]

Date reviewed: Nov 28, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: FRSPT-Q-03102016-N
 Work Order No.: 161245a

Start Date/Time: November 16, 2016 @ 16:50h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	10.5	10.0	10.5	9.8	10.5	10.6	7.6	7.6	7.6	350	352
	B	10	10	0											
	C	10	10	0											
	D														
100 (10°C)	A	100	100	2	11.5	10.0	10.5	10.7	10.6	10.4	7.3	7.6	8.0	1360	1318
	B	100	100	1											
	C	100	100	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML/YML		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCo3)	
Control (MHW)	98	68
Highest conc.	850	496
Hardness adjusted	—	—

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	11.5		
DO (mg/L)	10.7		
pH	7.3		
Cond (µS/cm)	1360		
Salinity (ppt)	0.7		

Comments: 0 organisms on surface ^{slight} Mortality: Heartbeat checked under microscope Yes

Sample Description: clear, no colour, no precipitate on surface, no odour, no particulates

Batch#: 102616AB 7-d previous # young/brood: 19 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Nov 28, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 161245 a

Start Date/Time: November 16, 2016 @ 1620h
Test Species: Daphnia magna
Set up by: Nuc

Sample Information:

Sample ID: GH-CC1-Q-03102016-N
Sample Date: November 15, 2016
Date Received: November 16, 2016
Sample Volume: 2 x 20L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 1026163
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 19
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC4X2
Stock Solution ID: 16NaO2
Date Initiated: November 23 2016
48-h LC50 (95% CL): 4.5 (3.8 - 5.4) g/L NaCl
3.9 (2.8 - 5.5)
Reference Toxicant Mean and Historical Range: 4.1 (3.1 - 5.5) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: 100% mortality at 48h TA the 100% (w) undiluted sample, tested at 20°C.

Reviewed by: [Signature]

Date reviewed: Nov 28, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: GH-CC1-Q-02102016-N
 Work Order No.: 161245 a

Start Date/Time: November 16, 2016 @ 1620h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-3 pH meter: pH-3 Cond./Salinity: C-3

Concentration (% v/v)	Number of Live Organisms Rep	No. Immobilized			Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48	48	0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.0	19.0	19.5	8.6	8.4	8.3	7.6	7.6	7.5	352	361
	B	10	10	0											
	C	10	10	0											
	D														
100 (20°)	A	100	00	0	18.0	19.0	18.5	9.3	8.5	8.2	7.8	7.6	7.8	3430	3250
	B	100	00	0											
	C	100	00	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	96	66
Highest conc.	3400	456
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.0		18.0
DO (mg/L)	10.1	(6 min)	9.3
pH	7.8	(aeration)	7.8
Cond (µS/cm)	3420		3430
Salinity (ppt)	1.8		1.8

Comments: 0 organisms on container bottom w/ precipitate on bottles. Mortality: Heartbeat checked under microscope yes

Sample Description: clear, no colour, no odour, no particulates

Batch#: 102616B 7-d previous # young/brood: 19 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Nov. 28, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 161245 a

Start Date/Time: November 16, 2016 @ 1620h
Test Species: Daphnia magna
Set up by: YVL

Sample Information:

Sample ID: GH-CC1-Q-03102016-N
Sample Date: November 15, 2016
Date Received: November 16, 2016
Sample Volume: 2 x 20L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 102616B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 19
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC412
Stock Solution ID: 16NaO2
Date Initiated: November 23, 2016
48-h LC50 (95% CL): 4.5 (3.8-5.4) g/L NaCl
3.9 (2.8-5.5)
Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: 10% mortality at 48h in the 100% (v/v) undiluted sample, tested at 10°C.

Reviewed by: [Signature]

Date reviewed: Nov. 28, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: GH-CC1-Q-03102016-N
 Work Order No.: 161248 a

Start Date/Time: November 16, 2016 @ 1620h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	10.5	10.0	10.5	9.8	10.4	10.2	7.6	7.6	7.6	350	356
	B	10	10	0											
	C	10	10	0											
	D														
100 (10°C)	A	10	100	8	11.5	10.0	10.5	10.5	10.5	10.4	7.8	7.7	7.8	3420	3370
	B	10	70	7											
	C	10	100	9											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	98	68
Highest conc.	3900	512
Hardness adjusted	—	—

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	11.5		
DO (mg/L)	10.5		
pH	7.8		
Cond (µS/cm)	3420		
Salinity (ppt)	1.8		

Comments: ① slight precipitate on surface Mortality: Heartbeat checked under microscope yes

Sample Description: precipitate on organisms bodies
clear, no colour, no colour, no particulates

Batch#: 102616B 7-d previous # young/brood: 19 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: YML Date reviewed: Nov. 28, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 161245a

Start Date/Time: November 16, 2016 @ 1605h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: GLSCI-Q-03102016-N
Sample Date: November 15, 2016
Date Received: November 16, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 101916B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 19
Mortality (%) in previous 7 d: 0
Days to first brood: 8

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC4^x2
Stock Solution ID: 16NaO₂
Date Initiated: November 23, 2016
48-h LC50 (95% CL): 4.5 (3.8 - 5.4) ^{na} g/L NaCl
3.9 (2.8 - 5.5)
Reference Toxicant Mean and Historical Range: 4.1 (3.1 - 5.5) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Nov. 28, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: GH-SC1-Q-03102016-N
 Work Order No.: 161245a

Start Date/Time: November 16, 2016 @ 1605h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-3 pH meter: pH-3 Cond./Salinity: C-3

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	19.0	19.0	18.5	8.6	8.4	8.3	7.6	7.6	7.7	352	362
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	18.5	19.0	18.5	9.2	8.5	8.2	7.9	7.8	7.9	2610	2530
	B	10	10	2											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO3)	
Control (MHW)	96	66
Highest conc.	1600	276
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.5		
DO (mg/L)	9.2		
pH	7.9		
Cond (µS/cm)	2610		
Salinity (ppt)	1.3		

Comments: Slight precipitate on surface Mortality: Heartbeat checked under microscope not needed

Sample Description: slightly grey, slightly turbid, no odour, slight particulates

Batch#: 101916B 7-d previous # young/brood: 19 Previous 7-d Mortality (%): 0 Day of 1st Brood: 8

Reviewed by: [Signature] Date reviewed: Nov 28, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 161245a

Start Date/Time: November 21, 2016 @ 1610h
Test Species: Daphnia magna
Set up by: YMC

Sample Information:

Sample ID: GH-CC1-Q-03102016-N
Sample Date: November 15, 2016
Date Received: November 16, 2016
Sample Volume: 2 x 20L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 102616B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: ave 19 22
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC42
Stock Solution ID: 16N902
Date Initiated: November 23, 2016
48-h LC50 (95% CL): 3.9 (2.8-5.5) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl
Reference Toxicant CV (%): 16

Test Results:

The 48h LC50 is estimated to be >100% (v/v)

Reviewed by:

[Signature]

Date reviewed:

Nov 28, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: GHCCI-2-03102016-N
 Work Order No.: 1612459

Start Date/Time: November 21, 2016 @ 16:00h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YHL

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-2/3

Concentration (% v/v)	Number of Live Organisms Rep	24		48		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48	0	24		48	0	24	48	0	24	48	0	48		
Control	A	10	10	0	19.0	19.0	19.0	8.7	8.3	8.3	7.6	7.6	7.6	350	357		
	B																
	C																
	D																
6.25	A	10	10	0	19.0	19.0	19.0	8.7	8.3	8.3	7.6	7.6	7.6	626	627		
	B																
	C																
	D																
12.5	A	10	10	0	19.0	19.0	19.0	8.7	8.4	8.3	7.6	7.6	7.7	802	805		
	B																
	C																
	D																
25	A	10	10	0	19.0	19.0	19.0	8.7	8.4	8.3	7.6	7.6	7.8	1230	1237		
	B																
	C																
	D																
50	A	10	10	0	19.0	19.0	19.0	8.8	8.4	8.4	7.5	7.6	7.9	1996	1971		
	B																
	C																
	D																
100	A	10	10	0	18.5	19.0	19.0	9.2	8.4	8.3	7.4	7.5	7.9	3310	3240		
	B																
	C																
	D																
Technician Initials		YHL	YHL	YHL	YHL	YHL	YHL	YHL	YHL	YHL	YHL	YHL	YHL	YHL	YHL		

Concentration	Hardness* (mg/L as CaCO3)	Alkalinity* (mg/L as CaCO3)
Control (MHW)	98	66
Highest conc.	3000	506
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.5		18.5
DO (mg/L)	10.2	(5 min aeration)	9.2
pH	7.3		7.4
Cond (µS/cm)	3290		3310
Salinity (ppt)	1.7		1.7

Comments: ① slight precipitate on surface Mortality: Heartbeat checked under microscope not

Sample Description: clear, no colour, no odour, no particulates

Batch#: 102616B 7-d previous # young/brood: 22 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Nov 28, 2016

Client: Teck

W.O.#: 161245a

Hardness and Alkalinity Datasheet

Alkalinity							Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO 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-SPL-Q	Nov. 16/16	Nov. 16/16	50	15.2	15.4	300	①0	7.7	770	JS
03102016-N@20°C										
FR-SPL-Q			50	15.2 25.2	25.6	496	①10	8.5	850	JS
03102016-N@10°C										
GH-CC1-Q			50	23.2	23.6	456	①10	3.4	3400	JS/MC
03102016-N@20°C										
GH-CC1-Q			50	26.0	26.4	512	①10	3.9	3900	JS/MC
03102016-N@10°C										
GH-SCL-Q			50	14.0	14.02	276	①10	16.0	1600	JS
03102016-N	↓	↓			JS					
MHW@20°C	Nov. 16/16	Nov. 16/16	50	3.4	3.5	66	50	4.8	96	MC
MHW@10°C	↓	↓	↓	3.5	3.6	68	↓	4.9	98	↓
GH-CC1-Q	Nov. 21/16	Nov. 21/16	50	25.6	25.9	506	①10	3.0	3000	MC
03102016-N@20°C							MC			
MHW@20°C	Nov. 21/16	Nov. 21/16	50	3.4	3.5	66	50	4.9	98	MC

Notes: ① Diluted to 100 mL w DI water.

Reviewed by: 

Date Reviewed: Nov. 28, 2016

APPENDIX C – Chain-of-custody form

COC ID:	20161115-1349				TURNAROUND TIME:		RUSH:					
PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental			Report Format / Distribution	Excel	PDF	EDD	
Project Manager	Lee Wilm			Lab Contact				Email 1:	Lee.Wilm@teck.com	x	x	x
Email				Email				Email 2:	Neil.Macdonald@teck.com	x	x	x
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	teckcoal@equisonline.com			x
City	Elkford	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-865-5289			Phone Number	604-420-8773							

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERVED	ANALYSIS REQUESTED								Temp °C		
									28 Day H. azteca Pass/Fail	32d FHM # Calgary	48 hr Daphnia Sinlge Conc. Pass/Fail	96 Hr Rainbow Trout Single Conc. Pass/Fail	30 Day Rainbow trout embryo alevin Pass/Fail	48 hr Daphnia Sinlge Conc. Pass/Fail @	48 hr Dapnia Sinlge Conc. Pass/Fail @ 10 deg	48 hr Dapnia Sinlge Conc. Pass/Fail @ 20 deg		48 hr Dapnia Sinlge Conc. Pass/Fail @ 25 deg	
FR_SP1_Q_03102016_N (2)	FR_SP1	WS		2016/11/15	10:05	G	2	Just ended			x	1					1	4.8	2x20L
GH_CCL_Q_03102016_N (1)	GH_CC1	WS		2016/11/15	11:13	G	2	16118			x	1				1		4.5	2x20L
GH_SCI_Q_03102016_N (3)	GH_SC1	WS		2016/11/15	11:25	G	1	161245			x	1						4.5	1x20L
FR_FRCP1_QR_31102016_N	FR_FRCP1	WS		2016/11/15	11:59	G	1		x									3.5	1x20L
FR_UFR1_QR_31102016_N	FR_UFR1	WS		2016/11/15	09:14	G	1		x									3.5	1x20L
FR_FRCP1_SA_31102016_N	FR_FRCP1	WS		2016/11/15	11:59	G	2						2					3.5	2x20L
FR_UFR1_SA_31102016_N	FR_UFR1	WS		2016/11/15	09:14	G	2						2					3.5	2x20L

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
① Clear, Colorless, No particulates, Odourless	N. Yamamoto	2016/11/15	Nautilus - Burnaby	Nov 16/16 - 10:00
② Clear, Colorless, No odour, No particulates.				
③ Grey & slightly turbid, some particulates, no odour			NY - Nain Yamamoto	

NR OF BOTTLES RETURNED/DESCRIPTION	Sampler's Name	Mobile #
Regular (default) X	N. Yamamoto	250 865 5204
Priority (2-3 business days) - 50% surcharge	Sampler's Signature	Date/Time
Emergency (1 Business Day) - 100% surcharge		Nov 15 2016
For Emergency <1 Day, ASAP or Weekend - Contact ALS		

Samples in 1

END OF REPORT



Acute Toxicity Test Results

Sample collected November 21, 2016

Final Report

December 6, 2016

Submitted to: **Teck Coal / Fording River Operations**
Elkford, BC

SAMPLE INFORMATION

Sample ID	Dates			Receipt temp.
	Collected	Received	<i>Daphnia magna</i> test initiation	
GH_CC1-WS-201611211010	21-Nov-16 at 1010h	23-Nov-16 at 1430h	23-Nov-16 at 1645h	4.3°C

TESTS

- *Daphnia magna* 48-h LC50 test

RESULTS

Toxicity test results

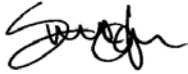
Sample ID	48-h LC50 (% v/v) [95% CL]
GH_CC1-WS-201611211010	89.1 [66.1 – 100]

CL = Confidence limits

QA/QC

QA/QC summary	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CI)	3.9 (2.8 – 5.5) g/L NaCl ¹
Reference toxicant historical mean (2 SD range)	4.1 (3.1 – 5.5) g/L NaCl
Reference toxicant CV	16%
Organism health history	Acceptable
Protocol deviations	None
Water quality range deviations	None
Control performance	Acceptable
Test performance	Valid

¹ Test date November 23, 2016



Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio
Senior Analyst

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 48-h *Daphnia magna* LC50 test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	Five concentrations, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Statistical software	CETIS Version 1.8.7
Test endpoints	Survival (48-hour LC50)
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 161285

Start Date/Time: November 23, 2016 @ 1645h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: GH-CC1-WS-201611211010
Sample Date: November 21, 2016
Date Received: November 23, 2016
Sample Volume: 5 x 1L

Test Validity Criteria:
≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.
WQ Ranges:
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 11021613
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 22
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC42
Stock Solution ID: 16N902
Date Initiated: November 23, 2016
48-h LC50 (95% CL): 3.9 (2.8-5.5) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: The 48h LC50 is estimated to be 89.1% (v/v), with 95% confidence limits between 66.1 to 100% (v/v)

Reviewed by: [Signature]

Date reviewed: Dec-2, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: GMCC1-WS-201611211010
 Work Order No.: 161285

Start Date/Time: November 23, 2016 @ 1645h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	18.5	19.0	19.0	8.6	8.4	8.4	7.6	7.6	7.7	348	362
	B														
	C														
	D														
6.25	A	10	10	0	18.5	19.0	19.0	8.6	8.4	8.3	7.6	7.6	7.7	623	624
	B														
	C														
	D														
12.5	A	10	6	0	18.5	19.0	19.0	8.7	8.5	8.4	7.6	7.7	7.8	803	809
	B														
	C														
	D														
25	A	10	10	0	19.0	19.0	19.0	8.6	8.5	8.4	7.7	7.7	8.0	1247	1251
	B														
	C														
	D														
50	A	10	10	0	19.0	19.0	19.0	8.6	8.5	8.5	7.7	7.8	8.0	2000	1983
	B														
	C														
	D														
100	A	10	4	4	19.0	19.0	19.0	9.1	8.5	8.4	7.7	7.9	7.8	3350	3220
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	100	70-68
Highest conc.	3270	432
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.5		19.0
DO (mg/L)	9.7	(7 min)	9.1
pH	7.6	(aeration)	7.7
Cond (µS/cm)	3350		3350
Salinity (ppt)	1.8		1.8

Comments: ① slight precipitate on surface & organisms Mortality; Heartbeat checked under microscope yes
② precipitate on organisms, all on container bottom

Sample Description: clear, no colour, no odour, no particulates

Batch#: 110216B 7-d previous # young/brood: 22 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Dec-2, 2016

CETIS Analytical Report

Report Date: 02 Dec-16 13:11 (p 1 of 2)
 Test Code: 161285 | 09-8791-7983

Daphnia magna 48-h Acute Survival Test

Nautilus Environmental

Analysis ID: 03-0581-4710	Endpoint: 48h Survival Rate	CETIS Version: CETISv1.8.7
Analyzed: 02 Dec-16 13:11	Analysis: Trimmed Spearman-Kärber	Official Results: Yes
Batch ID: 14-2717-0583	Test Type: Survival (48h)	Analyst: Yvonne Lam
Start Date: 23 Nov-16 16:45	Protocol: EC/EPS 1/RM/14	Diluent: Mod-Hard Synthetic Water
Ending Date: 25 Nov-16 16:40	Species: Daphnia magna	Brine:
Duration: 48h	Source: In-House Culture	Age:
Sample ID: 00-2240-0547	Code: 155CE23	Client: Teck Coal
Sample Date: 21 Nov-16 10:10	Material: Water Sample	Project:
Receive Date: 23 Nov-16 14:30	Source: Teck Coal (TECK COAL)	
Sample Age: 55h (4.3 °C)	Station: GH_CC1_WS-201611211010	

Trimmed Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	EC50	95% LCL	95% UCL
Control Threshold	0	40.00%	1.95	0.06477	89.09	66.11	120.1 ¹⁰⁰

48h 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	1	1	1	1	0	0	0.0%	0.0%	10	10
6.25		1	1	1	1	0	0	0.0%	0.0%	10	10
12.5		1	1	1	1	0	0	0.0%	0.0%	10	10
25		1	1	1	1	0	0	0.0%	0.0%	10	10
50		1	1	1	1	0	0	0.0%	0.0%	10	10
100		1	0.4	0.4	0.4	0	0	0.0%	60.0%	4	10

48h Survival Rate Detail

C-%	Control Type	Rep 1
0	Negative Control	1
6.25		1
12.5		1
25		1
50		1
100		0.4

48h Survival Rate Binomials

C-%	Control Type	Rep 1
0	Negative Control	10/10
6.25		10/10
12.5		10/10
25		10/10
50		10/10
100		4/10

YV
 Dec 2/16

Daphnia magna 48-h Acute Survival Test

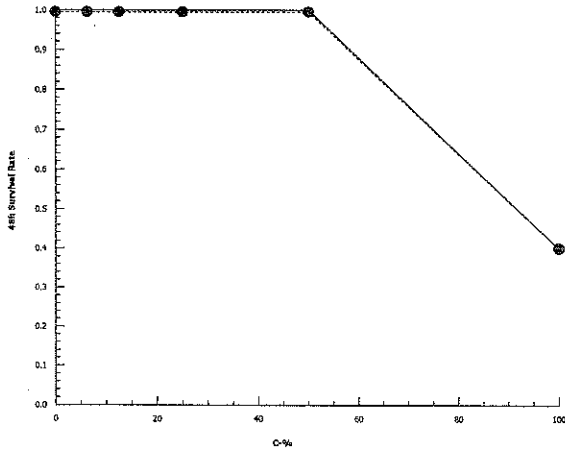
Nautilus Environmental

Analysis ID: 03-0581-4710
Analyzed: 02 Dec-16 13:11

Endpoint: 48h Survival Rate
Analysis: Trimmed Spearman-Kärber

CETIS Version: CETISv1.8.7
Official Results: Yes

Graphics



EW
Dec-2/16

APPENDIX C – Chain-of-custody form

END OF REPORT



Teck Coal / Greenhills Operation
ATTN: Leigh Stickney
P.O. Box 5000
Elkford, BC
VOB 1H0

Report Date: February 18, 2016
Work Order: 16161 - 16162

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. with 2007 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000)

Table 1. Results for the 96-h rainbow trout acute toxicity test.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
GH_PC1_WS_2016_02_02_N	February 3, 2015 @ 1253h	0

Table 2. Results for the 48-h *Daphnia magna* acute toxicity test.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
GH_PC1_WS_2016_02_02_N	February 3, 2015 @ 1253h	0

The test met all control performance criteria and no deviations from protocols were observed. The results presented in this report relate only to the sample tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck-
Greenhills Operations

Start Date/Time: Feb 7/16 @ 1035h

Work Order No.: 16161

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-PCI-WS-2016-02-02-N
Sample Date: Feb 3/16
Date Received: Feb 6/16
Sample Volume: 2 x 20L
Other: -

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 6

Test Organism Information:

Batch No.: 122915
Source: Aqua Farms
No. Fish/Volume (L): 10/15L
Loading Density (g/L): 0.33
Mean Length ± SD (mm): 30 ± 3
Mean Weight ± SD (g): 0.49 ± 0.12

Range: 26-34
Range: 0.27-0.64

Zinc Reference Toxicant Results:

Reference Toxicant ID: RT Zn 33
Stock Solution ID: 15 Zn 05
Date Initiated: Jan 20/16
96-h LC50 (95% CL): 80.5 (59.8⁴ - 109.5) mg/L Zn

Reference Toxicant Mean and Historical Range: 71.0 (33.9 - 148.4) mg/L Zn
Reference Toxicant CV (%): 44.6%

Test Results: 100% survival at 96 hours in the 100% (v/v) undiluted sample
0% mortality at 96 hours in the 100% (v/v) undiluted sample

Reviewed by: [Signature]

Date reviewed: Feb. 18, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck - Greenhill SOP
 Sample I.D. GH-PCI-WS-2016-02-02-N
 W.O. # 16161
 RBT Batch #: 122915
 Date Collected/Time: Feb 3 / 16 @ 1253h
 Date Setup/Time: Feb 7 / 16 @ 1035h
 Sample Setup By: As

Number Fish/Volume: 10/15L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Yes

D.O. meter: DO-2
 pH meter: pH-1
 Cond. Meter: X-1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
pH	8.0	/	8.1
D.O. (mg/L)	10.2	/	10.1
Cond. (µS/cm)	1079	/	1081

Concentration (% v/v)	# Survivors							Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)		
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
Control				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.1	9.8	9.8	9.8	10.1	6.7	6.8	6.8	6.6	6.7	25	28	
100				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.1	9.8	9.8	9.8	9.9	8.1	8.1	8.1	8.2	8.1	1081	1096	
Initials				EMM	EC	EC	EC	EMM	EC	EC	EC	EMM	EC	EC	EC	EMM	EC	EC	EC	EMM	EC	EC	EC	EMM	EC

WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Sample Description/Comments: Colorless, Clear, Odourless, some particulates

Fish Description at 96 h OK Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: [Signature]

Date Reviewed: Feb. 18, 2016

Daphnia magna Summary Sheet

Client: Teck - GH0
Work Order No.: 16162

Start Date/Time: February 8, 2016 @ 0805h
Test Species: Daphnia magna
Set up by: YMC

Sample Information:

Sample ID: GH_PCL_WS_2016_02_02-N
Sample Date: February 3, 2016
Date Received: February 6, 2016
Sample Volume: 1 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 012016A+B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 18
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC27
Stock Solution ID: ISN903
Date Initiated: February 1, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Feb. 18, 2016

**Freshwater Acute
48 Hour Toxicity Test Data Sheet**

Client: Teck Start Date/Time: February 8, 2016 @ 0805h
 Sample ID: GH-PC1-WS-2016-02-02-N No. Organisms/volume: 10/200mL
 Work Order No.: 16162 Test Organism: D.magna
 Set up by: YML
 Thermometer: Temp-5 DO meter: DO-213 pH meter: pH-113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	18.0	18.5	19.5	8.9	8.7	8.7	7.8	7.7	7.7	353	360
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	18.5	18.5	19.5	9.2	8.4	8.6	8.0	7.8	8.0	1083	1070
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO3)	
Control (MHW)	98	72
Highest conc.	530	196
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.5		
DO (mg/L)	9.2		
pH	8.0		
Cond (µS/cm)	1083		

Comments: _____ Mortality: Heartbeat checked under microscope n/a

Sample Description: clear, no colour, no odour, slight particulates

Batch#: 012016NAB 7-d previous # young/brood: 18 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: YML Date reviewed: Feb-18, 2016



Teck Coal / Greenhills Operation
ATTN: Leigh Stickney
P.O. Box 5000
Elkford, BC
VOB 1H0

Report Date: March 21, 2016
Work Order: 16307 - 16308

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 96-h rainbow trout acute toxicity test.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
GH_GH1_WS_2016-03-07_N	March 7, 2016 @ 0930h	0

Table 2. Results for the 48-h *Daphnia magna* acute toxicity test.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
GH_GH1_WS_2016-03-07_N	March 7, 2016 @ 0930h	3.3

The tests met all control performance criteria and no deviations from protocols were observed. The results presented in this report relate only to the sample tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck (440)

Start Date/Time: Mar 10/16 @ 0935h

Work Order No.: 16307

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-GH1-WS-2016-03-07-N
Sample Date: Mar 7/16
Date Received: Mar 9/16
Sample Volume: 1x20L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 12
Alkalinity (mg/L CaCO₃): 10

Test Organism Information:

Batch No.: 020816
Source: Aqua Farms
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.41
Mean Length ± SD (mm): 31 ± 1
Mean Weight ± SD (g): 0.50 ± 0.06

Range: 30-34
Range: 0.43-0.63

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn35
Stock Solution ID: 15Zn05
Date Initiated: Mar 4/16
96-h LC50 (95% CL): 87.1 (71.2-106.4) µg/L Zn

Reference Toxicant Mean and Historical Range: 71.7 (34.0-151.5) µg/L Zn
Reference Toxicant CV (%): 45%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: March 16, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck (GH0)
Sample I.D.: GH-GH1-WS-2016-03-07-N
W.O. #: 16307
RBT Batch #: 020816
Date Collected/Time: Mar 07 / 16 @ 0930h
Date Setup/Time: Mar 10 / 16 @ 0935h
Sample Setup By: EC

Number Fish/Volume: 10/12 L
7-d % Mortality: 0
Total Pre-aeration Time (mins): 60 mins
Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

D.O. meter: 2
pH meter: 1 *Thermometer: CER#12*
Cond. Meter: 2

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
pH	8.0		8.0
D.O. (mg/L)	10.8		10.6
Cond. (µS/cm)	1441		1441
Salinity (ppt)	0.7		0.7

Concentration	# Survivors							Temperature (°C)				Dissolved Oxygen (mg/L)				pH					Conductivity (µS/cm)			
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
(% v/v)				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.0	9.8	9.7	9.8	9.5	6.5	6.4	6.5	6.8	6.7	30	34
100				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.3	9.8	9.6	9.8	10.0	8.0	7.9	8.2	8.2	8.2	1441	1433
Initials				EC	AS	AS	EL	EL	EL	AS	AS	EL	EL	EL	AS	AS	EL	EL	EL	AS	AS	EL	EL	EL

WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Sample Description/Comments: Slightly grey, Opaque, No particulates, Odourless

Fish Description at 96 h All fish appear healthy Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: [Signature]

Date Reviewed: March 16, 2016

Daphnia magna Summary Sheet

Client: Teck (GHO)
Work Order No.: 16308

Start Date/Time: March 10, 2016 @ 1050h
Test Species: Daphnia magna
Set up by: NL

Sample Information:

Sample ID: GH-GH1-WS-2016-03-07-N
Sample Date: March 7, 2016
Date Received: March 9, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 021616A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 21
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC29
Stock Solution ID: 15NaO3
Date Initiated: March 15, 2016
48-h LC50 (95% CL): 5.2 (4.2-6.4) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl

Reference Toxicant CV (%): 13

Test Results: 3.3% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: 

Date reviewed: March 17, 2016

**Freshwater Acute
48 Hour Toxicity Test Data Sheet**

Client: Teck (GHA)
 Sample ID: GH-GHA-WS-2016-03-07-N
 Work Order No.: 16308

Start Date/Time: March 10, 2016 @ 10:50h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		48	Temperature (°C)	Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)			
		24	48	48		0	24	48	0	24	48	0	48		
Control	A	10	10	0	19.5	20.0	20.5	8.7	8.5	8.4	7.8	7.8	7.7	351	358
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10 ⁰	10 ⁰	0	19.5	20.0	20.5	9.0	8.4	8.3	8.2	8.2	8.1	1452	1409
	B	10 ⁰	10 ⁰	0											
	C	10 ⁰	9 ⁰	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

Concentration	Hardness* (mg/L as CaCO3)	Alkalinity* (mg/L as CaCO3)
Control (MHW)	100	72
Highest conc.	1030	256
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		
DO (mg/L)	9.0		
pH	8.2		
Cond (µS/cm)	1452		
Salinity (ppt)	4520.7		

Comments: 19 organisms on surface Mortality: Heartbeat checked under microscope 1/3

Sample Description: Slight grey colour, slightly turbid, no particulates, no odour

Batch#: 021616A 7-d previous # young/brood: 21 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: YML Date reviewed: March 16, 2016

Teck

COC ID:

GHO Q1 tox

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 REQUESTED													
								#N/A	#N/A	#N/A	P	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A			
GH_WADE_WS_2016-03-08_N	GH_WADE	WS	N	08-Mar		G	1	X	X												
GH_MCI_WS_2016-03-08_N	GH_MCI	WS	N	08-Mar		G	1	X	X												
GH_COUGAR_WS_2016-03-08_N	GH_COUGAR	WS	N	08-Mar		G	1	X	X												
GH_TCI_WS_2016-03-08_N	GH_TCI	WS	N	08-Mar		G	1	X	X												
GH_NC2_WS_2016-03-08_N	GH_NC2	WS	N	08-Mar		G	1	X	X												
GH_GH1_WS_2016-03-07_N	GH_GH1	WS	N	07-Mar-16	9:30	G	1	X	X												

ANALYSIS 30
 96 hr Rainbow trout (pass/fail) 16369
 48 hr daphnia (pass/fail) 16369
 48 hr daphnia @ 10 deg C (pass/fail)
 TECK Chronic Toxicity program (Q4)

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

RELINQUISHED BY/AFFILIATION

Date

Time

Accepted By/Affiliation

Date

Time

M. Calabrese / Mupgu

Mar 8 /16 16:30

Nautilus
 NY - New York
 1x20L
 Temp = 6.8°C

Mar 09 /16 09:40

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

Mariana Calabrese

Mobile #

647-244-7245

Sampler's Signature

M. Calabrese

Date/Time

Mar 8 /16 16:30



Teck Coal / Greenhills Operation

ATTN: Leigh Stickney
P.O. Box 5000
Elkford, BC
VOB 1H0

Report Date: March 21, 2016

Work Order: 16312 - 16313

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 96-h rainbow trout acute toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
GH_WADE_WS_2016-03-08_N	March 8, 2016 @ 1420h	0
GH_MC1_WS_2016-03-08_N	March 8, 2016 @ 1330h	0
GH_TC1_WS_2016-03-08_N	March 8, 2016 @ 0915h	0
GH_TC2_WS_2016-03-08_N	March 8, 2016 @ 1045h	0

Table 2. Results for the 48-h *Daphnia magna* acute toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
GH_WADE_WS_2016-03-08_N	March 8, 2016 @ 1420h	0
GH_MC1_WS_2016-03-08_N	March 8, 2016 @ 1330h	0
GH_TC1_WS_2016-03-08_N	March 8, 2016 @ 0915h	0
GH_TC2_WS_2016-03-08_N	March 8, 2016 @ 1045h	0

The tests met all control performance criteria and no deviations from protocols were observed. The results presented in this report relate only to the samples tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck (GH0)

Start Date/Time: Mar 11/16 @ 0915h

Work Order No.: 16312

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-WADE-WS-2016-03-08-N
Sample Date: Mar 08/16
Date Received: Mar 10/16
Sample Volume: 1x20L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 12
Alkalinity (mg/L CaCO₃): 10

Test Organism Information:

Batch No.: 020816
Source: Aqua Farms
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.46
Mean Length ± SD (mm): 32 ± 2
Mean Weight ± SD (g): 0.55 ± 0.09

Range: 30-36
Range: 0.44-0.72

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn35
Stock Solution ID: 15Zn05
Date Initiated: May 4/16
96-h LC50 (95% CL): 87.1 (71.2 - 106.4) µg/L Zn

Reference Toxicant Mean and Historical Range: 71.7 (34.0 - 151.5) µg/L Zn
Reference Toxicant CV (%): 45%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: March 18, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck (G40) EL
 Sample I.D.: GH-WA0E-WS-2016-03-078-N
 W.O. #: 16312
 RBT Batch #: 020816
 Date Collected/Time: Mar 08 / 16 @ 1420h
 Date Setup/Time: Mar 11 / 16 @ 0915h
 Sample Setup By: EC

 D.O. meter: 2 Thermometer: CER#2
 pH meter: 1
 Cond. Meter: 2

Number Fish/Volume: 10/12 L
 7-d % Mortality: EL 0
 Total Pre-aeration Time (mins): 480mins
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
pH	8.0		8.0
D.O. (mg/L)	11.4		10.4
Cond. (µS/cm)	511		511
Salinity (ppt)	0.2		0.2


Concentration	# Survivors						Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)		
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
(% v/v)								14.0	14.0	14.0	14.0	14.0	10.0	9.7	9.9	9.8	9.9	6.5	6.5	6.7	6.6	6.6	30	34
+1				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.3	9.6	9.8	10.0	10.0	8.0	8.3	8.2	8.2	8.2	511	514
100				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.3	9.6	9.8	10.0	10.0	8.0	8.3	8.2	8.2	8.2	511	514
Initials				M	N	EL	EL	EL	A	N	EL	EL	EL	A	N	EL	EL	EL	A	N	EL	EL	EL	EL

WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Sample Description/Comments: Slightly yellow, clear, ^{some} particulates, Odourless

Fish Description at 96 h All fish appear healthy Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: 

Date Reviewed: March 18, 2016

Rainbow Trout Summary Sheet

Client: Teck (GH0)

Start Date/Time: Mar 11/16 @ 0915h

Work Order No.: 16312

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-MCI-WS-2016-03-08-N
Sample Date: Mar 08/16
Date Received: Mar 10/16
Sample Volume: 1x20L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 12
Alkalinity (mg/L CaCO₃): 10

Test Organism Information:

Batch No.: 020816
Source: Aqua Farms
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.43
Mean Length ± SD (mm): 32 ± 2.4
Mean Weight ± SD (g): 0.51 ± 0.10

Range: 25-37
Range: 0.33-0.65

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn35
Stock Solution ID: 15Zn05
Date Initiated: Mar 4/16
96-h LC50 (95% CL): 87.1 (71.2 - 106.4) µg/L Zn

Reference Toxicant Mean and Historical Range: 71.7 (34.0 - 151.5) µg/L Zn
Reference Toxicant CV (%): 45%

Test Results: 0% mortality at 96 hours in the undiluted 100% ^{EU} SA (v/v) sample.

Reviewed by: 

Date reviewed: March 18, 2016

Rainbow Trout Summary Sheet

Client: Teck (GHO)

Start Date/Time: Mar 11/16 @ 0915h

Work Order No.: 16312

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-TCLWS-2016-03-08-N
Sample Date: Mar 08/16
Date Received: Mar 10/16
Sample Volume: 1x20L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 12
Alkalinity (mg/L CaCO₃): 10

Test Organism Information:

Batch No.: 020816
Source: Aqua Farms
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.46
Mean Length ± SD (mm): 33 ± 2
Mean Weight ± SD (g): 0.55 ± 0.06

Range: 30-35 ○
Range: 0.49-0.65

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn35
Stock Solution ID: 15Zn05
Date Initiated: May 4/16
96-h LC50 (95% CL): 87.1 (71.2 - 106.4) µg/L Zn

Reference Toxicant Mean and Historical Range: 71.7 (34.0 - 151.5) µg/L Zn
Reference Toxicant CV (%): 45%

Test Results: 0% mortality at 96 hours in the diluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: March 18, 2016

Rainbow Trout Summary Sheet

Client: Teck (GHO)

Start Date/Time: Mar 11/16 @ 0915h

Work Order No.: 16312

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-TC2-WS-2016-03-08-N
Sample Date: Mar 8/16
Date Received: Mar 10/16
Sample Volume: 1720L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 12
Alkalinity (mg/L CaCO₃): 10

Test Organism Information:

Batch No.: 020816
Source: Aqua Farms
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.42
Mean Length ± SD (mm): 33 ± 1 Range: 31-34 ○
Mean Weight ± SD (g): 0.51 ± 0.06 Range: 0.40-0.63

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn35
Stock Solution ID: 15Zn05
Date Initiated: Mar 4/16
96-h LC50 (95% CL): 87.1 (71.2 - 106.4) µg/L Zn

Reference Toxicant Mean and Historical Range: 71.7 (34.0-151.5) µg/L Zn
Reference Toxicant CV (%): 45%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: EW

Date reviewed: March 18, 2016

Daphnia magna Summary Sheet

Client: Teck (Gtlo)
Work Order No.: 16313

Start Date/Time: March 10, 2016 @ 1325h
Test Species: Daphnia magna
Set up by: MYL

Sample Information:

Sample ID: GLWADE-WS-2016-03-08-N
Sample Date: March 8, 2016
Date Received: March 10, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 022316B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 32
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC29
Stock Solution ID: 15Na03
Date Initiated: March 15, 2016
48-h LC50 (95% CL): 5.2 (4.2-6.4) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl

Reference Toxicant CV (%): 13

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: 

Date reviewed: March 18, 2016

**Freshwater Acute
48 Hour Toxicity Test Data Sheet**

Client: Teck (GHD) Start Date/Time: March 10, 2016 @ 1325h
 Sample ID: GH-WADE-WS-2016-03-08-N No. Organisms/volume: 10/200mL
 Work Order No.: 16313 Test Organism: D.magna
 Set up by: NML

Thermometer: Temp-S DO meter: DO-213 pH meter: pH-113 Cond./Salinity: 0-213

Concentration (% v/v)	Number of Live Organisms Rep	24		48		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48	24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	0	0	19.5	20.0	20.5	8.7	8.4	8.3	7.8	7.8	7.7	351	367
	B	10	10	0	0	0											
	C	10	10	0	0	0											
	D																
100	A	10	10	0	0	0	19.5	20.0	20.5	9.1	8.5	8.4	8.2	8.3	8.3	529	525
	B	10	10	0	0	0											
	C	10	10	0	0	0											
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
Technician Initials		NML	A	A	A	NML	NML	A	NML	NML	A	NML	NML	A	NML	A	

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO3)	
Control (MHW)	100	72
Highest conc.	240	254
Hardness adjusted	—	

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		19.5
DO (mg/L)	10.3	(3 min aeration)	9.1
pH	8.1		8.2
Cond (µS/cm)	525		529
Salinity (ppt)	0.2		0.2

Comments: _____ Mortality: Heartbeat checked under microscope not required
 Sample Description: slight yellowish-gray colour, slightly clear, some particulates, no odour
 Batch#: 02231613 7-d previous # young/brood: 32 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10
 Reviewed by: [Signature] Date reviewed: March 18, 2016

Daphnia magna Summary Sheet

Client: Teck (GHO)
Work Order No.: 16313

Start Date/Time: March 10, 2016 @ 1320h
Test Species: Daphnia magna
Set up by: MYL

Sample Information:

Sample ID: GH_MCI_WS_2016-03-08-N
Sample Date: March 8, 2016
Date Received: March 10, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 022316B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 32
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC29
Stock Solution ID: 15Na03
Date Initiated: March 15, 2016
48-h LC50 (95% CL): 5.2 (4.2-6.4) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl

Reference Toxicant CV (%): 13

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: EU

Date reviewed: March 18, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (GHD) Start Date/Time: March 10, 2016 @ 1320h
 Sample ID: GH-MC1-WS-2016-03-08-N No. Organisms/volume: 10/200mL
 Work Order No.: 16313 Test Organism: D. magna
 Set up by: VML

Thermometer: Temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	20.0	20.5	8.7	8.5	8.3	7.8	7.8	7.6	351	367
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.0	20.0	20.5	9.0	8.6	8.2	7.9	8.0	8.0	1790	1708
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		VML	A	A	VML	VML	A	VML	VML	A	VML	VML	A	VML	A

Concentration	Hardness* (mg/L as CaCO ₃)	Alkalinity* (mg/L as CaCO ₃)
Control (MHW)	100	72
Highest conc.	1080	278
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.0		19.0
DO (mg/L)	9.8 9.8		9.0
pH	7.9	(2 min. aerator)	7.9
Cond (µS/cm)	1762		1790
Salinity (ppt)	0.9		0.9

Comments: _____ Mortality: Heartbeat checked under microscope not req'd
 Sample Description: clear, no colour, no odour, slight particles
 Batch#: 02231613 7-d previous # young/brood: 32 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10
 Reviewed by: [Signature] Date reviewed: March 18, 2016

Daphnia magna Summary Sheet

Client: Teck (GHO)
Work Order No.: 16313

Start Date/Time: March 10, 2016 @ 13:0h
Test Species: Daphnia magna
Set up by: MYL

Sample Information:

Sample ID: GH-TCL-WS-2016-03-08-N
Sample Date: March 8, 2016
Date Received: March 10, 2016
Sample Volume: 2 x 1 L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 022316A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC29
Stock Solution ID: 15Na03
Date Initiated: March 15, 2016
48-h LC50 (95% CL): 5.2 (4.2-6.4) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: 

Date reviewed: March 18, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (GHD) Start Date/Time: March 10, 2016 @ 13:00h
 Sample ID: GH-TC1-WS-2016-03-08-N No. Organisms/volume: 10/200mL
 Work Order No.: 16313 Test Organism: D. magna
 Set up by: VML

Thermometer: Temp-S DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	20.0	20.5	8.7	8.4	8.3	7.8	7.8	7.7	351	354
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.5	20.0	20.5	9.0	8.3	8.4	8.2	8.3	8.3	1416	1413
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		VML	A	R	VML	VML	A	VML	VML	A	VML	VML	A	VML	A

Concentration	Hardness* (mg/L as CaCO3)	Alkalinity* (mg/L as CaCO3)
Control (MHW)	100	72
Highest conc.	850	220
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		19.5
DO (mg/L)	9.9		9.0
pH	8.1	(3 min aeration)	8.2
Cond (µS/cm)	1409		1416
Salinity (ppt)	0.7		0.7

Comments: _____ Mortality: Heartbeat checked under microscope ^{not} ~~not~~ _{at}

Sample Description: clear, slight yellow, no colour, no particulates, no odour.

Batch#: 022316A 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 70

Reviewed by: VML Date reviewed: March 18, 2016

Daphnia magna Summary Sheet

Client: Teck (GHO)
Work Order No.: 16313

Start Date/Time: March 10, 2016 @ 1315h
Test Species: Daphnia magna
Set up by: YNL

Sample Information:

Sample ID: GH-TCL-WS-2016-03-08-N
Sample Date: March 8, 2016
Date Received: March 10, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 022316A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTCL29
Stock Solution ID: 15Na03
Date Initiated: March 15, 2016
48-h LC50 (95% CL): 5.2 (4.2-6.4) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: 

Date reviewed: March 18, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (GHD)
 Sample ID: GH-TC2-WS-2016-03-08-N
 Work Order No.: 16313

Start Date/Time: March 10, 2016 @ 13:54
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: VML

Thermometer: Temp-S DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	20.0	20.5	8.7	8.4	8.3	7.8	7.8	7.7	351	362
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.5	20.0	20.5	9.2	8.5	8.4	8.2	8.2	8.2	1396	1398
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		VML	A	A	VML	VML	A	VML	VML	A	VML	VML	A	VML	A

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO ₃)	
Control (MHW)	100	72
Highest conc.	790	214
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		19.0
DO (mg/L)	10.0	(2 min aeration)	9.2
pH	8.1		8.2
Cond (µS/cm)	1386		1396
Salinity (ppt)	0.7		0.7

Comments: _____ Mortality: Heartbeat checked under microscope not req'd

Sample Description: clear, no colour, no particulates, no odour

Batch#: 022316A 7-d previous # young/brood: 10 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: [Signature] Date reviewed: March 18, 2016


Client: Teck (Gto)

W.O.#: 16313

Hardness and Alkalinity Datasheet

Sample ID	Sample Date	Alkalinity				Hardness			Technician
		Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO 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)	
GH-WADE-WS-	Mar 10/16	50	12.9	13.1	254	50	12.0	240	KL
2016-03-08-N					244		10.8		
GH-MCL-WS-		50	14.0	14.1	278	100 [Ⓢ]	10.8	1080	KL
2016-03-08-N									
GH-TCL-WS-		50	11.2	11.4	220	100 [Ⓢ]	8.5	850	KL
2016-03-08-N									
GH-TC2-WS-		50	10.9	11.1	214	100 [Ⓢ]	7.9	790	KL
2016-03-08-N	↓								
MHW	Mar 10/16	50	3.7	3.8	72	50	5.0	700	KL

Notes: [Ⓢ] Diluted to 100 mL w/ DI water

Reviewed by: 

Date Reviewed: March 18, 2016

COC ID:		GHO Q1 tox		TURNAROUND TIME:		regular		RUSH:	
PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name: Greenhills Operations		Lab Name: Nautilus Environmental		Lab Contact: Krysta Peary		Site: leigh.stickney@teck.com		EQIS: GHO	
Project Manager: Leigh Stickney		Email: leigh.stickney@teck.com		Address: 8664 Commence Court		Report Format / Distribution		Yes PDF Yes Excel	
Address: PO Box 5000		City: Elkford		Province: BC		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:		Phone Number:		Phone Number:		PO number: 359182	

SAMPLE DETAILS								ANALYSIS REQUESTED																				
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Please indicate below Filtered, Preserved 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									
GH_WADE_WS_2016-03-08_N	GH_WADE	WS	N	08-Mar-16	14:20	G	3	96 hr Rainbow trout (pass/fail)	X	48 hr daphnia (pass/fail)	X	48 hr daphnia @ 10 deg C (pass/fail)		TECK Chronic Toxicity program (Q4)											Temp °C-20L	6.0	Temp °C-1L	5.5
GH_MC1_WS_2016-03-08_N	GH_MC1	WS	N	08-Mar-16	13:30	G	3	96 hr Rainbow trout (pass/fail)	X	48 hr daphnia (pass/fail)	X	48 hr daphnia @ 10 deg C (pass/fail)		TECK Chronic Toxicity program (Q4)											Temp °C-20L	7.5	Temp °C-1L	7.0
GH_COUGAR_WS_2016-03-08_N	GH_COUGAR	WS	N	08-Mar-16		G	1	96 hr Rainbow trout (pass/fail)	X	48 hr daphnia (pass/fail)	X	48 hr daphnia @ 10 deg C (pass/fail)		TECK Chronic Toxicity program (Q4)														
GH_TC1_WS_2016-03-08_N	GH_TC1	WS	N	08-Mar-16	9:15	G	3	96 hr Rainbow trout (pass/fail)	X	48 hr daphnia (pass/fail)	X	48 hr daphnia @ 10 deg C (pass/fail)		TECK Chronic Toxicity program (Q4)											Temp °C-20L	5.5	Temp °C-1L	6.3
GH_TC2_WS_2016-03-08_N	GH_TC2	WS	N	08-Mar-16	10:45	G	3	96 hr Rainbow trout (pass/fail)	X	48 hr daphnia (pass/fail)	X	48 hr daphnia @ 10 deg C (pass/fail)		TECK Chronic Toxicity program (Q4)											Temp °C-20L	7.5	Temp °C-1L	6.3

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted by/Affiliation	Date	Time
	M. Calabrese / MPPG	Mar 8/16	17:00	Nautilus NY - Nari Yamamoto	Mar 10/16	10:30

SERVICE REQUEST (rush - subject to availability)		Sampler's Name	Sampler's Signature	Mobile #	Date/Time
Regular (default) <input checked="" type="checkbox"/>	Priority (2-3 business days) - 50% surcharge				
Emergency (1 Business Day) - 100% surcharge	For Emergency <1 Day, ASAP or Weekend - Contact ALS				

- 1) Slightly yellow, clear, some particulates, odourless
- 2) Clear, colorless, no particulates odourless, ppt formed
- 3) light yellow, clear, no particulates, odourless
- 4) Clear, colorless, no particulates, odourless

Sample Description.

1x 20L



Teck Coal / Greenhills Operation
ATTN: Leigh Stickney
P.O. Box 5000
Elkford, BC
VOB 1H0

Report Date: May 25, 2016
Work Order: 16543 - 16544

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 96-h rainbow trout acute toxicity test.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
GH_PC1_WS_2016_05_10_N	May 10, 2016 @ N/A	0

N/A = Not Available.

Table 2. Results for the 48-h *Daphnia magna* acute toxicity test.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
GH_PC1_WS_2016_05_10_N	May 10, 2016 @ N/A	0

N/A = Not Available.

The tests met performance criteria and no deviations from protocols were observed. The results presented in this report relate only to the sample tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck Coal (GHO)

Start Date/Time: May 13/16 @ 1050h

Work Order No.: 16543

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-PCI-WS-2016-05-10-N
Sample Date: May 10/16
Date Received: May 12/16
Sample Volume: 1X20L
Other: -

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 042716
Source: Aqua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.30
Mean Length ± SD (mm): 27 ± 1 Range: 25-28
Mean Weight ± SD (g): 0.30 ± 0.02 Range: 0.27-0.33

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn40
Stock Solution ID: 15Zn05
Date Initiated: May 12/16
96-h LC50 (95% CL): 25.0 (20.1-31.81) µg/L Zn (outside of 2SD but within 3SD of historical range)
Reference Toxicant Mean and Historical Range: 69.6 (34.0-142.3) µg/L Zn
Reference Toxicant CV (%): 43.0%

Test Results: 0% mortality at 96 hours in the undiluted 100% (V/V) sample.

Reviewed by: [Signature]

Date reviewed: May 24, 2016

Daphnia magna Summary Sheet

Client: Teck (GHO)
Work Order No.: 16544

Start Date/Time: May 14, 2016 @ 1115h
Test Species: Daphnia magna
Set up by: ~~AHE~~ AWD
YUC

Sample Information:

Sample ID: GH-PC1-WS-2016-05-10-N
Sample Date: May 10, 2016
Date Received: May 12, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:
≥ 90% mean control survival (no more than 2 mortalities in any control replicate)
WQ Ranges:
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 044¹⁹16A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 10
Days to first brood: 8

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC33
Stock Solution ID: 16NaCl
Date Initiated: May 18, 2016
48-h LC50 (95% CL): _____ g/L NaCl

Reference Toxicant Mean and Historical Range: _____ g/L NaCl
Reference Toxicant CV (%): _____

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: 

Date reviewed: May 24, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck Start Date/Time: May 19/16 @ 11:52
 Sample ID: GH-PCU-WS-2016-05-10 No. Organisms/Volume: 10/200mL
 Work Order No.: 12544 Test Organism: D. magna
 Set up by: AM

Thermometer: Temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	20.0	20.6	20.5	8.5	8.4	8.3	8.0	8.0	7.8	352	374
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10 ⁰	10 ⁰	0	20.0	20.5	20.5	8.6	8.5	8.1	8.2	8.3	8.2	1125	1158
	B	10 ⁰	10 ⁰	0											
	C	10 ⁰	10 ⁰	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		AM		AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM	AM

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	100	70
Highest conc.	740	208
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		
DO (mg/L)	8.6		
pH	8.2		
Cond (µS/cm)	1125		
Salinity (ppt)	0.6		

Comments: 0 organisms on surface Mortality: Heartbeat checked under microscope ^{not} MS/01

Sample Description: clear, slight yellow colour, no odour, no particulates

Batch#: 041916 A 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 10 Day of 1st Brood: 8

Reviewed by: AM Date reviewed: May 24, 2016



Teck Coal / Greenhills Operations
 ATTN: Leigh Stickney
 P.O. Box 5000
 Elkford, BC
 V0B 1H0

Report Date: June 22, 2016
 Work Order: 16637 - 16638

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

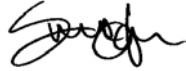
Table 1. Results for the 96-h rainbow trout acute toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
GH_WADE_WS_2016-06-07_N	June 7, 2016 @ 1230h	0
GH_MC1_WS_2016-06-07_N	June 7, 2016 @ 1350h	0
GH_COUGAR_WS_2016-06-07_N	June 7, 2016 @ 1250h	0
GH_TC1_WS_2016-06-07_N	June 7, 2016 @ 1457h	0
GH_TC2_WS_2016-06-07_N	June 7, 2016 @ 1525h	0
GH_WC1_WS_2016-06-07_N	June 7, 2016 @ 0910h	0
GH_GH1_WS_2016-06-06_N	June 6, 2016 @ 0830h	0

Table 2. Results for the 48-h *Daphnia magna* acute toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
GH_WADE_WS_2016-06-07_N	June 7, 2016 @ 1230h	0
GH_MC1_WS_2016-06-07_N	June 7, 2016 @ 1350h	0
GH_COUGAR_WS_2016-06-07_N	June 7, 2016 @ 1250h	0
GH_TC1_WS_2016-06-07_N	June 7, 2016 @ 1457h	0
GH_TC2_WS_2016-06-07_N	June 7, 2016 @ 1525h	0
GH_WC1_WS_2016-06-07_N	June 7, 2016 @ 0910h	0
GH_GH1_WS_2016-06-06_N	June 6, 2016 @ 0830h	0

The tests met performance criteria and there were no deviations from the protocol. The results presented in this report relate only to the samples tested.



Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck Coal (GH0)

Start Date/Time: Jun 10 116 @ 1300h

Work Order No.: 16637

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-WADE-WB-2016-076-07-N^{EL}
Sample Date: Jun 7 116
Date Received: Jun 9 116
Sample Volume: 1 X 20
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 052416
Source: Aqua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.30
Mean Length ± SD (mm): 25 ± 2
Mean Weight ± SD (g): 0.30 ± 0.05

Range: 22 - 29
Range: 0.24 - 0.39

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn42
Stock Solution ID: 15Zn05
Date Initiated: Jun 9/15
96-h LC50 (95% CL): 53.6 (43.2-66.4) mg/L Zn

Reference Toxicant Mean and Historical Range: 64.0 (27.3 - 149.8) mg/L Zn
Reference Toxicant CV (%): 53.0%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: June 22, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (GH)

Start Date/Time: Jun 10 116 @ 1300h

Work Order No.: 16637

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH_MCI-WS-2016-06-07-N
Sample Date: Jun 7 116
Date Received: Jun 9 116
Sample Volume: 1 X 20L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 052416
Source: Aqua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.32
Mean Length ± SD (mm): 29 ± 1
Mean Weight ± SD (g): 0.32 ± 0.03

Range: 27 - 30
Range: 0.28 - 0.37

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn42
Stock Solution ID: 15Zn05
Date Initiated: Jun 9/15
96-h LC50 (95% CL): 53.6 (43.2-66.4) µg/L Zn

Reference Toxicant Mean and Historical Range: 64.0 (27.3-149.8) µg/L Zn
Reference Toxicant CV (%): 53.0%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: June 22, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (GHO)

Start Date/Time: Jun 10 116 @ 1300h

Work Order No.: 16637

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-Congar-WS-2016-06-07-M
Sample Date: Jun 7 116
Date Received: Jun 9 116
Sample Volume: 1 X 20L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 052416
Source: Aqua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.33
Mean Length ± SD (mm): 27 ± 2
Mean Weight ± SD (g): 0.33 ± 0.04

Range: 23 - 30
Range: 0.27 - 0.42
EL

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn42
Stock Solution ID: 15Zn05
Date Initiated: Jun 9/15
96-h LC50 (95% CL): 53.6 (43.2-66.4) mg/L Zn

Reference Toxicant Mean and Historical Range: 64.0 (27.3-149.8) mg/L Zn
Reference Toxicant CV (%): 53.0%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: 

Date reviewed: June 27, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (GH)

Start Date/Time: Jun 10 / 16 @ 1300h

Work Order No.: 16637

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-TCL-WS-2016-09-07-N
Sample Date: Jun 7 / 16
Date Received: Jun 9 / 16
Sample Volume: 1 X 20L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 052416
Source: Aqua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.30
Mean Length ± SD (mm): 28 ± 3
Mean Weight ± SD (g): 0.30 ± 0.04

Range: 22 - 31
Range: 0.25 - 0.35

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn42
Stock Solution ID: 15Zn05
Date Initiated: Jun 9 / 15
96-h LC50 (95% CL): 53.6 (43.2 - 66.4) µg/L Zn

Reference Toxicant Mean and Historical Range: 64.0 (27.3 - 149.8) µg/L Zn
Reference Toxicant CV (%): 53.0%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: June 22, 2016

Rainbow Trout Summary Sheet

Client: Teck Wal (GH0)

Start Date/Time: Jun 10 / 16 @ 1300 h

Work Order No.: 16637

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-TC2-WS-2016-06-07-N
Sample Date: Jun 7 / 16
Date Received: Jun 9 / 16
Sample Volume: 1 X 20L
Other: _____

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 052416
Source: Aqua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.32
Mean Length ± SD (mm): 28 ± 2
Mean Weight ± SD (g): 0.32 ± 0.04

Range: 24 - 31
Range: 0.25 - 0.39

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn42
Stock Solution ID: 15Zn05
Date Initiated: Jun 9/15
96-h LC50 (95% CL): 53.6 (43.2-66.4) mg/L Zn

Reference Toxicant Mean and Historical Range: 64.0 (27.3 - 149.8) mg/L Zn
Reference Toxicant CV (%): 53.0%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: 

Date reviewed: June 22, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (GH0)

Start Date/Time: Jun 10 / 16 @ 1300h

Work Order No.: 16637

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-WCI-WS-2016-06-07-N
Sample Date: Jun 7 / 16
Date Received: Jun 9 / 16
Sample Volume: 1 X 20L
Other: /

Test Validity Criteria:

≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 052416
Source: Agua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.32
Mean Length ± SD (mm): 28 ± 1
Mean Weight ± SD (g): 0.32 ± 0.04

Range: 27 - 30
Range: 0.27 - 0.38

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn42
Stock Solution ID: 15Zn05
Date Initiated: Jun 9 / 15
96-h LC50 (95% CL): 53.6 (43.2 - 66.4) µg/L Zn

Reference Toxicant Mean and Historical Range: 64.0 (27.3 - 149.8) µg/L Zn
Reference Toxicant CV (%): 53.0%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: 

Date reviewed: June 22, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Tede Coal (G140)
Sample I.D.: G14-WC1-WS-2016-06-07-N
W.O. #: 16637
RBT Batch #: 052416
Date Collected/Time: JUN 7/16 @ 0910h
Date Setup/Time: JUN 10/16 @ 1300h
Sample Setup By: EC

Number Fish/Volume: 10/10 L
7-d % Mortality: 0.2
Total Pre-aeration Time (mins): 30 mins
Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER# 2 **D.O. meter:** 2
Cond./Salinity: 2 **pH meter:** 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	15.0	/	15.0
pH	8.0	/	8.0
D.O. (mg/L)	9.0	/	9.3
Cond. (µS/cm)	1512 1512	/	1512
Salinity (ppt)	0.8	/	0.8

Concentration	# Survivors								Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
(% v/v)				10	10	10	10	15.0	15.0	15.0	15.0	15.0	10.0	9.9	9.6	9.8	9.8	6.7	6.9	6.8	6.8	6.9	28	34	
100				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.3	9.8	9.8	9.8	9.8	8.0	8.1	8.1	8.3	8.3	1512	1508	
Initials				mo	mo	EL	EL	EC	mo	mo	EL	EL	EC	mo	mo	EL	EL	EC	mo	mo	EL	EL	EC	EL	

Sample Description/Comments: Clear, colorless, odorless, some particulates

Fish Description at 96 h: All fish appear healthy **Number of Stressed Fish at 96 h:** 0

Other Observations: _____

Reviewed by:

Date Reviewed: June 22, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (GH0) Start Date/Time: Jun 6^{EL} 10/16/16 @ 1300h^{EL}
 Work Order No.: 16637 Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-GH1-WS-2016-06-06-N
 Sample Date: Jun 6 116
 Date Received: Jun 9 116
 Sample Volume: 1 x 20L
 Other: /

Test Validity Criteria:
 ≥ 90% control survival
WQ Ranges:
 T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
 Hardness (mg/L CaCO₃): 10
 Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 052416
 Source: Aqua Farms
 No. Fish/Volume (L): 10/10L
 Loading Density (g/L): 0.32
 Mean Length ± SD (mm): 27 ± 1
 Mean Weight ± SD (g): 0.32 ± 0.04

Range: 26 - ~~27~~ 29
 Range: 0.27 - 0.38

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn42
 Stock Solution ID: 15Zn05
 Date Initiated: Jun 9/15
 96-h LC50 (95% CL): 53.6 (43.2-66.4) mg/L Zn

Reference Toxicant Mean and Historical Range: 64.0 (27.3 - 149.8) mg/L Zn
 Reference Toxicant CV (%): 53.0%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by:  Date reviewed: June 22, 2016

Daphnia magna Summary Sheet

Client: Teck (GHO)
Work Order No.: 16638

Start Date/Time: June 9, 2016 @ 1635h
Test Species: Daphnia magna
Set up by: YNL

Sample Information:

Sample ID: GH-WADE-WS-2016-06-07-N
Sample Date: June 7, 2016
Date Received: June 9, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 051016A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 19
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC34
Stock Solution ID: 16NaCl
Date Initiated: June 8, 2016
48-h LC50 (95% CL): 4.8 (4.0 - 5.9) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results:

0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by:

[Signature]

Date reviewed:

June 22, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck Start Date/Time: June 9, 2016 @ 1635h
 Sample ID: GH-WADE-WS-2016-06-07-N No. Organisms/volume: 10/200mL
 Work Order No.: 16638 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-11 DO meter: 213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
<u>Control</u>	A	10	10	0	19.5	19.5	19.5	8.7	8.4	8.5	7.7	7.7	7.8	345	351
	B	10	10	0											
	C	10	10	0											
	D														
<u>100</u>	A	100	100	0	19.0	19.5	19.5	8.8	8.3	8.5	8.2	8.2	22	508	512
	B	100	100	0											
	C	100	100	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	As	As	YML	YML	As	YML	YML	As	YML	YML	As	YML	As

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO3)	
Control (MHW)	94	70
Highest conc.	244	256
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.0		
DO (mg/L)	8.9		
pH	8.2		
Cond (µS/cm)	508		
Salinity (ppt)	0.2		

Comments: organisms on surface Mortality: Heartbeat checked under microscope no

Sample Description: clear, yellow, no odor, no particulates

Batch#: 051016A 7-d previous # young/brood: 19 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: June 22, 2016

Daphnia magna Summary Sheet

Client: Teck (GHO)
Work Order No.: 16638

Start Date/Time: June 9, 2016 @ 1640h
Test Species: Daphnia magna
Set up by: YNL

Sample Information:

Sample ID: GHI-MC1-WS-2016-06-07LN
Sample Date: June 7, 2016
Date Received: June 9, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 051016A+B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 19
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC34
Stock Solution ID: 16NaCl
Date Initiated: June 8, 2016
48-h LC50 (95% CL): 4.8 (4.0-5.9) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: [Signature]

Date reviewed: June 22, 2016

**Freshwater Acute
48 Hour Toxicity Test Data Sheet**

Client: Teck Start Date/Time: June 9, 2016 @ 1640h
 Sample ID: GH-MCI-WS-2016-06-07-LN No. Organisms/volume: 10/200mL
 Work Order No.: 16638 Test Organism: D.magna
 Set up by: YML
 Thermometer: temp-11 DO meter: 213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		48		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48	0	24		48	0	24	48	0	24	48	0	48		
Control	A	10	10	0	19.5	19.5	20.0	8.7	8.3	8.6	7.7	7.7	7.9	345	355		
	B	10	10	0													
	C	10	10	0													
	D																
100	A	100	100	0	19.0	19.5	20.0	8.9	8.4	8.5	8.4	8.3	8.4	757	753		
	B	100	↓	0													
	C	100	↓	0													
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
Technician Initials	YML	AS	AS	AS	YML	YML	AS	YML	YML	AS	YML	YML	AS	YML	AS		

Concentration	Hardness* (mg/L as CaCO3)	Alkalinity* (mg/L as CaCO3)
Control (MHW)	94	70
Highest conc.	400	256
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.0		/
DO (mg/L)	8.9		/
pH	8.4		/
Cond (µS/cm)	757		/
Salinity (ppt)	0.4		/

Comments: organisms on surfaces Mortality: Heartbeat checked under microscope NO

Sample Description: clear, no colour, no odour, no particulates

Batch#: OS1016ATB 7-d previous # young/brood: 19 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: June 22, 2016

Daphnia magna Summary Sheet

Client: Teck (GHO)
Work Order No.: 16638

Start Date/Time: June 9, 2016 @ 1645h
Test Species: Daphnia magna
Set up by: YHL

Sample Information:

Sample ID: GH-COUGAR-WS-2016-06-07-A
Sample Date: June 7, 2016
Date Received: June 9, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 051016B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 19
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC34
Stock Solution ID: 16NaCl
Date Initiated: June 8, 2016
48-h LC50 (95% CL): 4.8 (4.0-5.9) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: [Signature]

Date reviewed: June 22, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck Start Date/Time: June 9, 2016 @ 1645h
 Sample ID: GH COUGAR WS-2016-06-07-N No. Organisms/volume: 10/200mL
 Work Order No.: 16638 Test Organism: D. magna
 Set up by: YML
 Thermometer: temp-844 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	No. Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
control	A	10	10	0	19.5	19.5	20	8.7	8.3	8.5	7.7	7.7	7.8	345	355
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.5	19.5	20	8.8	8.1	8.5	8.0	8.2	8.3	440	445
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	AS	AS	YML	YML	AS	YML	YML	AS	YML	YML	AS	YML	AS

Concentration	Hardness* (mg/L as CaCO3)	Alkalinity* (mg/L as CaCO3)
Control (MHW)	94	70
Highest conc.	224	236
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		
DO (mg/L)	8.8		
pH	8.0		
Cond (µS/cm)	440		
Salinity (ppt)	0.2		

Comments: _____ Mortality: Heartbeat checked under microscope no

Sample Description: slightly yellow, clear, no odour, slight particulates

Batch#: 051016B 7-d previous # young/brood: 19 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: June 22, 2016

Daphnia magna Summary Sheet

Client: Teck (GHO)
Work Order No.: 16638

Start Date/Time: June 10, 2016 @ 1540h
Test Species: Daphnia magna
Set up by: YNL

Sample Information:

Sample ID: GH-TCl WS 2016-06-07-N
Sample Date: June 7, 2016
Date Received: June 9, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 052516A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 7

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC34
Stock Solution ID: 16NaCl
Date Initiated: June 8, 2016
48-h LC50 (95% CL): 4.8 (4.0 - 5.9) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: [Signature]

Date reviewed: June 22, 2016

**Freshwater Acute
48 Hour Toxicity Test Data Sheet**

Client: Teck
 Sample ID: GH-TC1-WS-2016-06-07-N
 Work Order No.: 16638

Start Date/Time: June 10, 2016 @ 1540h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-11 DO meter: 213 pH meter: 113 Cond./Salinity: 213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	19.5	20.0	20.0	8.8	8.6	8.4	7.8	8.0	8.0	355	364
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.5	20.0	20.0	7.3	8.1	8.0	8.2	8.2	8.1	1200	1204
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		AS	AS	AS	YML	AS	AS	YML	AS	AS	YML	AS	AS	YML	AS

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO3)	
Control (MHW)	94	70
Highest conc.	650	184
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		
DO (mg/L)	7.3		
pH	8.2		
Cond (µS/cm)	1200		
Salinity (ppt)	0.6		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: clear, no colour, no odour, no particulates

Batch#: 052516A 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 7

Reviewed by: [Signature] Date reviewed: June 22, 2016

Daphnia magna Summary Sheet

Client: Teck (GHO)
Work Order No.: 16638

Start Date/Time: June 10, 2016 @ 1545h
Test Species: Daphnia magna
Set up by: YNL

Sample Information:

Sample ID: GH-TC2-WS-2016-06-07-N
Sample Date: June 7, 2016
Date Received: June 9, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 052516B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 0
Days to first brood: 7

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC34
Stock Solution ID: 16NaCl
Date Initiated: June 8, 2016
48-h LC50 (95% CL): 4.8 (4.0-5.9) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: [Signature]

Date reviewed: June 22, 2016

**Freshwater Acute
48 Hour Toxicity Test Data Sheet**

Client: Teck
 Sample ID: GH-TCZ-WS-2016-06-07-N
 Work Order No.: 16638

Start Date/Time: June 10, 2016 @ 1545h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: YML

Thermometer: temp-11 DO meter: 213 pH meter: 113 Cond./Salinity: 213

Concentration (% v/v)	Number of Live Organisms Rep	No. Immobilized			Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48	48	0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	20.0	20.0	8.8	8.6	8.5	7.8	7.9	8.0	355	358
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	20.0	20.0	20.0	9.0	8.5	8.4	8.3	8.2	8.2	1197	1196
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		AS	AS	AS	YML	AS	AS	YML	AS	AS	YML	AS	AS	YML	AS

Concentration	Hardness* (mg/L as CaCO3)	Alkalinity*
Control (MHW)	94	70
Highest conc.	710	184
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		
DO (mg/L)	9.0		
pH	8.3		
Cond (µS/cm)	1197		
Salinity (ppt)	06		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: slight yellow colour, clear, no colour slight particulates

Batch#: 052516B 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 0 Day of 1st Brood: 7

Reviewed by: [Signature] Date reviewed: June 22, 2016

Daphnia magna Summary Sheet

Client: Teck (GHO)
Work Order No.: 16638

Start Date/Time: June 10, 2016 @ 1550h
Test Species: Daphnia magna
Set up by: YNL

Sample Information:

Sample ID: GH-WCI-WS-2016-06-07-N
Sample Date: June 7, 2016
Date Received: June 9, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:
≥ 90% mean control survival (no more than 2 mortalities in any control replicate)
WQ Ranges:
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 052516B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 0
Days to first brood: 7

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC34
Stock Solution ID: 16NaCl
Date Initiated: June 8, 2016
48-h LC50 (95% CL): 4.8 (4.0 - 5.9) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: [Signature]

Date reviewed: June 22, 2016

**Freshwater Acute
48 Hour Toxicity Test Data Sheet**

Client: Teck
 Sample ID: GH-WCL-WS-2016-06-07-N
 Work Order No.: 16638

Start Date/Time: June 10, 2016 @ 1550h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: YML

Thermometer: temp-11 DO meter: 213 pH meter: 113 Cond./Salinity: 213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	20.0	20.0	8.8	8.6	8.5	7.8	8.0	8.0	355	356
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.5	20.0	20.0	8.5	8.6	8.5	7.9	8.1	8.1	1519	1495
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		AS	AS	AS	YML	AS	AS	YML	AS	AS	YML	AS	AS	YML	AS

Concentration	Hardness* (mg/L as CaCO3)	Alkalinity*
Control (MHW)	94	70
Highest conc.	780	276
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		
DO (mg/L)	8.5		
pH	7.9		
Cond (µS/cm)	1519		
Salinity (ppt)	0.8		

Comments: _____ Mortality: Heartbeat checked under microscope ND

Sample Description: clear, no colour, no odour, slight particulates

Batch#: 052516B 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 0 Day of 1st Brood: 7

Reviewed by: [Signature] Date reviewed: June 22, 2016

Daphnia magna Summary Sheet

Client: Teck (GHO)
Work Order No.: 16638

Start Date/Time: June 10, 2016 @ 1555h
Test Species: Daphnia magna
Set up by: YNL

Sample Information:

Sample ID: GH-GH-WS-2016-06-06-N
Sample Date: June 6, 2016
Date Received: June 9, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:
≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:


Broodstock No.: 052516B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 0
Days to first brood: 7

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC34
Stock Solution ID: 16NaCl
Date Initiated: June 8, 2016
48-h LC50 (95% CL): 4.8 (4.0 - 5.9) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: 

Date reviewed: June 22, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: GLGH1-W3-2016-06-06-N
 Work Order No.: 16638

Start Date/Time: June 10, 2016 @ 1555h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-11 DO meter: 213 pH meter: 113 Cond./Salinity: 213

Concentration (% v/v)	Number of Live Organisms Rep	No. Immobilized		Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)		
		24	48	0	24	48	0	24	48	0	24	48	0	48	
Control	A	10	10	0	19.5	20.0	20.0	8.8	8.6	8.4	7.8	7.9	8.0	355	356
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	20.0	20.0	20.0	8.7	8.6	8.4	8.2	8.3	8.2	1023	1029
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		AS	AS	AS	YML	AS	AS	YML	AS	AS	YML	AS	AS	YML	AS

Concentration	Hardness* (mg/L as CaCO ₃)	Alkalinity* (mg/L as CaCO ₃)
Control (MHW)	94	70
Highest conc.	600	240
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		
DO (mg/L)	8.7		
pH	8.2		
Cond (µS/cm)	1023		
Salinity (ppt)	0.5		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: slight yellow colour, no odour, no particulates

Batch#: 0525163 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 0 Day of 1st Brood: 7

Reviewed by: YML Date reviewed: June 22, 2016

Client: Teck

W.O.#: 16638

Hardness and Alkalinity Datasheet

Sample ID	Sample Date	Alkalinity				Hardness			Technician
		Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO 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)	
GH_WADE_WS_	June 9/16	50	13.0	13.2	256	50	12.2	244	KL
2016-06-07-N									
GH_MCI_WS_	June 9/16	50	13.0	13.2	256	50	20.0	400	KL
2016-06-07-N									
GH_COUGAR_WS_	June 9/16	50	11.9	12.0	236	50	11.2	KL 114 224	KL
2016-06-07-N									
GH_TC1_WS_2016-06-07-N	June 10/16	50	9.4	9.6	184	10 ⁰	6.5	650	KL
GH_TC2_WS_	June 10/16	50	9.4	9.6	184	10 ⁰	7.1	710	↓
2016-06-07-N									
GH_WC1_WS_	June 10/16	40 50	12.7 14.0	14.2	276	10 ⁰	7.8	780	KL
2016-06-07-N									
GH_GH1_WS_	June 10/16	50	12.2	12.34	240	10 ⁰	6.0	600	KL
2016-06-06-N									
MHW	June 9/16	50	3.6	3.7	70	50	4.7	94	YML
MHW	June 10/16	50	3.6	3.7	70	50	4.7	94	YML

Notes: ① Diluted to 100 mL w DI water.

Reviewed by: 

Date Reviewed: June 17, 2016



Teck Coal / Greenhills Operations
ATTN: Leigh Stickney
P.O. Box 5000
Elkford, BC
VOB 1H0

Report Date: August 16, 2016
Work Order: 16816 - 16817

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 96-h rainbow trout acute single-concentration screening toxicity test.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
GH_PC1_WS_2016_08_02_N	August 2, 2016 @ N/A	0

N/A = Not available.

Table 2. Results for the 48-h *Daphnia magna* acute single-concentration screening toxicity test.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
GH_PC1_WS_2016_08_02_N	August 2, 2016 @ N/A	0

N/A = Not available.

All control performance criteria were met and no deviations from the test protocols were observed. The results presented in this report relate only to the sample tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck Coal (GHO)

Start Date/Time: Aug 05 116 @ 1030h

Work Order No.: 16816

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-PC1-WS-2016-08-02-N
Sample Date: Aug 02 / 16
Date Received: Aug 04 / 16
Sample Volume: 1 X 20 L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 11
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 071816a
Source: Aqua Farms
No. Fish/Volume (L): 10/10
Loading Density (g/L): 0.37
Mean Length ± SD (mm): 28 ± 2
Mean Weight ± SD (g): 0.37 ± 0.08

Range: 24 - 31
Range: 0.27 - 0.54

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn 45
Stock Solution ID: 15 ZnOS
Date Initiated: Aug 1 / 16
96-h LC50 (95% CL): 30.9 (23.3 - 40.9) mg/L Zn

Reference Toxicant Mean and Historical Range: 58.0 (29.4 - 114.4) mg/L Zn
Reference Toxicant CV (%): 40%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: Aug 15, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal (GH)
 Sample I.D.: GH-PCI-WS-2016-08-02-N
 W.O. #: 16816
 RBT Batch #: 071816A
 Date Collected/Time: Aug 02/16 @ (Not available)
 Date Setup/Time: Aug 05/16 @ 1030h
 Sample Setup By: EC

Number Fish/Volume: 10/10 L
 7-d % Mortality: 0.1
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER# 2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	15.0	/	15.0
pH	8.2	/	8.2
D.O. (mg/L)	9.4	/	9.6
Cond. (µS/cm)	1027	/	1027
Salinity (ppt)	0.5	/	0.5

Concentration (% v/v)	# Survivors								Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
(+)				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.9	9.6	9.8	9.9	9.8	6.9	7.0	7.0	7.0	6.9	29	33	
100				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.6	9.6	9.9	9.8	9.9	8.2	8.1	8.1	8.4	8.3	1027	1045	
Initials				Am	Am	EL	EL	EC	Am	Am	EL	EL	EC	Am	Am	EL	EL	EC	Am	Am	EL	EL	EC	EL	

Sample Description/Comments: pale green, clear, odourless, no particulates.

Fish Description at 96 h: All fish appear healthy Number of Stressed Fish at 96 h: 0

Other Observations: _____

Reviewed by:

Date Reviewed: Aug 15, 2016

Daphnia magna Summary Sheet

Client: Teck (GHO)
Work Order No.: 16817

Start Date/Time: August 7, 2016 @ 1145h
Test Species: Daphnia magna
Set up by: AWD

Sample Information:

Sample ID: GH_PCI_WS_2016_08_02_N
Sample Date: August 2, 2016
Date Received: August 4, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 071316A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 28
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16Na01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9 - 4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Aug 15, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck Start Date/Time: Aug 7 /16 @ 1145h
 Sample ID: 6H-PLI-WS-2016-08-02-N No. Organisms/volume: 10/200mL
 Work Order No.: 16817 Test Organism: D. magna
 Set up by: A

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	20.5	20.5	20.0	8.8	8.7	8.6	8.0	7.8	7.7	356	370
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	20.5	20.5	20.0	8.9	8.8	8.7	8.1	8.1	8.1	1043	1048
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		MM	MM	MM	MM	MM	MM	MM	MM	MM	MM	MM	MM	MM	MM

	Hardness*	Alkalinity*
	*(mg/L as CaCO ₃)	
Concentration		
Control (MHW)	96	68
Highest conc.	600	234
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.5		
DO (mg/L)	8.9		
pH	8.1		
Cond (µS/cm)	1043		
Salinity (ppt)	0.5		

Comments: _____ Mortality: Heartbeat checked under microscope ^{not} req'd

Sample Description: slight green colour, clear, no odour, no particulates

Batch#: 071316 A 7-d previous # young/brood: 28 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Aug 15, 2016



Teck Coal / Greenhills Operations
 ATTN: Leigh Stickney
 P.O. Box 5000
 Elkford, BC
 V0B 1H0

Report Date: August 23, 2016
 Work Order: 16846 – 16847

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

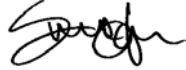
Table 1. Results for the 96-h rainbow trout acute single-concentration screening toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
GH_TC1_WS_2016-08-09_N	August 9, 2016 @ 1436h	0
GH_TC2_WS_2016-08-09_N	August 9, 2016 @ 1555h	0
GH_WC1_WS_2016-08-09_N	August 9, 2016 @ 1010h	0
GH_GH1_WS_2016-08-08_N	August 8, 2016 @ 0745h	0

Table 2. Results for the 48-h *Daphnia magna* acute single-concentration screening toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
GH_TC1_WS_2016-08-09_N	August 9, 2016 @ 1436h	13.3
GH_TC2_WS_2016-08-09_N	August 9, 2016 @ 1555h	3.3
GH_WC1_WS_2016-08-09_N	August 9, 2016 @ 1010h	0
GH_GH1_WS_2016-08-08_N	August 8, 2016 @ 0745h	0

All control performance criteria were met and no deviations from the test protocols were observed. The results presented in this report relate only to the samples tested.



Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck

Start Date/Time: Aug 12 116 @ 1330h

Work Order No.: 16846

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH_TCI_WS_2016-08-09-N
Sample Date: Aug 9 116
Date Received: Aug 11 116
Sample Volume: 1 X20 L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 11
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 0718166
Source: Aqua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.35
Mean Length ± SD (mm): 28 ± 2
Mean Weight ± SD (g): 0.35 ± 0.08

Range: 24 - 31
Range: 0.24 - 0.48

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn46
Stock Solution ID: 15Zn05
Date Initiated: Aug 09 116
96-h LC50 (95% CL): 107.2 (84.1 - 136.5) µg/L Zn

Reference Toxicant Mean and Historical Range: 55.6 (26.9 - 115.2) µg/L Zn
Reference Toxicant CV (%): 44%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample

Reviewed by: [Signature]

Date reviewed: Aug 19, 2016

Rainbow Trout Summary Sheet

Client: Teck

Start Date/Time: Aug 12 /16 @ 1330h

Work Order No.: 16846

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-TCLWS-2016-08-09-N
Sample Date: Aug 9 /16
Date Received: Aug 11 /16
Sample Volume: 1 X 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 11
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 0718166
Source: Aqua Farms
No. Fish/Volume (L): 10/10
Loading Density (g/L): 0.33
Mean Length ± SD (mm): 27 ± 2
Mean Weight ± SD (g): 0.33 ± 0.03

Range: 26 - 31
Range: 0.26 - 0.37

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn46
Stock Solution ID: 15Zn05
Date Initiated: Aug 09 116
96-h LC50 (95% CL): 107.2 (84.1 - 136.5) µg/L Zn

Reference Toxicant Mean and Historical Range: 55.6 (26.9 - 115.2) µg/L Zn
Reference Toxicant CV (%): 44%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample

Reviewed by: 

Date reviewed: Aug 19, 2016

Rainbow Trout Summary Sheet

Client: Teck

Start Date/Time: Aug 12 116 @ 1330h

Work Order No.: 16846

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH_WCI_WS-2016-08-09_N
Sample Date: Aug 9 116
Date Received: Aug 11 116
Sample Volume: 1 X 20 L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 11
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 0718166
Source: Aqua Farms
No. Fish/Volume (L): 10/10
Loading Density (g/L): 0.31
Mean Length ± SD (mm): 26 ± 1
Mean Weight ± SD (g): 0.31 ± 0.03

Range: 24 - 27
Range: 0.28 - 0.40

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn46
Stock Solution ID: 15Zn05
Date Initiated: Aug 09 116
96-h LC50 (95% CL): 107.2 (84.1 - 136.5) µg/L Zn

Reference Toxicant Mean and Historical Range: 55.6 (26.9 - 115.2) µg/L Zn
Reference Toxicant CV (%): 44%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: Aug 09, 2016

Rainbow Trout Summary Sheet

Client: Teck

Start Date/Time: Aug 12 /16 @ 1330h

Work Order No.: 16846

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-GH1-WS-2016-08-08-N
Sample Date: Aug 8 /16
Date Received: Aug 11 /16
Sample Volume: 1 X 20 L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 11
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 0718166
Source: Aqua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.32
Mean Length ± SD (mm): 26 ± 2
Mean Weight ± SD (g): 0.32 ± 0.07


Range: 24 - 30
Range: 0.23 - 0.45

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn46
Stock Solution ID: 15Zn05
Date Initiated: Aug 09/16
96-h LC50 (95% CL): 107.2 (84.1 - 136.5) µg/L Zn

Reference Toxicant Mean and Historical Range: 55.6 (26.9 - 115.2) µg/L Zn
Reference Toxicant CV (%): 44%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: 

Date reviewed: Aug 19, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck
 Sample I.D. GH-GH1-WS-2016-08-08-N
 W.O. # 16846
 RBT Batch #: 0718166
 Date Collected/Time: Aug 8/16 @ 0745h
 Date Setup/Time: Aug 12/16 @ 1330h
 Sample Setup By: EC

Number Fish/Volume: 10/10 L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER# 2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	15.0	/	15.0
pH	8.0	/	8.1
D.O. (mg/L)	9.5	/	9.8
Cond. (µS/cm)	1182	/	1179
Salinity (ppt)	0.6	/	0.6

Concentration (% v/v)	# Survivors						Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)			
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
(+)				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.8	9.8	9.9	9.8	9.8	6.8	6.9	7.0	6.9	7.0	72	96	
100				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.8	9.8	9.8	9.9	9.7	8.1	8.3	8.2	8.3	8.3	1179	1192	
Initials				Amo	Amo	EL	EL	EC	Amo	Amo	EL	EL	EC	Amo	Amo	EL	EL	EC	Amo	Amo	EL	EL	EC		

Sample Description/Comments: light yellow, clear, some particulates, odorless

Fish Description at 96 h All fish appear healthy Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: [Signature]

Date Reviewed: Aug 19, 2016

Daphnia magna Summary Sheet

Client: Teck (GHO)
Work Order No.: 16847

Start Date/Time: August 14, 2016 @ 1145h
Test Species: Daphnia magna
Set up by: AWD

Sample Information:

Sample ID: GH-TCL-WS-2016-08-09-N
Sample Date: August 9, 2016
Date Received: August 11, 2016
Sample Volume: 1 X 20L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 07206A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 18
Mortality (%) in previous 7 d: 10
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16Na01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 13.3% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: 

Date reviewed: Aug 19, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (GHO) Start Date/Time: Aug 14/16 @ 1145h
 Sample ID: GH-TC-WS 2016-08-09-N No. Organisms/volume: 10/200mL
 Work Order No.: 16847 Test Organism: D.magna
 Set up by: AS

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	No. Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)		
		24	48		0	24	48	0	24	48	0	24	48	0	48	
		Control	A		10	10	0	21.0	20.0	20.5	8.5	8.7	8.8	8.1	7.8	7.6
	B	10	10	0												
	C	10	9	0												
	D															
100	A	10	9	0	21.0	20.0	20.5	8.6	8.6	8.7	8.0	8.0	8.1	1399	1437	
	B	10	10	0												
	C	10	8	1												
	D															
	A															
	B															
	C															
	D															
	A															
	B															
	C															
	D															
	A															
	B															
	C															
	D															
Technician Initials		MM MM		MM	AS	MM MM			AS	MM MM		AS	MM MM		AS	MM

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCo3)	
Control (MHW)	100	76
Highest conc.	830	216
Hardness adjusted	—	—

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	21.0		
DO (mg/L)	8.6		
pH	8.0		
Cond (µS/cm)	1399		
Salinity (ppt)	0.6		

Comments: _____ Mortality: Heartbeat checked under microscope YES

Sample Description: light yellow colour, clear, no colour, no particulates

Batch#: 072016A 7-d previous # young/brood: 18 Previous 7-d Mortality (%): 10 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Aug 19, 2016

Daphnia magna Summary Sheet

Client: Teck (G+O)
Work Order No.: 16847

Start Date/Time: August 14, 2016 @ 1150h
Test Species: Daphnia magna
Set up by: AWD

Sample Information:

Sample ID: GH-TC2 WS_2016-08-09-N
Sample Date: August 9, 2016
Date Received: August 11, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 072016A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 18
Mortality (%) in previous 7 d: 10
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16Na01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 3.3% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Aug 19, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (Gho) Start Date/Time: Aug 14 / 16 @ 1150h
 Sample ID: GH-TC2-WS No. Organisms/volume: 10/200mL
 Work Order No.: 16847 2016-08-09-N Test Organism: D. magna
 Set up by: AS

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	21.0	20.0	20.5	8.5	8.6	8.5	8.1	7.7	7.6	348	380
	B	10	10	0											
	C	10	10	0											
	D														
100 %	A	10	10	0	21.0	20.0	20.5	8.6	8.5	8.6	8.1	8.0	8.2	1398	1416
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		MM	MM	MM	AS	MM	MM	AS	MM	MM	AS	MM	MM	AS	MM

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO3)	
Control (MHW)	100	76
Highest conc.	320	214
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	21.0		
DO (mg/L)	8.6		
pH	8.1		
Cond (µS/cm)	1398		
Salinity (ppt)	0.7		

Comments: _____ Mortality: Heartbeat checked under microscope YES

Sample Description: light yellow, clear, no odor, no particulates.

Batch#: 072016A 7-d previous # young/brood: 18 Previous 7-d Mortality (%): 10 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Aug 19, 2016

Daphnia magna Summary Sheet

Client: Teck (GHO)
Work Order No.: 16847

Start Date/Time: August 14, 2016 @ 09:55h
Test Species: Daphnia magna
Set up by: AWB

Sample Information:

Sample ID: GH-WCI-WS-2016-08-09-N
Sample Date: August 9, 2016
Date Received: August 11, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 072016A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 18
Mortality (%) in previous 7 d: 10
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16Na01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: 

Date reviewed: Aug 19, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (Gho) Start Date/Time: Aug 14/16 0955h ASSTh AS
 Sample ID: GH-UCI-WS-2016- No. Organisms/volume: 10/200mL
 Work Order No.: 16847 08-09N Test Organism: D. magna
 Set up by: AS

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	21.0	20.0	20.5	8.5	8.6	8.7	8.1	7.8	7.6	248	375
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10 ⁰⁰	0	21.0	20.0	20.5	8.6	8.5	8.6	7.9	8.0	8.0	1491	1469
	B	10	10 ⁰⁰	0											
	C	10	10 ⁰⁰	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		MM	MM	MM	AS	MM	MM	AS	MM	MM	AS	MM	MM	AS	MM

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO3)	
Control (MHW)	100	76
Highest conc.	840	286
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	21.0		
DO (mg/L)	8.6		
pH	7.9		
Cond (µS/cm)	1491		
Salinity (ppt)	0.7		

Comments: Slight precipitate on surface. Mortality: Heartbeat checked under microscope not req'd
 Sample Description: light yellow colour, clear, no odour, slight particulates.
 Batch#: 072016 A 7-d previous # young/brood: 18 Previous 7-d Mortality (%): 10 Day of 1st Brood: 9
 Reviewed by: [Signature] Date reviewed: Aug 19, 2016

Daphnia magna Summary Sheet

Client: Teck (GHO)
Work Order No.: 16897

Start Date/Time: August 12, 2016 @ 1605h
Test Species: Daphnia magna
Set up by: YHL

Sample Information:

Sample ID: GH-GHLWS-2016-08-08-N
Sample Date: August 8, 2016
Date Received: August 11, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 072716B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 22
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16Na01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: [Signature]

Date reviewed: Aug 19, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (GHO)
 Sample ID: GH-GH1-WS-2016-08-08-N
 Work Order No.: 16847

Start Date/Time: August 12, 2016 @ 1605h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	20.0	21.0	21.0	8.8	8.7	8.4	7.9	8.0	8.1	348	365
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	21.0	21.0	21.0	9.0	8.4	8.3	8.1	8.2	8.3	1182	1184
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		AS	AS	A	YML	A	A	YML	AS	A	YML	AS	A	YML	AS

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCo3)	
Control (MHW)	100	76
Highest conc.	740	270
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	21.0		
DO (mg/L)	9.0		
pH	8.1		
Cond (µS/cm)	1182		
Salinity (ppt)	0.6		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: light yellow color, clear, no odor, slight particulates.

Batch#: 0727163 7-d previous # young/brood: 22 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Aug 19, 2016


Client: TECK

W.O.#: 16847

Hardness and Alkalinity Datasheet

Sample ID	Sample Date	Alkalinity				Hardness			Technician
		Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO 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)	
GH_TC1_WS_2016-08-09-N	Aug 14/16	50	11.0	11.2	216	100	8.3	830	KL
GH_TC2_WS_2016-08-09-N	Aug 14/16	50	10.8	10.9	214	100	8.2	820	KL
GH_WC1_WS_2016-08-09-N	Aug 14/16	50	14.6	14.9	286	100	8.4	840	KL
GH_GH1_WS_2016-08-08-N	Aug 12/16	50	13.7	13.9	270	100	7.4	740	KL
MHW	Aug 12/16	50	3.9	4.0	76	50	5.0	100	YML

Notes: ① Diluted to 100 mL w/ DI water.

Reviewed by: 

Date Reviewed: Aug 19, 2016

Teck

COC ID:		GHO Q3 tox		TURNAROUND TIME:		regular		RUSH:			
PROJECT/CLIENT INFO				CLIENT'S DAY				OTHER INFO			
Facility Name: Greenhills Operations		Lab Name: Neutilus Environmental		Site:		leigh.stickney@teck.com		EQuIS: GHO			
Project Manager: Leigh Stickney		Lab Contact: Krysta Paszoy		Report Format / Distribution		Yes		PDF Yes Excel			
Email: leigh.stickney@teck.com		Address: 6666 Commerce Court		City: Burnaby		Province: BC		Country: Can			
Address: PO Box 5000		City: Elkford		Province: BC		Country: Canada		Postal Code: V0B 1H0			
City: Elkford		Province: BC		Country: Canada		Postal Code: V5K 4N7		Phone Number: 250 865 3274			
Postal Code: V0B 1H0		Country: Canada		City: Burnaby		Province: BC		Country: Can			
Phone Number: 250 865 3274		City: Burnaby		Province: BC		Country: Can		Postal Code: V5K 4N7			
City: Elkford		Province: BC		Country: Canada		Postal Code: V5K 4N7		Phone Number: 250 865 3274			
Postal Code: V0B 1H0		Country: Canada		City: Burnaby		Province: BC		Country: Can			
Phone Number: 250 865 3274		City: Burnaby		Province: BC		Country: Can		Postal Code: V5K 4N7			

SAMPLE DETAILS							ANALYSIS REQUESTED																
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G-Grp / C-Code	# Of Cont.	Please indicate below Filtered, Preserved 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	#N/A	#N/A		
								20 hr Rainbow trout (pass/fail)	48 hr daphnia (pass/fail)	48 hr daphnia @ 10 deg C (pass/fail)	TECK Chronic Toxicity program (Q4)	Temp °C											
GH_WA01_WS_2016-08-09_N	GH_WA01	WS	N	09-Aug		G	1	X	X	X													
GH_LC1_WS_2016-08-09_N	GH_LC1	WS	N	09-Aug		G	1	X	X	X													
GH_TC1_WS_2016-08-09_N	GH_TC1	WS	N	09-Aug	14:36	G	1	X	X	X													16.5
GH_TC2_WS_2016-08-09_N	GH_TC2	WS	N	09-Aug	15:55	G	1	X	X	X													16.5
GH_WC1_WS_2016-08-09_N	GH_WC1	WS	N	09-Aug	10:10	G	1	X	X	X													13.2
GH_GH1_WS_2016-08-08_N	GH_GH1	WS	N	08-Aug	7:45	G	1	X	X	X													13.2

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
	M. Calogrese / Nyrup	Aug 9/16	17:00	Neutilus NY - New Yamamoto	Aug 11/16	@ 09:50

SERVICE REQUEST (rush - subject to availability)			
Regular (default) <input checked="" type="checkbox"/>	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	M. Calogrese	Mobile #	
Sampler's Signature	<i>M. Calogrese</i>	Date/Time	Aug 9/16 17:00

① The canboys have hand written ID's on the only canboy also print-labeled has hand written ID "TC1" on pw "TC2" on the printed label. The hand written ID's are correct. Emma confirmed w/ client. NY



Teck Coal / Greenhills Operations
ATTN: Leigh Stickney
P.O. Box 5000
Elkford, BC
VOB 1H0

Report Date: August 26, 2016
Work Order: 16867 - 16868

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 96-h rainbow trout acute single-concentration screening toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
GH_WADE_WS_2016-08-09_N	August 15, 2016 @ 0930h	0
GH_LC1_WS_2016-08-09_N	August 15, 2016 @ 1110h	0

Table 2. Results for the 48-h *Daphnia magna* acute single-concentration screening toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
GH_WADE_WS_2016-08-09_N	August 15, 2016 @ 0930h	0
GH_LC1_WS_2016-08-09_N	August 15, 2016 @ 1110h	0

All control performance criteria were met and no deviations from the test protocols were observed. The results presented in this report relate only to the samples tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck Coal (GHO)

Start Date/Time: Aug 18 /16 @ 1330h

Work Order No.: 16867

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-WADE-WS-2016-08-09-N
Sample Date: Aug 15 /16
Date Received: Aug 17 /16
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 11
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 0718166
Source: Aqua Farms
No. Fish/Volume (L): 10/12
Loading Density (g/L): 0.33
Mean Length ± SD (mm): 36 ± 3
Mean Weight ± SD (g): 0.40 ± 0.13

Range: 32 - 41
Range: 0.27 - 0.71

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn46
Stock Solution ID: 15Zn05
Date Initiated: Aug 09 /16
96-h LC50 (95% CL): 107.2 (84.1 - 136.5) µg/L Zn

Reference Toxicant Mean and Historical Range: 55.6 (26.9 - 115.2) µg/L Zn
Reference Toxicant CV (%): 44%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: Aug 25, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal (GH)
 Sample I.D.: GH-WADE-WS-2016-08-09-N
 W.O. #: 16867
 RBT Batch #: 071816b
 Date Collected/Time: Aug 15/16 @ 0930h
 Date Setup/Time: Aug 18/16 @ 1330h
 Sample Setup By: EC

Number Fish/Volume: 10/12 L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER# 2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	15.0	/	15.0
pH	8.3	/	8.3
D.O. (mg/L)	9.4	/	9.8
Cond. (µS/cm)	531	/	531
Salinity (ppt)	0.3	/	0.3

Concentration (% v/v)	# Survivors								Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
C+1				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.9	9.9	9.8	9.8	9.8	7.0	6.9	7.0	7.0	7.2	33	40	
100				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.8	9.9	9.9	9.9	9.8	8.4	8.4	8.3	8.4	8.6	531	530	
Initials				EL	AS	AS	EL	EC	EL	AS	AS	EL	EC	EL	AS	AS	EL	EC	EL	AS	AS	EL	EC	EL	

Sample Description/Comments: light yellow, clear, no particulate, odourless

Fish Description at 96 h: All fish appear healthy Number of Stressed Fish at 96 h: 0

Other Observations: _____

Reviewed by: [Signature] Date Reviewed: Aug 25, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (GHO)

Start Date/Time: Aug 18 /16 @ 1330h

Work Order No.: 16867

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-LCI-WS-2016-08-09-N
Sample Date: Aug 15 /16
Date Received: Aug 17 /16
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 11
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 071816b
Source: Aqua Farms
No. Fish/Volume (L): 10/12
Loading Density (g/L): 0.34
Mean Length ± SD (mm): 36 ± 5
Mean Weight ± SD (g): 0.41 ± 0.14

Range: 29 - 43
Range: 0.22 - 0.65

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn46
Stock Solution ID: 15Zn05
Date Initiated: Aug 09 /16
96-h LC50 (95% CL): 107.2 (84.1 - 136.5) µg/L Zn

Reference Toxicant Mean and Historical Range: 55.6 (26.9 - 115.2) µg/L Zn
Reference Toxicant CV (%): 44%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: 

Date reviewed: Aug 25, 2016

Daphnia magna Summary Sheet

Client: Teck (GHO)
Work Order No.: 16868

Start Date/Time: August 18, 2016 @ 1605h
Test Species: Daphnia magna
Set up by: YVL

Sample Information:

Sample ID: GHLWADE-WS-2016-08-09LN
Sample Date: August 15, 2016
Date Received: August 17, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:
≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.
WQ Ranges:
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 072016A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 20
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16Na01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Aug 25, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (GHO) Start Date/Time: August 18, 2016 @ 1605h
 Sample ID: GH-WADE-WS-2016-08-09-N No. Organisms/volume: 10/200mL
 Work Order No.: 16868 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	20.5	20.0	20.0	8.5	8.6	8.8	7.7	7.7	7.9	351	360
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	20.5	20.0	20.0	9.0	8.5	8.7	8.2	8.2	8.3	540	553
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	AS	AS	YML	YML	AS	YML	YML	AS	YML	YML	AS	YML	AS

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO ₃)	
Control (MHW)	96	76
Highest conc.	244	300
Hardness adjusted	—	—

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.5		20.5
DO (mg/L)	9.8	(5 min aeration)	9.0
pH	8.1		8.2
Cond (µS/cm)	541		540
Salinity (ppt)	0.3		0.3

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: slight yellow colour, clear, no odour, no particulates

Batch#: 072016A 7-d previous # young/brood: 20 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Aug 25, 2016

Daphnia magna Summary Sheet

Client: Teck (GHO)
Work Order No.: 16868

Start Date/Time: August 18, 2016 @ 16:00h
Test Species: Daphnia magna
Set up by: YHL

Sample Information:

Sample ID: GHLLC1_WS_2016-08-09-N
Sample Date: August 15, 2016
Date Received: August 17, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 072016A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 20
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16Na01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Aug 25, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (GHS)
 Sample ID: GH-LCI-WS-2016-08-09-N
 Work Order No.: 16368

Start Date/Time: August 18, 2016 @ 1610h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		48		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48	0	24		48	0	24	48	0	24	48	0	48		
Control	A	10	10	0	20.5	20.0	20.0	8.5	8.4	8.5	7.7	7.7	7.9	351	360		
	B	10	10	0													
	C	10	10	0													
	D																
100	A	10	10	0	20.5	20.0	20.0	9.0	8.6	8.7	8.0	8.0	2167	1572			
	B	10	10	0													
	C	10	10	0													
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
Technician Initials		YML	AS	AS	YML	YML	AS	YML	YML	AS	YML	YML	AS	YML	AS		

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO3)	
Control (MHW)	96	76
Highest conc.	920	310
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.5		20.5
DO (mg/L)	10.1	(7 min aeration)	9.0
pH	7.9		8.0
Cond (µS/cm)	1615		1617
Salinity (ppt)	0.8		0.8

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: slight green colour, clear, no odour, no particulates

Batch#: 072016A 7-d previous # young/brood: 20 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Aug 25, 2016

Client: Teck

W.O.#: 16868

Hardness and Alkalinity Datasheet

Sample ID	Alkalinity						Hardness			Technician
	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO 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)	
GH-WADGWS 2016-08-09-N	Aug 17/16	Aug 18/16	50	15.2	15.4	300	50	12.2	244	SS
GH-LCL-WS 2016-08-09-N	Aug 17/16	Aug 18/16	10 [Ⓢ]	3.2	3.3	310	10 [Ⓢ]	9.2	920	SS
MHW	Aug 18/16	Aug 18/16	50	3.9	4.0	76	50	4.8	96	YML

Notes: [Ⓢ] Diluted to 100 mL w/ DI water

Reviewed by: 

Date Reviewed: Aug 25, 2016



Acute Toxicity Test Results

Sample collected November 15, 2016

Final Report

November 30, 2016

Submitted to: **Teck Coal / Greenhills Operations**
Elkford, BC

SAMPLE INFORMATION

Sample ID	Dates				Receipt temp.
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> test initiation	
GH_PC1_WS_2016-11-15_N	15-Nov-16 at 1047h	16-Nov-16 at 1000h	18-Nov-16 at 1545h	16-Nov-16 at 1600h	3.8°C

TESTS

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test

RESULTS

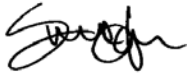
Toxicity test results

Sample ID	Percent mortality in 100% (v/v) sample	
	Rainbow trout	<i>Daphnia magna</i>
GH_PC1_WS_2016-11-15_N	0	17

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CI)	40.6 (34.1 – 48.4) µg/L Zn ¹	4.5 (3.8 – 5.4) g/L NaCl ²
Reference toxicant historical mean (2 SD range)	60.8 (22.0 – 167.6) µg/L Zn	4.1 (3.1 – 5.5) g/L NaCl
Reference toxicant CV	66%	15%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹ Test date November 14, 2016. ² Test date November 2, 2016.



Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio
Senior Analyst

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) single concentration test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquarium
Test volume	10 to 20 L (depending on size of fish)
Test solution depth	≥15 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tapwater
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Zinc (added as ZnCl ₂)

Table 2. Summary of test conditions: 48-h *Daphnia magna* single concentration test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: Tedco Coal (GHO)

Start Date/Time: Nov 18, 116 @ 1545h

Work Order No.: 161244b

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-PCI-WS-2016-11-15-N
Sample Date: Nov 15 116
Date Received: Nov 16 116
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 4

Test Organism Information:

Batch No.: 110116
Source: AK Vancouver Island Trout Hatchery
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.26
Mean Length ± SD (mm): 31 ± 1 Range: 29 - 31
Mean Weight ± SD (g): 0.32 ± 0.03 Range: 0.27 - 0.37

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn54
Stock Solution ID: 16Zn02
Date Initiated: Nov 14 116
96-h LC50 (95% CL): 40.6 (34.1 - 48.4) µg/L

Reference Toxicant Mean and Historical Range: 60.8 (22.0 - 167.6) µg/L Zn
Reference Toxicant CV (%): 66.1%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: Nov. 29, 2016

Daphnia magna Summary Sheet

Client: Teck (GHO)
Work Order No.: 161245 b

Start Date/Time: November 16, 2016 @ 1600h
Test Species: Daphnia magna
Set up by: YLC

Sample Information:

Sample ID: GH_PCI_WS-2016-11-15-N
Sample Date: November 15, 2016
Date Received: November 16, 2016
Sample Volume: 1 X 20 L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 101916B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 19
Mortality (%) in previous 7 d: 0
Days to first brood: 8

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC41
Stock Solution ID: 16NaO2
Date Initiated: November 2, 2016
48-h LC50 (95% CL): 4.5 (3.8 - 5.4) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.1 (3.1 - 5.5) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 16.7% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Nov. 29, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: GHI-PCI-WS-2016-11-15-N
 Work Order No.: 161245 b

Start Date/Time: November 16, 2016 @ 1600h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-3 pH meter: pH-3 Cond./Salinity: C-3

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	19.0	19.0	18.5	8.6	8.5	8.4	7.6	7.6	7.7	352	362
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	9	3	18.0	19.0	18.5	9.2	8.3	8.2	8.1	8.2	8.3	1062	1066
	B	10	10	4											
	C	10	6	1											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	96	66
Highest conc.	790	242
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.0		18.0
DO (mg/L)	9.9	(7 min)	9.2
pH	8.0	(aeration)	8.1
Cond (µS/cm)	1065		1062
Salinity (ppt)	0.5		0.5

Comments: _____ Mortality: Heartbeat checked under microscope YES

Sample Description: clear, no colour, slight particulates, no odour.

Batch#: 101916B 7-d previous # young/brood: 19 Previous 7-d Mortality (%): 0 Day of 1st Brood: 8

Reviewed by: [Signature] Date reviewed: NOV-29, 2016

APPENDIX C – Chain-of-custody form

END OF REPORT



Acute Toxicity Test Results

Sample collected December 5, 2016

Final Report

December 20, 2016

Submitted to: **Teck Coal / Greenhills Operations**
Elkford, BC

SAMPLE INFORMATION

Sample ID	Dates				Receipt temp.
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> test initiation	
GH_GH1_WS_2016-12-05_N	05-Dec-16 at 1601h	07-Dec-16 at 1112h	08-Dec-16 at 1340h	08-Dec-16 at 1600h	1.2°C

TESTS

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test

RESULTS

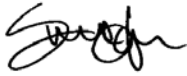
Toxicity test results

Sample ID	Percent mortality in 100% (v/v) sample	
	Rainbow trout	<i>Daphnia magna</i>
GH_GH1_WS_2016-12-05_N	0	0

QA/QC

QA/QC summary	<i>Rainbow trout</i>	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CI)	39.4 (32.2 – 48.4) µg/L Zn ¹	4.2 (3.7 – 4.8) g/L NaCl ²
Reference toxicant historical mean (2 SD range)	58.3 (21.0 – 161.7) µg/L Zn	4.1 (3.1 – 5.5) g/L NaCl
Reference toxicant CV	66%	15%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹ Test date: December 2, 2016; ² Test date: December 14, 2016



Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio
Senior Analyst

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) single concentration test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquarium
Test volume	10 to 20 L (depending on size of fish)
Test solution depth	≥15 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tapwater
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Zinc (added as ZnCl ₂)

Table 2. Summary of test conditions: 48-h *Daphnia magna* single concentration test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: Teck

Start Date/Time: Dec 8 / 16 @ 1340h

Work Order No.: 161324

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-GHI-WS-2016-12-05-N
Sample Date: Dec 5 / 16
Date Received: Dec 7 / 16
Sample Volume: 1 X 20 L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 9
Alkalinity (mg/L CaCO₃): 5

Test Organism Information:

Batch No.: 110916(B)
Source: Vancouver Island Trout Hatchery
No. Fish/Volume (L): 10 / 12L
Loading Density (g/L): 0.35
Mean Length ± SD (mm): 36 ± 3 Range: 32 - 39
Mean Weight ± SD (g): 0.42 ± 0.07 Range: 0.34 - 0.56

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn56
Stock Solution ID: 16Zn02
Date Initiated: Dec 2 / 16
96-h LC50 (95% CL): 39.4 (32.2 - 48.4) µg/L Zn
Reference Toxicant Mean and Historical Range: 58.3 (21.0 - 161.7) µg/L Zn
Reference Toxicant CV (%): 66%

Test Results: 100% survival at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature] Date reviewed: Dec 19, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 161325

Start Date/Time: December 8, 2016 @ 1600h
Test Species: Daphnia magna
Set up by: NHL

Sample Information:

Sample ID: GH_GH1_WS_2016-1205_N
Sample Date: December 5, 2016
Date Received: December 7, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 112316A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC43
Stock Solution ID: 16NaO2
Date Initiated: December 14, 2016
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h TA the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Dec 19, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: GH-GH11-WS-2016-12-05-N
 Work Order No.: 161325

Start Date/Time: December 8, 2016 @ 1600h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	18.5	18.5	19.0	8.5	8.4	8.6	7.6	7.7	7.8	355	359
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	18.5	18.5	19.0	8.9	8.3	8.7	8.0	8.0	8.1	1441	1439
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	A	A	YML	YML	A	YML	YML	A	YML	YML	A	YML	A

Concentration	Hardness* (mg/L as CaCO3)	Alkalinity*
Control (MHW)	100	70
Highest conc.	1070	267
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.5		
DO (mg/L)	8.9		
pH	8.0		
Cond (µS/cm)	1441		
Salinity (ppt)	0.7		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: clear, no colour, no odour, no particulates

Batch#: 112316A 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: YML Date reviewed: Dec 19, 2016

APPENDIX C – Chain-of-custody form

END OF REPORT



Acute Toxicity Test Results

Samples collected December 7, 2016

Final Report

December 21, 2016

Submitted to: **Teck Coal / Greenhills Operations**
Elkford, BC

SAMPLE INFORMATION

Sample ID	Dates				Receipt temp.
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> test initiation	
GH_TC1_WS_2016-12-07_N	07-Dec-16 at 1025h	09-Dec-16 at 1010h	09-Dec-16 at 1145h	09-Dec-16 at 11105h	0.0°C ¹
GH_TC2_WS_2016-12-07_N	07-Dec-16 at 0937h	09-Dec-16 at 1010h	09-Dec-16 at 1145h	09-Dec-16 at 1115h	0.0°C ¹
GH_WC1_WS_2016-12-07_N	07-Dec-16 at 1451h	09-Dec-16 at 1010h	09-Dec-16 at 1145h	09-Dec-16 at 1105h	0.8°C

¹ Client confirmed samples were slushy upon collection and agreed to proceed with testing

TESTS

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test

RESULTS

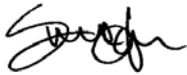
Toxicity test results

Sample ID	Percent mortality in 100% (v/v) sample	
	Rainbow trout	<i>Daphnia magna</i>
GH_TC1_WS_2016-12-07_N	0	0
GH_TC2_WS_2016-12-07_N	0	0
GH_WC1_WS_2016-12-07_N	0	0

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CI)	39.4 (32.2 – 48.4) µg/L Zn ¹	4.2 (3.7 – 4.8) g/L NaCl ²
Reference toxicant historical mean (2 SD range)	58.3 (21.0 – 161.7) µg/L Zn	4.1 (3.1 – 5.5) g/L NaCl
Reference toxicant CV	66%	15%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹ Test date: December 2, 2016; ² Test date: December 14, 2016



Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio
Senior Analyst

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) single concentration test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquarium
Test volume	10 to 20 L (depending on size of fish)
Test solution depth	≥15 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tapwater
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Zinc (added as ZnCl ₂)

Table 2. Summary of test conditions: 48-h *Daphnia magna* single concentration test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: Tock Coal (GHo)

Start Date/Time: Dec 9 /16 @ 1145L

Work Order No.: 161337

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-TCL-WS-2016-12-07-N
Sample Date: Dec 7 /16
Date Received: Dec 9 /16
Sample Volume: 1 X 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 9
Alkalinity (mg/L CaCO₃): 5

Test Organism Information:

Batch No.: 110916(B)
Source: Vancouver Island Trout Hatchery
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.39
Mean Length ± SD (mm): 36 ± 2 Range: 32 - 38
Mean Weight ± SD (g): 0.39 ± 0.07 Range: 0.27 - 0.51

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn56
Stock Solution ID: 16Zn02
Date Initiated: Dec 2/16
96-h LC50 (95% CL): 39.4 (32.2 - 48.4) mg/L Zn

Reference Toxicant Mean and Historical Range: 58.3 (21.0 - 161.7) mg/L Zn
Reference Toxicant CV (%): 66%

Test Results: 100% survival at 96h and in the undiluted 100% (v/v)
Sample. 0% mortality at 96h in the undiluted 100% (v/v)
sample.

Reviewed by: [Signature]

Date reviewed: Dec 21, 2016

Rainbow Trout Summary Sheet

Client: Trek Coal (GH)

Start Date/Time: Dec 9 116 @ 1145L

Work Order No.: 161337

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-TCR-WS-2016-12-07-N
Sample Date: Dec 7 /16
Date Received: Dec 9 /16
Sample Volume: 1 X 20 L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 9
Alkalinity (mg/L CaCO₃): 5

Test Organism Information:

Batch No.: 110916(B)
Source: Vancouver Island Trout Hatchery
No. Fish/Volume (L): 10 / 10L
Loading Density (g/L): 0.39
Mean Length ± SD (mm): 37 ± 2 Range: 34-40
Mean Weight ± SD (g): 0.39 ± 0.05 Range: 0.33 - 0.49

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn56
Stock Solution ID: 16Zn02
Date Initiated: Dec 2 /16
96-h LC50 (95% CL): 39.4 (32.2 - 48.4) µg/L Zn

Reference Toxicant Mean and Historical Range: 58.3 (21.0 - 161.7) µg/L Zn
Reference Toxicant CV (%): 66%

Test Results: 100% survival at 96 hours in the undiluted 100% (v/v) sample. 0% mortality at 96h in the undiluted 100% (v/v) sample

Reviewed by: [Signature]

Date reviewed: Dec-21, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teche Coal (G40)
 Sample I.D. GH-TL2-W3-2016-12-07-N
 W.O. # 161337
 RBT Batch #: 110916(D)
 Date Collected/Time: Dec 7/16 @ 0937h
 Date Setup/Time: Dec 9/16 @ 1145h
 Sample Setup By: EC

Number Fish/Volume: 10/10 L
 7-d % Mortality: 1.6
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER#2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
D.O. (mg/L)	10.6	/	10.3
pH	8.0	/	8.1
Cond. (µS/cm)	1575	/	1575
Salinity (ppt)	0.8	/	0.8

Concentration	# Survivors								Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
(% v/v)																									
CT1				10	10	10	10	14.0	15.0	15.0	15.0	15.0	10.1	9.9	9.9	10.0	9.9	6.8	6.8	6.9	7.1	7.0	25	33	
100				10	10	10	10	14.0	15.0	15.0	15.0	15.0	10.3	9.8	9.8	9.9	10.0	8.1	8.2	8.3	8.2	8.4	1575	1567	
Initials				AM	AM	MM	MM	EC	AM	AM	MM	MM	EC	AM	AM	MM	MM	EC	EC	AM	AM	MM	MM	EC	MM

Sample Description/Comments: Slightly yellow, No odour, No particulates, Clear

Fish Description at 96 h all fish appear normal Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: [Signature]

Date Reviewed: Dec-21, 2016

Rainbow Trout Summary Sheet

Client: Teik Coal

Start Date/Time: Dec 9 /16 @ 1145L

Work Order No.: 161337

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: GH-WET-WS-2016-12-07-N
Sample Date: Dec 7 /16
Date Received: Dec 9 /16
Sample Volume: 1 X 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 9
Alkalinity (mg/L CaCO₃): 5

Test Organism Information:

Batch No.: 110916(B)
Source: Vancouver Island Trout Hatchery
No. Fish/Volume (L): 10 / 10L
Loading Density (g/L): 0.39
Mean Length ± SD (mm): 36 ± 2
Mean Weight ± SD (g): 0.39 ± 0.04

Range: 34 - 39
Range: 0.34 - 0.47
0.34

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn56
Stock Solution ID: 16Zn02
Date Initiated: Dec 2/16
96-h LC50 (95% CL): 39.4 (32.2 - 48.4) µg/L Zn

Reference Toxicant Mean and Historical Range: 58.3 (21.0 - 161.7) µg/L Zn
Reference Toxicant CV (%): 66%

Test Results: 100% survival at 96 hours in the undiluted 100% (v/v)
Sample - 0% mortality at 96h in the undiluted 100% (v/v)

Reviewed by: [Signature] Date reviewed: Dec 21, 2016 ^{Sample}

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal
 Sample I.D. G14-WC1-WS-2016-12-07-N
 W.O. # 161337
 RBT Batch #: 110916(B)
 Date Collected/Time: Dec 7/16 @ 1451h
 Date Setup/Time: Dec 9/16 @ 1145h
 Sample Setup By: EC

Number Fish/Volume: 10/10 L
 7-d % Mortality: 1.6
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER#2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
D.O. (mg/L)	10.6	/	10.7
pH	7.9	/	8.0
Cond. (µS/cm)	1821	/	1830
Salinity (ppt)	1.0	/	1.0

Concentration	# Survivors								Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
(% v/v)																									
Ctl				10	10	10	10	14.0	15.0	15.0	15.0	15.0	10.1	9.9	9.9	10.0	9.9	6.8	6.8	6.9	7.1	7.0	25	32	
100				10	10	10	10	14.0	15.0	15.0	15.0	15.0	10.3	9.8	9.8	9.9	10.0	8.0	8.1	8.2	8.2	8.2	1830	16730	
Initials				AM	AM	MM	MM	EC	AM	AM	MM	MM	EC	AM	AM	MM	MM	EC	AM	AM	MM	MM	EC	MM	

Sample Description/Comments: Yellow, ^{EC} turbid. ^{some} particulates, no odour ① confirmed w/ 2nd meter
 Fish Description at 96 h all fish appear normal Number of Stressed Fish at 96 h 0
 Other Observations: _____

Reviewed by: [Signature] Date Reviewed: Dec-21, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 161336

Start Date/Time: December 9, 2016 @ 11:0h
Test Species: Daphnia magna
Set up by: AWD

Sample Information:

Sample ID: GHLTCLWS-2016-12-02-N
Sample Date: December 7, 2016
Date Received: December 9, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.
WQ Ranges:
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 112316 A+B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 21
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC43
Stock Solution ID: 16Na02
Date Initiated: December 14, 2016
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h TA the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Dec 21, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck Start Date/Time: Dec 9 / 16 @ 11:20h
 Sample ID: GH-TC1-WS-2016-12-07-N No. Organisms/volume: 10/200mL
 Work Order No.: 161338 Test Organism: D.magna
 Set up by: A

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		48		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48	0	24		48	0	24	48	0	24	48	0	48		
Control	A	10	10	0	19.0	19.0	19.0	2.9	2.7	2.0	7.6	7.7	7.6	351	367		
	B	10	10	0													
	C	10	10	0													
	D																
100	A	100	100	0	19.0	19.0	19.0	9.1	8.8	8.9	7.7	7.1	7.9	1593	164		
	B	100	100	0													
	C	100	100	0													
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
Technician Initials		A	A		A	A	A	A	A	A	A	A	A	A	A		

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO3)	
Control (MHW)	100	70
Highest conc.	1100	264
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.0		
DO (mg/L)	9.1		
pH	7.7		
Cond (µS/cm)	1593		
Salinity (ppt)	0.8		

Comments: ① several daphnia on surface Mortality: Heartbeat checked under microscope NO

Sample Description: clear, slightly yellow, no odour, no particulates

Batch#: 112316 A&B 7-d previous # young/brood: 21 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Dec 21, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 161338

Start Date/Time: December 9, 2016 @ 1115h
Test Species: Daphnia magna
Set up by: AWD

Sample Information:

Sample ID: GH-TC2-WS-2016-12-07N
Sample Date: December 7, 2016
Date Received: December 9, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 112316A+B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 21
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC43
Stock Solution ID: 16Na02
Date Initiated: December 14, 2016
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Dec-21, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: GH-TC2-WS-2016-
 Work Order No.: 161330 12-07-N

Start Date/Time: Dec 9 / 16 @ 11:56h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: A

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.0	19.0	19.0	8.9	8.7	8.8	7.6	7.7	7.7	351	365
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.0	19.0	19.0	9.2	8.8	9.2	7.8	8.2	8.0	1493	1550
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		A	A	A	A	A	A	A	A	A	A	A	A	A	A

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	100	70
Highest conc.	1070	246
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.0		
DO (mg/L)	9.2		
pH	7.8		
Cond (µS/cm)	1493		
Salinity (ppt)	0.7		

Comments: _____ Mortality: Heartbeat checked under microscope no

Sample Description: clear, slightly yellow, no odour, no particulates

Batch#: 112316A+B 7-d previous # young/brood: 21 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Dec-21, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 161338

Start Date/Time: December 9, 2016 @ 11:54h
Test Species: Daphnia magna
Set up by: AWD

Sample Information:

Sample ID: GH-WCI-WS-2016-12-07-N
Sample Date: December 7, 2016
Date Received: December 9, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 112316 A+B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 21
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC43
Stock Solution ID: 16Na02
Date Initiated: December 14, 2016
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h TA the 100% (v/v) undiluted sample.

Reviewed by: 

Date reviewed: Dec. 21, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: GH WCL WS-2016-12-07-N
 Work Order No.: 161330

Start Date/Time: Dec 9 / 16 @ 11:05
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: A

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
<u>Control</u>	A	<u>10</u>	<u>10</u>	<u>0</u>	<u>19.0</u>	<u>19.0</u>	<u>19.0</u>	<u>8.9</u>	<u>8.7</u>	<u>9.0</u>	<u>7.6</u>	<u>7.7</u>	<u>7.7</u>	<u>351</u>	<u>365</u>
	B	<u>10</u>	<u>10</u>	<u>0</u>											
	C	<u>10</u>	<u>10</u>	<u>0</u>											
	D														
<u>100</u>	A	<u>10</u>	<u>10</u>	<u>0</u>	<u>18.0</u>	<u>19.0</u>	<u>19.0</u>	<u>9.1</u>	<u>8.8</u>	<u>8.9</u>	<u>7.8</u>	<u>8.0</u>	<u>7.9</u>	<u>1752</u>	<u>1748</u>
	B	<u>10</u>	<u>10</u>	<u>0</u>											
	C	<u>10</u>	<u>10</u>	<u>0</u>											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		<u>A</u>	<u>A</u>	<u>A</u>	<u>A</u>	<u>A</u>	<u>A</u>	<u>A</u>	<u>A</u>	<u>A</u>	<u>A</u>	<u>A</u>	<u>A</u>	<u>A</u>	<u>A</u>

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCo3)	
Control (MHW)	<u>100</u>	<u>70</u>
Highest conc.	<u>1110</u>	<u>288</u>
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	<u>18.0</u>		
DO (mg/L)	<u>9.1</u>		
pH	<u>7.8</u>		
Cond (µS/cm)	<u>1772</u>		
Salinity (ppt)	<u>0.9</u>		

Comments: _____ Mortality: Heartbeat checked under microscope no

Sample Description: yellow, slightly turbid, no odour, slight particulates

Batch#: 112316 AKB 7-d previous # young/brood: 21 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Dec 21, 2016

Client: Teck

W.O.#: 161338

Hardness and Alkalinity Datasheet

Sample ID	Alkalinity						Hardness			Technician
	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO 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)	
GH-TCL-WS 2016-12-07-N			50 ^{ml}				100			
GH-TCL-WS 2016-12-07-N	Dec. 9/16	Dec. 9/16	50	13.4	13.6	264	100	11.6	1160	JS
GH-TCL-WS 2016-12-07-N	Dec. 9/16	Dec. 9/16	50	12.5	12.7	246	100	10.7	1070	JS
GH-WCL-WS 2016-12-07-N	Dec. 9/16	Dec. 9/16	50	14.6	14.8	288	100	11.1	1110	JS
MHW	Dec. 9/16	Dec. 9/16	50	3.6	3.7	70	50	5.0	100	YMC

Notes: Adjusted to 100 ml w/ DI water

Reviewed by: 

Date Reviewed: Dec. 20, 2016

APPENDIX C – Chain-of-custody form

END OF REPORT



Teck Coal/ Elkview Operation
ATTN: Michael Moore
RR1 HWY 3
Sparwood, BC
V0B 2G1

Report Date: February 16, 2016
Work Order: 16151 - 16152

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. with 2007 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000)

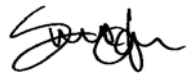
Table 1. Results for the 96-h rainbow trout acute toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
EV_EC1_WS_2016-02-02_N	February 2, 2016 @ 0935h	0
EV_SP1_WS_2016-02-02_N	February 2, 2016 @ 1000h	0
EV_MG1_WS_2016-02-02_N	February 2, 2016 @ 0915h	0
EV_GT1_WS_2016-02-02_N	February 2, 2016 @ 0950h	0
EV_BC1_WS_2016-02-02_N	February 2, 2016 @ 0915h	0
EV_OC1_WS_2016-02-02_N	February 2, 2016 @ 1240h	0
EV_GC2_WS_2016-02-02_N	February 2, 2016 @ 0720h	0
EV_LC1_WS_2016-02-02_N	February 2, 2016 @ 0815h	0
EV_SM1_WS_2016-02-02_N	February 2, 2016 @ 1040h	0
EV_DC1_WS_2016-02-02_N	February 2, 2016 @ 1105h	0

Table 2. Results for the 48-h *Daphnia magna* acute toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
EV_EC1_WS_2016-02-02_N	February 2, 2016 @ 0935h	0
EV_SP1_WS_2016-02-02_N	February 2, 2016 @ 1000h	0
EV_MG1_WS_2016-02-02_N	February 2, 2016 @ 0915h	0
EV_GT1_WS_2016-02-02_N	February 2, 2016 @ 0950h	0
EV_BC1_WS_2016-02-02_N	February 2, 2016 @ 0915h	0
EV_OC1_WS_2016-02-02_N	February 2, 2016 @ 1240h	0
EV_GC2_WS_2016-02-02_N	February 2, 2016 @ 0720h	0
EV_LC1_WS_2016-02-02_N	February 2, 2016 @ 0815h	0
EV_SM1_WS_2016-02-02_N	February 2, 2016 @ 1040h	0
EV_DC1_WS_2016-02-02_N	February 2, 2016 @ 1105h	100

The tests met performance criteria and no deviations from the protocol were observed. The results presented in this report relate only to the samples tested.



Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Julianna Kalocai, M.Sc., R.P.Bio
QA Officer

Rainbow Trout Summary Sheet

Client: Teck Coal-EVO Start Date/Time: Feb 4/16 @ 1245h
 Work Order No.: 16152 Test Species: EL
Oncorhynchus mykiss

Sample Information:

Sample ID: EV-EC1-WS-2016-02-02-N
 Sample Date: Feb 2/16
 Date Received: Feb 4/16
 Sample Volume: 2x70L
 Other: /

Test Validity Criteria:
 ≥ 90% control survival
WQ Ranges:
 T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
 Hardness (mg/L CaCO₃): 8
 Alkalinity (mg/L CaCO₃): 6

Test Organism Information:

Batch No.: 122915
 Source: Aqua Farms
 No. Fish/Volume (L): 10/12L
 Loading Density (g/L): 0.39
 Mean Length ± SD (mm): 37 ± 3 Range: 33 - 40
 Mean Weight ± SD (g): 0.47 ± 0.09 Range: 0.33 - 0.59
EL

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn33
 Stock Solution ID: 15Zn05
 Date Initiated: Jan 20/16
 96-h LC50 (95% CL): 80.5 (59.8 - 109.5) mg/L Zn
4
 Reference Toxicant Mean and Historical Range: 71.0 (33.9 - 148.4) mg/L Zn
 Reference Toxicant CV (%): 44.6%

Test Results: 100% survival at 96 hours in the undiluted 100% (v/v) sample
0% mortality at 96 hours in the undiluted 100% (v/v) sample

Reviewed by: JG Date reviewed: Feb. 16/16

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: TeckCoal-EVO
 Sample I.D. EV-EC1-WS-2016-02-02-N
 W.O. # 16152
 RBT Batch #: 122915
 Date Collected/Time: Feb 2 11/6 @ 0935h
 Date Setup/Time: Feb 2 11/6 @ 1245h
 Sample Setup By: EL EC EC

Number Fish/Volume: 10/12 L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 120mins
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

D.O. meter: 2
 pH meter: 1
 Cond. Meter: 2

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
pH	7.9	/	8.0
D.O. (mg/L)	11.7	/	11.3
Cond. (µS/cm)	1662	/	1662

Concentration (% v/v)	# Survivors								Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
100				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.3	10.0	9.9	9.8	9.8	6.5	6.5	6.9	7.0	7.8	25	30	
100				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.5	10.0	9.8	9.9	9.9	8.0	8.2	8.1	8.0	8.1	1662	1637	
Initials				EL	A	A	FMV	EL	EL	A	A	FMV	EL	EL	A	A	FMV	EL	EL	A	A	FMV	EL	FMV	

WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Sample Description/Comments: Clear, Colorless, Odourless, No ppt

Fish Description at 96 h all okay Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: JOU

Date Reviewed: Feb. 16/16

Rainbow Trout Summary Sheet

Client: TeckCoal - EVO

Start Date/Time: Feb 4/16 @ 1245h

Work Order No.: 16152

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-SPI-WS-2016-02-02-N
Sample Date: Feb 2/16
Date Received: Feb 4/16
Sample Volume: 2x20L
Other: -

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 6

Test Organism Information:

Batch No.: 122915
Source: Aqua Farms
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.40
Mean Length ± SD (mm): 38 ± 2 Range: 35 - 40
Mean Weight ± SD (g): 0.48 ± 0.06 Range: 0.39 - 0.56

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn33
Stock Solution ID: 15Zn05
Date Initiated: Jan 20/16
96-h LC50 (95% CL): 80.5 (59.8[±] - 109.5) mg/L Zn
Reference Toxicant Mean and Historical Range: 71.0 (33.9 - 148.4) mg/L Zn
Reference Toxicant CV (%): 44.6%

Test Results: 100% survival at 96 hours in the undiluted 100% (v/v) sample
0% mortality at 96 hours in the undiluted 100% (v/v) sample

Reviewed by: JGU

Date reviewed: Feb. 16/16

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal-EVO
 Sample I.D.: EV-SPI-WS-2016-02-02-N
 W.O. #: 16152
 RBT Batch #: 122915
 Date Collected/Time: Feb 2/16 @ 1000h
 Date Setup/Time: Feb 24/16 @ 1245h
 Sample Setup By: EC

Number Fish/Volume: 10/12 L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 30 mins
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

D.O. meter: 2
 pH meter: 1
 Cond. Meter: 2

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
pH	7.8	/	7.9
D.O. (mg/L)	10.4	/	10.3
Cond. (µS/cm)	1665	/	1665

Concentration (% v/v)	# Survivors							Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
(+1)				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.3	10.0	9.9	9.9	9.8	6.5	6.5	7.0	6.8	6.8	25	30
100				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.3	10.1	9.7	9.8	9.9	7.9	8.1	8.1	8.1	8.1	1665	1644
Initials				EL	A	MM	MM	EL	EL	A	MM	MM	EL	EL	A	MM	MM	EL	EL	A	MM	MM	EL	MM

WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Sample Description/Comments: Clear, Colorless, Odourless, No ppt.

Fish Description at 96 h all okay Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: JGU Date Reviewed: Feb. 16/16

Rainbow Trout Summary Sheet

Client: Teck Coal-EVO

Start Date/Time: Feb 4/16 @ 1245h

Work Order No.: 16152

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-MG1-WS-2016-02-02-N
Sample Date: Feb 2/16
Date Received: Feb 4/16
Sample Volume: 2X20L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 6

Test Organism Information:

Batch No.: 122915
Source: Aqua Farms
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.41
Mean Length ± SD (mm): 39 ± 2 Range: 35-42
Mean Weight ± SD (g): 0.50 ± 0.07 Range: 0.39-0.58

Zinc Reference Toxicant Results:

Reference Toxicant ID: RT Zn 33
Stock Solution ID: 15 Zn 05
Date Initiated: Jan 20/16
96-h LC50 (95% CL): 80.5 (59.8[±] 109.5) mg/L Zn
Reference Toxicant Mean and Historical Range: 71.0 (33.9 - 148.4) mg/L Zn
Reference Toxicant CV (%): 44.6%

Test Results: 100% survival at 96 hours in the 100% (v/v) undiluted sample
0% mortality at 96 hours in the 100% (v/v) undiluted sample

Reviewed by: JCH

Date reviewed: Feb-16/16

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal - EVO
 Sample I.D. EV-MG1-WS-2016-02-02-N
 W.O. # 16152
 RBT Batch #: 122915
 Date Collected/Time: Feb 2/16 @ 0915h
 Date Setup/Time: Feb 2/16 @ 1245h
 Sample Setup By: EC EC

Number Fish/Volume: 10/12 L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 120 mins
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

D.O. meter: 2
 pH meter: 1
 Cond. Meter: 2

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	15.0	/	15.0
pH	8.1	/	8.1
D.O. (mg/L)	10.8	/	10.7
Cond. (µS/cm)	1236	/	1236

Concentration (% V/V)	# Survivors							Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
(+1)				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.3	9.8	9.8	9.8	9.8	6.5	6.6	6.7	6.7	6.7	25	30
100				10	10	10	10	15.0	14.0	14.0	14.0	14.0	10.3	9.9	9.8	9.7	9.9	8.1	8.0	8.1	8.1	8.1	1236	1244
Initials				EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC

WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Sample Description/Comments: Clear, Slightly yellow, Odourless, NO ppt

Fish Description at 96 h OK Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: JGU Date Reviewed: Feb. 16/16

Rainbow Trout Summary Sheet

Client: Teck Coal-EVO

Start Date/Time: Feb 4/16 @ 1245h

Work Order No.: 16152

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-GT1-WS-2016-02-02-N
Sample Date: Feb 2/16
Date Received: Feb 4/16
Sample Volume: 2x20L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 6

Test Organism Information:

Batch No.: 122915
Source: Aqua Farms
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.36
Mean Length ± SD (mm): 37 ± 3
Mean Weight ± SD (g): 0.44 ± 0.07

Range: 34 - 43
Range: 0.36 - 0.56

Zinc Reference Toxicant Results:

Reference Toxicant ID: RT Zn 33
Stock Solution ID: 15 Zn 05
Date Initiated: Jan 20/16
96-h LC50 (95% CL): 80.5 (59.8[±] - 109.5) mg/L Zn
4

Reference Toxicant Mean and Historical Range: 71.0 (33.9 - 148.4) mg/L Zn
Reference Toxicant CV (%): 44.6%

Test Results: 100% survival at 96 hours in the undiluted 100% (v/v) sample
0% mortality at 96 hours in the undiluted 100% (v/v) sample

Reviewed by: JGH

Date reviewed: Feb. 16/16

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: TeckCoal-EVO
 Sample I.D. EV-GT1-WS-2016-02-02-N
 W.O. # 16152
 RBT Batch #: 122915
 Date Collected/Time: Feb 2/16 @ 0950h
 Date Setup/Time: Feb 8/16 @ 1245h
 Sample Setup By: EC

Number Fish/Volume: 10/12 L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 120 mins
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

D.O. meter: 2
 pH meter: 1
 Cond. Meter: 2

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
pH	8.0		8.1
D.O. (mg/L)	11.2		10.8
Cond. (µS/cm)	1853		1853

Concentration (% v/v)	# Survivors								Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
(+)				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.3	9.9	9.7	9.9	9.8	6.5	6.5	6.8	6.7	6.8	25	30	
100				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.4	9.9	9.8	9.9	9.7	8.1	8.1	8.1	8.1	8.1	1853	1811	
Initials				EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	

WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Sample Description/Comments: colorless EL Slightly yellow, clear, odourless, no ppt

Fish Description at 96 h okay Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: JOU

Date Reviewed: Feb. 16/16

Rainbow Trout Summary Sheet

Client: Teck Coal-EVO

Start Date/Time: Feb 4/16 @ 1245h

Work Order No.: 16152

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-BCI-WS-2016-02-02-N
Sample Date: Feb 2/16
Date Received: Feb 4/16
Sample Volume: 2X20L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 6

Test Organism Information:

Batch No.: 122915
Source: Aqua Farms
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.40
Mean Length ± SD (mm): 40 ± 2 Range: 37-43
Mean Weight ± SD (g): 0.48 ± 0.06 Range: 0.38-0.58

Zinc Reference Toxicant Results:

Reference Toxicant ID: RT Zn 33
Stock Solution ID: 15 Zn 05
Date Initiated: Jan 20/16
96-h LC50 (95% CL): 80.5 (59.8[±] 109.5) mg/L Zn
Reference Toxicant Mean and Historical Range: 71.0 (33.9 - 148.4) mg/L Zn
Reference Toxicant CV (%): 44.6%

Test Results: 100% survival at 96 hours in the undiluted 100% (v/v) sample
0% mortality at 96 hours in the undiluted 100% (v/v) sample

Reviewed by: JCH

Date reviewed: Feb. 16/16

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: TeckCoal-EVO
 Sample I.D. EV-BCL-WS-2016-02-02-N
 W.O. # 16152
 RBT Batch #: 122915
 Date Collected/Time: Feb 2/16 @ 0915h
 Date Setup/Time: Feb 2/16 @ 1245h
 Sample Setup By: EC EC

Number Fish/Volume: 10/12 L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 120 mins
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

D.O. meter: 2
 pH meter: 1
 Cond. Meter: 2

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.5	/	14.5
pH	7.9	/	8.0
D.O. (mg/L)	11.1	/	10.7
Cond. (µS/cm)	1863	/	1863

Concentration (% v/v)	# Survivors								Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
C+1				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.3	9.9	9.8	9.8	9.8	6.5	6.5	6.8	6.7	6.8	25	30	
100				10	10	10	10	14.5	14.0	14.0	14.0	14.0	10.4	10.1	9.8	9.7	9.8	8.0	8.1	8.2	8.1	8.1	1863	1812	
Initials				EC	A	~	EMM	EL	EL	A	~	EMM	EL	EL	A	~	EMM	EL	EL	A	~	EMM	EL	EMM	

WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Sample Description/Comments: Clear, Colorless, Odourless, No ppt

Fish Description at 96 h okay Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: JGU

Date Reviewed: Feb. 16/16
JGU

Rainbow Trout Summary Sheet

Client: Teck Coal-EVO Start Date/Time: Feb 4/16 @ 1245h
Work Order No.: 16152 Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-001-WS-2016-02-02-N
Sample Date: Feb 2/16
Date Received: Feb 4/16
Sample Volume: 2x20L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 6

Test Organism Information:

Batch No.: 122915
Source: Aqua Farms
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.44
Mean Length ± SD (mm): 38 ± 3 Range: 35 - 42
Mean Weight ± SD (g): 0.52 ± 0.11 Range: 0.35 - 0.65

Zinc Reference Toxicant Results:

Reference Toxicant ID: RT Zn 33
Stock Solution ID: 15 Zn 05
Date Initiated: Jan 20/16
96-h LC50 (95% CL): 80.5 (59.5[±] - 109.5) mg/L Zn
Reference Toxicant Mean and Historical Range: 71.0 (33.9 - 148.4) mg/L Zn
Reference Toxicant CV (%): 44.6%

Test Results: 100% survival at 96 hours in the 100% (v/v) undiluted sample
0% mortality at 96 hours in the 100% (v/v) undiluted sample

Reviewed by: JOH Date reviewed: Feb. 16/16

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal - EVO
 Sample I.D. EV-001-WS-2016-02-02-N
 W.O. # 16152
 RBT Batch #: 122915
 Date Collected/Time: Feb 2/16 @ 1240h
 Date Setup/Time: Feb 2/16 @ 1245h
 Sample Setup By: EL EL

Number Fish/Volume: 10/12 L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 120 mins
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

D.O. meter: 2
 pH meter: 1
 Cond. Meter: 2

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.5	/	14.5
pH	7.7		7.8
D.O. (mg/L)	11.0		10.7
Cond. (µS/cm)	655		655

Concentration (% v/v)	# Survivors								Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
10				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.3	9.8	9.6	9.9	9.8	6.5	6.6	6.7	6.8	6.8	25	31	
100				10	10	10	10	14.5	14.0	14.0	14.0	14.0	10.3	9.9	9.8	9.8	9.9	7.8	8.2	8.1	8.1	8.2	655	675	
Initials				EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	

WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Sample Description/Comments: light Brown, Opaque, Odourless, No ppt

Fish Description at 96 h okay Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: JGH

Date Reviewed: Feb. 16/16

Rainbow Trout Summary Sheet

Client:

Teck Coal-EVO

Start Date/Time:

Feb 4/16 @ 1245h

Work Order No.:

16152

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID:

EV-GCZ-WS-2016-02-02-N

Sample Date:

Feb 4/16

Date Received:

Feb 4/16

Sample Volume:

2x20L

Other:

/

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type:

Dechlorinated Municipal Tap Water

Hardness (mg/L CaCO₃):

8

Alkalinity (mg/L CaCO₃):

6

Test Organism Information:

Batch No.:

122915

Source:

Aqua Farms

No. Fish/Volume (L):

10/12L

Loading Density (g/L):

0.37

Mean Length ± SD (mm):

38 ± 2

Mean Weight ± SD (g):

0.45 ± 0.10

Range:

34 - 40

Range:

0.29 - 0.60

Zinc Reference Toxicant Results:

Reference Toxicant ID:

RT Zn 33

Stock Solution ID:

15 Zn 05

Date Initiated:

Jan 20/16

96-h LC50 (95% CL):

80.5 (59.8 - 109.5) mg/L Zn

4

Reference Toxicant Mean and Historical Range:

71.0 (33.9 - 148.4) mg/L Zn

Reference Toxicant CV (%):

44.6%

Test Results:

100% survival at 96 hours in the undiluted 100% (v/v) sample
0% mortality at 96 hours in the undiluted 100% (v/v) sample

Reviewed by:

JGH

Date reviewed:

Feb. 16/16

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal-EVO
 Sample I.D.: EV-GCR-WS-2016-02-02-N
 W.O. #: 16152
 RBT Batch #: 122915
 Date Collected/Time: Feb 2/16 @ 0720h
 Date Setup/Time: Feb 2/16 @ 1245h
 Sample Setup By: EC EC

Number Fish/Volume: 10/12 L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 120 mins
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

D.O. meter: 2
 pH meter: 1
 Cond. Meter: 2

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
pH	8.2	/	8.2
D.O. (mg/L)	11.6	/	11.2
Cond. (µS/cm)	923	/	923

Concentration (% v/v)	# Survivors								Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
(+1)				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.3	10.0	9.9	9.9	9.8	6.5	6.6	6.7	6.8	6.8	25	30	
100				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.5	10.0	9.7	9.8	9.8	8.2	8.2	8.2	8.1	8.2	923	897	
Initials				EC	A	A	EMM	EL	EL	A	A	EMM	EL	EL	A	A	EMM	EL	EL	A	A	EMM	EL	EMM	

WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Sample Description/Comments: Clear, colorless, NO odour, NO ppt EL some black particulates

Fish Description at 96 h okay Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: JGU Date Reviewed: Feb. 16/16

Rainbow Trout Summary Sheet

Client: Teck Coal_EVO

Start Date/Time: Feb 4/16 @ 1245h

Work Order No.: 16152

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-LC1-WS-2016-02-02-N
Sample Date: Feb 2/16
Date Received: Feb 4/16
Sample Volume: 2x20L
Other: -

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 6

Test Organism Information:

Batch No.: 122915
Source: Aqua Farms
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.39
Mean Length ± SD (mm): 38 ± 2
Mean Weight ± SD (g): 0.47 ± 0.08
Range: 35 - 40
Range: 0.36 - 0.56

Zinc Reference Toxicant Results:

Reference Toxicant ID: RT Zn 33
Stock Solution ID: 15 Zn 05
Date Initiated: Jan 20/16
96-h LC50 (95% CL): 80.5 (59.8⁸⁰ - 109.5) mg/L Zn
Reference Toxicant Mean and Historical Range: 71.0 (33.9 - 148.4) mg/L Zn
Reference Toxicant CV (%): 44.6%

Test Results: 100% survival at 96 hours in the undiluted 100% (v/v) sample
0% mortality at 96 hours in the undiluted 100% (v/v) sample

Reviewed by: JCh

Date reviewed: Feb-16/16

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal-EVO
 Sample I.D. EV-LCL-WS-2016-02-02-N
 W.O. # 16152
 RBT Batch #: 122915
 Date Collected/Time: Feb 2/16 @ 0815h
 Date Setup/Time: Feb 24/16 @ 1245h
 Sample Setup By: EL EC

Number Fish/Volume: 10/12 L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 120 mins
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

D.O. meter: 2
 pH meter: 1
 Cond. Meter: 2

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
pH	7.7	/	7.8
D.O. (mg/L)	11.0	/	10.8
Cond. (µS/cm)	690	/	690

Concentration (% v/v)	# Survivors						Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)		
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
(+)				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.3	10.1	9.8	9.9	9.8	6.5	6.6	6.8	6.9	6.8	25	30
100				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.5	10.2	9.9	9.8	9.9	7.8	8.3	8.2	8.1	8.2	690	610
Initials				EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL

WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Sample Description/Comments: Clear, colorless, odourless, no ppt

Fish Description at 96 h all okay Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: JGU

Date Reviewed: Feb. 16/16

Rainbow Trout Summary Sheet

Client: Teck Coal-EVO

Start Date/Time: Feb 4/16 @ 1245h

Work Order No.: 16152

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-SMI-WS-2016-02-02-N
Sample Date: Feb 2/16
Date Received: Feb 4/16
Sample Volume: 2X20L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 6

Test Organism Information:

Batch No.: 122915
Source: Aqua Farms
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.38
Mean Length ± SD (mm): 37 ± 2 Range: 32-40
Mean Weight ± SD (g): 0.45 ± 0.07 Range: 0.31-0.53

Zinc Reference Toxicant Results:

Reference Toxicant ID: RT Zn 33
Stock Solution ID: 15 Zn 05
Date Initiated: Jan 20/16
96-h LC50 (95% CL): 80.5 (59.8²⁰ - 109.5) mg/L Zn
Reference Toxicant Mean and Historical Range: 71.0 (33.9 - 148.4) mg/L Zn
Reference Toxicant CV (%): 44.6%

Test Results: 100% survival at 96 hours in the undiluted 100% (v/v) sample
0% mortality at 96 hours in the undiluted 100% (v/v) sample

Reviewed by: JGU Date reviewed: Feb. 16/16

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal-EVO
 Sample I.D.: EV_SML_WS_2016.02.02-N
 W.O. #: 16152
 RBT Batch #: 122915
 Date Collected/Time: Feb 2/16 @ 1040h
 Date Setup/Time: Feb 2/16 @ 1245h
 Sample Setup By: EC EC

Number Fish/Volume: 10/12 L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 120 mins
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

D.O. meter: 2
 pH meter: 1
 Cond. Meter: 2

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
pH	8.1	/	8.2
D.O. (mg/L)	11.6	/	10.8
Cond. (µS/cm)	566	/	566

Concentration (% v/v)	# Survivors							Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
(+)				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.3	9.8	9.7	9.9	9.8	6.3	6.6	6.8	6.7	6.8	25	30
100				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.4	10.0	9.7	9.8	9.9	8.2	8.3	8.2	8.2	8.3	566	566
Initials				EC	A	A	FMM	EC	EC	A	A	FMM	EC	EC	A	A	FMM	EC	EC	A	A	FMM	EC	FMM

WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Sample Description/Comments: light yellow, clear, no odour, no ppt

Fish Description at 96 h OK Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: JGH

Date Reviewed: Feb. 16/16

Rainbow Trout Summary Sheet

Client: Teck Coal-EVO

Start Date/Time: Feb 4/16 @ 1245h

Work Order No.: 16152

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-DCL-WS-2016-02-02-N
Sample Date: Feb 2/16
Date Received: Feb 4/16
Sample Volume: 2x20L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 6

Test Organism Information:

Batch No.: 122915
Source: Aqua Farms
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.36
Mean Length ± SD (mm): 36 ± 3 Range: 30-41
Mean Weight ± SD (g): 0.43 ± 0.07 Range: 0.29-0.52

Zinc Reference Toxicant Results:

Reference Toxicant ID: RT Zn 33
Stock Solution ID: 15 Zn 05
Date Initiated: Jan 20/16
96-h LC50 (95% CL): 80.5 (59.8[±] 109.5) mg/L Zn
Reference Toxicant Mean and Historical Range: 71.0 (33.9 - 148.4) mg/L Zn
Reference Toxicant CV (%): 44.6%

Test Results: 100% survival at 96 hours in the 100% (v/v) undiluted sample
0% mortality at 96 hours in the 100% (v/v) undiluted sample

Reviewed by: JCh Date reviewed: Feb. 16/16

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal-EVO
 Sample I.D.: EV-DCI-WS-2016-02-02-N
 W.O. #: 16152
 RBT Batch #: 122915
 Date Collected/Time: Feb 2, 16 @ 1105h
 Date Setup/Time: Feb 2, 16 @ 1245h
 Sample Setup By: EC

Number Fish/Volume: 10/12 L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 120 mins
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

D.O. meter: 2
 pH meter: 1
 Cond. Meter: 2

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
pH	7.7		7.9
D.O. (mg/L)	11.6		11.3
Cond. (µS/cm)	1852		1852

Concentration (% v/v)	# Survivors								Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
(+)				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.3	9.9	9.8	9.9	9.8	6.5	6.6	7.0	6.9	6.8	25	30	
100				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.4	10.0	9.9	9.9	9.8	7.9	8.2	8.1	8.2	8.2	1852	1802	
Initials				EC				EL	EL				EL	EL				EL	EL				EL		

WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Sample Description/Comments: Clear, Colorless, Odourless, No ppt

Fish Description at 96 h all okay Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: JGU Date Reviewed: Feb. 16/16

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 16151

Start Date/Time: February 5, 2016 @ 1415h
Test Species: Daphnia magna
Set up by: YHL

Sample Information:

Sample ID: EV_ECLWS_2016-02-02-N
Sample Date: February 2, 2016
Date Received: February 4, 2016
Sample Volume: 2 x 20 L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 012016B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 15
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC27
Stock Solution ID: 15Na03
Date Initiated: February 1, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: JGH

Date reviewed: Feb. 16/16

**Freshwater Acute
48 Hour Toxicity Test Data Sheet**

Client: Teck
 Sample ID: EV_ECI_WS_2016-02-02_N
 Work Order No.: 16151

Start Date/Time: February 5, 2016 @ 1415h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YMC

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		48	No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	0	19.0	20.5	20.5	8.0	8.5	8.5	7.6	7.8	7.9	359	361
	B	10	10	0	0											
	C	10	10	0	0											
	D															
100	A	10	10 ⁰	0	0	20.5	20.5	20.6	8.8	8.6	8.5	7.8	8.1	8.1	1677	1653
	B	10	10 ⁰	0	0											
	C	10	10 ⁰	0	0											
	D															
	A															
	B															
	C															
	D															
	A															
	B															
	C															
	D															
	A															
	B															
	C															
	D															
Technician Initials						YMC			YMC			YMC			YMC	

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCo3)	
Control (MHW)	100	72
Highest conc.	1040	300
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.5		
DO (mg/L)	8.8		
pH	7.8		
Cond (µS/cm)	1677		

Comments: ① white film on surface Mortality: Heartbeat checked under microscope N/A

Sample Description: clear, no colour, no particulates, no odour

Batch#: 012016B 7-d previous # young/brood: 15 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: JGH Date reviewed: Feb. 16/16

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 16151

Start Date/Time: February 4, 2016 @ 1105h
Test Species: Daphnia magna
Set up by: YNL

Sample Information:

Sample ID: EV_SPL_WS_2016-02-02-N
Sample Date: February 2, 2016
Date Received: February 4, 2016
Sample Volume: 2 x 20 L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 011216A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC27
Stock Solution ID: 15NaO3
Date Initiated: February 1, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: JCh

Date reviewed: Feb. 16/16

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck Start Date/Time: February 4, 2016 @ 11:05
 Sample ID: EV-SPI-WS-2016-02-02-N No. Organisms/volume: 10/200mL
 Work Order No.: 10151 Test Organism: D. magna
 Set up by: YML

Thermometer: temp -5 DO meter: DO-3 pH meter: pH-3 Conductivity meter: C-3

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
		<u>Control</u>	A		<u>10</u>	<u>10</u>	<u>0</u>	<u>19.0</u>	<u>20.0</u>	<u>20.5</u>	<u>8.7</u>	<u>8.6</u>	<u>8.4</u>	<u>7.7</u>	<u>7.7</u>
	B	<u>10</u>	<u>10</u>	<u>0</u>											
	C	<u>10</u>	<u>10</u>	<u>0</u>											
	D														
<u>100</u>	A	<u>10</u>	<u>10</u>	<u>0</u>	<u>19.5</u>	<u>20.0</u>	<u>20.5</u>	<u>9.0</u>	<u>8.5</u>	<u>8.4</u>	<u>7.8</u>	<u>8.0</u>	<u>8.1</u>	<u>1678</u>	<u>1632</u>
	B	<u>10</u>	<u>10</u>	<u>0</u>											
	C	<u>10</u>	<u>10</u>	<u>0</u>											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		<u>YML</u>	<u>M</u>	<u>M</u>	<u>YML</u>	<u>M</u>	<u>M</u>	<u>YML</u>	<u>YML</u>	<u>M</u>	<u>YML</u>	<u>YML</u>	<u>M</u>	<u>YML</u>	<u>M</u>

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO3)	
Control (MHW)	<u>100</u>	<u>70</u>
Highest conc.	<u>1090</u>	<u>320</u>
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	<u>19.5</u>		<u>19.5</u>
DO (mg/L)	<u>9.7</u>	<u>(2 min aeration)</u>	<u>9.0</u>
pH	<u>7.7</u>		<u>7.8</u>
Cond (µS/cm)	<u>1678</u>		<u>1678</u>

Comments: _____ Mortality: Heartbeat checked under microscope N/A

Sample Description: clear, colourless, no particulates, no odour.

Batch#: 011216A 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: JLH Date reviewed: Feb. 16/16

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 16151

Start Date/Time: February 4, 2016 @ 1415h
Test Species: Daphnia magna
Set up by: NL

Sample Information:

Sample ID: EV_MGLWS_2016-02-02-N
Sample Date: February 2, 2016
Date Received: February 4, 2016
Sample Volume: 2 x 20 L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 011216B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 20
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC27
Stock Solution ID: 15Na03
Date Initiated: February 1, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl

Reference Toxicant CV (%): 13

Test Results: 0% mortality at 48h in the 100% (v/v) undisturbed sample.

Reviewed by: JGk

Date reviewed: Feb. 16/16

**Freshwater Acute
48 Hour Toxicity Test Data Sheet**

Client: Teck
 Sample ID: EV-MG1-WS-2016-02-02-N
 Work Order No.: 16151

Start Date/Time: February 4, 2016 @ 14:54
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		10	10		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	20.0	20.6	8.7	8.6	8.5	7.7	7.7	7.7	359	370
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.5	20.0	20.6	9.1	8.4	8.4	8.1	8.1	8.1	1236	1232
	B	10	10	0											
	C	10	10	0											
	D		10	0											
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	A		YML	YML	A	YML	YML	A	YML	YML	A	YML	A

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO3)	
Control (MHW)	100	70
Highest conc.	800	286
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		19.5
DO (mg/L)	10.1	(4 min aeration)	9.1
pH	8.0		8.1
Cond (µS/cm)	1244		1236

Comments: _____ Mortality: Heartbeat checked under microscope 2/1A

Sample Description: clear, slightly yellow, no particulates, no odour

Batch#: 01121613 7-d previous # young/brood: 20 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: YML Date reviewed: Feb. 16/16

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 16151

Start Date/Time: February 4, 2016 @ 1055h
Test Species: Daphnia magna
Set up by: YNL

Sample Information:

Sample ID: EV_GTI_WS_2016-02-02-N
Sample Date: February 2, 2016
Date Received: February 4, 2016
Sample Volume: 2 x 20 L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 011216A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC27
Stock Solution ID: 15Na03
Date Initiated: February 1, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl

Reference Toxicant CV (%): 13

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: JOB

Date reviewed: Feb. 16/16

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck Start Date/Time: February 4, 2016 @ 10:55i
 Sample ID: EV-GTI-WS-2016-02-02-N No. Organisms/volume: 10/200mL
 Work Order No.: 16151 Test Organism: D.magna
 Set up by: YML

Thermometer: temp -5 DO meter: DO-3 pH meter: pH-3 Conductivity meter: C-3

Concentration (% v/v)	Number of Live Organisms Rep	No. Immobilized		Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)		
		24	48	0	24	48	0	24	48	0	24	48	0	48	
Control	A	10	10	0	19.0	20.0	2.5	8.7	8.6	2.4	7.7	7.7	7.7	358	372
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.5	20.0	2.5	9.1	8.5	2.4	8.0	7.9	5.0	1870	1861
	B	10	10	0											
	C	10	10	0											
	D		10 ^m												
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	AM	A	YML	AM	AM	YML	YML	AM	YML	YML	AM	YML	AM

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO3)	
Control (MHW)	100	70
Highest conc.	1100	256
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		19.5
DO (mg/L)	9.8	(3 min aeration)	9.1
pH	7.9		8.0
Cond (µS/cm)	1861		1870

Comments: _____ Mortality: Heartbeat checked under microscope N/A

Sample Description: clear, colourless, no particulates, no odour

Batch#: 011216A 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: UGH Date reviewed: Feb. 16/16

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 16151

Start Date/Time: February 4, 2016 @ 1410h
Test Species: Daphnia magna
Set up by: NL

Sample Information:

Sample ID: EV_BCLWS_2016-02-02-N
Sample Date: February 2, 2016
Date Received: February 4, 2016
Sample Volume: 2 x 20 L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 011216B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 20
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC27
Stock Solution ID: 15Na03
Date Initiated: February 1, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: JGU

Date reviewed: Feb. 16/16

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: EV-BC1-WS-2016-02-02-N
 Work Order No.: 16151

Start Date/Time: February 4, 2016 @ 1410h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: Temp-5 DO meter: DO-213 pH meter: pH-113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	20.0	20.5	8.7	8.4	8.4	7.7	7.7	7.7	359	372
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.5	20.0	20.5	9.0	8.3	8.4	7.9	7.9	8.0	1874	1848
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML			YML	YML		YML	YML		YML	YML		YML	

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO ₃)	
Control (MHW)	100	70
Highest conc.	1130	270
Hardness adjusted		

	initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		19.5
DO (mg/L)	10.0	(3 min)	9.0
pH	7.9	(aeration)	7.9
Cond (µS/cm)	1876		1874

Comments: _____ Mortality: Heartbeat checked under microscope N/A

Sample Description: clear, colourless, no particulates, no odour.

Batch#: 011216B 7-d previous # young/brood: 20 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: JGh Date reviewed: Feb. 16/16

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 16151

Start Date/Time: February 4, 2016 @ 1115 h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: EV_OCLWS_2016-02-02-N
Sample Date: February 2, 2016
Date Received: February 4, 2016
Sample Volume: 2 x 20 L

Test Validity Criteria:
≥ 90% mean control survival (no more than 2 mortalities in any control replicate)
WQ Ranges:
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 011216A+B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 18
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC27
Stock Solution ID: 15Na03
Date Initiated: February 1, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/LNaCl
Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: JOU Date reviewed: Feb. 16/16

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: EV001-WS-2016-02-02-N
 Work Order No.: 16151

Start Date/Time: February 4, 2016 @ 11:56
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: YML

Thermometer: temp -5 DO meter: DO-3 pH meter: pH-3 Conductivity meter: C-3

Concentration (% v/v)	Number of Live Organisms Rep	24		48		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		0	24	48	0		24	48	0	24	48	0	24	48	0	48	
Control	A	10	10	0	19.0	20.0	20.5	8.7	8.6	8.4	7.7	7.7	7.6	358	364		
	B	10	10	0													
	C	10	10	0													
	D																
100	A	10	10	0	20.0	20.0	20.5	8.9	8.5	8.4	7.7	8.0	670	671			
	B	10	10	0													
	C	10	10	0													
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
Technician Initials	YML	A			YML	A			YML	YML	A	YML	YML	A	YML	A	

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO3)	
Control (MHW)	100	70
Highest conc.	310	272
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		20.0
DO (mg/L)	10.1	(3 min aeration)	8.9
pH	7.7		7.7
Cond (µS/cm)	675		670

Comments: _____ Mortality: Heartbeat checked under microscope N/A

Sample Description: light brown, slightly opaque, no particulates, no odors

Batch#: 011216A+B 7-d previous # young/brood: 18 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: JGK Date reviewed: Feb. 16/16

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 16151

Start Date/Time: February 4, 2016 @ 11:00h
Test Species: Daphnia magna
Set up by: YHL

Sample Information:

Sample ID: EV_GC2_WS_2016-02-02-N
Sample Date: February 2, 2016
Date Received: February 4, 2016
Sample Volume: 2 x 20 L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 011216A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC27
Stock Solution ID: 15NaO3
Date Initiated: February 1, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl

Reference Toxicant CV (%): 13

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: JGh

Date reviewed: Feb. 16/16

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: EV-GC2-WS-2016-02-02-N
 Work Order No.: 16151

Start Date/Time: February 4, 2016 @ 11:00
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: YML

Thermometer: temp -5 DO meter: DO-3 pH meter: pH-3 Conductivity meter: C-3

Concentration (% v/v)	Number of Live Organisms Rep	No. Immobilized			Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48	48	0	24	48	0	24	48	0	24	48	0	48
		<u>Control</u>	A	<u>10</u>	<u>10</u>	<u>0</u>	<u>19.0</u>	<u>20.0</u>	<u>2.5</u>	<u>8.7</u>	<u>8.0</u>	<u>8.4</u>	<u>7.7</u>	<u>7.7</u>	<u>7.6</u>
	B	<u>10</u>	<u>10</u>	<u>0</u>											
	C	<u>10</u>	<u>10</u>	<u>0</u>											
	D														
<u>100</u>	A	<u>10</u>	<u>10</u>	<u>0</u>	<u>19.0</u>	<u>20.0</u>	<u>2.5</u>	<u>9.2</u>	<u>8.4</u>	<u>8.3</u>	<u>8.1</u>	<u>8.0</u>	<u>8.1</u>	<u>926</u>	<u>912</u>
	B	<u>10</u>	<u>10</u>	<u>0</u>											
	C	<u>10</u>	<u>10</u>	<u>0</u>											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		<u>YML</u>	<u>AS</u>	<u>M</u>	<u>YML</u>	<u>AS</u>	<u>M</u>	<u>YML</u>	<u>YML</u>	<u>M</u>	<u>YML</u>	<u>YML</u>	<u>AS</u>	<u>YML</u>	<u>M</u>

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO ₃)	
Control (MHW)	<u>100</u>	<u>70</u>
Highest conc.	<u>620</u>	<u>244</u>
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	<u>19.5</u>		<u>19.0</u>
DO (mg/L)	<u>9.8</u>	<u>(3 min aeration)</u>	<u>9.2</u>
pH	<u>8.0</u>		<u>8.1</u>
Cond (µS/cm)	<u>924</u>		<u>926</u>

Comments: _____ Mortality: Heartbeat checked under microscope N/A

Sample Description: clear, colourless, some black particulates, no odour.

Batch#: 011216A 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: JGK Date reviewed: Feb. 16/16

Daphnia magna Summary Sheet

Client: Teck (EVO)
Work Order No.: 16151

Start Date/Time: February 5, 2016 @ 1410h
Test Species: Daphnia magna
Set up by: YHL

Sample Information:

Sample ID: EV_LCI_WS_2016-02-02-N
Sample Date: February 2, 2016
Date Received: February 4, 2016
Sample Volume: 2 x 20 L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 012016B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 15
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC27
Stock Solution ID: 15Na03
Date Initiated: February 1, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: JOU

Date reviewed: Feb. 16/16

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: EV_LCI-WS-2016-02-02-N
 Work Order No.: 16151

Start Date/Time: February 5, 2016 @ 14:04
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YMC

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.0	20.5	20.5	8.6	8.4	8.5	7.6	7.8	7.9	359	362
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	20.5	20.5	20.5	8.9	8.6	8.6	7.7	8.2	8.2	708	684
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials															

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO ₃)	
Control (MHW)	100	72
Highest conc.	364	328
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.5		
DO (mg/L)	8.9		
pH	7.7		
Cond (µS/cm)	708		

Comments: _____ Mortality: Heartbeat checked under microscope n/a

Sample Description: clear, no colour, no particulates, no odour

Batch#: 01201613 7-d previous # young/brood: 15 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: JGU Date reviewed: Feb. 16/16

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 16151

Start Date/Time: February 4, 2016 @ 1110h
Test Species: Daphnia magna
Set up by: YHL

Sample Information:

Sample ID: EV_SMLWS_2016-02-02-N
Sample Date: February 2, 2016
Date Received: February 4, 2016
Sample Volume: 2 x 20 L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 011216A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC27
Stock Solution ID: 15Na03
Date Initiated: February 1, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: JCh

Date reviewed: Feb. 16/16

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: EV-SMT-WS-2016-02-02-N
 Work Order No.: 16151

Start Date/Time: February 4, 2016 @ 11:01
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp -5 DO meter: DO-3 pH meter: pH-3 Conductivity meter: C-3

Concentration (% v/v)	Number of Live Organisms Rep	No. Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.0	20.0	20.5	8.7	8.7	8.4	7.7	7.7	7.7	358	368
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	20.0	20.0	20.5	9.0	8.5	8.4	8.0	8.0	8.0	580	587
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	AM	AM	YML	AM	AM	YML	YML	AM	YML	YML	AM	YML	AM

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO ₃)	
Control (MHW)	100	70
Highest conc.	278	254
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.5		20.0
DO (mg/L)	10.3	(5 min)	9.0
pH	7.9	(aeration)	8.0
Cond (µS/cm)	579		580

Comments: _____ Mortality: Heartbeat checked under microscope N/A

Sample Description: clear, colourless, no particulates, no odour

Batch#: 011216A 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: JGU Date reviewed: Feb-16/16

Daphnia magna Summary Sheet

Client: Teck (EVO)
Work Order No.: 16151

Start Date/Time: February 4, 2016 @ 1050 h
Test Species: Daphnia magna
Set up by: NL

Sample Information:

Sample ID: EV-DCLWS-2016-02-02-N
Sample Date: February 2, 2016
Date Received: February 4, 2016
Sample Volume: 2 x 20 L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 011216B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 20
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC27
Stock Solution ID: 15NaO3
Date Initiated: February 1, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 100% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: JGU

Date reviewed: Feb. 16/16

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck Start Date/Time: February 4, 2016 @ 1050
 Sample ID: EV-DCI-WS-2016-02-02-N No. Organisms/Volume: 10/200mL
 Work Order No.: 16151 Test Organism: D. magna
 Set up by: YML

Thermometer: temp -5 DO meter: DO-3 pH meter: pH-3 Conductivity meter: C-3

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
		<u>Control</u>	A		<u>10</u>	<u>10</u>	<u>0</u>	<u>19.0</u>	<u>20.0</u>	<u>20.5</u>	<u>8.7</u>	<u>8.6</u>	<u>8.5</u>	<u>7.7</u>	<u>7.7</u>
	B	<u>10</u>	<u>10</u>	<u>0</u>											
	C	<u>10</u>	<u>10</u>	<u>0</u>											
	D														
<u>100</u>	A	<u>90</u>	<u>00</u>	<u>0</u>	<u>22.0</u>	<u>20.0</u>	<u>20.5</u>	<u>9.0</u>	<u>8.2</u>	<u>8.4</u>	<u>7.8</u>	<u>8.0</u>	<u>8.0</u>	<u>1885</u>	<u>1853</u>
	B	<u>90</u>	<u>00</u>	<u>0</u>											
	C	<u>100</u>	<u>00</u>	<u>0</u>											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		<u>YML</u>	<u>AM</u>	<u>AM</u>	<u>YML</u>	<u>AM</u>	<u>AM</u>	<u>YML</u>	<u>YML</u>	<u>AM</u>	<u>YML</u>	<u>YML</u>	<u>AM</u>	<u>YML</u>	<u>AM</u>

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO3)	
Control (MHW)	<u>100</u>	<u>70</u>
Highest conc.	<u>1270</u>	<u>354</u>
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	<u>20.5</u>		<u>20.0</u>
DO (mg/L)	<u>10.3</u>	<u>(5 min)</u>	<u>9.0</u>
pH	<u>7.7</u>	<u>(aeration)</u>	<u>7.8</u>
Cond (µS/cm)	<u>1867</u>		<u>1885</u>

Comments: 0 organisms on surface, while film on surface Mortality: Heartbeat checked under microscope 400

Sample Description: clear, colorless, no particulates, no odour.

Batch#: 01121613 7-d previous # young/brood: 20 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: JGK Date reviewed: Feb. 16/16

Client: Teck Coal

W.O.#: 16151

Hardness and Alkalinity Datasheet

Sample ID	Sample Date	Alkalinity				Hardness			Technician
		Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO 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)	
EV_EC1_WS_2016-02-02_N	Feb 5/16	50	15.3	15.6	300	10 ⁰ 50 ^{KL}	10.4	1040	KL
EV_SP1_WS_2016-02-02_N	Feb 4/16		16.2	16.4	320	10 ⁰	10.9	1090	
EV_MG1_WS_2016-02-02_N	↓		14.5	14.7	286	10 ⁰	8.0	800	
EV_GT1_WS_2016-02-02_N	Feb 4/16		13.0	13.2	256	10 ⁰	11.0	1100	
EV_BC1_WS_2016-02-02_N	↓		13.8	14.1	270	10 ⁰	11.3	1130	
EV_OC1_WS_2016-02-02_N	Feb 4/16		13.8	14.0	272	10⁰ ^{KL} 50	3.8 ^{15.5} KL	310	
EV_GC2_WS_2016-02-02_N	Feb 4/16		12.4	12.6	244	10 ⁰	6.2	620	
EV_LC1_WS_2016-02-02_N	Feb 5/16		16.7	17.0	328	50	18.2	364	
EV_SM1_WS_2016-02-02_N	Feb 4/16		13.0	13.3	254	10⁰ ^{KL} 50	3.0 ^{15.9} KL	278	
EV_PC1_WS_2016-02-02_N	Feb 4/16	↓	18.0	18.3	354	10 ⁰	12.7	1270	↓
MHW	Feb 4/16	50	3.6	3.7	70	50	5.0	100	YML
MHW	Feb 5/16	50	3.7	3.8	72	50	5.0	100	YML

Notes: ① Sample diluted w/ DI w/ to 100ml

Reviewed by: JGK

Date Reviewed: Feb-16/16

Nautilus Environmental
8664 Commerce Court
Imperial Square Lake City
Burnaby BC, V5A 4N7

16151-48H D. Magna P/F
16152-96H RBT P/F

COC # _____ 2022016

Page 1 of 1

Report to:		Report Format / Distribution			Service Requested: (rush - subject to availability)																																
Company: TECK COAL LTD (ELKVIEW)		<input checked="" type="checkbox"/> Standard <input type="checkbox"/> Other			<input checked="" type="radio"/> Regular (Default)																																
Contact: Michael Moore		<input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> Excel <input checked="" type="checkbox"/> Digital <input type="checkbox"/> Fax			<input type="radio"/> Priority (2-3 Business Days) - 50% Surcharge																																
Address: RR1 HWY 3		Email 1: michael.moore@teck.com			<input type="radio"/> Emergency (1 Business Day) - 100% Surcharge																																
Sparwood, BC, V0B 2G1, Canada		Email 2: james.boldt@teck.com			<input type="radio"/> For Emergency < 1 Day, ASAP or Weekend - Contact ALS																																
Phone: 250-425-8868 Fax: _____		Email 3: cassandra.knooihuizen@teck.com			Analysis Request Please indicate below Filtered, Preserved or both (F, P, F/P)																																
Invoice To: Same as Report? <input checked="" type="radio"/> Yes <input type="radio"/> No		Email 4: madison.wassick@teck.com																																			
Company: Send all Invoices to: dtteckcoalaccounts@teck.com		Client / Project Information:			<table border="1"> <tr> <td>TECKCOAL-MONTHLY-VA</td> <td>Toxicity 7-day/72 hr</td> <td>T-Se (CCMS)</td> <td>T-Metal (TECKCOAL-MET-T-VA)</td> <td>D-Metal (TECKCOAL-MET-D-VA)</td> <td>EPH</td> <td>TSS</td> <td>TURBIDITY</td> <td>Toxicity - 30 Day</td> <td>Toxicity 96-Hr/48-Hr Pass/Fail</td> <td>Toxicity 7-day/ 72-Hr Pass/Fail</td> <td>BOD</td> <td rowspan="10">Number of Containers - 20L</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>							TECKCOAL-MONTHLY-VA	Toxicity 7-day/72 hr	T-Se (CCMS)	T-Metal (TECKCOAL-MET-T-VA)	D-Metal (TECKCOAL-MET-D-VA)	EPH	TSS	TURBIDITY	Toxicity - 30 Day	Toxicity 96-Hr/48-Hr Pass/Fail	Toxicity 7-day/ 72-Hr Pass/Fail	BOD	Number of Containers - 20L													
TECKCOAL-MONTHLY-VA	Toxicity 7-day/72 hr	T-Se (CCMS)	T-Metal (TECKCOAL-MET-T-VA)	D-Metal (TECKCOAL-MET-D-VA)								EPH	TSS	TURBIDITY	Toxicity - 30 Day	Toxicity 96-Hr/48-Hr Pass/Fail	Toxicity 7-day/ 72-Hr Pass/Fail	BOD	Number of Containers - 20L																		
Contact: Attn: Accounting		Job #: Elkview Quarterly Toxicity Testing																																			
Address: Same as above		PO / AFE: 418934 PO																																			
Phone: _____ Fax: _____		Quote #:																																			
Lab Work Order # (lab use only)		Nautilus Contact: Krysta Pearcy										Sampler: JB, MW																									
Sample	Sample Identification	Date (mm-dd-yy)	Time (hh:mm)	Matrix																																	
	EV_EC1_WS_2016-02-02_N (1)	2-Feb-16	9:35	WS																																	
	EV_SP1_WS_2016-02-02_N	2-Feb-16	10:00	WS																																	
	EV_MG1_WS_2016-02-02_N	2-Feb-16	9:15	WS																																	
	EV_GT1_WS_2016-02-02_N	2-Feb-16	9:50	WS																																	
	EV_BC1_WS_2016-02-02_N	2-Feb-16	9:15	WS																																	
	EV_OC1_WS_2016-02-02_N	2-Feb-16	12:40	WS																																	
	EV_GC2_WS_2016-02-02_N	2-Feb-16	7:20	WS																																	
	EV_LC1_WS_2016-02-02_N	2-Feb-16	8:15	WS																																	
	EV_SM1_WS_2016-02-02_N	2-Feb-16	10:40	WS																																	
	EV_DC1_WS_2016-02-02_N	2-Feb-16	11:05	WS																																	
20																																					
Special Instructions / Regulations / Hazardous Details																																					
Toxicity 7-Day/72-Hr Pass/ Fail = 7 d C. dubia and 72 h P. subcapitata Toxicity 96-Hr/48-Hr = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail Toxicity 30-Day = Rainbow trout embryo-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:	Date & Time:	Received by:	Date:	Time:	Temperature:	Verified by:	Date & Time:	Observations:																													
Madison Wassick	2/2/2016 15:00	Nautilus NY - Nan Yamamoto	Feb 04/16	10:20				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

(1) EV-EC1 - 1 canby leaked but still 1/2 full.

Temp °C
4.5
4.5
3.5
4.2
3.5
2.0
4.0
4.1
2.5
4.5



Teck Coal/ Elkview Operation
ATTN: Michael Moore
RR1 HWY 3
Sparwood, BC
V0B 2G1

Report Date: February 29, 2016
Work Order: 16200 - 16201

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. with 2007 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000)

Table 1. Results for the 96-h rainbow trout acute toxicity test.

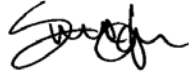
Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
EV_DC1_WS_2016-02-15_N	February 15, 2016 @ 0810h	0

Table 2. Results for the 48-h *Daphnia magna* acute toxicity tests.

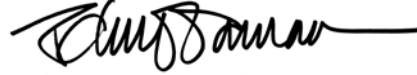
Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
EV_DC1_WS_2016-02-15_N [tested at 20°C]	February 15, 2016 @ 0810h	0
EV_DC1_WS_2016-02-15_N [tested at 10°C]	February 15, 2016 @ 0810h	0

As requested by client, the sample was also tested with *D. magna* at 10°C, which was initiated concurrently with the standard test (20°C). No additional rainbow trout test was conducted.

Test results indicated similar responses in all the test treatments, including the controls. All control performance criteria were met and no deviations from the test protocols were observed. The results presented in this report relate only to the sample tested.



Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck Coal LTD (Elkview) Start Date/Time: Feb 18/16 @ 1100h

Work Order No.: 16201 Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-DLL-W5-2016-02-15-N
Sample Date: Feb 15/16
Date Received: Feb 17/16
Sample Volume: 1 x 20L
Other: -

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 6
Alkalinity (mg/L CaCO₃): 4

Test Organism Information:

Batch No.: 012216
Source: Aqua Farms
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.43
Mean Length ± SD (mm): 32 ± 2 Range: 29-35
Mean Weight ± SD (g): 0.52 ± 0.07 Range: 0.37-0.63

Zinc Reference Toxicant Results:

Reference Toxicant ID: RJZn34
Stock Solution ID: 15Zn05
Date Initiated: Feb 16/16
96-h LC50 (95% CL): 43.5 (29.2 - 63.8) µg/L Zn

Reference Toxicant Mean and Historical Range: 72.8 (35.5 - 149.2) µg/L Zn
Reference Toxicant CV (%): 43.2%

Test Results: 100% survival at 96 hours in the undiluted 100% (v/v) sample.
0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature] Date reviewed: March 1, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal LTD (Elkview)
 Sample I.D. EV-DCI-WS-2016-02-15-N
 W.O. # 16201
 RBT Batch #: 012216
 Date Collected/Time: Feb 15/16 @ 0810h
 Date Setup/Time: Feb 18/16 @ 1100h
 Sample Setup By: EC

Number Fish/Volume: 10/12 L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 90 mins
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

D.O. meter: 2
 pH meter: 1
 Cond. Meter: 2

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
pH	7.8	/	7.8
D.O. (mg/L)	11.0	/	10.7
Cond. (µS/cm)	1833	/	1828

Concentration (% v/v)	# Survivors						Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)			
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
10				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.0	9.9	9.8	9.6	9.5	6.8	6.6	6.7	6.8	6.8	30	33	
100				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.3	9.9	9.8	9.6	9.6	7.8	8.1	8.0	8.0	8.1	1828	1763	
																</									

Daphnia magna Summary Sheet

Client: Teck (EVO)
Work Order No.: 16200

Start Date/Time: February 17, 2016 @ 1700h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: EV-DCI-WS-2016-02-15-N
Sample Date: February 15, 2016
Date Received: February 17, 2016
Sample Volume: 1 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 012716A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 23
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC28
Stock Solution ID: 15Na03
Date Initiated: February 23, 2016
48-h LC50 (95% CL): 4.5 (3.8 - 5.4) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.2-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample, tested at 20°C.

Reviewed by: [Signature]

Date reviewed: March 1, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Test Start Date/Time: Feb 17/16 07:00h
 Sample ID: EJ-DCI-WS-2016-02-15-N No. Organisms/Volume: 10/200mL
 Work Order No.: 16200 Test Organism: D. magna
 Set up by: YTL

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	No. Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)		
		24	48		48	0	24	48	0	24	48	0	24	48	0	48
		<u>Control</u>	A		<u>10</u>	<u>10</u>	<u>0</u>	<u>19.5</u>	<u>19.5</u>	<u>19.0</u>	<u>8.6</u>	<u>8.4</u>	<u>8.4</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>
	B	<u>10</u>	<u>10</u>	<u>0</u>												
	C	<u>10</u>	<u>10</u>	<u>0</u>												
	D															
<u>100 (20°C)</u>	A	<u>10</u>	<u>10⁰</u>	<u>0</u>	<u>20.0</u>	<u>19.5</u>	<u>19.0</u>	<u>8.9</u>	<u>8.3</u>	<u>8.5</u>	<u>7.8</u>	<u>8.0</u>	<u>8.2</u>	<u>1820</u>	<u>1796</u>	
	B	<u>10</u>	<u>10⁰</u>	<u>0</u>												
	C	<u>10</u>	<u>10⁰</u>	<u>0</u>												
	D															
	A															
	B															
	C															
	D															
	A															
	B															
	C															
	D															
	A															
	B															
	C															
	D															
Technician Initials		<u>YTL</u>	<u>YTL</u>	<u>YTL</u>	<u>YTL</u>	<u>YTL</u>	<u>YTL</u>	<u>YTL</u>	<u>YTL</u>	<u>YTL</u>	<u>YTL</u>	<u>YTL</u>	<u>YTL</u>	<u>YTL</u>	<u>YTL</u>	

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO ₃)	
Control (MHW)	<u>100</u>	<u>68</u>
Highest conc.	<u>1390</u>	<u>400</u>
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	<u>19.0</u>		<u>20.0</u>
DO (mg/L)	<u>10.1</u>	<u>(3 min aeration)</u>	<u>8.9</u>
pH	<u>7.8</u>		<u>7.8</u>
Cond (µS/cm)	<u>1836</u>		<u>1820</u>

Comments: slight white film on surface Mortality: Heartbeat checked under microscope all

Sample Description: clear, no colour, no particulates, no odour

Batch#: 012716A 7-d previous # young/brood: 23 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: March 1, 2016

Daphnia magna Summary Sheet

Client: Teck (EVO)
Work Order No.: 16200

Start Date/Time: February 17, 2016 @ 17:00h ^{1655h}
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: EV-DCI-WS-2016-02-15-N
Sample Date: February 15, 2016
Date Received: February 17, 2016
Sample Volume: 1 x 1L

Test Validity Criteria:
≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 012716A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 23
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC28
Stock Solution ID: 15Na03
Date Initiated: February 23, 2016
48-h LC50 (95% CL): 4.5 (3.8 - 5.4) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.2-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample, tested at 10°C.

Reviewed by: [Signature]

Date reviewed: March 1, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Truck Start Date/Time: Feb 17/16 @ 1655h
 Sample ID: EJ-DCI-WS-2016-02-15-N No. Organisms/volume: 10/200mL
 Work Order No.: 16200 Test Organism: D.magna
 Set up by: YTL

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	10.5	9.5	9.5	10.9	11.0	11.0	7.6	7.6	7.6	351	346
	B	10	10	0											
	C	10	10	0											
	D														
100 (10 °C)	A	10	10	0	10.7	9.5	9.5	10.8	11.1	11.2	7.7	7.7	8.0	1825	1829
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YTL		YTL	YTL	YTL	YTL	YTL	YTL	YTL	YTL	YTL	YTL	YTL	YTL

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO ₃)	
Control (MHW)	100	70
Highest conc.	1450	350
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	10.5		
DO (mg/L)	10.8		
pH	7.7		
Cond (µS/cm)	1825		

Comments: _____ Mortality: Heartbeat checked under microscope 0/9

Sample Description: clear, no colour, no particulates, no odour

Batch#: 012716A 7-d previous # young/brood: 23 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: March 1, 2016


Client: Teck-EVO

W.O.#: 16200

Hardness and Alkalinity Datasheet

Sample ID	Sample Date	Alkalinity				Hardness			Technician
		Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO 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)	
EV-DCI-WS 2016-02-15-N (200)	Feb 17/16	10 [Ⓛ]	4.1	4.2	400	10 [Ⓛ]	13.9	1390	JS
MHW (20°C)	Feb 17/16	50	3.5	3.6	68	50	5.0	100	MM
EV-DCI-WS 2016-02-15-N (100)	Feb 17/16	10 [Ⓛ]	3.6	3.7	350	10 [Ⓛ]	14.5	1450	MM
MHW (10°C)	Feb 17/16	50	3.6	3.7	70	50	5.0	100	MM

Notes: ① Diluted to 100ml w/ DI. water

Reviewed by: 

Date Reviewed: March 1, 2016



Acute Toxicity Test Results

Sample collected March 7, 2016

Final Report

March 29, 2017

Submitted to: **Teck Coal / Elkview Operations**
Elkford, BC

SAMPLE INFORMATION

Sample ID	Dates				Receipt temp.
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> test initiation	
EV_AQ1_WS_2016-03-07_N	07-Mar-16 at 1400h	09-Mar-16 at 0940h	10-Mar-16 at 0935h	10-Mar-16 at 1025h	7.2°C

TESTS

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test

RESULTS

Toxicity test results

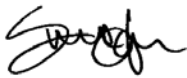
Sample ID	Percent mortality in 100% (v/v) sample	
	Rainbow trout	<i>Daphnia magna</i>
EV_AQ1_WS_2016-03-07_N	0	0

Data for all samples listed on the chain of custody have been provided in a separate report.

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CI)	87.1 (71.2 – 106.4) µg/L Zn ¹	5.2 (4.2 – 6.4) g/L NaCl ²
Reference toxicant historical mean (2 SD range)	71.7 (34.0 – 151.5) µg/L Zn	4.2 (3.3 – 5.3) g/L NaCl
Reference toxicant CV	45%	13%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹ Test date: March 4, 2016; ² Test Date: March 15, 2016, LC = Lethal Concentration, SD = Standard Deviation, CV = Coefficient of Variation



Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio
Senior Analyst

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) single concentration test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquarium
Test volume	10 to 20 L (depending on size of fish)
Test solution depth	≥15 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tapwater
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Zinc (added as ZnCl ₂)

Table 2. Summary of test conditions: 48-h *Daphnia magna* single concentration test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: Teck Coal (EVO)

Start Date/Time: Mar 10/16 @ 0935h

Work Order No.: 16309

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-AQI-WS-2016-03-07-N
Sample Date: Mar 7/16
Date Received: Mar 9/16
Sample Volume: 1x20L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 12
Alkalinity (mg/L CaCO₃): 10

Test Organism Information:

Batch No.: 020816
Source: Aqua Farms
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.43
Mean Length ± SD (mm): 31.11
Mean Weight ± SD (g): 0.52 ± 0.04

Range: 29-33
Range: 0.43-0.57

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn35
Stock Solution ID: 15Zn05
Date Initiated: Mar 4/16
96-h LC50 (95% CL): 87.1 (71.2-106.4) µg/L Zn

Reference Toxicant Mean and Historical Range: 71.7 (34.0-151.5) µg/L Zn
Reference Toxicant CV (%): 45%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: March 16, 2016

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 16310

Start Date/Time: March 10, 2016 @ 1025h
Test Species: Daphnia magna
Set up by: MYL

Sample Information:

Sample ID: EV-AQI-WS-2016-03-02LN
Sample Date: March 7, 2016
Date Received: March 9, 2016
Sample Volume: 1 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:


Broodstock No.: 021616A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 21
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC29
Stock Solution ID: 15Na03
Date Initiated: March 15, 2016
48-h LC50 (95% CL): 5.2 (4.2 - 6.4) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3 - 5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: 

Date reviewed: March 17, 2016

**Freshwater Acute
48 Hour Toxicity Test Data Sheet**

Client: Teck (Evo)
 Sample ID: EV-AQI-WS-2016-03-07-N
 Work Order No.: 16310

Start Date/Time: March 10, 2016 @ 1025h
 No. Organisms/Volume: 10/200mL
 Test Organism: D.magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	20.0	20.5	8.7	8.5	8.4	7.8	7.8	7.7	351	355
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.5	20.0	20.5	9.1	8.5	8.3	8.0	8.1	8.1	775	770
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	AO		YML	YML		YML	YML		YML	YML		YML	

Concentration	Hardness* (mg/L as CaCO3)	Alkalinity* (mg/L as CaCO3)
Control (MHW)	100	72
Highest conc.	340	230
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		
DO (mg/L)	9.1		
pH	8.0		
Cond (µS/cm)	775		
Salinity (ppt)	0.4		

Comments: _____ Mortality: Heartbeat checked under microscope not reg'd.

Sample Description: light grey/brown colour, slightly opaque, no odour, some particulates.

Batch#: 021616A 7-d previous # young/brood: 21 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: YML Date reviewed: March 16, 2016

APPENDIX C – Chain-of-custody form

END OF REPORT



Teck Coal/ Elkview Operations
ATTN: Michael Moore
RR1 HWY 3
Sparwood, BC
V1C 4C3

Report Date: June 22, 2016
Work Order: 16618 - 16619

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 96-h rainbow trout acute toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
EV_SM1_WS_2016-06-06_N	June 6, 2016 @ 0830h	0
EV_DC1_WS_2016-06-06_N	June 6, 2016 @ 1010h	0
EV_OC1_WS_2016-06-06_N	June 6, 2016 @ 1205h	0

Table 2. Results for the 48-h *Daphnia magna* acute toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
EV_SM1_WS_2016-06-06_N	June 6, 2016 @ 0830h	0
EV_DC1_WS_2016-06-06_N	June 6, 2016 @ 1010h	0
EV_OC1_WS_2016-06-06_N	June 6, 2016 @ 1205h	0

The tests met performance criteria and there were no deviations from the protocol. The results presented in this report relate only to the samples tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck coal (EVO)

Start Date/Time: June 9 / 16 @ 1115h

Work Order No.: 16618

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV_SMI_WS_2016-06-06-N

Sample Date: June 6 / 16 @ 0830h

Date Received: June 8 / 16 @ 1010h

Sample Volume: 1 x 20L

Other: ✓

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water

Hardness (mg/L CaCO₃): 10

Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 050416

Source: ^{EL} ~~Miracle Springs~~ Aqua Farms

No. Fish/Volume (L): 10 / 12L

Loading Density (g/L): 0.34

Mean Length ± SD (mm): 28 ± 2

Range: 26 - 31

Mean Weight ± SD (g): 0.41 ± 0.09

Range: 0.21 - 0.54

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn 41

Stock Solution ID: 15 Zn 05

Date Initiated: May 26 / 16

96-h LC50 (95% CL): 37.9 (33.2 - 43.2) µg/L Zn

Reference Toxicant Mean and Historical Range: 66.7 (27.6 - 161.2) µg/L Zn

Reference Toxicant CV (%): 56

Test Results: 0 mortality
EL ~~100~~ % survival at 96 hours in the 100 % (V/V) undiluted sample.

Reviewed by: 

Date reviewed: June 17, 2016

Rainbow Trout Summary Sheet

Client: Teck coal (EVO)

Start Date/Time: June 9 / 16 @ 1115h

Work Order No.: 16618

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV.DCI.WS.2016-06-06-N

Sample Date: June 6 / 16 @ 1005h

Date Received: June 8 / 16 @ 1010h

Sample Volume: 1 x 20L

Other: _____

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water

Hardness (mg/L CaCO₃): 10

Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 050416

Source: el ~~Miracle Springs~~ Aqua Farms

No. Fish/Volume (L): 10 / 12 L

Loading Density (g/L): 0.32

Mean Length ± SD (mm): 26 ± 3

Range: 21 - 31

Mean Weight ± SD (g): 0.38 ± 0.15

Range: 0.20 - 0.70

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTzn 41

Stock Solution ID: 15 zn 05

Date Initiated: MAY 26 / 16

96-h LC50 (95% CL): 37.9 (33.2 - 43.2) µg/L zn

Reference Toxicant Mean and Historical Range: 66.7 (27.6 - 161.2) µg/L zn

Reference Toxicant CV (%): 56

Test Results: 0 mortality
el 100% survival_{el} at 96 hours in the 100% undiluted sample (v/v).

Reviewed by: 

Date reviewed: June 17, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (EVO)

Start Date/Time: June 9/16 @ 1115h

Work Order No.: 16618

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV_OC1_WS_2016-06-06_N

Sample Date: June 6/16 @ 1010h

Date Received: June 8/16 @ 1010h

Sample Volume: 1 x 20L

Other: -

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water

Hardness (mg/L CaCO₃): 10

Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 050416

Source: EL ~~Miracle Springs~~ Aqua Farms

No. Fish/Volume (L): 10 / 12 L

Loading Density (g/L): 0.42

Mean Length ± SD (mm): 30 ± 3

Range: 26 - 33

Mean Weight ± SD (g): 0.51 ± 0.13

Range: 0.30 - 0.72

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZN41

Stock Solution ID: 15 Zn 05

Date Initiated: MAY 26/16

96-h LC50 (95% CL): 37.9 (33.2 - 43.2) µg/L Zn

Reference Toxicant Mean and Historical Range: 66.7 (27.6 - 161.2) µg/L Zn

Reference Toxicant CV (%): 56

Test Results: EL 0 mortality
EL 100% survival at 96 hours in the ^{JW} undiluted 100% (V/V) sample.
undiluted

Reviewed by: 

Date reviewed: June 17, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 16619

Start Date/Time: June 9, 2016 @ 1700h
Test Species: Daphnia magna
Set up by: YNL

Sample Information:

Sample ID: EV-SM1-WS-2016-06-08-N
Sample Date: June 6, 2016
Date Received: June 8, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 051816A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 19
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC34
Stock Solution ID: 16NaCl
Date Initiated: June 8, 2016
48-h LC50 (95% CL): 4.8 (4.0-5.9) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: 

Date reviewed: June 17, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: EV-SM1-WS-2016-06-06-N
 Work Order No.: 16619

Start Date/Time: June 9, 2016 @ 1700h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: YML

Thermometer: temp - 11 DO meter: 213 pH meter: pH - 113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		48	No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48			0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	0	19.5	19.5	10.0	8.7	8.3	8.5	7.7	7.8	8.0	345	353
	B	10	10	0	0											
	C	10	10	0	0											
	D															
100	A	10	10	0	0	20.0	19.5	10.0	8.4	8.2	8.5	8.0	8.2	8.3	459	462
	B	10	10	0	0											
	C	10	10	0	0											
	D															
	A															
	B															
	C															
	D															
	A															
	B															
	C															
	D															
Technician Initials		YML	AS		AS	YML	YML	AS	YML	YML	AS	YML	YML	AS	YML	AS

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO3)	
Control (MHW)	94	70
Highest conc.	214	198
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		
DO (mg/L)	8.4		
pH	8.0		
Cond (µS/cm)	459		
Salinity (ppt)	0.2		

Comments: _____ Mortality: Heartbeat checked under microscope ND

Sample Description: clear, no colour, no odour, no particulates

Batch#: 051816A 7-d previous # young/brood: 19 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: June 17, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 16619

Start Date/Time: June 9, 2016 @ 1710h
Test Species: Daphnia magna
Set up by: YNL

Sample Information:

Sample ID: EV-DCL-WS-2016-06-06-N
Sample Date: June 6, 2016
Date Received: June 8, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:
≥ 90% mean control survival (no more than 2 mortalities in any control replicate)
WQ Ranges:
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 051816A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 19
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC34
Stock Solution ID: 16Na01
Date Initiated: June 8, 2016
48-h LC50 (95% CL): 4.8 (4.0 - 5.9) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: [Signature]

Date reviewed: June 17, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: EV-DCL-WS-2016-06-06-N
 Work Order No.: 16619

Start Date/Time: June 9, 2016 @ 17:10h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-11 DO meter: 213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		48	No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		0	24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	0	19.5	19.5	20.0	8.7	8.9	8.5	7.7	7.8	8.0	345	351
	B	10	10	0												
	C	10	10	0												
	D															
100	A	10	10	0	0	20.0	19.5	20.2	8.5	8.3	8.5	7.9	8.2	8.7	1389	1380
	B	10	10	0												
	C	10	10	0												
	D															
	A															
	B															
	C															
	D															
	A															
	B															
	C															
	D															
Technician Initials		YML	AS		AS	YML	YML	AS	YML	YML	AS	YML	YML	AS	YML	AS

Concentration	Hardness* (mg/L as CaCO ₃)	Alkalinity* (mg/L as CaCO ₃)
Control (MHW)	94	70
Highest conc.	750	300
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		
DO (mg/L)	8.5		
pH	7.9		
Cond (µS/cm)	1389		
Salinity (ppt)	0.7		

Comments: _____ Mortality: Heartbeat checked under microscope no

Sample Description: clear, slight yellow colour, no odour, slight particulates

Batch#: 051816A 7-d previous # young/brood: 19 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: June 17, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 16619

Start Date/Time: June 9, 2016 @ 1700h
Test Species: Daphnia magna
Set up by: YNL

Sample Information:

Sample ID: EV_OCI-WS-2016-06-06-N
Sample Date: June 6, 2016
Date Received: June 8, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 051816A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 19
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC34
Stock Solution ID: 16NaCl
Date Initiated: June 8, 2016
48-h LC50 (95% CL): 4.8 (4.0-5.9) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: [Signature]

Date reviewed: June 17, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: EV-001-WS-2016-06-06-N
 Work Order No.: 16619

Start Date/Time: June 9, 2016 @ 17:00h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-11 DO meter: 213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	19.5	20.0	8.7	8.3	8.6	7.7	7.8	8.0	345	352
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	20.0	19.5	20.0	8.0	8.1	8.4	7.6	8.1	8.1	722	700
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	AS	AS	YML	YML	AS	YML	YML	AS	YML	YML	AS	YML	AS

Concentration	Hardness* (mg/L as CaCO3)	Alkalinity* (mg/L as CaCO3)
Control (MHW)	94	70
Highest conc.	354	308
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		
DO (mg/L)	8.0		
pH	7.6		
Cond (µS/cm)	722		
Salinity (ppt)	0.43		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: clear, no colour, no odour, no particulates

Batch#: 051816A 7-d previous # young/brood: 19 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: June 17, 2016

Teck

Page 1 of 1

COC ID: 20160606		TURNAROUND TIME:		RUSH:							
PROJECT/CLIENT INFO			LABORATORY			OTHER INFO					
Facility Name / Job:	Elkview Operations	Lab Name:	Nautilus Environmental	Report Format / Distribution	Excel	PDF	BIDD				
Job Description:	Monthly Toxicity Sampling	Lab Contact:	Krysta Peacey	Email 1:	Michael.Moore@teck.com	X	X	X			
Project Manager:	Michael Moore	Email:	krysta@nautilusenvironmental.ca	Email 2:	tecktest@nautilusenv.com	X	X	X			
Email:	Michael.Moore@teck.com	Address:	8664 Commerce Court	Email 3:	James.Bold@teck.com	X	X	X			
Address:	RR#1 HWY#3		Imperial Square Lake City	Email 4:	Samuel.Greig@teck.com	X	X	X			
City:	Sparwood	Province:	BC	City:	Imperial Square	Province:	BC	PO number:			
Postal Code:	V1C 4C3	Country:	Canada	Postal Code:	V5A 4N7	Country:	Canada	418927			
Phone Number:	1-250-865-3289	Phone Number:									
SAMPLE DETAILS			ANALYSIS REQUESTED								
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	C=Grab C=Comp	# Of Cont.	Toxicity 96-h rainbow trout (Pass/Fail)	Toxicity 48-h Daphnia magna (Pass/Fail)	Temp °C (1L bottles)	Temp °C (20L canboy)
EV_SM1_WS_2016-06-06_N	EV_SM1	WS	N	2016/06/06	8:30	G	3	1	2	17.5	18.4
EV_DCI_WS_2016-06-06_N	EV_DCI	WS	N	2016/06/06	10:10	G	3	1	2	17.5	18.3
EV_OCI_WS_2016-06-06_N	EV_OCI	WS	N	2016/06/06	12:05	G	3	1	2	17.5	17.3
Total							9				
ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS			RE-LINQUISHED BY/AFFILIATION			DATE/TIME			ACCREDITED BY/AFFILIATION		
Toxicity 96-hr/48-hr = 96 hr Rainbow Trout pass/fail & 48 hr Daphnia pass/fail (Daphnia testing to occur at 20 degrees)									Nautilus NY - New York metro June 08/16 @ 10:10		
NR OF BOTTLES RETURNED/DESCRIPTION			Sampler's Name			Mobile #			Date/Time		
Regular (default) X			Corynne C. H. [Signature]								
Priority (2-3 business days) - 50% surcharge											
Emergency (1 Business Day) - 100% surcharge											
For Emergency <1 Day, ASAP or Weekend - Contact ALS											

①
②
③

WO # 16618
16619

(2x1L + 1x20L)
↓

- ① sample time on the 20L canboy is 10:05
- ② sample time on the 20L canboy is 10:10

Sample Description:

- ① clear, colorless, odorless, No particulates.
- ② yellow, clear, odorless, Some particulates
- ③ clear, colorless, No particulates, odorless



Acute Toxicity Test Results

Samples collected June 7, 2016

Final Report

March 29, 2017

Submitted to: **Teck Coal / Elkview Operations**
Elkford, BC

SAMPLE INFORMATION

Sample ID	Dates				Receipt temp.
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> test initiation	
EV_AQ1_WS_2016-06-07_N	07-Jun-16 at 1300h	09-Jun-16 at 1120h	10-Jun-16 at 1300h	09-Jun-16 at 1610h	18.5°C
EV_MG1_WS_2016-06-07_N	07-Jun-16 at 0940h	09-Jun-16 at 1120h	10-Jun-16 at 1300h	09-Jun-16 at 1620h	17.5°C
EV_SP1_WS_2016-06-07_N	07-Jun-16 at 0810h	09-Jun-16 at 1120h	10-Jun-16 at 1300h	09-Jun-16 at 1625h	17.5°C
EV_EC1_WS_2016-06-07_N	07-Jun-16 at 0845h	09-Jun-16 at 1120h	10-Jun-16 at 1300h	09-Jun-16 at 1630h	17.5°C

TESTS

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test

RESULTS

Toxicity test results

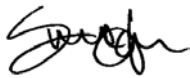
Sample ID	Percent mortality in 100% (v/v) sample	
	Rainbow trout	<i>Daphnia magna</i>
EV_AQ1_WS_2016-06-07_N	0	0
EV_MG1_WS_2016-06-07_N	0	0
EV_SP1_WS_2016-06-07_N	0	3.3
EV_EC1_WS_2016-06-07_N	0	0

Data for all samples listed on the chain of custody have been provided in a separate report.

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CI)	53.6 (43.2 – 66.4) µg/L Zn ¹	4.8 (4.0 – 5.9) g/L NaCl ²
Reference toxicant historical mean (2 SD range)	64.0 (27.3 – 149.8) µg/L Zn	4.2 (3.2 – 5.6) g/L NaCl
Reference toxicant CV	53%	15%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹ Test date: June 5, 2016; ² Test Date: June 8, 2016, LC = Lethal Concentration, SD = Standard Deviation, CV = Coefficient of Variation



Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio
Senior Analyst

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) single concentration test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquarium
Test volume	10 to 20 L (depending on size of fish)
Test solution depth	≥15 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tapwater
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Zinc (added as ZnCl ₂)

Table 2. Summary of test conditions: 48-h *Daphnia magna* single concentration test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: Teck Coal (EVO)

Start Date/Time: Jun 10 / 16 @ 1300h

Work Order No.: 16635

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-AR1-WS-2016-06-07-N
Sample Date: Jun 7 / 16
Date Received: Jun 9 / 16
Sample Volume: 1 X 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 052416
Source: Aqua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): ~~0.31~~ 0.26
Mean Length ± SD (mm): 28 ± 2
Mean Weight ± SD (g): 0.31 ± 0.04

Range: 26 - 30
Range: 0.27 - 0.38

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn42
Stock Solution ID: 15Zn05
Date Initiated: Jun 9/15
96-h LC50 (95% CL): 53.6 (43.2-66.4) mg/L Zn

Reference Toxicant Mean and Historical Range: 64.0 (27.3 - 149.8) mg/L Zn
Reference Toxicant CV (%): 53.0%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v)
sample.

Reviewed by: 

Date reviewed: June 17, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (EVO) Start Date/Time: Jun 10 116 @ 1300h

Work Order No.: 16635 Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV_MG1_WS_2016-06-07-N
Sample Date: Jun 7 116
Date Received: Jun 9 116
Sample Volume: 1 X 20L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 052416
Source: Aqua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.31
Mean Length ± SD (mm): 29 ± 2 Range: 26 - 31
Mean Weight ± SD (g): 0.31 ± 0.04 Range: 0.26 - 0.39

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn42
Stock Solution ID: 15Zn05
Date Initiated: Jun 9/15
96-h LC50 (95% CL): 53.6 (43.2-66.4) mg/L Zn

Reference Toxicant Mean and Historical Range: 64.0 (27.3 - 149.8) mg/L Zn
Reference Toxicant CV (%): 53.0%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature] Date reviewed: June 20, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (EVO)

Start Date/Time: Jun 10 11/16 @ 1300h

Work Order No.: 16635

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV_SPL_WS_2016-06-07-N
Sample Date: Jun 7 116
Date Received: Jun 9 116
Sample Volume: 1 X 20L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 8

Test Organism Information:


Batch No.: 052416
Source: Aqua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.31
Mean Length ± SD (mm): 28 ± 2 Range: 24 - 30
Mean Weight ± SD (g): 0.31 ± 0.04 Range: 0.26 - 0.36

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn42
Stock Solution ID: 15Zn05
Date Initiated: Jun 9/15
96-h LC50 (95% CL): 53.6 (43.2-66.4) mg/L Zn

Reference Toxicant Mean and Historical Range: 64.0 (27.3 - 149.8) mg/L Zn
Reference Toxicant CV (%): 53.0%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: 

Date reviewed: June 20, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (EVO)

Start Date/Time: Jun 10 / 16 @ 1300h

Work Order No.: 16635

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-ECL-WS-2016-06-07-N
Sample Date: Jun 7 / 16
Date Received: Jun 9 / 16
Sample Volume: 1 X 20L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 052416
Source: Aqua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.32
Mean Length ± SD (mm): 27 ± 3
Mean Weight ± SD (g): 0.32 ± 0.07

Range: 22 - 30
Range: 0.20 - 0.43

Zinc Reference Toxicant Results:

Reference Toxicant ID: RIZn42
Stock Solution ID: 15Zn05
Date Initiated: Jun 9/15
96-h LC50 (95% CL): 53.6 (43.2-66.4) mg/L Zn

Reference Toxicant Mean and Historical Range: 64.0 (27.3 - 149.8) mg/L Zn
Reference Toxicant CV (%): 53.0%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: June 20, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal (EVO)
Sample I.D.: EV-EC1-WS-2016-06-07-N
W.O. #: 16635
RBT Batch #: 052416
Date Collected/Time: Jun 7/16 @ 0845h
Date Setup/Time: Jun 10/16 @ 1300h
Sample Setup By: EC

Number Fish/Volume: 10/10 L
7-d % Mortality: 0.0
Total Pre-aeration Time (mins): 30
Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER# 2 **D.O. meter:** 2
Cond./Salinity: 2 **pH meter:** 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	15.0	/	15.0
pH	8.0	/	8.1
D.O. (mg/L)	9.5	/	9.7
Cond. (µS/cm)	1613	/	1613
Salinity (ppt)	0.8	/	0.8

Concentration	# Survivors								Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
(% v/v)				10	10	10	10	15.0	15.0	15.0	15.0	15.0	10.0	9.8	9.6	9.8	9.8	06.7	06.7	6.8	6.9	6.9	6.9	28	34
(+1)				10	10	10	10	15.0	15.0	15.0	15.0	9.7	9.9	9.7	9.7	9.7	8.1	8.2	8.2	8.3	8.3	1613	1585		
100																									

Daphnia magna Summary Sheet

Client: Teck (EVO)
Work Order No.: 16636

Start Date/Time: June 9, 2016 @ 1610h
Test Species: Daphnia magna
Set up by: YHL

Sample Information:

Sample ID: EV_AQ1_WS_2016-06-07-N
Sample Date: June 7, 2016
Date Received: June 9, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 051816B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 19
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC34
Stock Solution ID: 16NaCl
Date Initiated: June 8, 2016
48-h LC50 (95% CL): 4.8 (4.0 - 5.9) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: [Signature]

Date reviewed: June 20, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck Start Date/Time: June 9, 2016 @ 1610h
 Sample ID: EV-LAQ/WS-2016-06-01-N No. Organisms/volume: 10/200mL
 Work Order No.: 16636 Test Organism: D.magna
 Set up by: YML

Thermometer: temp-11 DO meter: 213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	19.5	20.0	8.7	8.3	8.6	7.7	7.7	8.0	345	352
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.5	19.5	20.0	7.5	8.1	8.5	8.1	8.1	658	654	
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	AS	AS	YML	YML	AS	YML	YML	AS	YML	YML	AS	YML	AS

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO3)	
Control (MHW)	94	70
Highest conc.	310	210
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		
DO (mg/L)	7.5		
pH	8.1		
Cond (µS/cm)	658		
Salinity (ppt)	0.3		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: clear, no colour, no odour, no particulates

Batch#: 05181613 7-d previous # young/brood: 19 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: June 20, 2016

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 16636

Start Date/Time: June 9, 2016 @ 1620h
Test Species: Daphnia magna
Set up by: YNL

Sample Information:

Sample ID: EV_M61-WS_2016-06-07-N
Sample Date: June 7, 2016
Date Received: June 9, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 0518163
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 19
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC34
Stock Solution ID: 16NaCl
Date Initiated: June 8, 2016
48-h LC50 (95% CL): 4.8 (4.0-5.9) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results:

0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by:

[Signature]

Date reviewed:

June 20, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: EV-MG1-WS-2016-06-07-N
 Work Order No.: 16636

Start Date/Time: June 9, 2016 @ 1620h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-11 DO meter: 213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	No. Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	19.5	20.0	8.7	8.3	8.5	7.7	7.8	8.0	345	352
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.5	19.5	20.0	9.1	8.3	8.6	8.1	8.2	8.3	1074	1072
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	AS	AS	YML	YML	AS	YML	YML	AS	YML	YML	AS	YML	AS

	Hardness*	Alkalinity*
	*(mg/L as CaCO3)	
Concentration		
Control (MHW)	94	70
Highest conc.	630	210
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		
DO (mg/L)	9.1		
pH	8.1		
Cond (µS/cm)	1074		
Salinity (ppt)	0.5		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: clear, no colour, no odour, no particulates.

Batch#: 051816B 7-d previous # young/brood: 19 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: YML Date reviewed: June 20, 2016

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 16636

Start Date/Time: June 9, 2016 @ 1625h
Test Species: Daphnia magna
Set up by: YHL

Sample Information:

Sample ID: EV_SPL_WS_2016-06-07-LN
Sample Date: June 7, 2016
Date Received: June 9, 2016
Sample Volume: 2x1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 051816B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 19
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC34
Stock Solution ID: 16NaCl
Date Initiated: June 8, 2016
48-h LC50 (95% CL): 4.8 (4.0-5.9) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 3.3
0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: [Signature]

Date reviewed: June 20, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: EV-SP1-WS-2016-06-07-N
 Work Order No.: 16636

Start Date/Time: June 9, 2016 @ 1625h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-11 DO meter: 213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
<u>Control</u>	A	<u>10</u>	<u>10</u>	<u>0</u>	<u>19.5</u>	<u>19.5</u>	<u>20.0</u>	<u>8.7</u>	<u>8.4</u>	<u>8.5</u>	<u>7.7</u>	<u>7.8</u>	<u>8.0</u>	<u>345</u>	<u>751</u>
	B	<u>10</u>	<u>10</u>	<u>0</u>											
	C	<u>10</u>	<u>10</u>	<u>0</u>											
	D														
<u>100</u>	A	<u>9</u>	<u>9</u>	<u>0</u>	<u>19.5</u>	<u>19.5</u>	<u>20.0</u>	<u>8.6</u>	<u>8.5</u>	<u>8.6</u>	<u>7.7</u>	<u>8.0</u>	<u>8.1</u>	<u>1635</u>	<u>1599</u>
	B	<u>10</u>	<u>10</u>	<u>0</u>											
	C	<u>10</u>	<u>10</u>	<u>0</u>											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		<u>YML</u>	<u>AS</u>	<u>AS</u>	<u>YML</u>	<u>YML</u>	<u>AS</u>	<u>YML</u>	<u>YML</u>	<u>AS</u>	<u>YML</u>	<u>YML</u>	<u>AS</u>	<u>YML</u>	<u>AS</u>

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO ₃)	
Control (MHW)	<u>94</u>	<u>70</u>
Highest conc.	<u>930</u>	<u>288</u>
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	<u>19.5</u>		
DO (mg/L)	<u>8.6</u>		
pH	<u>7.7</u>		
Cond (µS/cm)	<u>1635</u>		
Salinity (ppt)	<u>0.8</u>		

Comments: _____ Mortality: Heartbeat checked under microscope ND

Sample Description: clear, no colour, no odour, no particulates

Batch#: 051816B 7-d previous # young/brood: 19 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: June 20, 2016

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 16636

Start Date/Time: June 9, 2016 @ 1630h
Test Species: Daphnia magna
Set up by: YHL

Sample Information:

Sample ID: EV-ECL-WS-2016-06-07-N
Sample Date: June 7, 2016
Date Received: June 9, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 051016A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 19
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC34
Stock Solution ID: 16Na01
Date Initiated: June 8, 2016
48-h LC50 (95% CL): 4.8 (4.0 - 5.9) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: [Signature]

Date reviewed: June 20, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck Start Date/Time: June 9, 2016 @ 1630h
 Sample ID: EV-EC1-WS-2016-06-07-N No. Organisms/volume: 10/200mL
 Work Order No.: 16636 Test Organism: D.magna
 Set up by: YML

Thermometer: temp-11 DO meter: 213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
<u>Control</u>	A	<u>10</u>	<u>10</u>	<u>0</u>	<u>19.5</u>	<u>19.5</u>	<u>20.0</u>	<u>8.7</u>	<u>8.3</u>	<u>8.5</u>	<u>7.7</u>	<u>7.7</u>	<u>8.0</u>	<u>345</u>	<u>353</u>
	B	<u>10</u>	<u>10</u>	<u>0</u>											
	C	<u>10</u>	<u>10</u>	<u>0</u>											
	D														
<u>100</u>	A	<u>10</u>	<u>10</u>	<u>0</u>	<u>19.5</u>	<u>19.5</u>	<u>20.0</u>	<u>8.6</u>	<u>8.2</u>	<u>8.6</u>	<u>7.9</u>	<u>8.1</u>	<u>8.1</u>	<u>1606</u>	<u>1576</u>
	B	<u>10</u>	<u>10</u>	<u>0</u>											
	C	<u>10</u>	<u>10</u>	<u>0</u>											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		<u>YML</u>	<u>AS</u>	<u>AS</u>	<u>YML</u>	<u>YML</u>	<u>AS</u>	<u>YML</u>	<u>YML</u>	<u>AS</u>	<u>YML</u>	<u>YML</u>	<u>AS</u>	<u>YML</u>	<u>AS</u>

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCo3)	
Control (MHW)	<u>94</u>	<u>70</u>
Highest conc.	<u>1000</u>	<u>288</u>
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	<u>19.5</u>		
DO (mg/L)	<u>8.6</u>		
pH	<u>7.9</u>		
Cond (µS/cm)	<u>1606</u>		
Salinity (ppt)	<u>0.8</u>		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: clear, no colour, no odour, no particulates

Batch#: 051016A 7-d previous # young/brood: 19 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: June 20, 2016

Client: Teck

W.O.#: 16636

Hardness and Alkalinity Datasheet

Sample ID	Sample Date	Alkalinity				Hardness			Technician
		Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO 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)	
EV_AQ1-WS-2016-06-07A	June 9/16	50	10.7	10.9	210	50	15.5	310	KC
EV_AQ6-WS-2016-06-07N			10.7	10.9	210	50	16.0	320	
EV_MFI-WS-2016-06-07D			10.7	10.9	210	100 [Ⓧ]	6.3	630	
EV_SPI-WS-2016-06-07-N			14.6	14.8	288	100 [Ⓧ]	9.3	930	
EV_ECI-WS-2016-06-07-N			14.6	14.8	288	100 [Ⓧ]	10.0	1000	
MHW	↓	↓	3.6	3.7	70	50	4.7	94	YMC

Notes: [Ⓧ]Diluted to 100mL w/ DI water

Reviewed by: 

Date Reviewed: June 17, 2016

APPENDIX C – Chain-of-custody form

Teck

COC ID: 20160607		TURNAROUND TIME:		RUSH:										
PROJECT/CLIENT INFO			LABORATORY			OTHER INFO								
Facility Name / Job# Elkview Operations			Lab Name Nautilus Environmental			Report Format / Distribution								
Job Description Monthly Toxicity Sampling			Lab Contact Krysta Pearcy			Excel <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EDD <input checked="" type="checkbox"/>								
Project Manager Michael Moore			Email krysta@nautilusenvironmental.ca			Email 1: Michael.Moore@teck.com								
Email Michael.Moore@teck.com			Address 8664 Commerce Court			Email 2: teckcoal@nautilus.com								
Address RR#1 HWY# 3			Imperial Square Loko City			Email 3: James.Kofot@teck.com								
City Sparwood			City Burnaby			Email 4: Cameron.Griffin@teck.com								
Postal Code VIC 4C3			Postal Code V5A 4N7			Email 5:								
Province BC			Province BC			PO number 418927								
Country Canada			Country Canada			Phone Number 1-250-865-5289								
SAMPLE DETAILS					ANALYSIS REQUESTED									
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G-Grab	C-Comp	# Of Cont.	Toxicity 96-h rainbow trout (Pass/Fail)	Toxicity 48-h Daphnia magna	Temp °C	Temp °C		
EV_AQ1_WS_2016-06-07_N	EV_AQ1	WS	N	2016/06/07	13:00	0	3		1	2	17.3	18.5		
EV_AQ6_WS_2016-06-07_N	EV_AQ6	WS	N	2016/06/07	12:35	0	3		1	2	18.2	20L		
EV_MG1_WS_2016-06-07_N	EV_MG1	WS	N	2016/06/07	9:40	0	3		1	2	17.5	17.5		
EV_SPI_WS_2016-06-07_N	EV_SPI	WS	N	2016/06/07	8:10	0	3		1	2	17.5	17.5		
EV_EC1_WS_2016-06-07_N	EV_EC1	WS	N	2016/06/07	8:45	0	3		1	2	17.5	17.5		
Total								15						
ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS			RELINQUISHED BY/AFFILIATION			DATE/TIME			ACCEPTED BY/AFFILIATION			DATE/TIME		
Toxicity 96-Hr/48-Hr = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphnia testing to occur at 20 degrees)									Nautilus			Jun 09/16 @ 11:20		
NY - New Yamamoto														
NO. OF BOTTLES RETURNED/DESCRIPTION			Sampler's Name			Mobile #			Sampler's Signature			Date/Time		
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			Cameron Co. Sr.											

16635

16636

Temp °C 1L bottles
Temp °C 20L

1x 20L + 2x 1L
↓

Sample Description:

- ① Clear, Colorless, No particulates, Odorless.
- ② Clear, Colorless, Odorless, No particulates.
- ③ Clear, Colorless, Odorless, No particulates.
- ④ Clear, Colorless, Odorless, No particulates.
- ⑤ Clear, Colorless, No particulates, Odorless.

END OF REPORT



Teck Coal/ Elkview Operations
ATTN: Michael Moore
RR1 HWY 3
Sparwood, BC
V1C 4C3

Report Date: June 23, 2016
Work Order: 16642 - 16643

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 96-h rainbow trout acute toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
EV_GC2_WS_2016-06-08_N	June 8, 2016 @ 0720h	0
EV_GT1_WS_2016-06-08_N	June 8, 2016 @ 1030h	0
EV_BC1_WS_2016-06-08_N	June 8, 2016 @ 1010h	0

Table 2. Results for the 48-h *Daphnia magna* acute toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
EV_GC2_WS_2016-06-08_N	June 8, 2016 @ 0720h	0
EV_GT1_WS_2016-06-08_N	June 8, 2016 @ 1030h	0
EV_BC1_WS_2016-06-08_N	June 8, 2016 @ 1010h	0

The tests met performance criteria and there were no deviations from the protocol. The results presented in this report relate only to the samples tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck ^{EL} Coal (EVO) Start Date/Time: Jun 10 11/16 @ 1300h

Work Order No.: 16642 Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV_GC2_WS_2016-06-08-N
Sample Date: Jun 8 11/16
Date Received: Jun 10 11/16
Sample Volume: 1 X 20L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 052416
Source: Aqua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.31
Mean Length ± SD (mm): 26 ± 2 Range: 22 - 29
Mean Weight ± SD (g): 0.31 ± 0.05 Range: 0.24 - 0.36

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn42
Stock Solution ID: 15Zn05
Date Initiated: Jun 9/15
96-h LC50 (95% CL): 53.6 (43.2-66.4) µg/L Zn
Reference Toxicant Mean and Historical Range: 64.0 (27.3-149.8) µg/L Zn
Reference Toxicant CV (%): 53.0%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature] Date reviewed: June 22, 2016

Rainbow Trout Summary Sheet

Client: TeckCoal (EVO)

Start Date/Time: Jun 13/16 @ 0920h

Work Order No.: 16642

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-GT1-WS-2016-06-08-N
Sample Date: Jun 8 /16
Date Received: Jun 8 10 /16
Sample Volume: 1 X 20L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 052416
Source: Aqua Farms
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.27
Mean Length ± SD (mm): 32 ± 1 Range: 30 - 34
Mean Weight ± SD (g): 0.32 ± 0.08 Range: 0.21 - 0.46

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn42
Stock Solution ID: 15Zn05
Date Initiated: Jun 9/15
96-h LC50 (95% CL): 53.6 (43.2 - 66.4) mg/L Zn

Reference Toxicant Mean and Historical Range: 64.0 (27.3 - 149.8) mg/L Zn
Reference Toxicant CV (%): 53.0%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: June 22, 2016

Rainbow Trout Summary Sheet

Client: Tede Coal (Evo)

Start Date/Time: Jun 13 /16 @ 0920h

Work Order No.: 16642

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-BCL-WS-2016-06-08-N
Sample Date: Jun 8 /16
Date Received: Jun 8/10/16
Sample Volume: 1 X 20L
Other: /

Test Validity Criteria:

≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 052416
Source: Aqua Farms
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.30
Mean Length ± SD (mm): 29 ± 3 Range: 25 - 36
Mean Weight ± SD (g): 0.36 ± 0.04 Range: 0.31 - 0.42

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn42
Stock Solution ID: 15Zn05
Date Initiated: Jun 9/15
96-h LC50 (95% CL): 53.6 (43.2 - 66.4) µg/L Zn

Reference Toxicant Mean and Historical Range: 64.0 (27.3 - 149.8) µg/L Zn
Reference Toxicant CV (%): 53.0%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: June 22, 2016

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 16643

Start Date/Time: June 10, 2016 @ 1645h
Test Species: Daphnia magna
Set up by: YNL

Sample Information:

Sample ID: EV-GC2-WS-2016-06-08-N
Sample Date: June 8, 2016
Date Received: June 10, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 052516A4B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 7

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC34
Stock Solution ID: 16Na01
Date Initiated: June 8, 2016
48-h LC50 (95% CL): 4.8 (4.0 - 5.9) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: [Signature]

Date reviewed: June 22, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: EV_GC2-WS-2016-06-08-N
 Work Order No.: 16643

Start Date/Time: June 10, 2016 @ 1645h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-11 DO meter: 213 pH meter: 113 Cond./Salinity: 213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	19.5	20.0	20.0	8.8	8.5	8.6	7.8	7.9	8.0	355	358
	B	10	10	0											
	C	10	10	0											
	D	10	10	0											
100	A	10	10	0	19.5	20.0	20.0	8.5	8.4	8.5	7.8	8.1	8.2	1014	1011
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		AS	AS	AS	YML	AS	AS	YML	AS	AS	YML	AS	AS	YML	AS

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO ₃)	
Control (MHW)	94	70
Highest conc.	510	190
Hardness adjusted	—	—

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		
DO (mg/L)	8.5		
pH	7.8		
Cond (µS/cm)	1014		
Salinity (ppt)	0.5		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: clear, no colour, no odour, slight particulates.

Batch#: 052516MB 7-d previous # young/brood: 17¹⁶ Previous 7-d Mortality (%): 0 Day of 1st Brood: 7

Reviewed by: [Signature] Date reviewed: June 27, 2016

Daphnia magna Summary Sheet

Client: Teck (EVO)
Work Order No.: 16643

Start Date/Time: June 10, 2016 @ 1650h
Test Species: Daphnia magna
Set up by: YNL

Sample Information:

Sample ID: EV-GT1-WS-2016-06-08-N
Sample Date: June 8, 2016
Date Received: June 10, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 052516A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 7

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC34
Stock Solution ID: 16Na01
Date Initiated: June 8, 2016
48-h LC50 (95% CL): 4.8 (4.0 - 5.9) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: 

Date reviewed: June 27, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck Start Date/Time: Jun 10, 2016 @ 1650h
 Sample ID: EV-BTM EV-GTI-WS-2016-0608 No. Organisms/volume: 10/200mL
 Work Order No.: 16643 N Test Organism: D. magna
 Set up by: YU

Thermometer: temp-11 DO meter: 2/3 pH meter: 1/3 Cond./Salinity: 2/3

Concentration (% v/v)	Number of Live Organisms Rep	24		48		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		0	24	48	0		24	48	0	24	48	0	24	48	0	48	
Control	A	10	10	60	19.5	20.0	20.0	8.8	8.5	8.3	7.8	7.9	8.0	355	352		
	B	10	10	0													
	C	10	10	0													
	D																
100	A	10	10	0	19.5	20.0	20.0	8.6	8.4	8.5	7.9	8.2	8.3	1792	1764		
	B	10	10	0													
	C	10	10	0													
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
Technician Initials		YU	YU	YU	YU	YU	YU	YU	YU	YU	YU	YU	YU	YU	YU		

Concentration	Hardness* (mg/L as CaCO ₃)	Alkalinity* (mg/L as CaCO ₃)
Control (MHW)	94	70
Highest conc.	1170	236
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		
DO (mg/L)	8.6		
pH	7.9		
Cond (µS/cm)	1792		
Salinity (ppt)	0.9		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: clear, no colour, no odour, no particulates.

Batch#: 052516A 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 7

Reviewed by: YU Date reviewed: June 22, 2016

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 16643

Start Date/Time: June 10, 2016 @ 1655h
Test Species: Daphnia magna
Set up by: YHL

Sample Information:

Sample ID: EV-BCI-WS-2016-06-08-N
Sample Date: June 8, 2016
Date Received: June 10, 2016
Sample Volume: 2 x 1 L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 052516A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 7

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC34
Stock Solution ID: 16Na01
Date Initiated: June 8, 2016
48-h LC50 (95% CL): 4.8 (4.0 - 5.9) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: 

Date reviewed: June 22, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: EV-BCI-WS-2016-06-08-N
 Work Order No.: 16643

Start Date/Time: June 10, 2016 @ 1655h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-11 DO meter: 213 pH meter: 113 Cond./Salinity: 213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	20.0	20.0	8.8	8.8	8.4	7.8	8.0	7.9	355	356
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.5	20.0	20.0	9.1	9.7	8.5	7.8	8.0	8.1	1727	1724
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		AS	AS	AS	YML	AS	AS	YML	AS	AS	YML	AS	AS	YML	AS

Concentration	Hardness* (mg/L as CaCO ₃)	Alkalinity* (mg/L as CaCO ₃)
Control (MHW)	94	70
Highest conc.	970	224
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		
DO (mg/L)	9.1		
pH	7.8		
Cond (µS/cm)	1727		
Salinity (ppt)	0.9		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: clear, no colour, no odour, no particulates

Batch#: 052516A 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 7

Reviewed by: YML Date reviewed: June 22, 2016

Teck

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO							
Facility Name / Job:	Elbeview Operations	Lab Name:	Nautilus Environmental	Report Format / Distribution:	Excel	PDF	EDD				
Job Description:	Monthly Toxicity Sampling	Lab Contact:	Krysa Peary	Email 1:	Michael.Moore@teck.com	X	X	X			
Project Manager:	Michael Moore	Email:	krysta@nautilusenvironmental.ca	Email 2:	mtat@nautilus.com	X	X	X			
Email:	Michael.Moore@teck.com	Address:	8564 Commerce Court	Email 3:	James.Boldt@teck.com	X	X	X			
Address:	RR#1 HWY#3		Imperial Square Lake City	Email 4:	Caroleen.Griffin@teck.com	X	X	X			
				Email 5:							
City:	Sparwood	Province:	BC	City:	Burnaby	Province:	BC	FO number:	418927		
Postal Code:	V1C 4C3	Country:	Canada	Postal Code:	V5A 4N7	Country:	Canada				
Phone Number:	1-250-865-5289			Phone Number:							
SAMPLE DETAILS				ANALYSIS REQUESTED							
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G-Grab C-Comp	# Of Cont.	Toxicity 96-h rainbow trout (Pass/Fail)	Toxicity 48-h Daphnia magna	Temp °C 1L	Temp °C 20L
EV_LCI_WS_2016-06-08_N	EV_LCI	WS	N	2016/06/08							
EV_GC2_WS_2016-06-08_N	EV_GC2	WS	N	2016/06/08	7:20	G	3	1	2	13.9	17.5
EV_GT1_WS_2016-06-08_N	EV_GT1	WS	N	2016/06/08	10:30	G	3	1	2	↓	16.5
EV_BC1_WS_2016-06-08_N	EV_BC1	WS	N	2016/06/08	10:10	G	3	1	2	↓	17.4
Total							2				
ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS				RELIQUISHED BY/AFFILIATION		DATE/TIME		ANALYZED BY/AFFILIATION		DATE/TIME	
Toxicity 96-Hr/48-Hr = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphnia testing to occur at 20 degrees)								Nautilus		June 10/16 @ 09:30	
NB OF BOTTLES RETURNED/DESCRIPTION				Sampler's Name		Mobile #		Date/Time			
Regular (default) X				JAMES BOLDT				JUNE 8 2016 12:30			
Priority (2-3 business days) - 50% surcharge				Sampler's Signature							
Emergency (1 Business Day) - 100% surcharge				J-B							
For Emergency < 1 Day, ASAP or Weekend - Contact ALS!											

1
2
3

WO # 16642
16643

2x 1L + 1x 20L
↓

Sample Description:

- 1) Clear, colorless, odorless, some particulates.
- 2) Clear, colorless, odorless, no particulates
- 3) Clear, colorless, odorless, no particulates



Teck Coal/ Elkview Operations
ATTN: Michael Moore
RR1 HWY 3
Sparwood, BC
V1C 4C3

Report Date: July 27, 2016
Work Order: 16747 - 16748

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 96-h rainbow trout acute single-concentration screening toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
EV_SM1_WS_2016-07-11_N	July 11, 2016 @ 0825h	0
EV_DC1_WS_2016-07-11_N	July 11, 2016 @ 1005h	0
EV_OC1_WS_2016-07-11_N	July 11, 2016 @ 1145h	0

Table 2. Results for the 48-h *Daphnia magna* acute single-concentration screening toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
EV_SM1_WS_2016-07-11_N	July 11, 2016 @ 0825h	0
EV_DC1_WS_2016-07-11_N	July 11, 2016 @ 1005h	0
EV_OC1_WS_2016-07-11_N	July 11, 2016 @ 1145h	0

The tests met performance criteria and there were no deviations from the protocol. The results presented in this report relate only to the samples tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck Coal (EVO)

Start Date/Time: Jul 14 116 @ 1130 h

Work Order No.: 16747

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-SMI-WS-2016-07-11-N
Sample Date: Jul 11 116
Date Received: Jul 13 116
Sample Volume: 1 X 20L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 10

Test Organism Information:

Batch No.: 060716
Source: Aqua Farms
No. Fish/Volume (L): 10/12 L
Loading Density (g/L): 0.41
Mean Length ± SD (mm): 31 ± 4
Mean Weight ± SD (g): 0.49 ± 0.22

Range: 26 - 37
Range: 0.18 - 0.91

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn43
Stock Solution ID: 152705
Date Initiated: Jun 27 116
96-h LC50 (95% CL): 48.9 (36.4-65.6) µg/L Zn

Reference Toxicant Mean and Historical Range: 62.4 (26.9 - 144.8) µg/L Zn
Reference Toxicant CV (%): 52 %

Test Results: EC
100 % mortality at 96 hours in the undiluted
100 % (VIV) sample.

Reviewed by: [Signature]

Date reviewed: July 22, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (Evo) Start Date/Time: Jul 14 116 @ 1130 h

Work Order No.: 16747 Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-DLLWS-2016-07-11-N
Sample Date: Jul 11 116
Date Received: Jul 13 116
Sample Volume: 1 X 20L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 10

Test Organism Information:

Batch No.: 060716
Source: Aqua Farms
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.38
Mean Length ± SD (mm): 32 ± 3 Range: 26 - 37
Mean Weight ± SD (g): 0.46 ± 0.18 Range: 0.24 - 0.89

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn43
Stock Solution ID: 15Zn05
Date Initiated: Jun 27 116
96-h LC50 (95% CL): 48.9 (36.4-65.6) µg/L Zn
Reference Toxicant Mean and Historical Range: 62.4 (26.9 - 144.8) µg/L Zn
Reference Toxicant CV (%): 52%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature] Date reviewed: July 22, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (Evo)

Start Date/Time: Jul 14 116 @ 1130 h

Work Order No.: 16747

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-UCI-WS-2016-07-11-N
Sample Date: Jul 11 116
Date Received: Jul 15 116
Sample Volume: 1 X 20L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 10

Test Organism Information:

Batch No.: 060716
Source: Aqua Farms
No. Fish/Volume (L): 10/12 L
Loading Density (g/L): 0.37
Mean Length ± SD (mm): 31.21 ± 4
Mean Weight ± SD (g): 0.44^{EV} ± 0.18

Range: 24 - 35
Range: 0.20 - 0.74

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn43
Stock Solution ID: 15Zn05
Date Initiated: Jun 27 116
96-h LC50 (95% CL): 48.9 (36.4-65.6) µg/L Zn

Reference Toxicant Mean and Historical Range: 62.4 (26.9 - 144.8) µg/L Zn
Reference Toxicant CV (%): 52%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: July 22, 2016

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 16748

Start Date/Time: July 14, 2016 @ 1135h
Test Species: Daphnia magna
Set up by: AWD

Sample Information:

Sample ID: EV-SMI-WS-2016-07-1-N
Sample Date: July 11, 2016
Date Received: July 13, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 062816B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC35
Stock Solution ID: 16Na01
Date Initiated: June 30, 2016
48-h LC50 (95% CL): 3.9 (2.8-5.5) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.3 (3.2-5.7) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: July 22, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (EVO) Start Date/Time: July 14, 2016 @ 1135h
 Sample ID: EV-sm1-WS-2016-07-11-N No. Organisms/volume: 10/200mL
 Work Order No.: 16748 Test Organism: D.magna
 Set up by: aus
 Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	No. Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	19.0	19.6	8.5	8.5	8.7	7.6	7.7	8.1	344	352
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.0	19.0	19.5	9.0	8.5	8.6	8.0	8.2	8.3	470	477
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials:		WML	A	A	A	WML	A	B	WML	A	B	WML	B	A	A

	Hardness*	Alkalinity*
	*(mg/L as CaCO ₃)	
Concentration		
Control (MHW)	100	66
Highest conc.	213	196
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.0		
DO (mg/L)	9.0		
pH	8.0		
Cond (µS/cm)	470		
Salinity (ppt)	0.2		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: clear, no colour, no odour, no particulates

Batch#: 062816B 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: July 22, 2016

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 16748

Start Date/Time: July 14, 2016 @ 1140h
Test Species: Daphnia magna
Set up by: AWD

Sample Information:

Sample ID: EV-DC1-WS-2016-07-1-N
Sample Date: July 11, 2016
Date Received: July 13, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:
≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 062816B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC35
Stock Solution ID: 16Na01
Date Initiated: June 30, 2016
48-h LC50 (95% CL): 3.9 (2.8-5.5) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.3 (3.2-5.7) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: 

Date reviewed: July 22, 2016

**Freshwater Acute
48 Hour Toxicity Test Data Sheet**

Client: Teck (EVO) Start Date/Time: July 14, 2016 @ 1140h
 Sample ID: EV-DC1 - WS - 2016 - 07 - 11 - N No. Organisms/volume: 10/200mL
 Work Order No.: 16748 Test Organism: D.magna
 Set up by: ms
 Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: 0-213

Concentration (% v/v)	Number of Live Organisms Rep	24		48		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		0	24	48	0		24	48	0	24	48	0	24	48	0	48	
Control	A	10	10	0	19.5	19.0	19.5	8.5	8.6	8.5	7.6	7.7	8.0	344	355		
	B	10	10	0													
	C	10	10	0													
	D																
100	A	10	10	0	19.0	19.0	19.5	9.1	8.5	8.6	8.0	8.2	8.4	1590	1594		
	B	10	10	0													
	C	10	10	0													
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
Technician Initials		MM	A	A	A	MM	A	A	MM	A	A	MM	A	A	A		

Concentration	Hardness* (mg/L as CaCO3)	Alkalinity* (mg/L as CaCO3)
Control (MHW)	100	66
Highest conc.	790	314
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.0		
DO (mg/L)	9.1		
pH	8.0		
Cond (µS/cm)	1590		
Salinity (ppt)	0.8		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: clear, no colour, no odour, no particulates

Batch#: 062816B 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: MM Date reviewed: July 22, 2016

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 16748

Start Date/Time: July 14, 2016 @ 1145h
Test Species: Daphnia magna
Set up by: AWD

Sample Information:

Sample ID: EV-OCI-WS-2016-07-1-N
Sample Date: July 11, 2016
Date Received: July 13, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:
≥ 90% mean control survival (no more than 2 mortalities in any control replicate)
WQ Ranges:
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 062816B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC35
Stock Solution ID: 16NaCl
Date Initiated: June 30, 2016
48-h LC50 (95% CL): 3.9 (2.8-5.5) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.3 (3.2-5.7) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: 

Date reviewed: July 22, 2016

**Freshwater Acute
48 Hour Toxicity Test Data Sheet**

Client: Teck (EVO) Start Date/Time: July 14, 2016 @ 1145h
 Sample ID: EV-OCI-WS-2016-07-11-N No. Organisms/volume: 10/200mL
 Work Order No.: 16748 Test Organism: D.magna
 Set up by: ms
 Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: 0-213

Concentration (% v/v)	Number of Live Organisms Rep	No. Immobilized		Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)		
		24	48	0	24	48	0	24	48	0	24	48	0	48	
Control	A	10	10	0	19.5	19.0	19.6	8.5	8.6	8.6	7.6	7.7	8.0	344	359
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.0	19.0	19.5	9.1	8.6	8.7	7.9	8.2	8.4	726	687
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		ms	ms	ms	ms	ms	ms	ms	ms	ms	ms	ms	ms	ms	ms

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO3)	
Control (MHW)	100	66
Highest conc.	336	360
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.0		
DO (mg/L)	9.1		
pH	7.9		
Cond (µS/cm)	726		
Salinity (ppt)	0.4		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: clear, yellow colour, no odour, no particulates.

Batch#: 062816B 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: July 22, 2016

Teck

COC ID: 20160711		TURNAROUND TIME:		RUSH:							
PROJECT/CLIENT INFO											
Facility Name / Job# Elkview Operations		Lab Name Nautilus Environmental		Report Format / Distribution							
Job Description Monthly Toxicity Sampling		Lab Contact Krysta Pearey		Excel	PDF						
Project Manager Michael Moore		Email krysta@nautilusenvironmental.ca		Y	Y						
Email Michael.Moore@teck.com		Address 8664 Commerce Court		Y	Y						
Address RR#1 HWY# 3		Imperial Square Lake City		Y	Y						
City Sparwood		Province BC	Country Canada	Y	Y						
Postal Code V1C 4C3		City Burnaby	Province BC	Y	Y						
Phone Number 1-250-865-6289		Postal Code V5A 4N7	Country Canada	PO number 418927							
SAMPLE DETAILS			ANALYSIS REQUESTED								
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G-Grab C-Comp	# of Cont.	Toxicity 96-h Rainbow trout (Pass/Fail)	Toxicity 48-h Daphnia magna (P/F)	Temp °C 1L	Temp °C 20L
EV_SMI_WS_2016-07-11_N	EV_SMI	ws	N	2016/07/11	8:25	G	3	1	2	13.2	14.0
EV_DCI_WS_2016-07-11_N	EV_DCI	ws	N	2016/07/11	10:05	G	3	1	2	13.0	13.0
EV_OCI_WS_2016-07-11_N	EV_OCI	ws	N	2016/07/11	11:45	G	3	1	2	14.0	13.0
Total							9				
ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS			RELINQUISHED BY/AFFILIATION		DATE/TIME		ACCEPTED BY/AFFILIATION		DATE/TIME		
Toxicity 96-hr/48-hr = 96 hr Rainbow Trout pass/fail & 48 hr Daphnia pass/fail (Daphnia testing to occur at 20 degrees)							Nautilus NY - Alan Yamamoto		Jul 13/16 @ 09:54		
NO. OF BOTTLES RETURNED/DESCRIPTION			SAMPLER'S NAME		MOBILE #						
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			Cam Griffin								
			SAMPLER'S SIGNATURE		DATE/TIME						
					11 July 2016 / 13:00						

①
②
③

1x20L + 2x1L
↓

wo # 16747
16748

Sample Description:
 ① Clean, colorless, odorless, No particulates
 ② Clean, colorless, odorless, No particulates.
 ③ Yellow, odorless, Clear, No particulates.



Acute Toxicity Test Results

Samples collected July 12, 2016

Final Report

March 29, 2017

Submitted to: **Teck Coal / Elkview Operations**
Elkford, BC

SAMPLE INFORMATION

Sample ID	Dates				Receipt temp.
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> test initiation	
EV_AQ1_WS_2016-07-12_N	12-Jul-16 at 0745h	14-Jul-16 at 0952h	14-Jul-16 at 1130h	14-Jul-16 at 1300h	13.5°C
EV_MG1_WS_2016-07-12_N	12-Jul-16 at 1320h	14-Jul-16 at 0952h	14-Jul-16 at 1130h	14-Jul-16 at 1310h	13.5°C
EV_SP1_WS_2016-07-12_N	12-Jul-16 at 1200h	14-Jul-16 at 0952h	14-Jul-16 at 1130h	14-Jul-16 at 1315h	14.5°C
EV_EC1_WS_2016-07-12_N	12-Jul-16 at 1225h	14-Jul-16 at 0952h	14-Jul-16 at 1130h	14-Jul-16 at 1255h	13.5°C

TESTS

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test

RESULTS

Toxicity test results

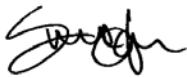
Sample ID	Percent mortality in 100% (v/v) sample	
	Rainbow trout	<i>Daphnia magna</i>
EV_AQ1_WS_2016-07-12_N	0	0
EV_MG1_WS_2016-07-12_N	0	0
EV_SP1_WS_2016-07-12_N	0	0
EV_EC1_WS_2016-07-12_N	0	0

Data for all samples listed on the chain of custody have been provided in a separate report.

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CI)	48.9 (36.4 – 65.6) µg/L Zn ¹	3.9 (2.8 – 5.5) g/L NaCl ²
Reference toxicant historical mean (2 SD range)	62.4 (26.9 – 144.8) µg/L Zn	4.3 (3.2 – 5.7) g/L NaCl
Reference toxicant CV	52%	15%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹ Test date: June 27, 2016; ² Test Date: June 30, 2016, LC = Lethal Concentration, SD = Standard Deviation, CV = Coefficient of Variation



Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio
Senior Analyst

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) single concentration test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquarium
Test volume	10 to 20 L (depending on size of fish)
Test solution depth	≥15 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tapwater
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Zinc (added as ZnCl ₂)

Table 2. Summary of test conditions: 48-h *Daphnia magna* single concentration test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: Teck Coal (EVO)

Start Date/Time: Jul 14 116 @ 1130 h

Work Order No.: 16757

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-AQ1-WS-2016-07-12-N
Sample Date: Jul 12 /16
Date Received: Jul 14 /16
Sample Volume: 1 X 20L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 10

Test Organism Information:

Batch No.: 060716
Source: Aqua Farms
No. Fish/Volume (L): 10/12 L
Loading Density (g/L): 0.39
Mean Length ± SD (mm): 32 ± 2
Mean Weight ± SD (g): 0.47 ± 0.16

Range: 29 - 36
Range: 0.27 - 0.75

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn43
Stock Solution ID: 15Zn05
Date Initiated: Jun 27 116
96-h LC50 (95% CL): 48.9 (36.4-65.6) µg/L Zn

Reference Toxicant Mean and Historical Range: 62.4 (26.9 - 144.8) µg/L Zn
Reference Toxicant CV (%): 52 %

Test Results: 0 % mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: July 25, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (Evo)

Start Date/Time: Jul 14 116 @ 1130 h

Work Order No.: 16757

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV_MG1WS_2016-07-12-N
Sample Date: Jul 12 116
Date Received: Jul 14 116
Sample Volume: 1 X 20L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 10

Test Organism Information:

Batch No.: 060716
Source: Aqua Farms
No. Fish/Volume (L): 10/12 L
Loading Density (g/L): 0.34
Mean Length ± SD (mm): 30 ± 2
Mean Weight ± SD (g): 0.41 ± 0.14

Range: 27 - 34
Range: 0.26 - 0.69

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn43
Stock Solution ID: 15Zn05
Date Initiated: Jun 27 116
96-h LC50 (95% CL): 48.9 (36.4-65.6) µg/L Zn

Reference Toxicant Mean and Historical Range: 62.4 (26.9 - 144.8) µg/L Zn
Reference Toxicant CV (%): 52%

Test Results: 0 % mortality at 96 hours in the undiluted 100% (V/V) sample.

Reviewed by: [Signature]

Date reviewed: July 25, 2016

Rainbow Trout Summary Sheet

Client: Tedc Coal (Evo)

Start Date/Time: Jul 14 116 @ 1130h

Work Order No.: 16757

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-SPI-WS-2016-0712-N
Sample Date: Jul 12 116
Date Received: Jul 14 116
Sample Volume: 1 X 20L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 10

Test Organism Information:

Batch No.: 060716
Source: Aqua Farms
No. Fish/Volume (L): 10/12 L
Loading Density (g/L): 0.43
Mean Length ± SD (mm): 33 ± 3
Mean Weight ± SD (g): 0.51 ± 0.14
Range: 27 - 37
Range: 0.22 - 0.70

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn43
Stock Solution ID: 15Zn05
Date Initiated: Jun 27 116
96-h LC50 (95% CL): 48.9 (36.4-65.6) µg/L Zn

Reference Toxicant Mean and Historical Range: 62.4 (26.9 - 144.8) µg/L Zn
Reference Toxicant CV (%): 52%

Test Results: 0 % mortality at 96 hours in the undiluted 100% (1/1) sample.

Reviewed by: [Signature]

Date reviewed: July 25, 2016

Rainbow Trout Summary Sheet

Client:

Teck Coal (EVO)

Start Date/Time:

Jul 14 116 @ 10:30 h
EL

Work Order No.:

16757

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID:

EV-EL-WS-2016-07-12-N²

Sample Date:

Jul 12 116

Date Received:

Jul 14 116

Sample Volume:

1 X 20L

Other:

/

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type:

Dechlorinated Municipal Tap Water

Hardness (mg/L CaCO₃):

8

Alkalinity (mg/L CaCO₃):

10

Test Organism Information:

Batch No.:

060716

Source:

Aqua Farms

No. Fish/Volume (L):

10/12 L

Loading Density (g/L):

0.36

Mean Length ± SD (mm):

32 ± 2

Mean Weight ± SD (g):

0.44 ± 0.14

Range:

29 - 37

Range:

0.27 - 0.70

Zinc Reference Toxicant Results:

Reference Toxicant ID:

RTZn43

Stock Solution ID:

15Zn05

Date Initiated:

Jun 27 116

96-h LC50 (95% CL):

48.9 (36.4-63.6) µg/L Zn

Reference Toxicant Mean and Historical Range:

62.4 (26.9 - 144.8) µg/L Zn

Reference Toxicant CV (%):

52 %

Test Results:

0 % mortality at 96 hours in the undiluted
100% (V/V) sample.

Reviewed by:

[Signature]

Date reviewed:

July 25, 2016

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 16758

Start Date/Time: July 14, 2016 @ 1300h
Test Species: Daphnia magna
Set up by: AWD

Sample Information:

Sample ID: EV_AQI_WS_2016-07-12_N
Sample Date: July 12, 2016
Date Received: July 14, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 062816B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC35
Stock Solution ID: 16NaCl
Date Initiated: June 30, 2016
48-h LC50 (95% CL): 3.9 (2.8-5.5) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.3 (3.2-5.7) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: 

Date reviewed: July 25, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (EVO) Start Date/Time: July 14, 2016 @ 1300h
 Sample ID: EV-A01 - WS - 2016 - 07 - 12 N No. Organisms/volume: 10/200mL
 Work Order No.: 16758 Test Organism: D.magna
 Set up by: AMS
 Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	19.0	19.5	8.5	8.6	8.6	7.6	7.7	8.0	344	359
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.0	19.0	19.5	9.0	8.4	8.6	8.0	8.2	2.4	600	607
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		AMS	AMS	AMS	AMS	AMS	AMS	AMS	AMS	AMS	AMS	AMS	AMS	AMS	AMS

Concentration	Hardness* (mg/L as CaCo3)	Alkalinity* (mg/L as CaCo3)
Control (MHW)	100	66
Highest conc.	272	214
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.0		
DO (mg/L)	9.0		
pH	8.0		
Cond (µS/cm)	600		
Salinity (ppt)	0.3		

Comments: _____ Mortality: Heartbeat checked under microscope NO
 Sample Description: light yellow, slightly turbid, no odour, no particulates
 Batch#: 062816B 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9
 Reviewed by: [Signature] Date reviewed: July 25, 2016

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 16758

Start Date/Time: July 14, 2016 @ 1310h
Test Species: Daphnia magna
Set up by: AWD

Sample Information:

Sample ID: EV-MGT-WS-2016-07-1-N
Sample Date: July 12, 2016
Date Received: July 14, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 062816A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:


Reference Toxicant ID: DmTC35
Stock Solution ID: 16NaCl
Date Initiated: June 30, 2016
48-h LC50 (95% CL): 3.9 (2.8-5.5) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.3 (3.2-5.7) g/L NaCl

Reference Toxicant CV (%): 15

Test Results:

0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: 

Date reviewed: July 25, 2016

**Freshwater Acute
48 Hour Toxicity Test Data Sheet**

Client: Teck (EVO) Start Date/Time: July 14, 2016 @ 1310h
 Sample ID: EV-MGT-WS-2016-07-12-N No. Organisms/volume: 10/200mL
 Work Order No.: 16758 Test Organism: D. magna
 Set up by: aus
 Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: 0-213

Concentration (% v/v)	Number of Live Organisms Rep	No. Immobilized		Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)		
		24	48	0	24	48	0	24	48	0	24	48	0	48	
Control	A	10	10	0	19.5	19.0	19.5	8.5	8.6	8.6	7.6	7.7	8.0	344	357
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.0	19.0	19.5	9.0	8.7	8.7	8.0	8.2	8.3	1169	1170
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		WML	A	A	A	WML	A	A	WML	A	A	WML	A	A	A

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO3)	
Control (MHW)	100	66
Highest conc.	670	200
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.0		
DO (mg/L)	9.0		
pH	8.0		
Cond (µS/cm)	1169		
Salinity (ppt)	3.6		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: clear, light yellow colour, no odour, no particulates.

Batch#: 062816A 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: WML Date reviewed: July 25, 2016

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 16758

Start Date/Time: July 14, 2016 @ 1315h
Test Species: Daphnia magna
Set up by: AWD

Sample Information:

Sample ID: EV-SPI-WS-2016-07-1-N
Sample Date: July 12, 2016
Date Received: July 14, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:
≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 062816A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC35
Stock Solution ID: 16NaCl
Date Initiated: June 30, 2016
48-h LC50 (95% CL): 3.9 (2.8-5.5) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.3 (3.2-5.7) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: 

Date reviewed: July 25, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (EVO) Start Date/Time: July 14, 2016 @ 1315h
 Sample ID: EV-SPI - WS - 2016 - 07 - 12 - N No. Organisms/volume: 10/200mL
 Work Order No.: 16758 Test Organism: D. magna
 Set up by: aus

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		48		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		0	24	48	0		24	48	0	24	48	0	24	48	0	48	
Control	A	10	10	0	19.5	19.0	19.5	8.5	8.0	8.7	7.6	7.7	8.1	344	356		
	B	10	10	0													
	C	10	10	0													
	D																
100	A	10	10	0	19.0	19.0	19.5	9.1	8.6	8.7	7.9	8.0	22	1666	1610		
	B	10	10	0													
	C	10	10	0													
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
Technician Initials		ML	A	A	A	ML	A	A	ML	A	A	ML	A	A	A		

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCo3)	
Control (MHW)	100	66
Highest conc.	810	316
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.0		
DO (mg/L)	9.1		
pH	7.9		
Cond (µS/cm)	1666		
Salinity (ppt)	0.8		

Comments: slight precipitate on surface @ 24h + 48h Mortality: Heartbeat checked under microscope NO

Sample Description: Clear, no colour, no odour, no particulates

Batch#: 062816A 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: July 25, 2016

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 16758

Start Date/Time: July 14, 2016 @ 1255h
Test Species: Daphnia magna
Set up by: AWD

Sample Information:

Sample ID: EV-001-WS-2016-07-1-N
Sample Date: July 12, 2016
Date Received: July 14, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 062816B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC35
Stock Solution ID: 16Na01
Date Initiated: June 30, 2016
48-h LC50 (95% CL): 3.9 (2.8-5.5) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.3 (3.2-5.7) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: 

Date reviewed: July 25, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (EVO) Start Date/Time: July 14, 2016 @ 1255h
 Sample ID: EV-EC1 - WS - 2016 - 07 - 12 - N No. Organisms/volume: 10/200mL
 Work Order No.: 16758 Test Organism: D. magna
 Set up by: AVS
 Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: 0-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
<u>Control</u>	A	10	10	0	19.5	19.0	19.5	8.5	8.4	8.5	7.6	7.7	8.0	344	353
	B	10	10	0											
	C	10	10	0											
	D														
<u>100</u>	A	10	10	0	19.0	19.0	19.5	9.1	8.5	8.6	8.0	8.2	8.3	1617	1602
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		<u>AVS</u>	<u>AVS</u>	<u>AVS</u>	<u>AVS</u>	<u>AVS</u>	<u>AVS</u>	<u>AVS</u>	<u>AVS</u>	<u>AVS</u>	<u>AVS</u>	<u>AVS</u>	<u>AVS</u>	<u>AVS</u>	<u>AVS</u>

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO3)	
Control (MHW)	100	66
Highest conc.	790	286
Hardness adjusted		

	initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.0		
DO (mg/L)	9.1		
pH	8.0		
Cond (µS/cm)	1617		
Salinity (ppt)	0.8		

Comments: _____ Mortality: Heartbeat checked under microscope NO
 Sample Description: clear, no colour, no odour, no particulates
 Batch#: 062816B 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9
 Reviewed by: AVS Date reviewed: July 25, 2016

APPENDIX C – Chain-of-custody form

Teck

COC ID: 20160712		TURNAROUND TIME:		RUSH:									
PROJECT/CLIENT/INFO			LABORATORY			OTHER INFO							
Facility Name / Job: Elkview Operations			Lab Name: Nautilus Environmental			Report Format / Distribution							
Job Description: Monthly Toxicity Sampling			Lab Contact: Krysta Peary			Excel <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EDD <input checked="" type="checkbox"/>							
Project Manager: Michael Moore			Email: krysta@nautilusenvironmental.ca			Email 1: Michael.Moore@teck.com							
Email: Michael.Moore@teck.com			Address: 8664 Commerce Court			Email 2: ted@nautilusenvironmental.com							
Address: RR#1 HWY# 3			Imperial Square Lake City			Email 3: krysta.peary@teck.com							
City: Sparwood			City: Burnaby			Email 4: Concess.Grding@teck.com							
Province: BC			Province: BC			Email 5:							
Postal Code: V1C 4C3			Postal Code: V5A 4N7			PO number: 418927							
Country: Canada			Country: Canada										
Phone Number: 1-250-865-5289			Phone Number:										
SAMPLE DETAILS					ANALYSIS REQUESTED								
Sample ID	Sample Location	Field Matrix	Hazardous Material (Y/N)	Date	Time (Clock)	Q=Onab C=Comp	# Of Cont.	Toxicity 96-h rainbow trout (Pass/Fail)	Toxicity 48-h Daphnia magna P/F				
EV_AQ1_WS_2016-07-12_N	EV_AQ1	WS	N	2016/07/12	7:15	G	3	1	2				13.5
EV_AQ6_WS_2016-07-12_N	EV_AQ6	WS	N	2016/07/12	7:20	G	3	1	2				14.0
EV_MG1_WS_2016-07-12_N	EV_MG1	WS	N	2016/07/12	13:20	G	3	1	2				13.5
EV_SP1_WS_2016-07-12_N	EV_SP1	WS	N	2016/07/12	12:00	G	3	1	2				14.5
EV_EC1_WS_2016-07-12_N	EV_EC1	WS	N	2016/07/12	12:25	G	3	1	2				13.5
Total							15						
ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS					REQUISITIONED BY/AFFILIATION		DATE/TIME		ACCEPTED BY/AFFILIATION		DATE/TIME		
Toxicity 96-hr/48-hr = 96 hr Rainbow Trout pass/fail & 48 hr Daphnia pass/fail (Daphnia testing to occur at 20 degrees)									Nautilus NY - Nautilus Yamamoto		Jul 14/16 @ 09:52		
NB OF BOTTLES RETURNED/DESCRIPTION					Sampler's Name		Mobile #						
Regular (default) <input checked="" type="checkbox"/>					Sampler's Signature		Date/Time						
Priority (2-3 business days) - 50% surcharge													
Emergency (1 Business Day) - 100% surcharge													
For Emergency <1 Day, ANAP or Weekend - Contact ALS													

1
2
3
4
5

1x20L + 2x1L
↓

wo# 16757
16758

Sample Description:

- ① light yellow, slightly turbid, No particulates, Odourless, Clear, Colorless, some particulates, Odourless
- ② light yellow, Clear, No particulates, Odourless
- ③ Clear, Colorless, Odourless, No particulates.
- ④ Odourless
- ⑤ Clear, Odourless, No particulates. Colorless.

END OF REPORT



Teck Coal/ Elkview Operations
ATTN: Michael Moore
RR1 HWY 3
Sparwood, BC
V1C 4C3

Report Date: July 27, 2016
Work Order: 16764 - 16765

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 96-h rainbow trout acute single-concentration screening toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
EV_GC2_WS_2016-07-13_N	July 13, 2016 @ 0710h	0
EV_GT1_WS_2016-07-13_N	July 13, 2016 @ 0835h	0
EV_BC1_WS_2016-07-13_N	July 13, 2016 @ 0800h	0

Table 2. Results for the 48-h *Daphnia magna* acute single-concentration screening toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
EV_GC2_WS_2016-07-13_N	July 13, 2016 @ 0710h	0
EV_GT1_WS_2016-07-13_N	July 13, 2016 @ 0835h	0
EV_BC1_WS_2016-07-13_N	July 13, 2016 @ 0800h	0

The tests met performance criteria and there were no deviations from the protocol. The results presented in this report relate only to the samples tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck Coal (EVO)

Start Date/Time: Jul 15 116 @ 1230h

Work Order No.: 16764

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-^{EL}GZC2-WS-2016-07-13-N
Sample Date: Jul 13 / 16
Date Received: Jul 15 / 16
Sample Volume: 1^{ml} x 20L
Other: ✓

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 10

Test Organism Information:

Batch No.: 062916
Source: Aqua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.32
Mean Length ± SD (mm): 27 ± 1
Mean Weight ± SD (g): 0.32 ± 0.05

Range: 26 - 30
Range: 0.21 - 0.39

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn44
Stock Solution ID: 15Zn05
Date Initiated: Jul 14 / 16
96-h LC50 (95% CL): 85.8 (61.9 - 121.8) µg/L Zn

Reference Toxicant Mean and Historical Range: 59.7 (27.1 - 131.8) µg/L Zn
Reference Toxicant CV (%): 48%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: July 26, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (Evo) Start Date/Time: Jul 15 116 @ 1230h

Work Order No.: 16764 Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV_GTI_WS_2016-07-13-N
Sample Date: Jul 13 / 16
Date Received: Jul 15 / 16
Sample Volume: 1 x 20L
Other: ✓

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 10

Test Organism Information:

Batch No.: 062916
Source: Aqua Farms
No. Fish/Volume (L): 10 / 10L
Loading Density (g/L): 0.41
Mean Length ± SD (mm): 31 ± 2
Mean Weight ± SD (g): 0.41 ± 0.10

Range: 27 - 35
Range: 0.28 - 0.64

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn44
Stock Solution ID: 15Zn05
Date Initiated: Jul 14 / 16
96-h LC50 (95% CL): 85.8 (61.9 - 121.8) µg/L Zn

Reference Toxicant Mean and Historical Range: 59.7 (27.1 - 131.8) µg/L Zn
Reference Toxicant CV (%): 48%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample!

Reviewed by: [Signature] Date reviewed: July 26, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (EVO)

Start Date/Time: Jul 15 116 @ 1230h

Work Order No.: 16764

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-BC1-WS 2016-07-13-N
Sample Date: Jul 13 / 16
Date Received: Jul 15 / 16
Sample Volume: 1 x 20L
Other: ✓

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 10

Test Organism Information:

Batch No.: 062916
Source: Aqua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.34
Mean Length ± SD (mm): 29 ± 1
Mean Weight ± SD (g): 0.34 ± 0.05

Range: 27 - 31
Range: 0.22 - 0.40

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn44
Stock Solution ID: 15Zn05
Date Initiated: Jul 14 / 16
96-h LC50 (95% CL): 85.8 (61.9 - 121.8) µg/L Zn

Reference Toxicant Mean and Historical Range: 59.7 (27.1 - 131.8) µg/L Zn
Reference Toxicant CV (%): 48%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample

Reviewed by: [Signature]

Date reviewed: July 26, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal (EVO)
 Sample I.D.: EV-BCI-WS-2016-07-13-N
 W.O. #: 16764
 RBT Batch #: 062916
 Date Collected/Time: Jul 13/16 @ 0800h
 Date Setup/Time: Jul 14/16 @ 1230h
 Sample Setup By: EC

Number Fish/Volume: 10/10 L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER# 2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	15.0	/	15.0
pH	7.8	/	7.9
D.O. (mg/L)	10.0	/	10.0
Cond. (µS/cm)	1795	/	1795
Salinity (ppt)	0.9	/	0.9

Concentration	# Survivors							Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
(% v/v)				10	10	10	10	15.0	15.0	15.0	15.0	15.0	10.0	9.9	10.0	9.9	9.8	6.9	7.0	6.9	6.9	7.0	29	35
100				10	10	10	10	15.0	15.0	15.0	15.0	15.0	10.0	9.8	9.9	9.9	9.8	7.9	8.2	8.2	8.2	8.2	1795	1726
Initials				Am	Am	EL	EL	EC	Am	Am	EL	EL	EC	Am	Am	EL	EL	EC	Am	Am	EL	EL	EC	EL

Sample Description/Comments: Colorless, Clear, Odourless, No particulates

Fish Description at 96 h: All fish appear healthy Number of Stressed Fish at 96 h: 0

Other Observations: _____

Reviewed by:  Date Reviewed: July 26, 2016

Daphnia magna Summary Sheet

Client: Teck (EVO)
Work Order No.: 16765

Start Date/Time: July 15, 2016 @ 1425h
Test Species: Daphnia magna
Set up by: YVL/AWP

Sample Information:

Sample ID: EV_GC2_WS-2016-07-13-N
Sample Date: July 13, 2016
Date Received: July 15, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 062216B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC36
Stock Solution ID: 16NaCl
Date Initiated: July 20, 2016
48-h LC50 (95% CL): 3.7 (3.2-4.2) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.3 (3.2-5.7) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: 

Date reviewed: July 26, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck Start Date/Time: July 15/16 @ 1425h
 Sample ID: EV-622WS-2016-07-13-N No. Organisms/volume: 10/200mL
 Work Order No.: 16765 Test Organism: D.magna
 Set up by: YTL/AM
 Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	19.5	19.0	8.5	8.6	8.7	7.6	7.9	8.0	345	357
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	18.0	19.5	19.0	9.2	8.5	8.6	7.7	8.2	8.2	1084	1079
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		A	A	A	A	A	A	A	A	A	A	A	A	A	A

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	100	66
Highest conc.	500	180
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.0		
DO (mg/L)	9.2		
pH	7.7		
Cond (µS/cm)	1084/1084		
Salinity (ppt)	0.5		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: clear, no colour, no odour, no particulates.

Batch#: 06221CB 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: July 26, 2016

Daphnia magna Summary Sheet

Client: Teck (EVO)
Work Order No.: 16765

Start Date/Time: July 15, 2016 @ 1430h
Test Species: Daphnia magna
Set up by: YML/AWP

Sample Information:

Sample ID: EV-GT1-WS-2016-07-13-N
Sample Date: July 13, 2016
Date Received: July 15, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 062216B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC36
Stock Solution ID: 16NaCl
Date Initiated: July 20, 2016
48-h LC50 (95% CL): 3.7 (3.2-4.2) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.3 (3.2-5.7) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: 

Date reviewed: July 26, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck Start Date/Time: July 15/16 @ 1430h
 Sample ID: EV-671 WS-2016-07-13-N No. Organisms/volume: 10/200mL
 Work Order No.: 16765 Test Organism: D.magna
 Set up by: YTL/Am

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	19.6	19.0	8.5	8.7	8.6	7.6	7.9	8.0	345	357
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	18.0	19.6	19.0	9.2	8.9	8.7	7.9	8.1	8.2	1833	1802
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		Am	Am	Am	Am	Am	Am	Am	Am	Am	Am	Am	Am	Am	Am

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO3)	
Control (MHW)	60	66
Highest conc.	980	232
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.0		
DO (mg/L)	9.2		
pH	7.9		
Cond (µS/cm)	1833		
Salinity (ppt)	0.7		

Comments: _____ Mortality: Heartbeat checked under microscope No
 Sample Description: clear, no colour, no odour, no particulates
 Batch#: 06221CB 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9
 Reviewed by: [Signature] Date reviewed: July 20, 2016

Daphnia magna Summary Sheet

Client: Teck (EVO)
Work Order No.: 16765

Start Date/Time: July 15, 2016 @ 1435h
Test Species: Daphnia magna
Set up by: YML/AWP

Sample Information:

Sample ID: EV-BCI-WS-2016-07-13-N
Sample Date: July 13, 2016
Date Received: July 15, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 062210B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC36
Stock Solution ID: 16NaCl
Date Initiated: July 20, 2016
48-h LC50 (95% CL): 3.7 (3.2-4.2) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.3 (3.2-5.7) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: 

Date reviewed: July 26, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: EV-34WS-2016-07-13-N
 Work Order No.: 16765

Start Date/Time: July 15/16 0.1435h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YTL/Am

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	19.6	19.0	8.5	8.6	8.7	7.6	8.0	8.0	345	356
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	15.0	19.6	19.0	9.3	8.6	8.6	7.9	8.1	8.2	1799	1758
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		A	A	A	A	A	A	A	A	A	A	A	A	A	A

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	100	66
Highest conc.	1030	218
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	15.0		
DO (mg/L)	9.3		
pH	7.9		
Cond (µS/cm)	1799		
Salinity (ppt)	0.9		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: clear, no colour, no odour, no particulates.

Batch#: 06221CB 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: July 26, 2016

Teck		COC ID: 20160713		TURNAROUND TIME:		RUSH:					
PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job: Elkview Operations				Lab Name: Nautika Environmental				Report Format / Distribution			
Job Description: Monthly Toxicity Sampling				Lab Contact: Krysta Pearce				Excel PDF EDD			
Project Manager: Michael Moore				Email: krysta@nautikaenvironmental.ca				Email 1: Michael.Moore@teck.com			
Email: Michael.Moore@teck.com				Address: 8664 Commerce Court				Email 2: krysta@teck.com			
Address: RR#1 HWY# 3				Imperial Square Lake City				Email 3: krysta@teck.com			
City: Sparwood				City: Duraby				Email 4: Cameron.Grimm@teck.com			
Province: BC				Province: BC				Email 5:			
Postal Code: V1C 4C3				Postal Code: V5A 4N7				PO number: 418927			
Country: Canada				Country: Canada							
Phone Number: 1-250-865-3289				Phone Number:							
SAMPLE DETAILS						ANALYSIS REQUESTED					
Sample ID	Sample Location	Field Matrix	Hazardous Material (Y/N)	Date	Time (24hr)	C-Grab C-Comp	# Of Cont.	Toxicity 96-h rainbow trout (Pass/Fail)	Toxicity 48-h Daphnia magna P/F	Temp °C	
EV_GC2_WS_2016-07-13_N	EV_GC2	WS	N	2016/07/13	7:10	0	3	1	2	13.2	
EV_GC2_WS_2016-07-13_N	EV_GC2	WS	N	2016/07/13	7:10	0	3	1	2	13.2	
EV_GTI_WS_2016-07-13_N	EV_GTI	WS	N	2016/07/13	8:35	0	3	1	2	13.2	
EV_BCI_WS_2016-07-13_N	EV_BCI	WS	N	2016/07/13	8:00	0	3	1	2	13.2	
Total							9				
ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS				REQUINISHED BY/AFFILIATION				DATE/TIME		DATE/TIME	
Toxicity 96-Hr/48-Hr = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphnia testing to occur at 20 degrees)								Nautika		Jul 15/16 @ 11:10	
NB OF BOTTLES RETURNED/DESCRIPTION				SAMPLER'S NAME				MOBILE #			
Regular (default) X				Cameron Grimm							
Priority (2-3 business days) - 50% surcharge				SAMPLER'S SIGNATURE				Date/Time		12 July '16 / 10:30	
Emergency (1 Business Day) - 100% surcharge											
For Emergency <1 Day, ASAP or Weekend - Contact ALS											

1x20 + 2x1L
↓

wo# 16764
16765

Sample Description:
 ① clear, colorless, No particulates, Odourless
 ② colorless, No particulates, Odourless, Clear
 ③ colorless, Clear, Odourless, No particulates



Teck Coal/ Elkview Operations
ATTN: Michael Moore
RR1 HWY 3
Sparwood, BC
V1C 4C3

Report Date: August 12, 2016
Work Order: 16812 - 16813

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 96-h rainbow trout acute LC50 toxicity test.

Sample ID	Collection Date and Time	96-h LC50 (%v/v)
EV_WRLD_WS_2016-08-02_NP	August 2, 2016 @ 1600h	>100

Table 2. Results for the 48-h *Daphnia magna* acute LC50 toxicity test.

Sample ID	Collection Date and Time	48-h LC50 (%v/v)
EV_WRLD_WS_2016-08-02_NP	August 2, 2016 @ 1600h	>100

The tests met performance criteria and there were no deviations from the protocol. The results presented in this report relate only to the sample tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Rainbow Trout Summary Sheet

Client: ALS (Teck-Evo)

Start Date/Time: Aug 05 116 @ 1030h

Work Order No.: 16813

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: ~~480744~~ EV-WR LP-WS-2016-08-02-AP
Sample Date: Aug 02 / 16
Date Received: Aug 04 / 16
Sample Volume: 1 X 20 L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 11
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 071816a
Source: Aqua Farms
No. Fish/Volume (L): 10/10
Loading Density (g/L): 0.36
Mean Length ± SD (mm): 28 ± 2
Mean Weight ± SD (g): 0.36 ± 0.05

Range: 25 - 30
Range: 0.29 - 0.44

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn 45
Stock Solution ID: 15 ZnOS
Date Initiated: Aug 1 116
96-h LC50 (95% CL): 30.9 (23.3 - 40.9) µg/L Zn

Reference Toxicant Mean and Historical Range: 58.0 (29.4 - 114.4) µg/L Zn
Reference Toxicant CV (%): 40%

Test Results: The 96h LC50 is estimated to be >100% (v/v).

Reviewed by: [Signature]

Date reviewed: Aug 12, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: ALS (Teck-EVO)

Sample I.D. 180794 + EV.WRLD.WS.2016-07-13-NP

W.O. # 16813

RBT Batch #: 071816a

Date Collected/Time: Aug 02/16 @ (not available)

Date Setup/Time: Aug 05/16 @ 10:30h

Sample Setup By: EC

Number Fish/Volume: 10/10 L

7-d % Mortality: 0.1

Total Pre-aeration Time (mins): 30

Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER# 2

D.O. meter: 2

Cond./Salinity: 2

pH meter: 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	15.0	/	15.0
pH	7.9	/	8.0
D.O. (mg/L)	8.3	/	8.9
Cond. (µS/cm)	1028	/	1028
Salinity (ppt)	0.5	/	0.5

Concentration (% v/v)	# Survivors								Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96		0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
Control				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.9	9.7	9.9	9.9	9.8	6.9	6.9	7.0	7.0	7.0	29	36	
6.25				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.9	9.6	9.8	9.8	9.8	7.1	7.1	7.1	7.3	7.1	104	113	
12.5				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.9	9.7	9.9	9.8	9.9	7.3	7.4	7.2	7.4	7.2	180	186	
25				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.9	9.5	9.8	9.9	9.9	7.5	7.5	7.5	7.6	7.4	305	312	
50				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.8	9.6	9.8	9.9	9.8	7.8	7.7	7.6	7.8	7.6	590	602	
100				10	10	10	10	15.0	15.0	15.0	15.0	15.0	8.9	9.7	9.9	9.9	9.9	8.0	8.1	8.0	8.3	8.2	1028	1032	
Initials				AW	AW	EL	EL	EC	AW	AW	EL	EL	EC	AW	AW	EL	EL	EC	AW	AW	EL	EL	EC	EL	

Sample Description/Comments: light yellow, slightly turbid, some particulates, Odourless

Fish Description at 96 h All fish appear healthy Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: [Signature]

Date Reviewed: Aug 12, 2016

Daphnia magna Summary Sheet

Client: YUL ALS Teck (Evo)
Work Order No.: 16812

Start Date/Time: August 4, 2016 @ 1445h
Test Species: Daphnia magna
Set up by: YUL/JS

Sample Information:

Sample ID: YUL ~~110079411~~ EV-WRLD-WS-2016-07-13-11
Sample Date: August 2, 2016
Date Received: August 4, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 071316A+B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 21
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16Na01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9 - 4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: The 48h LC50 is estimated to be >100% (v/v)

Reviewed by: [Signature]

Date reviewed: Aug 12, 2016

**Freshwater Acute
48 Hour Toxicity Test Data Sheet**

Client: ALS Teck (Evo) 08-02-16 Start Date/Time: Aug 4/16 @ 1445h
 Sample ID: ~~180794~~ EV-WRLD-WS-2016 No. Organisms/volume: 10/200mL
 Work Order No.: 16812 07-13-16 Test Organism: D. magna
 Set up by: YYL/JS

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	No. Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	20.5	20.5	20.0	8.8	8.5	8.7	7.6	7.7	8.0	361	365
	B														
	C														
	D														
6.25	A	10	10	0	20.0	20.5	20.0	8.8	8.4	8.8	7.8	7.7	8.0	408	430
	B														
	C														
	D														
12.5	A	10	10	0	20.0	20.5	20.0	8.7	8.5	8.7	7.8	7.8	8.0	451	454
	B														
	C														
	D														
25	A	10	10	0	20.5	20.5	20.0	8.8	8.5	8.6	7.8	7.8	8.1	542	549
	B														
	C														
	D														
50	A	10	10	0	20.0	20.5	20.0	8.7	8.4	8.6	7.8	7.9	8.1	714	718
	B														
	C														
	D														
100	A	10	10	0	20.0	20.5	20.0	8.8	8.5	8.6	7.8	8.0	8.2	1038	1039
	B														
	C														
	D														
Technician Initials		WW	A	A	YYL/JS	WW	A	YYL/JS	WW	A	YYL/JS	WW	A	YYL/JS	A

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO3)	
Control (MHW)	96	68
Highest conc.	610	196
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		
DO (mg/L)	8.8		
pH	7.8		
Cond (µS/cm)	1038		
Salinity (ppt)	0.5		

Comments: _____ Mortality: Heartbeat checked under microscope ND

Sample Description: slight yellow colour, slightly turbid, some particulates, no odour

Batch#: 071316A+B 7-d previous # young/brood: 21 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Aug 12, 2016



Acute Toxicity Test Results

Sample collected August 8, 2016

Final Report

March 29, 2017

Submitted to: **Teck Coal / Elkview Operations**
Elkford, BC

SAMPLE INFORMATION

Sample ID	Dates				Receipt temp.
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> test initiation	
EV_BC1_WS_2016-08-08_N	08-Aug-16 at 0930h	10-Aug-16 at 0956h	11-Aug-16 at 1215h	12-Aug-16 at 1520h	14.5°C

TESTS

- Rainbow trout 96-h LC50 test
- *Daphnia magna* 48-h LC50 test

RESULTS

Toxicity test results

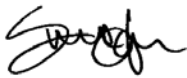
Sample ID	LC50 (%v/v)	
	Rainbow trout	<i>Daphnia magna</i>
EV_BC1_WS_2016-08-08_N	> 100	> 100

Data for all samples listed on the chain of custody have been provided in a separate report.

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CI)	107.2 (84.1 – 136.5) µg/L Zn ¹	3.4 (2.9 – 4.1) g/L NaCl ²
Reference toxicant historical mean (2 SD range)	55.6 (26.9 – 115.2) µg/L Zn	4.2 (3.2 – 5.6) g/L NaCl
Reference toxicant CV	44%	15%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹ Test date: August 9, 2016; ² Test Date: August 10, 2016, LC = Lethal Concentration, SD = Standard Deviation, CV = Coefficient of Variation



Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio
Senior Analyst

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) LC50 test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquarium
Test volume	10 to 20 L (depending on size of fish)
Test solution depth	≥15 cm
Test concentrations	Five concentrations, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tapwater
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Statistical software	CETIS Version 1.8.7
Test endpoints	Survival (96-hour LC50)
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Zinc (added as ZnCl ₂)

Table 2. Summary of test conditions: 48-h *Daphnia magna* LC50 test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	Five concentrations, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Statistical software	CETIS Version 1.8.7
Test endpoints	Survival (48-hour LC50)
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: Teck Coal (Evo)

Start Date/Time: Aug 11 116 @ 1215h

Work Order No.: 16836

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: Ev-BCI-WS-2016-08-08-N
Sample Date: Aug 8 116
Date Received: Aug 10 116
Sample Volume: 2 X 20 L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 11
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 0718166
Source: Aqua Farms
No. Fish/Volume (L): 10/10L
Loading Density (g/L): 0.32
Mean Length ± SD (mm): 26 ± 2
Mean Weight ± SD (g): 0.32 ± 0.05

Range: 23 - 31
Range: 0.27 - 0.45

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn46
Stock Solution ID: 15Zn05
Date Initiated: Aug 09 116
96-h LC50 (95% CL): 107.2 (84.1 - 136.5) µg/L Zn

Reference Toxicant Mean and Historical Range: 55.6 (26.9 - 115.2) µg/L Zn
Reference Toxicant CV (%): 44%

Test Results: The 96h LC50 is estimated to be >100% (v/v).

Reviewed by: [Signature]

Date reviewed: Aug 18, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal (EVO)
 Sample I.D.: EV-BC1-WS-2016-08-08-N
 W.O. #: 16836
 RBT Batch #: 071816h
 Date Collected/Time: Aug 8 /16 @ 0930h
 Date Setup/Time: Aug 11/16 @ 1215h
 Sample Setup By: EC

Number Fish/Volume: 10/10 L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER# 2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	15.0	/	15.0
pH	8.0	/	8.0
D.O. (mg/L)	9.2	/	9.4
Cond. (µS/cm)	1759	/	1759
Salinity (ppt)	0.9	/	0.9

Concentration (% v/v)	# Survivors							Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
(+1)				10	10	10	10	15.0	16.0	15.0	15.0	15.0	9.8	9.9	9.7	9.9	9.8	6.9	6.9	7.0	6.9	6.9	32	39
6.25				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.8	10.0	9.8	9.6	9.8	7.0	7.2	7.1	7.0	7.3	175	193
12.5				10	10	10	10	15.0	15.0	15.0	15.0	15.0	10.0	9.9	9.8	9.7	9.7	7.4	7.4	7.3	7.1	7.6	316	323
25				10	10	10	10	15.0	15.0	15.0	15.0	15.0	10.0	9.9	9.8	9.6	9.7	7.7	7.6	7.5	7.4	7.9	559	565
50				10	10	10	10	15.0	15.0	15.0	15.0	15.0	10.0	10.0	9.8	9.7	9.8	8.0	7.8	7.6	7.7	8.3	993	1009
100				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.4	9.9	9.9	9.7	9.8	8.0	8.1	7.9	8.0	8.4	1459	1769
Initials				EV	AS	A	TK	EC	EL	AS	AS	EL	EC	EV	AS	AS	EL	EC	EV	AS	AS	EL	EC	EV

Sample Description/Comments: Clear, Colorless, Some particulates, Odorless

Fish Description at 96 h All fish appear healthy Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by:

Date Reviewed: Aug 18, 2016

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 16837

Start Date/Time: August 12, 2016 @ 1520h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: EV-BC1-WS-2016-08-08-N
Sample Date: August 8, 2016
Date Received: August 10, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 072716 A+B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 21
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16Na01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: The 48h LC50 is estimated to be >100% (v/v)

Reviewed by: [Signature]

Date reviewed: Aug 18, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: TPCK (Evo) Start Date/Time: August 12, 2016 @ 1520h
 Sample ID: EV-BCI-W5 2016-08-02-N No. Organisms/volume: 10/200mL
 Work Order No.: 16837 Test Organism: D.magna
 Set up by: YML

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	20.0	21.0	21.0	8.8	8.6	8.5	7.9	8.0	8.1	348	370
	B														
	C														
	D														
6.25%	A	10	10	0	20.0	21.0	21.0	8.9	8.5	8.5	7.9	8.0	8.1	461	492
	B														
	C														
	D														
12.5	A	10	10	0	20.5	21.0	21.0	8.8	8.6	8.5	7.9	8.1	8.1	564	535
	B														
	C														
	D														
25	A	10	10	0	20.5	21.0	21.0	8.8	8.6	8.4	7.9	8.1	8.2	754	760
	B														
	C														
	D														
50	A	10	10	0	21.0	21.0	21.0	8.8	8.6	8.5	7.9	8.1	8.2	1105	1002
	B														
	C														
	D														
100	A	10	10	0	21.0	21.0	21.0	9.0	8.5	8.6	7.9	8.2	8.3	1766	1757
	B														
	C														
	D														
Technician Initials		AD	AD	AD	YML	AD	AD	YML	AD	AD	YML	AD	AD	YML	AD

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO3)	
Control (MHW)	100	76
Highest conc.	1020	242
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	21.0		
DO (mg/L)	9.0		
pH	7.9		
Cond (µS/cm)	1766		
Salinity (ppt)	0.9		

Comments: _____ Mortality: Heartbeat checked under microscope no

Sample Description: clear, no colour, no odour, slight particulates.

Batch#: 072716AYS 7-d previous # young/brood: 721 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Aug 18, 2016

APPENDIX C – Chain-of-custody form

Teck		COC ID: 20160808B		TURNAROUND TIME:		RUSH: EMERGENCY RUSH!							
PROJECT/CLIENT INFO				LABORATORY				OTHER INFO					
Facility Name / Job: Elkview Operations		Lab Name: Nautilus Environmental		Report Format / Distribution		Excel	PDF	EDD					
Job Description: Wastewater Ditch BODIE CREEK		Lab Contact: Krysta Peurcy		Email 1: Michael.Moore@teck.com		X	X	X					
Project Manager: Michael Moore		Email: krysta@nautilusenvironmental.ca		Email 2: teckenv@nautilus.com		X	X	X					
Email: Michael.Moore@teck.com		Address: 8664 Commerce Court		Email 3: jerry.fedtr@teck.com		X	X	X					
Address: RR#1 HWY# 3		Imperial Square Lako City		Email 4: cmoore@nautilus.com		X	X	X					
City: Sparwood		Province: BC		City: Danbury		Province: BC		PG number: 318934					
Postal Code: VIC 4C3		Country: Canada		Postal Code: V3A 4N7		Country: Canada							
Phone Number: 1-250-865-5289		Phone Number:											
SAMPLE DETAILS								ANALYSIS REQUESTED					
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G-Grab C-Comp	# Of Cont.	Toxicity 96-h rainbow trout LC-50 (Daphnia) <i>NY</i>	Toxicity 48-h Daphnia magna LC-50 (Daphnia) <i>NY</i>				
EV_BCI_WS_2016-08-08_N	EV_BCI	WS	N	2016/08/08	9:30	G	4	2	2			14.5	
EV_BCMC_WS_2016-08-08_NP	EV_BCMC	WS	N	2016/08/08	8:15	G	4	2	2			14.0	
							Total	8					
ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS								RELINQUISHED BY/APPLICATION		DATE/TIME		ACCEPTED BY/APPLICATION	
Toxicity 96-Hr/48-HR = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphnia testing to occur at 20 degrees)												Nautilus NY - Nain Yamamoto	
NO OF BOTTLES RETURNED/DESCRIPTION								DATE/TIME		ACCEPTED BY/APPLICATION		DATE/TIME	
Regular (default)								Sampler's Name		James Boldt		Mobile #	
Priority (2-3 business days) - 50% surcharge								Sampler's Signature				Date/Time	
Emergency (1 Business Day) - 100% surcharge <input checked="" type="checkbox"/>												August 8 2016 2:36 PM	
For Emergency <1 Day, ASAP or Weekend - Contact ALS!													

①
②

2x20L + 2x1L
↓

WO# 16836
16837

Sample Description:

- ① Clear, Colorless, Some particulates, Odourless
- ② Clear, Colorless, No particulates, Odourless

END OF REPORT



Teck Coal/ Elkview Operations
ATTN: Michael Moore
RR1 HWY 3
Sparwood, BC
V1C 4C3

Report Date: October 12, 2016
Work Order: 161036 - 161037

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 96-h rainbow trout acute single-concentration screening toxicity test.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
EV_LC1_WS_2016-09-26_N	September 26, 2016 @ 1150h	10

Table 2. Results for the 48-h *Daphnia magna* acute single-concentration screening toxicity test.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
EV_LC1_WS_2016-09-26_N	September 26, 2016 @ 1150h	0

The tests met performance criteria and there were no deviations from the protocol. The results presented in this report relate only to the sample tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Julianna Kalocai, M.Sc., R.P.Bio
QA Officer

Rainbow Trout Summary Sheet

Client: Teck Coal (EVO)

Start Date/Time: Sept 30 116 @ 1130h

Work Order No.: 161036

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-201-WS-2016-09-26-N
Sample Date: Sept 26 /16
Date Received: Sept 28 /16
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 091416
Source: Miracle Springs
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.27
Mean Length ± SD (mm): 29 ± 2
Mean Weight ± SD (g): 0.33 ± 0.07

Range: 25 - 31
Range: 0.19 - 0.43

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn50
Stock Solution ID: 16 Zn 02
Date Initiated: Sept 28/16
96-h LC50 (95% CL): 70.7 (52.0 - 96.3) mg/L Zn

Reference Toxicant Mean and Historical Range: 63.9 (25.2 - 162.1) mg/L Zn
Reference Toxicant CV (%): 59%

Test Results: 10% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: JCh

Date reviewed: Oct. 12/16

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 161037

Start Date/Time: September 28, 2016 @ 1300h
Test Species: Daphnia magna
Set up by: EC/AWD

Sample Information:

Sample ID: EV-LCI-WS-2016-09-26-N
Sample Date: September 26, 2016
Date Received: September 28, 2016
Sample Volume: 2 x 1 L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 091416B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 20
Mortality (%) in previous 7 d: 0
Days to first brood: 8

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC39
Stock Solution ID: 16NaO2
Date Initiated: September 21, 2016
48-h LC50 (95% CL): 3.9 (2.8-5.5) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: JOL

Date reviewed: Oct. 12/16

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (Evo)
 Sample ID: EV-LCI-WS-2016-09-26-N
 Work Order No.: 161037

Start Date/Time: Sept 28/16 @ 1300h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: EL/AWD

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	20.0	20.0	18.5	8.6	8.5	8.4	7.8	7.6	7.7	348	357
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	20.0	20.0	18.5	9.0	8.5	8.4	7.8	7.9	8.0	991	872
	B	10	9	0											
	C	10	9	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		MM	MM	MM	EL	MM	MM	EE	MM	MM	EL	MM	MM	EE	MM

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	100	74
Highest conc.	460	600
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		
DO (mg/L)	9.0		
pH	7.8		
Cond (µS/cm)	991		
Salinity (ppt)	0.5		

Comments: _____ Mortality: Heartbeat checked under microscope ^{not} ~~not~~ _{negative}

Sample Description: Clear, colorless, ^{some} ~~no~~ particulates, Odourless

Batch#: 091416B 7-d previous # young/brood: 20 Previous 7-d Mortality (%): 0 Day of 1st Brood: 8

Reviewed by: JGU Date reviewed: Oct. 12/16



Teck Coal/ Elkview Operations
 ATTN: Michael Moore
 RR1 HWY 3
 Sparwood, BC
 V1C 4C3

Report Date: October 17, 2016
 Work Order: 161060 - 161061

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

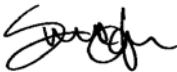
Table 1. Results for the 96-h rainbow trout acute single-concentration screening toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
EV_GC2_WS_2016-10-03_N	October 3, 2016 @ 0830h	0
EV_LC1_WS_2016-10-03_N	October 3, 2016 @ 0920h	0
EV_SM1_WS_2016-10-03_N	October 3, 2016 @ 1015h	0
EV_DC1_WS_2016-10-03_N	October 3, 2016 @ 1125h	0
EV_OC1_WS_2016-10-03_N	October 3, 2016 @ 1350h	0

Table 2. Results for the 48-h *Daphnia magna* acute single-concentration screening toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
EV_GC2_WS_2016-10-03_N	October 3, 2016 @ 0830h	3.3
EV_LC1_WS_2016-10-03_N	October 3, 2016 @ 0920h	0
EV_SM1_WS_2016-10-03_N	October 3, 2016 @ 1015h	0
EV_DC1_WS_2016-10-03_N	October 3, 2016 @ 1125h	0
EV_OC1_WS_2016-10-03_N	October 3, 2016 @ 1350h	0

The tests met performance criteria and there were no deviations from the protocol. The results presented in this report relate only to the samples tested.



Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Julianna Kalocai, M.Sc., R.P.Bio
QA Officer

Rainbow Trout Summary Sheet

Client: Tech Coal (EVO) Start Date/Time: Oct 6 116 @ 0945h
Work Order No.: 161060 Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV_GCC_WS-2016-10-03-N
Sample Date: Oct 3 / 16
Date Received: Oct 5 / 16
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 091416
Source: Miracle Springs
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.81
Mean Length ± SD (mm): 29 ± 3 Range: 24 - 31
Mean Weight ± SD (g): 0.37 ± 0.14 Range: 0.23 - 0.60

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn50
Stock Solution ID: 16Zn02
Date Initiated: Sept 28/16
96-h LC50 (95% CL): 70.7 (52.0 - 96.3) mg/L Zn

Reference Toxicant Mean and Historical Range: 63.9 (25.2 - 162.1) mg/L Zn
Reference Toxicant CV (%): 59%

Test Results: 0% mortality at 96 hours in the undiluted
100% (v/v) sample.

Reviewed by: JOU Date reviewed: Oct. 17/16

Rainbow Trout Summary Sheet

Client: Tedco Coal (EVO)

Start Date/Time: Oct 6 116 @ 0945h

Work Order No.: 161060

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-LC1-WL2016-10-03-N
Sample Date: Oct 3 116
Date Received: Oct 5 116
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 091416
Source: Miracle Springs
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.31
Mean Length ± SD (mm): 28 ± 3 Range: 24 - 31
Mean Weight ± SD (g): 0.37 ± 0.09 Range: 0.25 - 0.52

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn50
Stock Solution ID: 16Zn02
Date Initiated: Sept 28/16
96-h LC50 (95% CL): 70.7 (52.0 - 96.3) mg/L Zn

Reference Toxicant Mean and Historical Range: 63.9 (25.2 - 162.1) mg/L Zn
Reference Toxicant CV (%): 59%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: JGh

Date reviewed: Oct. 17/16

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal (Evo)
 Sample I.D.: EV_LCI-WS-2016-10-03-N
 W.O. #: 161060
 RBT Batch #: 09141b
 Date Collected/Time: Oct 7/16 @ 0920h
 Date Setup/Time: Oct 6/16 @ 0945h
 Sample Setup By: EC

Number Fish/Volume: 10/12 L
 7-d % Mortality: 1.4
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER# 2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	15.0	/	15.0
pH	7.6		7.8
D.O. (mg/L)	9.7		9.9
Cond. (µS/cm)	973		973
Salinity (ppt)	0.4		0.4

Concentration	# Survivors							Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	(% v/v)	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0
CT1				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.9	9.6	9.7	9.8	9.8	7.0	7.1	6.9	7.0	7.0	32	38
100				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.9	9.8	9.8	9.8	9.8	7.8	8.1	8.2	8.3	8.7	973	987

Rainbow Trout Summary Sheet

Client: Teck Coal (EVO) Start Date/Time: Oct 6 116 @ 0945h

Work Order No.: 161060 Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV_SMLHS-2016-10-03-N
Sample Date: Oct 3 116
Date Received: Oct 5 116
Sample Volume: 1 x 20L
Other: /

Test Validity Criteria:

≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 091416
Source: Miracle Springs
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.33
Mean Length ± SD (mm): 31 ± 1 Range: 29 - 33
Mean Weight ± SD (g): 0.40 ± 0.08 Range: 0.30 - 0.58

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn50
Stock Solution ID: 16Zn02
Date Initiated: Sept 28/16
96-h LC50 (95% CL): 70.7 (52.0-96.3) mg/L Zn
Reference Toxicant Mean and Historical Range: 63.9 (25.2 - 162.1) mg/L Zn
Reference Toxicant CV (%): 59%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: JGH Date reviewed: Oct-17/16

Rainbow Trout Summary Sheet

Client: Teck Coal (EVO)

Start Date/Time: Oct 6 116 @ 0945h

Work Order No.: 161060

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-DCI-WS-2016-10-03-N
Sample Date: Oct 3 /16
Date Received: Oct 5 /16
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 091416
Source: Miracle Springs
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.38
Mean Length ± SD (mm): 30 ± 3
Mean Weight ± SD (g): 0.46 ± 0.17

Range: 24 - 35
Range: 0.24 - 0.78

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn50
Stock Solution ID: 16Zn02
Date Initiated: Sept 28/16
96-h LC50 (95% CL): 70.7 (52.0 - 96.3) mg/L Zn

Reference Toxicant Mean and Historical Range: 63.9 (25.2 - 162.1) mg/L Zn
Reference Toxicant CV (%): 59%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample

Reviewed by: JGh

Date reviewed: Oct. 17/16

Rainbow Trout Summary Sheet

Client: Tedc Coal (EVO)

Start Date/Time: Oct 6 116 @ 0945h

Work Order No.: 161060

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-OCL-WS-2016-10-03-N
Sample Date: Oct 3 116
Date Received: Oct 5 116
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 091416
Source: Miracle Springs
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.29
Mean Length ± SD (mm): 29 ± 2
Mean Weight ± SD (g): 0.35 ± 0.12

Range: 27 - 31
Range: 0.21 - 0.65

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn50
Stock Solution ID: 16Zn02
Date Initiated: Sept 28/16
96-h LC50 (95% CL): 70.7 (52.0 - 96.3) mg/L Zn

Reference Toxicant Mean and Historical Range: 63.9 (25.2 - 162.1) mg/L Zn
Reference Toxicant CV (%): 59%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: JBL

Date reviewed: Oct. 17/16

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal (Evo)
 Sample I.D.: EV_OCI_WS-2016-10-03-N
 W.O. #: 161060
 RBT Batch #: 091416
 Date Collected/Time: Oct 3/16 @ 1350h
 Date Setup/Time: Oct 6/16 @ 0945h
 Sample Setup By: EC

Number Fish/Volume: 10/12 L
 7-d % Mortality: 1.4
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER# 2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	15.0	/	15.0
pH	7.7		7.9
D.O. (mg/L)	9.7		9.8 EL
Cond. (µS/cm)	624		642.4
Salinity (ppt)	0.3		0.3

Concentration	# Survivors							Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	(% v/v)	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0
Ct1				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.8	9.7	9.8	9.8	9.8	7.0	7.1	6.9	7.0	7.0	32	38
100				10	10	10	10	15.0	15.0	15.0	15.0	15.0	9.8	9.8	9.9	9.9	9.8	7.9	8.3	8.4	8.4	8.4	624	619

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 161061

Start Date/Time: October 5, 2016 @ 1440h
Test Species: Daphnia magna
Set up by: YTL

Sample Information:

Sample ID: EV_GC2_WS_2016-10-03_N
Sample Date: October 3, 2016
Date Received: October 5, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 091416A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 10
Days to first brood: 8

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC39
Stock Solution ID: 16NaO2
Date Initiated: September 21, 2016
48-h LC50 (95% CL): 3.9 (2.8-5.5) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: 3.3% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: Jon

Date reviewed: Oct-17/16

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (Evo)
 Sample ID: EV-GCZ-WS-2016-10-03-N
 Work Order No.: 161061

Start Date/Time: October 5, 2016 @ 1440h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: YML

Thermometer: CER #5 DO meter: DO-3 pH meter: pH-3 Cond./Salinity: C-3

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	19.5	19.5	19.5	8.5	8.6	8.4	7.7	7.6	7.6	351	358
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	18.5	19.5	19.5	9.0	8.5	8.5	7.8	7.9	8.0	940	942
	B	10	9	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	100	68
Highest conc.	620	208
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.5		
DO (mg/L)	9.0		
pH	7.8		
Cond (µS/cm)	940		
Salinity (ppt)	0.5		

Comments: _____ Mortality: Heartbeat checked under microscope yes

Sample Description: clear, no colour, no odour, no particulates

Batch#: 091416A 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 10 Day of 1st Brood: 8

Reviewed by: JGU Date reviewed: Oct. 17/16

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 161061

Start Date/Time: October 5, 2016 @ 1450h
Test Species: Daphnia magna
Set up by: YTL

Sample Information:

Sample ID: EV_LCI_WS_2016-10-03_N
Sample Date: October 3, 2016
Date Received: October 5, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 091416A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 10
Days to first brood: 8

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC39
Stock Solution ID: 16NA02
Date Initiated: September 21, 2016
48-h LC50 (95% CL): 3.9 (2.8-5.5) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: JOU

Date reviewed: Oct. 17/16

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (Env)
 Sample ID: EV-LCI-WS-2016-10-03-N
 Work Order No.: 161061

Start Date/Time: October 5, 2016 @ 1450h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: YML

Thermometer: CER #5 DO meter: DO-3 pH meter: pH-3 Cond./Salinity: C-3

Concentration (% v/v)	Number of Live Organisms Rep	Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	19.5	19.5	19.5	8.5	8.4	8.4	7.7	7.6	7.6	351	359
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	100	0	18.5	19.5	19.5	8.1	8.3	8.2	7.5	7.9	7.8	465	886
	B	10	100	0											
	C	10	100	1											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	100	68
Highest conc.	580	506
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.5		
DO (mg/L)	8.1		
pH	7.5		
Cond (µS/cm)	465		
Salinity (ppt)	0.5		

Comments: precipitate on organisms bodies Mortality: Heartbeat checked under microscope not req'd

Sample Description: clear, no colour, no odour, no particulates

Batch#: 091416A 7-d previous # young/brood: 10 Previous 7-d Mortality (%): 10 Day of 1st Brood: 8

Reviewed by: YML Date reviewed: Oct-17/16

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 161061

Start Date/Time: October 5, 2016 @ 1455h
Test Species: Daphnia magna
Set up by: YTL

Sample Information:

Sample ID: EV_SM1_WS_2016-10-03_N
Sample Date: October 3, 2016
Date Received: October 5, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 091416A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 10
Days to first brood: 8

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC39
Stock Solution ID: 16NaO2
Date Initiated: September 21, 2016
48-h LC50 (95% CL): 3.9 (2.8-5.5) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: JGh

Date reviewed: Oct. 17/16

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (Evo)
 Sample ID: EV-SM1 - W2 2016 - 10 - 03 N
 Work Order No.: 161061

Start Date/Time: October 5, 2016 @ 1455h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: CER #5 DO meter: DO-3 pH meter: pH-3 Cond./Salinity: C-3

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	19.5	19.5	19.5	8.5	8.4	8.3	7.7	7.6	7.6	351	356
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.0	19.5	19.5	8.8	8.4	8.2	8.1	8.1	8.2	473	477
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	100	68
Highest conc.	218	224
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.0		
DO (mg/L)	8.8		
pH	8.1		
Cond (µS/cm)	473		
Salinity (ppt)	0.2		

Comments: _____ Mortality: Heartbeat checked under microscope ^{not} rec'd

Sample Description: clear no colour, no odour, no particulates

Batch#: 091416A 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 10 Day of 1st Brood: 8

Reviewed by: JOU Date reviewed: Oct. 17/16

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 161061

Start Date/Time: October 5, 2016 @ 1445h
Test Species: Daphnia magna
Set up by: YTL

Sample Information:

Sample ID: EV_DCI_WS_2016-10-03_N
Sample Date: October 3, 2016
Date Received: October 5, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 091416
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 10
Days to first brood: 8

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC39
Stock Solution ID: 16NaO2
Date Initiated: September 21, 2016
48-h LC50 (95% CL): 3.9 (2.8-5.5) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: JGU

Date reviewed: Oct. 17/16

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (Evo)
 Sample ID: EV-DCI-WS-2016-10-03-N
 Work Order No.: 161061

Start Date/Time: October 5, 2016 @ 1445h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: YML

Thermometer: CER #5 DO meter: DO-3 pH meter: pH-3 Cond./Salinity: C-3

Concentration (% v/v)	Number of Live Organisms Rep	24		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	19.5	19.5	8.5	8.4	8.4	7.7	7.6	7.6	351	362
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	18.0	19.5	19.5	9.1	8.5	8.4	7.9	7.9	8.0	1668	1655
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	100	68
Highest conc.	1090	332
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.0		
DO (mg/L)	9.1		
pH	7.9		
Cond (µS/cm)	1668		
Salinity (ppt)	0.8		

Comments: _____ Mortality: Heartbeat checked under microscope not req'd

Sample Description: clear, no colour, no odour, no particulates

Batch#: 091416A 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 10 Day of 1st Brood: 8

Reviewed by: JGU Date reviewed: Oct. 17/16

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 161061

Start Date/Time: October 5, 2016 @ 1455h
Test Species: Daphnia magna
Set up by: YTL

Sample Information:

Sample ID: EV_OCI_WS_2016-10-03_N
Sample Date: October 3, 2016
Date Received: October 5, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 091416A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 10
Days to first brood: 8

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC39
Stock Solution ID: 16NaO2
Date Initiated: September 21, 2016
48-h LC50 (95% CL): 3.9 (2.8-5.5) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: JGK

Date reviewed: Oct. 17/16

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (Env)
 Sample ID: EW-001-WS 2016-10-03-N
 Work Order No.: 161061

Start Date/Time: October 5, 2016 @ 1455h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: CER #5 DO meter: DO-3 pH meter: pH-3 Cond./Salinity: C-3

Concentration (% v/v)	Number of Live Organisms Rep	24		48		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		0	24	48	0		24	48	0	24	48	0	24	48	0	48	
Control	A	10	10	0	19.5	19.5	19.5	8.5	8.4	8.4	7.7	7.6	7.6	351	357		
	B	10	10	0													
	C	10	10	0													
	D																
100	A	10	10	0	19.5	19.5	19.5	8.2	8.5	8.4	7.7	7.9	8.0	628	590		
	B	10	10	0													
	C	10	10	0													
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML		

Concentration	Hardness* (mg/L as CaCO ₃)	Alkalinity* (mg/L as CaCO ₃)
Control (MHW)	100	68
Highest conc.	380	366
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		
DO (mg/L)	8.2		
pH	7.7		
Cond (µS/cm)	628		
Salinity (ppt)	0.3		

Comments: _____ Mortality: Heartbeat checked under microscope not record

Sample Description: slight yellow colour, clear, no odour, no particulates.

Batch#: 091416A 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 10 Day of 1st Brood: 8

Reviewed by: JGU Date reviewed: Oct. 17/16

Client: Teck

W.O.#: 161061

Hardness and Alkalinity Datasheet

Sample ID	Alkalinity						Hardness			Technician
	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO 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)	
EV-GC2-WS- 2016-10-03-N	Oct-3/16	Oct 5/16	50	10.7	11.0	208	100	6.2	620	YWL
EV-LCI-WS- 2016-10-03-N			50	25.7	26.1	506	100	5.8	580	YWL
EV-SMI-WS- 2016-10-03-N			50	11.4	11.6	224	50	10.9	218	YWL
EV-DCL-WS- 2016-10-03-N			50	16.8	17.0	332	100	10.9	1090	YWL
EV-OCL-WS- 2016-10-03-N			50	18.5	18.7	366	100	3.8	380	YWL
MHW	Oct-5/16	Oct-5/16	50	3.5	3.6	68	50	5.0	100	YWL

Notes: ① Diluted to 100 mL w/ DI water.

Reviewed by: JCh Date Reviewed: Oct. 17/16

Teck		COC ID: 20161003		TURNAROUND TIME:		RUSH:													
PROJECT/CLIENT INFO				LABORATORY				OTHER INFO											
Facility Name / Job: Elkview Operations				Lab Name: Nantus Environmental				Report Format / Distribution											
Job Description: Monthly Toxicity Sampling				Lab Contact: Krysta Percy				Excel PDF EDD											
Project Manager: Michael Moore				Email: krysta@nantusenvironmental.ca				Email 1: mluon@teck.com X X X											
Email: Michael.Moore@teck.com				Address: 8664 Commerce Court				Email 2: teckcorp@nanonline.com X X X											
Address: RR#1 HWY# 3				Imperial Square Lake City				Email 3: jenn.robert@teck.com X X X											
City: Sparwood				City: Burnaby				Email 4: Cameron.Gilfillan@teck.com X X X											
Province: BC				Province: BC				Email 5:											
Postal Code: VIC 4C3				Postal Code: V3A 4N7				PO number: 418927											
Country: Canada				Country: Canada															
Phone Number: 1-250-865-5289				Phone Number:															
SAMPLE DETAILS								ANALYSIS REQUESTED											
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G-Grab C=Comp	# Of Cont.	Toxicity 96-h rainbow trout Pass/Fail	Toxicity 48-h Daphnia magna P/F							Temp °C			
EV_GC2_WS_2016-10-03_N	EV_GC2	WS	N	2016/10/03	8:30	G	3	1	2							11.0			
EV_LC1_WS_2016-10-03_N	EV_LC1	WS	N	2016/10/03	9:20	G	3	1	2										
EV_SM1_WS_2016-10-03_N	EV_SM1	WS	N	2016/10/03	10:15	G	3	1	2										
EV_DC1_WS_2016-10-03_N	EV_DC1	WS	N	2016/10/03	11:25	G	3	1	2										
EV_OC1_WS_2016-10-03_N	EV_OC1	WS	N	2016/10/03	13:50	G	3	1	2										
Total							15												
ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS				RELINQUISHED BY/AFFILIATION				ACCEPTED BY/AFFILIATION				DATE/TIME							
Toxicity 96-Hr/48-HR = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphnia testing to occur at 20 degrees)				wof				16/10/16				16/10/16				Nantus NY - New Vancouver Oct 05/16 @ 09:40			
NR OF BOTTLES RETURNED/DESCRIPTION				Sampler's Name				Mobile #				Date/Time							
Regular (default) X				Cory Guiten								3 OCT 2016							
Priority (2-3 business days) - 50% surcharge				Sampler's Signature															
Emergency (1 Business Day) - 100% surcharge																			
For Emergency <1 Day, ASAP or Weekend - Contact ALS																			

(1)
(2)

1x20L + 2x1L
↓

Sample Description:

- ① Clear, colorless, No particulate, No smell
- ② Clear, colorless, Odourless, No particulate.
- ③ Clear, colorless, No particulate, Odourless
- ④ Clear, colorless, No particulate, Odourless
- ⑤ Slightly yellow, Clear, no particulate, odourless.



Acute Toxicity Test Results

Samples collected October 4, 2016

Final Report

March 29, 2017

Submitted to: **Teck Coal / Elkview Operations**
Elkford, BC

SAMPLE INFORMATION

Sample ID	Dates				Receipt temp.
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> test initiation	
EV_SP1_WS_2016-10-04_N	04-Oct-16 at 0855h	06-Oct-16 at 1010h	06-Oct-16 at 1245h	06-Oct-16 at 1410h	8.5°C
EV_EC1_WS_2016-10-04_N	04-Oct-16 at 0835h	06-Oct-16 at 1010h	06-Oct-16 at 1245h	06-Oct-16 at 1415h	8.5°C
EV_MG1_WS_2016-10-04_N	04-Oct-16 at 1020h	06-Oct-16 at 1010h	06-Oct-16 at 1245h	06-Oct-16 at 1420h	8.5°C
EV_GT1_WS_2016-10-04_N	04-Oct-16 at 1200h	06-Oct-16 at 1010h	06-Oct-16 at 1245h	06-Oct-16 at 1405h	8.5°C

TESTS

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test

RESULTS

Toxicity test results

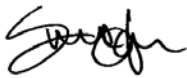
Sample ID	Percent mortality in 100% (v/v) sample	
	Rainbow trout	<i>Daphnia magna</i>
EV_SP1_WS_2016-10-04_N	0	0
EV_EC1_WS_2016-10-04_N	0	0
EV_MG1_WS_2016-10-04_N	0	0
EV_GT1_WS_2016-10-04_N	10	0

Data for all samples listed on the chain of custody have been provided in a separate report.

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CI)	70.7 (52.0 – 96.3) µg/L Zn ¹	4.2 (3.7 – 4.8) g/L NaCl ²
Reference toxicant historical mean (2 SD range)	63.9 (25.2 – 162.1) µg/L Zn	4.1 (3.0 – 5.4) g/L NaCl
Reference toxicant CV	59%	16%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹ Test date: September 28, 2016; ² Test Date: October 12, 2016, LC = Lethal Concentration, SD = Standard Deviation, CV = Coefficient of Variation



Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio
Senior Analyst

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) single concentration test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquarium
Test volume	10 to 20 L (depending on size of fish)
Test solution depth	≥15 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tapwater
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Zinc (added as ZnCl ₂)

Table 2. Summary of test conditions: 48-h *Daphnia magna* single concentration test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: Teck Coal (Evo)

Start Date/Time: Oct 6 116 @ 1245h

Work Order No.: 161074

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-SPI-WS-2016-10-04-N
Sample Date: Oct 8 4/16
Date Received: Oct 6 116
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 091416
Source: Miracle Springs
No. Fish/Volume (L): 10/12
Loading Density (g/L): 0.35
Mean Length ± SD (mm): 29 ± 5
Mean Weight ± SD (g): 0.42 ± 0.15

Range: 21 - 35
Range: 0.23 - 0.63

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn50
Stock Solution ID: 16Zn02
Date Initiated: Sept 28/16
96-h LC50 (95% CL): 70.7 (52.0 - 96.3) mg/L Zn

Reference Toxicant Mean and Historical Range: 63.9 (25.2 - 162.1) mg/L Zn
Reference Toxicant CV (%): 59%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: Oct 21, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (Evo) Start Date/Time: Oct 6 116 @ 1245h

Work Order No.: 161074 Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-ELI-WS-2016-10-04-N
Sample Date: Oct 4 116
Date Received: Oct 6 116
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 091416
Source: Miracle Springs
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.26
Mean Length ± SD (mm): 29 ± 4 Range: 24 - 34
Mean Weight ± SD (g): 0.34 ± 0.11 Range: 0.20 - 0.51

Zinc Reference Toxicant Results:

Reference Toxicant ID: RIZn50
Stock Solution ID: 16Zn02
Date Initiated: Sept 28/16
96-h LC50 (95% CL): 70.7 (52.0 - 96.3) mg/L Zn
Reference Toxicant Mean and Historical Range: 63.9 (25.2 - 162.1) mg/L Zn
Reference Toxicant CV (%): 59%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature] Date reviewed: Oct 21, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (EVO) Start Date/Time: Oct 6 116 @ 1245h

Work Order No.: 161074 Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV-MG1-WS-2016-10-04-N
Sample Date: Oct 4 / 16
Date Received: Oct 6 / 16
Sample Volume: 1 x 20L
Other: /

Test Validity Criteria:

≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 091416
Source: Miracle Springs
No. Fish/Volume (L): 10/12
Loading Density (g/L): 0.36
Mean Length ± SD (mm): 31 ± 2 Range: 27 - 36
Mean Weight ± SD (g): 0.44 ± 0.17 Range: 0.29 - 0.71

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn50
Stock Solution ID: 16Zn02
Date Initiated: Sept 28/16
96-h LC50 (95% CL): 70.7 (52.0 - 96.3) mg/L Zn

Reference Toxicant Mean and Historical Range: 63.9 (25.2 - 162.1) mg/L Zn
Reference Toxicant CV (%): 59%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature] Date reviewed: Oct 21, 2016

Rainbow Trout Summary Sheet

Client: Tede Coal (Evo)

Start Date/Time: Oct 6 116 @ 1245h

Work Order No.: 161074

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EVGTI-WS-2016-10-14-N
Sample Date: Oct 4 116
Date Received: Oct 6 116
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 091416
Source: Miracle Springs
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.31
Mean Length ± SD (mm): 29 ± 3
Mean Weight ± SD (g): 0.37 ± 0.08

Range: 22 - 33
Range: 0.21 - 0.57

Zinc Reference Toxicant Results:

Reference Toxicant ID: RIZn50
Stock Solution ID: 16 Zn 02
Date Initiated: Sept 28/16
96-h LC50 (95% CL): 70.7 (52.0 - 96.3) mg/L Zn

Reference Toxicant Mean and Historical Range: 63.9 (25.2 - 162.1) mg/L Zn
Reference Toxicant CV (%): 59%

Test Results: 10% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: Oct-21, 2016

Daphnia magna Summary Sheet

Client: Teck (EVO)
Work Order No.: 161075

Start Date/Time: October 6, 2016 @ 1410h
Test Species: Daphnia magna
Set up by: NL/AWD

Sample Information:

Sample ID: EV_SPI_WS_2016-10-04-N
Sample Date: October 4, 2016
Date Received: October 6, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:
≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.
WQ Ranges:
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 092116B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 28
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC40
Stock Solution ID: 16NaO2
Date Initiated: October 12, 2016
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.1 (3.0-5.4) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Oct-21, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (Evo)
 Sample ID: EV-SPL-WS-2016-10-04-N
 Work Order No.: 161075

Start Date/Time: October 6, 2016 @ 14:06h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: MIC/AWD

Thermometer: CER#5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	20.0	19.5	19.5	8.6	8.4	8.0	7.6	7.6	7.7	355	375
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	20.0	19.5	19.5	9.0	8.6	8.1	7.6	8.1	8.1	1060	125
	B	10	10	0										1075	
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		MIC	AWD		MIC	MIC		MIC	MIC		MIC	MIC		MIC	

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO3)	
Control (MHW)	100	68
Highest conc.	1060	314
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		
DO (mg/L)	9.0		
pH	7.6		
Cond (µS/cm)	1060		
Salinity (ppt)	0.5		

Comments: _____ Mortality: Heartbeat checked under microscope N^o

Sample Description: clear no colour, no odour, no particulates

Batch#: 0921KB 7-d previous # young/brood: 28 Previous 7-d Mortality (%): φ Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Oct-21, 2016

Daphnia magna Summary Sheet

Client: Teck (EVO)
Work Order No.: 161075

Start Date/Time: October 6, 2016 @ 1415h
Test Species: Daphnia magna
Set up by: YNL/AWD

Sample Information:

Sample ID: EV-EC1-WS-2016-10-04-N
Sample Date: October 4, 2016
Date Received: October 6, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 092116B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 28
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC40
Stock Solution ID: 16NaO2
Date Initiated: October 12, 2016
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.0-5.4) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Oct 21, 2016

**Freshwater Acute
48 Hour Toxicity Test Data Sheet**

Client: TRUCK (EVO)
 Sample ID: EV-ECL-WS-2016-10-04-N
 Work Order No.: 161075

Start Date/Time: October 6, 2016 @ 14:5h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: NLC/AWD

Thermometer: CER#5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	20.0	19.5	19.5	8.6	8.5	8.0	7.6	7.6	7.7	355	377
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	20.5	19.5	19.5	9.1	8.4	8.2	7.9	8.2	8.2	982	1654
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		NLC	AWD	A	NLC	NLC	A	NLC	NLC	A	NLC	NLC	A	NLC	A

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO3)	
Control (MHW)	100	68
Highest conc.	1000	310
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.5		
DO (mg/L)	9.1		
pH	7.9		
Cond (µS/cm)	982		
Salinity (ppt)	0.4		

Comments: _____ Mortality: Heartbeat checked under microscope ND

Sample Description: clear, no colour, no odour, no particulates

Batch#: 09216B 7-d previous # young/brood: 28 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Oct-21, 2016

Daphnia magna Summary Sheet

Client: Teck (EVO)
Work Order No.: 161075

Start Date/Time: October 6, 2016 @ 1420h
Test Species: Daphnia magna
Set up by: NL/AWD

Sample Information:

Sample ID: EV_MGLWS_2016-10-04-N
Sample Date: October 4, 2016
Date Received: October 6, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 092116B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 28
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC40
Stock Solution ID: 16NaO2
Date Initiated: October 12, 2016
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.0-5.4) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: 

Date reviewed: Oct. 21, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: TREK (EVO)
 Sample ID: EV-MGI-NS-2016-10-04-N
 Work Order No.: 161075

Start Date/Time: October 6, 2016 @ 14:20h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: MML/AWD

Thermometer: CER#5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	20.0	19.5	19.5	8.6	8.5	8.0	7.6	7.6	7.7	355	381
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	20.0	19.5	19.5	9.1	8.2	8.1	7.9	8.0	8.2	642	178
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		MML	AWD	A	MML	MML	A	MML	MML	A	MML	MML	A	MML	A

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO3)	
Control (MHW)	100	63
Highest conc.	760	178
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		
DO (mg/L)	9.1		
pH	7.9		
Cond (µS/cm)	642		
Salinity (ppt)	0.3		

Comments: _____ Mortality: Heartbeat checked under microscope NJ

Sample Description: clear, no colour, no odour, no particulates

Batch#: 092116KB 7-d previous # young/brood: 25²⁸ Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Oct 21, 2016

Daphnia magna Summary Sheet

Client: Teck (EVO)
Work Order No.: 161075

Start Date/Time: October 6, 2016 @ 1405h
Test Species: Daphnia magna
Set up by: NIL/AWD

Sample Information:

Sample ID: EV-GTI-WS-2016-10-04-N
Sample Date: October 4, 2016
Date Received: October 6, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 092116B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 28
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC40
Stock Solution ID: 16Na02
Date Initiated: October 12, 2016
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.0-5.4) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: 

Date reviewed: Oct. 21, 2016

**Freshwater Acute
48 Hour Toxicity Test Data Sheet**

Client: Teck (Env)
 Sample ID: EV-GTI-WS-2016-10-04N
 Work Order No.: 161075

Start Date/Time: October 6, 2016 @ 1405h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: MCL/AWD

Thermometer: CER#5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	20.0	19.5	19.5	8.6	8.4	8.0	7.6	7.6	7.7	355	377
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	20.5	19.5	19.5	8.9	8.4	8.0	7.9	8.1	8.1	1534	1887
	B	10	10	0										1109	
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		MCL	AWD	A	MCL	MCL	A	MCL	MCL	A	MCL	MCL	A	MCL	A

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO3)	
Control (MHW)	100	68
Highest conc.	1130	252
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.5		
DO (mg/L)	8.9		
pH	7.9		
Cond (µS/cm)	* 1534 1109		
Salinity (ppt)	0.806		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: clear, no colour, no odour, no particulates

Batch#: 09216B 7-d previous # young/brood: 28 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Oct. 21, 2016

Client: Teck

W.O.#: 161015

Hardness and Alkalinity Datasheet

Sample ID	Alkalinity						Hardness			Technician
	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO 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)	
EV-SPI-WS- 2016-10-04-N	Oct 4/16	Oct 6/16	50	16.0	16.3	314	10 [Ⓢ]	12.6	1260	YML
EV-ECL-WS- 2016-10-04-N			50	15.8	16.1	310	10 [Ⓢ]	12.0	1200	YML
EV-MGL-WS- 2016-10-04-N			50	9.1	9.3	178	10 [Ⓢ]	7.6	760	YML
EV-AQB-WS- 2016-10-04-N			50	12.6	12.9	246	50	13.3	266	YML
EV-GTI-WS- 2016-10-04-N			50	13.0	13.4	252	10 [Ⓢ]	11.3	1130	YML
MHW	Oct 6/16	Oct 6/16	50	3.5	3.6	68	50	5.0	100	YML

Notes: [Ⓢ] Diluted to 100 mL w/ DI water.

Reviewed by: 

Date Reviewed: Oct. 21, 2016

APPENDIX C – Chain-of-custody form

Teck														
COC ID:		20161004			TURNAROUND TIME:			RUSH:						
PROJECT/CLIENT INFO:					LABORATORY:				OTHER INFO:					
Facility Name / Job:		Elkview Operations			Lab Name:		Nautius Environmental			Report Format / Distribution:				
Job Description:		Monthly Toxicity Sampling			Lab Contact:		Krysta Peary			Excel	PDF	EDD		
Project Manager:		Michael Moore			Email:		krysta@nautiusenvironmental.ca			Email 1:	Michael.Moore@teck.com	X	X	X
Email:		Michael.Moore@teck.com			Address:		8664 Commerce Court			Email 2:	teckcof@nautius.com	X	X	X
Address:		RR#1 HWY# 3			City:		Imperial Square Lake City			Email 3:	krysta@nautius.com	X	X	X
City:		Sparwood			Province:		BC			Email 4:	Genevieve.Gifford@teck.com	X	X	X
Postal Code:		V1C 4C3			Country:		Canada			Email 5:				
Phone Number:		1-250-865-5289			City:		Burnaby			Province:	BC	FO number:	418927	
Postal Code:		V5A 4N7			Country:		Canada							
Phone Number:					City:									
SAMPLE DETAILS:					ANALYSIS REQUESTED:									
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	Ce/Grab Co-Comp	# Of Cont.	Toxicity 96-hr rainbow trout (Pass/Fail)	Toxicity 48-hr Daphnia magna P/F					
EV_SPI_WS_2016-10-04_N	EV_SPI	WS	N	2016/10/04	8:55	G	3	1	2			8.5		
EV_EC1_WS_2016-10-04_N	EV_EC1	WS	N	2016/10/04	8:35	G	3	1	2					
EV_MG1_WS_2016-10-04_N	EV_MG1	WS	N	2016/10/04	10:20	G	3	1	2					
EV_AQ6_WS_2016-10-04_N	EV_AQ6	WS	N	2016/10/04	7:05	G	3	1	2					
[REDACTED]	[REDACTED]													
[REDACTED]	[REDACTED]													
EV_GT1_WS_2016-10-04_N	EV_GT1	WS	N	2016/10/04	12:00	G	3	1	2					
Total						15#								
ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS:				REQUISITIONED BY/AFFILIATION:				DATE/TIME:		ACCEPTED BY/AFFILIATION:		DATE/TIME:		
Toxicity 96-Hr/48-HR = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphnia testing to occur at 20 degrees)										Nautius		Oct 06/16 @ 10:10		
										NY - Nan Yamamoto				
NO OF BOTTLES RETURNED/DESCRIPTION:				Sampler's Name:				Mobile #:						
Regular (default) <input checked="" type="checkbox"/>				Cam Griffin										
Priority (2-3 business days) - 50% surcharge				Sampler's Signature:				Date/Time:		4 OCT 2016				
Emergency (1 Business Day) - 100% surcharge														
For Emergency <1 Day, ASAP or Weekend - Contact ALS														

①
②
③
④
⑤

1x20L + 2x1L
↓

Sample Description:

- ① Clear, colorless, No particulates, Odourless.
- ② Clear, colorless, No particulates, Odourless.
- ③ Clear, colorless, No particulates, Odourless.
- ④ Clear, colorless, No particulates, Odourless.
- ⑤ Clear, colorless, No particulates, Odourless.

wo # 161074 - 96H Rbt P/F
161075 - 48H D. Magna P/F

END OF REPORT



Teck Coal/ Elkview Operations
ATTN: Michael Moore
RR1 HWY 3
Sparwood, BC
V1C 4C3

Report Date: October 28, 2016
Work Order: 161127 - 161128

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 96-h rainbow trout acute single-concentration screening toxicity test.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
EV_AQ1_WS_2016-10-17_N	October 17, 2016 @ 1330h	0

Table 2. Results for the 48-h *Daphnia magna* acute single-concentration screening toxicity test.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
EV_AQ1_WS_2016-10-17_N	October 17, 2016 @ 1330h	0

The tests met performance criteria and there were no deviations from the protocol. The results presented in this report relate only to the sample tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck Coal (Evo)

Start Date/Time: Oct 20 116 @ 1300h

Work Order No.: 161127

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: EV_AQI_WS 2016-10-17-N
Sample Date: Oct 17 116
Date Received: Oct 18 116
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 092316
Source: Aqua Farms
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.28
Mean Length ± SD (mm): 29 ± 2
Mean Weight ± SD (g): 0.34 ± 0.10

Range: 25 - 33
Range: 0.21 - 0.56

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn51
Stock Solution ID: 16Zn02
Date Initiated: Oct 13/16
96-h LC50 (95% CL): 45.8 (27.1 - 75.2) µg/L Zn

Reference Toxicant Mean and Historical Range: 65.5 (26.3 - 163.2) µg/L Zn
Reference Toxicant CV (%): 58%

Test Results: 100% survival at 96 hours in the undiluted 100% (1/1) sample.

Reviewed by: [Signature]

Date reviewed: Oct. 26, 2016

Daphnia magna Summary Sheet

Client: Teck (Evo)
Work Order No.: 161128

Start Date/Time: October 18, 2016 @ 1550h
Test Species: Daphnia magna
Set up by: ML

Sample Information:

Sample ID: EV-AQLWS-2016-10-17LN
Sample Date: October 17, 2016
Date Received: October 18, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 092816A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC40
Stock Solution ID: 16Na02
Date Initiated: October 12, 2016
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.0-5.4) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: [Signature]

Date reviewed: Oct 26, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (Env)
 Sample ID: EV-AG1-WS-2016-10-17-N
 Work Order No.: 161128

Start Date/Time: October 18, 2016 @ 1550h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.0	19.5	19.5	8.6	8.6	8.4	7.6	7.8	7.6	359	361
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	21.0	19.5	19.5	8.9	8.5	8.4	8.0	8.1	8.1	687	685
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO ₃)	
Control (MHW)	100	78
Highest conc.	380	236
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	21.0		
DO (mg/L)	8.9		
pH	8.0		
Cond (µS/cm)	687		
Salinity (ppt)	0.3		

Comments: _____ Mortality: Heartbeat checked under microscope ^{not} reg'd.

Sample Description: clear, light yellow colour, no odour, no particulates.

Batch#: 92816A 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: [Signature] Date reviewed: Oct. 26, 2016

Teck

COC ID: 20161017		TURNAROUND TIME:				RUSH:												
PROJECT/CLIENT INFO				LABORATORY				OTHER INFO										
Facility Name / Job# Elkview Operations				Lab Name Nautilus Environmental		Report Format / Distribution			Excel	PDF	EDD							
Job Description SA Chronic Toxicity Sampling				Lab Contact Krysta Peracy		Email 1: Michael.Moore@teck.com			X	X	X							
Project Manager Michael Moore				Email krysta@nautilusenvironmental.ca		Email 2: tecklab@nautilusonline.com			X	X	X							
Email Michael.Moore@teck.com				Address 8664 Commerce Court		Email 3: James.Boldt@teck.com			X	X	X							
Address RR#1 HWY# 3				Imperial Square, Lake City		Email 4: Cameron.Graff@teck.com			X	X	X							
City Sparwood Province BC				City Burnaby Province BC		Email 5:												
Postal Code V1C 4C3 Country Canada				Postal Code V5A 4N7 Country Canada		PO number 432106												
Phone Number 1-250-865-5289				Phone Number														
SAMPLE DETAILS						ANALYSIS REQUESTED												
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30-day rainbow trout early life stage P/F	72h P.subcapitata P/F	7d C.dupia P/F	96 hr rainbow trout Pass/Fail	48 hr Daphnia Pass/Fail				Temp °C	
EV_HC1_WS_2016-10-17_N	EV_HC1	ws	N	10/17/2016	10:45	G	4		x	x	x						5.0	4x20
EV_MC2_WS_2016-10-17_N	EV_MC2	ws	N	10/17/2016	12:45	G	4		x	x	x						5.8	4x20L
① EV_AQ1_WS_2016-10-17_N	EV_AQ1	ws	N	10/17/2016	13:30	G	3	W/F	16/121	16/120	16/119	16/127	16/128				6.0	1x20L 2x1L
							Total	8										
ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS				RELINQUISHED BY/AFFILIATION				DATE/TIME		ACCEPTED BY/AFFILIATION			DATE/TIME					
72h P.subcapitata P/F 7d C.dupia P/F 30d rainbow trout early life stage P/F 96 hr Rainbow Trout P/F 48 hr Daphnia P/F										Nautilus NY - Nari Yamamoto			Oct 18/16 @ 09:00					
Regular (default) X				Sampler's Name				Cameron Graff		Mobile #								
Priority (2-3 business days) - 50% surcharge				Sampler's Signature						Date/Time			17 OCT 2016					
Emergency (1 Business Day) - 100% surcharge																		
For Emergency <1 Day, ASAP or Weekend - Contact ALSI																		

① Sample Description = light yellow, clear, odorless, no particulates.



Teck Coal/ Line Creek Operations
ATTN: Jay Jones
Box 2003
Sparwood, BC
V0B 2G0

Report Date: March 21, 2016
Work Order: 16305 – 16306

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 96-h rainbow trout acute toxicity test.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
LC_LC7_Q_WS_2016-03-07_N	March 7, 2016 @ N/A	0

N/A = Not Available.

Table 2. Results for the 48-h *Daphnia magna* acute toxicity test.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
LC_LC7_Q_WS_2016-03-07_N	March 7, 2016 @ N/A	6.7

N/A = Not Available.

The tests met performance criteria and there were no deviations from the protocol. The results presented in this report relate only to the sample tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck (LCO)

Start Date/Time: Mar 10/16 @ 0935h

Work Order No.: 16305

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: LC-LC7-Q-WS-2016-03-07-N
Sample Date: Mar 7/16
Date Received: Mar 9/16
Sample Volume: 2 x 20L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 12
Alkalinity (mg/L CaCO₃): 10

Test Organism Information:

Batch No.: 020816
Source: Aqua Farms
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.42
Mean Length ± SD (mm): 31 ± 1
Mean Weight ± SD (g): 0.50 ± 0.03

Range: 30-34
Range: 0.46-0.54

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn35
Stock Solution ID: 15Zn05
Date Initiated: Mar 4/16
96-h LC50 (95% CL): 87.1 (71.2-106.4) µg/L Zn

Reference Toxicant Mean and Historical Range: 71.7 (34.0-151.5) µg/L Zn
Reference Toxicant CV (%): 45%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: March 16, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck (LCO)
Sample I.D.: LC-LC7-2-WS-2016-03-07-N
W.O. #: 16305
RBT Batch #: 020816
Date Collected/Time: Mar 07 / 16 @ NIA (not available)
Date Setup/Time: Mar 10 / 16 @ 0935h
Sample Setup By: EC

Number Fish/Volume: 10/12 L
7-d % Mortality: 0
Total Pre-aeration Time (mins): 70 mins
Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

D.O. meter: 2 Thermometer: CER#2
pH meter: 1
Cond. Meter: 2

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
pH	7.9	/	7.9
D.O. (mg/L)	11.2	/	10.9
Cond. (µS/cm)	461	/	461
Salinity (ppt)	0.2	/	0.2

Concentration (% v/v)	# Survivors							Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
(+)				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.0	9.7	9.6	9.9	9.7	6.5	6.4	6.6	6.8	6.7	30	34
100				10	10	10	10	14.0	14.0	14.0	14.0	14.0	10.3	9.8	9.6	9.8	10.0	7.9	8.0	8.1	8.2	8.2	461	463
Initials				EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC

WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Sample Description/Comments: Clear, colorless, some particulates, odourless
 No
 EC

Fish Description at 96 h: All fish appear healthy **Number of Stressed Fish at 96 h:** 0

Other Observations: _____

Reviewed by: [Signature]

Date Reviewed: March 16, 2016

Daphnia magna Summary Sheet

Client: Teck (Lco)
Work Order No.: 16306

Start Date/Time: March 10, 2016 @ 1015h
Test Species: Daphnia magna
Set up by: WYL

Sample Information:

Sample ID: LC-LC7-Q-WS-2016-0307N
Sample Date: March 7, 2016
Date Received: March 9, 2016
Sample Volume: 2 x 20L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 021616B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 21
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC29
Stock Solution ID: 15Na03
Date Initiated: March 15, 2016
48-h LC50 (95% CL): 5.2 (4.2-6.4) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 6.7% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: March 17, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teek (LCO)
 Sample ID: LC-LC7-Q-WS-2016-03-07A
 Work Order No.: 16306

Start Date/Time: March 10, 2016 @ 10:54
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YVL

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		48	No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		0	24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	0	19.5	7.00	20.5	8.7	8.4	8.3	7.8	7.89	7.7	351	350
	B	10	10	0	0											
	C	10	10	0	0											
	D				0											
100	A	100	100	0	0	19.5	7.00	20.5	9.1	8.5	8.4	8.1	8.2	8.1	472	473
	B	100	100	0	0											
	C	100	100	0	0											
	D				0											
	A															
	B															
	C															
	D															
	A															
	B															
	C															
	D															
	A															
	B															
	C															
	D															
Technician Initials		YVL	AZ			YVL	YVL		YVL	YVL		YVL	YVL		YVL	

Concentration	Hardness* (mg/L as CaCO ₃)	Alkalinity* (mg/L as CaCO ₃)
Control (MHW)	100	72
Highest conc.	244	172
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		19.5
DO (mg/L)	10.1		9.1
pH	8.1	(2 min aeration)	8.1
Cond (µS/cm)	470		472
Salinity (ppt)	0.2		0.2

Comments: organisms on surface Mortality: Heartbeat checked under microscope yes

Sample Description: clear, no colour, no odour, no particulates

Batch#: 0246/03B 7-d previous # young/brood: 21 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: YVL Date reviewed: March 16, 2016



Teck Coal / Line Creek Operations
ATTN: Jay Jones
Box 2003
Sparwood, BC
VOB 2G0

Report Date: May 16, 2016
Work Order: 16504 - 16505

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 96-h rainbow trout acute toxicity test.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
LC_LC7_Q_WS_2016-05-04_N	May 2, 2016 @ 1126h	0

Table 2. Results for the 48-h *Daphnia magna* acute toxicity test.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
LC_LC7_Q_WS_2016-05-04_N	May 2, 2016 @ 1126h	0

The tests met performance criteria and there were no deviations from the test methods. The results presented here relate only to the sample tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck Coal (LCO)

Start Date/Time: May 5/16 @ 0600h

Work Order No.: 16505

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: LC-LC7-Q-WS-2016-05-04-N
Sample Date: May 2/16
Date Received: May 3/16
Sample Volume: 1x20L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 040716
Source: Miracle Springs
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.29
Mean Length ± SD (mm): 27 ± 2 Range: 23 - 30
Mean Weight ± SD (g): 0.35 ± 0.08 Range: 0.24 - 0.50

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn39
Stock Solution ID: 15Zn05
Date Initiated: Apr 28/16
96-h LC50 (95% CL): 91.9 (68.7 - 123.5) µg/L Zn

Reference Toxicant Mean and Historical Range: 69.4 (34.1 - 141.3) µg/L Zn
Reference Toxicant CV (%): 43%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample

Reviewed by: [Signature]

Date reviewed: May 12, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal (LCO)
 Sample I.D.: LC-LC7-Q-WS-2016-05-04-N
 W.O. #: 16505
 RBT Batch #: 090716
 Date Collected/Time: May 2/16 @ 1126h
 Date Setup/Time: May 5/16 @ 0600h
 Sample Setup By: EC

Number Fish/Volume: 10/12 L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER# 2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	15.0	/	15.0
pH	8.3	/	8.3
D.O. (mg/L)	10.0	/	10.0
Cond. (µS/cm)	424	/	424
Salinity (ppt)	0.2	/	0.2

Concentration	# Survivors								Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
(% v/v)																									
C+I				10	10	10	10	15.0	15.0	15.0	15.0	15.0	10.0	9.9	9.9	9.8	9.8	6.7	6.7	6.9	6.8	6.8	25	31	
100				10	10	10	10	15.0	15.0	15.0	15.0	15.0	10.0	9.8	9.8	9.9	9.9	8.3	8.3	8.2	8.2	8.2	424	433	
Initials				EL	AS	AS	EL	EC	EL	AS	AS	EL	EC	EL	AS	AS	EL	EC	EL	AS	AS	EL	EC	EL	

Sample Description/Comments: light yellow, clear, odourless, no particulates

Fish Description at 96 h: All fish appear healthy Number of Stressed Fish at 96 h: 0

Other Observations: _____

Reviewed by:

Date Reviewed: May 12, 2016

Daphnia magna Summary Sheet

Client: Teck (LCO)
Work Order No.: 16504

Start Date/Time: May 4, 2016 @ 1420h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: LL-LCT-Q-WS-2016-05-04-N
Sample Date: May 2, 2016
Date Received: May 3, 2016
Sample Volume: 2x1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 041916A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 15
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC32
Stock Solution ID: 16NaCl
Date Initiated: April 27, 2016
48-h LC50 (95% CL): 4.8 (4.0 - 5.9) g/LNaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: May 12, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (Lco) Start Date/Time: May 4, 2016 @ 1420h
 Sample ID: LC-LC7-Q-WS-2016-05-04-N No. Organisms/volume: 10/200mL
 Work Order No.: 16504 Test Organism: D.magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	20.0	20.0	20.0	8.4	8.3	8.2	7.6	7.6	7.7	352	363
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	20.5	20.0	20.0	8.5	8.2	8.3	8.3	8.2	8.2	439	443
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	96	66
Highest conc.	234	206
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.5		
DO (mg/L)	8.5		
pH	8.3		
Cond (µS/cm)	439		
Salinity (ppt)	0.2		

Comments: _____ Mortality: Heartbeat checked under microscope not req'd

Sample Description: clear, light yellow colour, no odour, no particulates

Batch#: 041916A 7-d previous # young/brood: 15 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: May 12, 2016



Acute Toxicity Test Results

Sample collected October 31, 2016

Final Report

November 24, 2016

Submitted to: **Teck Coal / Line Creek Operations**
Sparwood, BC

SAMPLE INFORMATION

Sample ID	Dates				
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> test initiation	Receipt temp.
LC_LCDSSLCC_WS_2016-10-31_NP	31-Oct-16 at 1613h	05-Nov-16 at 1245h ¹ ; 02-Nov-16 at 0930h ²	05-Nov-16 at 1435h	02-Nov-16 at 1540h	11.0°C ¹ / 5.4°C ²

¹ Receipt at Aquatox; ² Receipt at Nautilus (Burnaby)

The sample was received at Nautilus Environmental (Burnaby, BC) and forwarded to Nautilus Environmental (Calgary, AB) for rainbow trout testing, but the limited number of available fish for testing from suppliers in both BC and AB resulted in the trout testing being conducted by Aquatox, ON. The *Daphnia* screening tests were performed at Nautilus Environmental (Burnaby, BC).

TESTS

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test – also tested at 10°C as requested by the client, which was initiated concurrently with the standard test exposure of 20°C.

RESULTS

Toxicity test results

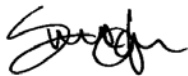
Sample ID	Percent mortality in 100% (v/v) sample		
	Rainbow trout	<i>Daphnia magna</i>	
		10°C	20°C
LC_LCDSSLCC_WS_2016-10-31_NP	0	0	0

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CI)	4142 (3815 - 4556) mg/L KCl ¹	4.5 (3.8 – 5.4) g/L NaCl ²
Reference toxicant historical mean (2 SD range)	3602 (3056 – 4245) mg/L KCl	4.1 (3.1 – 5.5) g/L NaCl
Reference toxicant CV	N/A	15%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹ Test date November 1, 2016. ² Test date November 2, 2016.

N/A = Not Available



Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio
Senior Analyst

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) single concentration test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L vessel
Test volume	20 L
Test solution depth	≥15 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated municipal tapwater
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test measurements	Temperature measured daily; dissolved oxygen, pH and conductivity measured at test initiation and test termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Potassium chloride

Table 2. Summary of test conditions: 48-h *Daphnia magna* single concentration test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data



AquaTox Testing & Consulting Inc.
 B-11 Nicholas Beaver Rd.
 Puslinch ON N0B 2J0
 Tel: (519) 763-4412 Fax: (519) 763-4419

TOXICITY TEST REPORT
Rainbow Trout
 Page 1 of 2

Work Order : 232321
 Sample Number : 49520

SAMPLE IDENTIFICATION

Company :	Nautilus Environmental, Calgary	Time Collected :	Not provided
Location :	Calgary AB	Date Collected :	2016-10-31
Substance :	1617-0372	Date Received :	2016-11-05
Sampling Method :	Not provided	Date Tested :	2016-11-05
Sampled By :	Not provided	Temp. on arrival :	11.0°C
Sample Description :	Clear, colourless, slight odour.		
Test Method :	Reference Method for Determining Acute Lethality of Liquid Effluents to Rainbow Trout. Environment Canada, EPS 1/RM/13 (2nd Edition, December 2000, with May 2007 and February 2016 amendments).		

96-h TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested.

POTASSIUM CHLORIDE REFERENCE TOXICANT DATA

Organism Batch :	T16-18	Historical Mean LC50 :	3602 mg/L
Date Tested (yyyy-mm-dd) :	2016-11-01	Warning Limits (± 2SD) :	3056 - 4245 mg/L
LC50 (95% Confidence Limits) :	4142 mg/L (3815 - 4556)	Analyst(s) :	SV, FS, DK
Statistical Method :	Linear Regression (MLE)		

TEST FISH

Control Fish Sample Size :	10	Cumulative stock tank mortality:	0 % (prev. 7 days)
Mean Fish Weight (± 2 SD) :	0.48 ± 0.23 g	Mean Fish Fork Length (± 2 SD) :	36.4 ± 5.1 mm
Range of Weights :	0.34 - 0.68 g	Range of Fork Lengths (mm) :	34 - 40 mm
Fish Loading Rate :	0.2 g/L		

TEST CONDITIONS

Test Organism :	<i>Oncorhynchus mykiss</i>	Volume Tested (L) :	20
Sample Treatment :	None	Number of Replicates :	1
pH Adjustment :	None	Organisms Per Replicate :	10
Test Aeration :	Yes	Total Organisms Per Test Level :	10
Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Test Method Deviation(s) :	None

Date: 2016-11-22
 yyyy-mm-dd

Approved by: 
 Project Manager



TOXICITY TEST REPORT

Rainbow Trout

Page 2 of 2

Work Order: 232321
Sample Number: 49520

Total Pre-Aeration Time (h)		pH	D.O. (mg/L)	Cond. (µmhos/cm)	Temp. (°C)	O ₂ Sat. (%)*
0:30	Initial Water Chemistry:	8.1	9.8	740	15.0	-
	Chemistry after 30min air:	8.0	9.7	745	15.0	100

0 hours

Date & Time	2016-11-05	14:35					
Technician:	DK						
Test Conc. (%)	Mortality	Immobility	pH	D.O.	Cond.	Temp.	O ₂ Sat. (%)*
100	0	0	8.0	9.7	745	15.0	100
Control	0	0	8.3	9.7	835	15.0	100

Notes:

24 hours

Date & Time	2016-11-06	14:35					
Technician:	DK						
Test Conc. (%)	Mortality	Immobility	pH	D.O.	Cond.	Temp.	O ₂ Sat. (%)*
100	0	0	-	-	-	14.0	
Control	0	0	-	-	-	14.0	

Notes:

48 hours

Date & Time	2016-11-07	14:35					
Technician:	SV(FS)						
Test Conc. (%)	Mortality	Immobility	pH	D.O.	Cond.	Temp.	O ₂ Sat. (%)*
100	0	0	-	-	-	14.0	
Control	0	0	-	-	-	14.0	

Notes:

72 hours

Date & Time	2016-11-08	14:35					
Technician:	SV(FS)						
Test Conc. (%)	Mortality	Immobility	pH	D.O.	Cond.	Temp.	O ₂ Sat. (%)*
100	0	0	-	-	-	15.0	
Control	0	0	-	-	-	15.0	

Notes:

96 hours

Date & Time	2016-11-09	14:35					
Technician:	FS						
Test Conc. (%)	Mortality	Immobility	pH	D.O.	Cond.	Temp.	O ₂ Sat. (%)*
100	0	0	8.0	9.2	758	15.0	
Control	0	0	8.2	9.3	785	15.0	

Notes:

Control organisms showing stress: 0
Organism Batch : T16-18

"-" = not measured/not required

Number immobile does not include number of mortalities.

* adjusted for actual temp. & barometric pressure

Test Data Reviewed By: DK
Date: 2016-11-14



AquaTox Testing & Consulting Inc.
 B-11 Nicholas Beaver Rd.
 Puslinch ON N0B 2J0
 Tel: (519) 763-4412 Fax: (519) 763-4419

TOXICITY TEST REPORT
Rainbow Trout
 Page 1 of 2

Work Order : 232321
 Sample Number : 49520

SAMPLE IDENTIFICATION

Company :	Nautilus Environmental, Calgary	Time Collected :	Not provided
Location :	Calgary AB	Date Collected :	2016-10-31
Substance :	1617-0372	Date Received :	2016-11-05
Sampling Method :	Not provided	Date Tested :	2016-11-05
Sampled By :	Not provided	Temp. on arrival :	11.0°C
Sample Description :	Clear, colourless, slight odour.		
Test Method :	Reference Method for Determining Acute Lethality of Liquid Effluents to Rainbow Trout. Environment Canada, EPS 1/RM/13 (2nd Edition, December 2000, with May 2007 and February 2016 amendments).		

96-h TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested.

POTASSIUM CHLORIDE REFERENCE TOXICANT DATA

Organism Batch :	T16-18	Historical Mean LC50 :	3602 mg/L
Date Tested (yyyy-mm-dd) :	2016-11-01	Warning Limits (± 2SD) :	3056 - 4245 mg/L
LC50 (95% Confidence Limits) :	4142 mg/L (3815 - 4556)	Analyst(s) :	SV, FS, DK
Statistical Method :	Linear Regression (MLE)		

TEST FISH

Control Fish Sample Size :	10	Cumulative stock tank mortality:	0 % (prev. 7 days)
Mean Fish Weight (± 2 SD) :	0.48 ± 0.23 g	Mean Fish Fork Length (± 2 SD) :	36.4 ± 5.1 mm
Range of Weights :	0.34 - 0.68 g	Range of Fork Lengths (mm) :	34 - 40 mm
Fish Loading Rate :	0.2 g/L		

TEST CONDITIONS

Test Organism :	<i>Oncorhynchus mykiss</i>	Volume Tested (L) :	20
Sample Treatment :	None	Number of Replicates :	1
pH Adjustment :	None	Organisms Per Replicate :	10
Test Aeration :	Yes	Total Organisms Per Test Level :	10
Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Test Method Deviation(s) :	None

Date: 2016-11-22
 yyyy-mm-dd

Approved by: 
 Project Manager

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 161203

Start Date/Time: November 2, 2016 @ 1540h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: LC-LCDSSLCC-WS-2016-10-31-NP
Sample Date: October 31, 2016
Date Received: November 2, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 101216B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 23
Mortality (%) in previous 7 d: 0
Days to first brood: 8

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC41
Stock Solution ID: 16NaO2
Date Initiated: November 2, 2016
48-h LC50 (95% CL): 4.5 (3.8 - 5.4) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.1 (3.1 - 5.5) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (V/V) undiluted sample, tested at 20°C.

Reviewed by: [Signature]

Date reviewed: Nov. 23, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck Start Date/Time: November 2, 2016 @ 15:40
 Sample ID: LC-LCD SSLCC-WS-2016-10-3LNP No. Organisms/volume: 10/200mL
 Work Order No.: 161203 Test Organism: D.magna
 Set up by: YMC

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	19.0	19.5	19.0	8.6	8.4	8.3	7.6	7.6	7.6	354	363
	B	10	10	0											
	C	10	10	0											
	D														
100 (200C)	A	10	10	0	18.5	19.6	19.0	9.2	8.4	8.3	7.9	7.9	8.0	750	754
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YMC	YMC	YMC	YMC	YMC	YMC	YMC	YMC	YMC	YMC	YMC	YMC	YMC	YMC

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	94	66
Highest conc.	430	176
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.5		
DO (mg/L)	9.2		
pH	7.9		
Cond (µS/cm)	750		
Salinity (ppt)	0.4		

Comments: _____ Mortality: Heartbeat checked under microscope ^{not req'd}

Sample Description: clear, no colour, no odour, no particulates.

Batch#: 101216B 7-d previous # young/brood: 23 Previous 7-d Mortality (%): 0 Day of 1st Brood: 8

Reviewed by: [Signature] Date reviewed: Nov-23, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 16/203

Start Date/Time: November 2, 2016 @ 1545h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: LC LC DSSLCC-WS-2016-10-31-NP
Sample Date: October 31, 2016
Date Received: November 2, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 101216B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 23
Mortality (%) in previous 7 d: 0
Days to first brood: 8

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC41
Stock Solution ID: 16NaO2
Date Initiated: November 2, 2016
48-h LC50 (95% CL): 4.5 (3.8 - 5.4) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.1 (3.1 - 5.5) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample, tested at 10°C

Reviewed by: [Signature]

Date reviewed: Nov 23, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck Start Date/Time: November 2, 2016 @ 1545h
 Sample ID: LC-LCDSSLC WS-2016-10-31-NP No. Organisms/volume: 10/200mL
 Work Order No.: 161203 Test Organism: D. magna
 Set up by: VMC

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	11.5	11.0	10.5	9.7	10.4	10.3	7.6	7.5	7.9	352	351
	B	10	10	0											
	C	10	10	0											
	D														
100 (100%)	A	10	10	0	11.5	11.0	10.5	9.9	10.3	10.3	7.9	7.9	8.0	754	754
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		VMC	VMC	VMC	VMC	VMC	VMC	VMC	VMC	VMC	VMC	VMC	VMC	VMC	VMC

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO ₃)	
Control (MHW)	96	68
Highest conc.	440	180
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	11.5		
DO (mg/L)	9.9		
pH	7.9		
Cond (µS/cm)	754		
Salinity (ppt)	0.4		

Comments: _____ Mortality: Heartbeat checked under microscope not noted

Sample Description: clear, no colour, no odour, no particulates.

Batch#: 1012168 7-d previous # young/brood: 23 Previous 7-d Mortality (%): 0 Day of 1st Brood: 8

Reviewed by: VMC Date reviewed: Nov-23, 2016

Client: Teck

W.O.#: 161203

Hardness and Alkalinity Datasheet

Sample ID	Alkalinity						Hardness			Technician
	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO 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)	
LC-LCDSLCC WS-2016-10-31-NP @ 20°C	Nov. 2/16	Nov. 2/16	50	9.0	9.2	176	100	4.3	430	YML
LC-LCDSLCC WS-2016-10-31-NP @ 10°C	Nov. 2/16	Nov. 2/16	50	9.2	9.4	180	100	4.4	440	YML
MHW @ 20°C	Nov. 2/16	Nov. 2/16	50	3.4	3.5	66	50	4.7	94	YML
MHW @ 10°C	↓	↓	↓	3.5	3.6	68	↓	4.8	96	↓

Notes: ① Diluted to 100 mL w/ DI water.

Reviewed by: 

Date Reviewed: Nov. 23, 2016

APPENDIX C – Chain-of-custody form



TESTING LOCATION (Please Circle)

Burnaby
 8664 Commerce Court
 Burnaby, British Columbia, Canada
 V5A 4N7
 Phone 604.420.8773

Calgary
 #4, 6125 12 Street SE
 Calgary, Alberta, Canada
 T2H 2K1
 Phone 403.253.7121

Chain of Custody

Date Nov. 01/16 Page of

Report to:		Invoice To:		ANALYSES REQUIRED										Receipt Temperature (°C)								
Company	Nautilus Environmental	Company	(same)	96h RBT LC50	96h RBT p/f	96h RBT LT50																
Address	8664 Commerce Court	Address																				
City/Prov/PC	Burnaby, BC	City/Prov/PC																				
Contact	Yvonne Lam	Contact																				
Phone	604-420-8773	Phone																				
Email	yvonne@nautilusenvironmental.ca	Email																				
PO No.		PO No.																				
Sample Collection By:				Sample Type: <input type="radio"/> Grab <input type="radio"/> OR <input type="radio"/> Composite																		
SAMPLE ID	DATE (DD/MM/YY)	TIME	MATRIX	# OF CONTAINERS AND VOLUME (e.g. 1 x 20 L)	COMMENTS																	
1 Ruskin MHP	01/11/16			1 x 20L	1617-0371																	10
2 LC_LCDSSLCC_WS_	31/10/16			1 x 20L	1617-0372																	16
3 2016-10-31_NP																						
4																						
5																						
6																						
7																						
8																						
9																						
10																						
SPECIAL INSTRUCTIONS/COMMENTS (CLIENT)				SAMPLE RECEIPT DETAILS (LABORATORY)				SAMPLE DESCRIPTION AND COMMENTS (LABORATORY)														
				1. Total No. of Containers	2	4. Ice Present in Cooler?	<input checked="" type="radio"/> Y <input type="radio"/> N															
				2. Courier	Master	5. Seal Present?	<input checked="" type="radio"/> Y <input type="radio"/> N															
				3. Good Condition?	<input checked="" type="radio"/> Y <input type="radio"/> N	6. Initials Present on Seal?	<input checked="" type="radio"/> Y <input type="radio"/> N															
RELINQUISHED BY (CLIENT)				RECEIVED BY (LABORATORY)				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.														
Yvonne Lam		<i>[Signature]</i>		MC		<i>[Signature]</i>																
(Printed Name)		(Signature)		(Printed Name)		(Signature)																
<i>[Signature]</i> Nautilus		02/11/16		<i>[Signature]</i>		2016/11/01																
(Company)		(Date DD/MM/YY and Time)		(Company)		(Date DD/MM/YY and Time)																

END OF REPORT



Acute Toxicity Test Results

Samples collected November 15, 2016

Final Report

November 30, 2016

Submitted to: **Teck Coal / Line Creek Operations**
Sparwood, BC

SAMPLE INFORMATION

Sample ID	Dates				Receipt temp.
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> test initiation	
LC_LCDSSLCC_WS_2016-11-15_N	15-Nov-16 at 1230h	16-Nov-16 at 1000h	18-Nov-16 at 1545h	16-Nov-16 at 1505h	3.5°C
LC_LC5_WS_2016-11-15_N	15-Nov-16 at 1056h	16-Nov-16 at 1000h	17-Nov-16 at 1340h	16-Nov-16 at 1510h	4.5°C

TESTS

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test

RESULTS

Toxicity test results

Sample ID	Percent mortality in 100% (v/v) sample	
	Rainbow trout	<i>Daphnia magna</i>
LC_LCDSSLCC_WS_2016-11-15_N	0	0
LC_LC5_WS_2016-11-15_N	0	0

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CI)	40.6 (34.1 – 48.4) µg/L Zn ¹	4.5 (3.8 – 5.4) g/L NaCl ²
Reference toxicant historical mean (2 SD range)	60.8 (22.0 – 167.6) µg/L Zn	4.1 (3.1 – 5.5) g/L NaCl
Reference toxicant CV	66%	15%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹ Test date November 14, 2016. ² Test date November 2, 2016.



Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio
Senior Analyst

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) single concentration test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquarium
Test volume	10 to 20 L (depending on size of fish)
Test solution depth	≥15 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tapwater
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Zinc (added as ZnCl ₂)

Table 2. Summary of test conditions: 48-h *Daphnia magna* single concentration test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: Teck Coal

Start Date/Time: Nov 18 116 @ 1545h

Work Order No.: 161244c

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: LC-LCDS2LL WS-2016-11-15-N
Sample Date: Nov 15 116
Date Received: Nov 16 116
Sample Volume: 1x X20 L
Other: 2

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 4

Test Organism Information:

Batch No.: 110116
Source: AK Vancouver Island Trout Hatchery
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.26
Mean Length ± SD (mm): 70 ± 2 Range: 26 - 31
Mean Weight ± SD (g): 0.31 ± 0.02 Range: 0.27 - 0.34

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn54
Stock Solution ID: 16Zn02
Date Initiated: Nov 14 116
96-h LC50 (95% CL): 40.6 (34.1 - 48.4) µg/L

Reference Toxicant Mean and Historical Range: 60.8 (22.0 - 167.6) µg/L Zn
Reference Toxicant CV (%): 66.1%

Test Results: 100% survival
0% mortality at 96 hours in the undiluted 100% (v/v) sample. 0% mortality at 96h in the undiluted 100% sample.

Reviewed by: [Signature]

Date reviewed: Nov-28, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Tech Coal
 Sample I.D. LC-LCDSSLCC-ws-2016-11-15-L
 W.O. # 161244C
 RBT Batch #: 110116
 Date Collected/Time: Nov 15/16 @ 1230h
 Date Setup/Time: Nov 18/16 @ 1545h
 Sample Setup By: EC

Number Fish/Volume: 10/12L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CE#2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Parameters	Undiluted Sample WQ	
	Initial WQ	Adjustment
Temp °C	14.0	14.0
D.O. (mg/L)	9.9	9.9
pH	8.2	8.1
Cond. (µS/cm)	375	375
Salinity (ppt)	0.4	0.4

Concentration	# Survivors										Temperature (°C)						Dissolved Oxygen (mg/L)						pH						Conductivity (µS/cm)					
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96							
(% V/V)	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96							
CT1				10	10	10	10	14.0	14.0	14.0	14.0	15.0	10.0	9.8	9.7	9.7	9.8	6.7	6.9	7.0	6.8	6.9	2.7	2.7	2.7	2.7	3.0							
100				10	10	10	10	14.0	14.0	14.0	15.0	9.9	9.7	9.7	9.8	9.8	8.1	8.3	8.4	8.2	8.2	7.75	7.75	7.75	7.75	7.84								
Initials				AA	AA	EA	EL	EA	EA	EA	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL							

Sample Description/Comments: Clear, Colorless, No particulates, No odour

Fish Description at 96 h: All fish appear normal Number of Stressed Fish at 96 h: 0

Other Observations: _____

Reviewed by: EC Date Reviewed: Nov-28, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (LCO)

Start Date/Time: Nov 17 116 @ 1340h

Work Order No.: 161244 e

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: LC-LCS-WS-2016-11-15-N
Sample Date: Nov 15 116
Date Received: Nov 16 116
Sample Volume: 1 x²⁰ L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 4

Test Organism Information:

Batch No.: 110116
Source: AK Vancouver Island Trout Hatchery
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.26
Mean Length ± SD (mm): 31 ± 1 Range: 30 - 34
Mean Weight ± SD (g): 0.32 ± 0.04 Range: 0.27 - 0.41

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn54
Stock Solution ID: 16Zn02
Date Initiated: Nov 14 116
96-h LC50 (95% CL): 40.6 (34.1-48.4) µg/L

Reference Toxicant Mean and Historical Range: 60.8 (22.0-167.6) µg/L Zn
Reference Toxicant CV (%): 66.1%

Test Results: 100% survival at 96 hours in the undiluted
100% (V/V) sample. 0% mortality at 96h in the
undiluted 100% (V/V) sample.

Reviewed by: [Signature] Date reviewed: Nov 28, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Tellicoal (LC)
 Sample I.D. LC-LCS-W3-2016-11-15-N
 W.O. # 161244c
 RBT Batch #: 110116
 Date Collected/Time: Nov 15/16 @ 1356h
 Date Setup/Time: Nov 17/16 @ 1340h
 Sample Setup By: EC

Number Fish/Volume: 10/12 L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Parameters	Undiluted Sample WQ	
	Initial WQ	30 min WQ
Temp °C	14.0	14.0
D.O. (mg/L)	10.3	10.3
pH	8.1	8.2
Cond. (µS/cm)	695	695
Salinity (ppt)	0.3	0.3

Thermometer: CER#2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Concentration	# Survivors						Temperature (°C)						Dissolved Oxygen (mg/L)						pH						Conductivity (µS/cm)
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96			
(% v/v)	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
41				10	10	10	10	14.0	15.0	14.5	14.5	15.0	10.1	9.9	9.8	9.9	9.8	6.8	6.9	7.0	7.1	7.0	26	31	
100				10	10	10	10	14.0	15.0	14.5	14.5	15.0	10.3	9.9	9.7	9.9	9.7	8.2	8.3	8.4	8.3	8.2	695	707	
Initials				EV	AB	AB	EL	EL	EL	EL	AB	AB	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	

Sample Description/Comments: (100%, colorless, no particulates, no odour)

Fish Description at 96 h All fish appear normal Number of Stressed Fish at 96 h 2

Other Observations: _____
 Reviewed by: EC Date Reviewed: Nov 28, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 161245e

Start Date/Time: November 16, 2016 @ 1505h
Test Species: Daphnia magna
Set up by: YMC

Sample Information:

Sample ID: LLCDSS2016-NS-2016-11-15-N
Sample Date: November 15, 2016
Date Received: November 16, 2016
Sample Volume: ~~1.25 L~~
2 x 1 L

Test Validity Criteria:
≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.
WQ Ranges:
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 8.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 101916B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 19
Mortality (%) in previous 7 d: 0
Days to first brood: 8

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC41
Stock Solution ID: 16NaO2
Date Initiated: November 2, 2016
48-h LC50 (95% CL): 4.5 (3.8 - 5.4) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.1 (3.1 - 5.5) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: [Signature]

Date reviewed: Nov 28, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: LC-LCDSBCC-WS-2016-11-19-N
 Work Order No.: 161245C

Start Date/Time: November 16, 2016 @ 1505h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: WNL

Thermometer: Temp-5 DO meter: DO-3 pH meter: pH-3 Cond./Salinity: C-3

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	19.0	19.0	18.5	8.6	8.4	8.3	7.6	7.6	7.7	352	355
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.0	19.0	18.5	8.9	8.5	8.4	8.0	8.0	8.1	788	786
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		WNL	WNL	WNL	WNL	WNL	WNL	WNL	WNL	WNL	WNL	WNL	WNL	WNL	WNL

Concentration	Hardness* (mg/L as CaCO3)	Alkalinity* (mg/L as CaCO3)
Control (MHW)	96	66
Highest conc.	390	212
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.0		
DO (mg/L)	8.9		
pH	8.0		
Cond (µS/cm)	788		
Salinity (ppt)	0.4		

Comments: _____ Mortality: Heartbeat checked under microscope not required

Sample Description: clear, no colour, no odour, no particulates.

Batch#: 101916B 7-d previous # young/brood: 19 Previous 7-d Mortality (%): 0 Day of 1st Brood: 8

Reviewed by: WNL Date reviewed: Nov 28, 2016

Daphnia magna Summary Sheet

Client: Teck (LCO)
Work Order No.: 161245C

Start Date/Time: November 16, 2016 @ 15:0h
Test Species: Daphnia magna
Set up by: YHL

Sample Information:

Sample ID: LCLES-WS-2016-11-15-N
Sample Date: November 15, 2016
Date Received: November 16, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 101916B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 19
Mortality (%) in previous 7 d: 0
Days to first brood: 3

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC41
Stock Solution ID: 16NaO2
Date Initiated: November 2, 2016
48-h LC50 (95% CL): 4.5 (3.8 - 5.4) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.1 - 5.5) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Nov. 28, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: ICLOS-WS-2016-115-N
 Work Order No.: 161245a

Start Date/Time: November 16, 2016 @ 15:0h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-3 pH meter: pH-3 Cond./Salinity: C-3

Concentration (% v/v)	Number of Live Organisms Rep	24		48	No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	0	19.0	19.0	18.5	8.6	8.3	8.3	7.6	7.6	7.7	352	358
	B	10	10	0	0											
	C	10	10	0	0											
	D															
100	A	10	10	0	0	18.5	19.0	18.5	8.8	8.4	8.3	8.1	8.1	8.1	707	708
	B	10	10	0	0											
	C	10	10	0	0											
	D															
	A															
	B															
	C															
	D															
	A															
	B															
	C															
	D															
	A															
	B															
	C															
	D															
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO3)	
Control (MHW)	96	66
Highest conc.	430	202
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.5		
DO (mg/L)	8.8		
pH	8.1		
Cond (µS/cm)	707		
Salinity (ppt)	0.3		

Comments: _____ Mortality: Heartbeat checked under microscope not needed

Sample Description: clear, no colour, no odour, no particulates

Batch#: 101916B 7-d previous # young/brood: 19 Previous 7-d Mortality (%): 0 Day of 1st Brood: 8

Reviewed by: YML Date reviewed: Nov. 28, 2016

APPENDIX C – Chain-of-custody form

COC ID: 20161115-1435	TURNAROUND TIME:	RUSH:
Facility Name / Job# Line Creek Operation	LABORATORY	OTHER INFO:
Project Manager Jay Jones	Lab Name Nautilus Environmental	Report Format / Distribution
Email jay.jones@teck.com	Lab Contact Krysta Peary	Email 1:
Address Box 2003	Email Krysta@NautilusEnvironmental.ca	Email 2: lin.dial@teck.com
15km North Hwy 43	Address 8664 commerce Court	Email 3: lackco@tubsonline.com
City Sparwood	City Burnaby	Email 4: call@ood@teck.com
Postal Code V0B 2G0	Province BC	PO number
Country Canada	Country Canada	322106
Phone Number 250-425-6111	Postal Code V5A 4N7	
	Phone Number 604-420-8773	

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	72h P. subcapitata P/R	7d C.dubia P/R	30 d rainbow trout early life stage P/R	7 d C.dubia dilution series	72hr subcapitata dilution series	7d minor plant grown dilution series	7 d myks development dilution series	96hr RT Single Generation Toxicity Test	48hr DM Single Concentration Toxicity Test	Temp °C
LC_LCDSLCC_WS_2016-11-15_N	LC_LCDSLCC	WS	N	2016/11/15	12:30	G	36			X					XX	XX	3.5
LC_LC5_WS_2016-11-15_N	LC_LC5	WS	N	2016/11/15	10:56	G	3								XX	XX	4.5
																	1x20L + 2x1L

REINQUISHED BY/AFIRMATION
November 15, 2016
Tyler Phillips

DATE/TIME ACCEPTED BY/AFIRMATION
November 15, 2016
Tyler Phillips

DATE/TIME
November 15, 2016
Tyler Phillips

DATE/TIME
November 15, 2016
Tyler Phillips

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS
① Clear, colorless, No particulates, No odor
② Clear, colorless, No particulates, No odor

REQUIREMENTS RETURNED/DISPOSITION
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

MOBILE # (250) 919-0965
DATE/TIME November 15, 2016

END OF REPORT



Acute Toxicity Test Results

Sample collected December 5, 2016

Final Report

December 20, 2016

Submitted to: **Teck Coal / Line Creek Operations**
Sparwood, BC

SAMPLE INFORMATION

Sample ID	Dates				Receipt temp.
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> test initiation	
LC_LC7_WS_2016-12-05-N	05-Dec-16 at 1442h	07-Dec-16 at 1112h	08-Dec-16 at 1340h	08-Dec-16 at 1600h	0.8°C

TESTS

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test

RESULTS

Toxicity test results

Sample ID	Percent mortality in 100% (v/v) sample	
	Rainbow trout	<i>Daphnia magna</i>
LC_LC7_WS_2016-12-05-N	10	0

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CI)	39.4 (32.2 – 48.4) µg/L Zn ¹	4.2 (3.7 – 4.8) g/L NaCl ²
Reference toxicant historical mean (2 SD range)	58.3 (21.0 – 161.7) µg/L Zn	4.1 (3.1 – 5.5) g/L NaCl
Reference toxicant CV	66%	15%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹ Test date: December 2, 2016; ² Test date: December 14, 2016



Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio
Senior Analyst

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) single concentration test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquarium
Test volume	10 to 20 L (depending on size of fish)
Test solution depth	≥15 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tapwater
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Zinc (added as ZnCl ₂)

Table 2. Summary of test conditions: 48-h *Daphnia magna* single concentration test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: Teck

Start Date/Time: Dec 8 /16 @1340h

Work Order No.: 161326

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: LC LC7-WS-2016-12-05-N
Sample Date: Dec 5 /16
Date Received: Dec 7 /16
Sample Volume: 1 X 20 L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 9
Alkalinity (mg/L CaCO₃): 5

Test Organism Information:

Batch No.: 110916(B)
Source: Vancouver Island Trout Hatchery
No. Fish/Volume (L): 10 / 12 L
Loading Density (g/L): 0.36
Mean Length ± SD (mm): 37 ± 2 Range: 35 - 39
Mean Weight ± SD (g): 0.44 ± 0.08 Range: 0.36 - 0.60

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn56
Stock Solution ID: 16Zn02
Date Initiated: Dec 2 /16
96-h LC50 (95% CL): 39.4 (32.2 - 48.4) mg/L Zn
Reference Toxicant Mean and Historical Range: 58.3 (21.0 - 161.7) mg/L Zn
Reference Toxicant CV (%): 66%

Test Results: 10% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature] Date reviewed: Dec. 19, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck
 Sample I.D.: LC-LC7-W5-2016-12-05-N
 W.O.#: 161326
 RBT Batch #: 110916(B)
 Date Collected/Time: Dec 5/16 @ 1442h
 Date Setup/Time: Dec 8/16 @ 1340h
 Sample Setup By: EC/AND/YYC
 Number Fish/Volume: 10/12 L
 7-d % Mortality: 15
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 ml/min/L? (Y/N): Y

Parameters	Undiluted Sample WQ	
	Initial WQ	Adjustment
Temp °C	14.0	14.0
pH	8.0	8.0
D.O. (mg/L)	10.3	10.3
Cond. (µS/cm)	592	593
Salinity (ppt)	0.3	0.3

Thermometer: CER# 2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Concentration	# Survivors						Temperature (°C)						Dissolved Oxygen (mg/L)						pH						Conductivity (µS/cm)		
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24		48	72
(% V/V)																											
CFI				10	10	10	10	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330
100				10	10	10	10	140	150	160	170	180	190	200	210	220	230	240	250	260	270	280	290	300	310	320	330
Initials																											

Sample Description/Comments: Clear, colorless, no odor, no particulate.

Fish Description at 96 h: all surviving fish appear normal Number of Stressed Fish at 96 h: 0

Other Observations:

Reviewed by: EC Date Reviewed: Dec 19, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 161327

Start Date/Time: December 8, 2016 @ 1600h
Test Species: Daphnia magna
Set up by: YMC

Sample Information:

Sample ID: LC-LC7-WS-2016-12-05-N
Sample Date: December 5, 2016
Date Received: December 7, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 112316A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC43
Stock Solution ID: 10NaO2
Date Initiated: December 14, 2016
48-h LC50 (95% CL): 4.2 (3.7 - 4.8) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.1 - 5.5) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h TA the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Dec 19, 2016

**Freshwater Acute
48 Hour Toxicity Test Data Sheet**

Client: Teck
 Sample ID: LC-LC7-WF 2016-12-05-N
 Work Order No.: 161327

Start Date/Time: December 8, 2016 @ 1600h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	No. Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	18.5	18.5	19.0	8.5	8.5	8.0	7.6	7.7	7.9	355	361
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	18.5	18.5	19.0	8.7	8.3	8.5	8.0	8.0	8.0	596	568
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	AS	AS	YML	YML	AS	YML	YML	AS	YML	YML	AS	YML	AS

	Hardness*	Alkalinity*
Concentration	(mg/L as CaCO ₃)	
Control (MHW)	100	70
Highest conc.	320	312
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.5		
DO (mg/L)	8.7		
pH	8.0		
Cond (µS/cm)	596		
Salinity (ppt)	0.3		

Comments: _____ Mortality: Heartbeat checked under microscope no

Sample Description: clear, no colour, no odour, no particulates

Batch#: 112316A 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Dec 19, 2016

APPENDIX C – Chain-of-custody form

END OF REPORT



Acute Toxicity Test Results

Samples collected December 19, 2016

Final Report

January 5, 2017

Submitted to: **Teck Coal / Line Creek Operations**
Sparwood, BC

SAMPLE INFORMATION

Sample ID	Dates				Receipt temp.
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> test initiation	
LC_LCDSSLCC_WS_2016-12-19_NP	19-Dec-16 at N/A	21-Dec-16 at 1025h	21-Dec-16 at 1315h	21-Dec-16 at 1530h	9.0°C
LC_LC5_WS_2016-12-19_NP	19-Dec-16 at N/A	21-Dec-16 at 1025h	21-Dec-16 at 1315h	21-Dec-16 at 1530h	6.6°C

N/A = Not available

TESTS

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test

RESULTS

Toxicity test results

Sample ID	Percent mortality in 100% (v/v) sample	
	Rainbow trout	<i>Daphnia magna</i>
LC_LCDSSLCC_WS_2016-12-19_NP	0	0
LC_LC5_WS_2016-12-19_NP	0	0

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CI)	50.0 (40.2 – 62.2) µg/L Zn ¹	4.2 (3.7 – 4.8) g/L NaCl ²
Reference toxicant historical mean (2 SD range)	56.7 (20.2 – 159.0) µg/L Zn	4.1 (3.1 – 5.5) g/L NaCl
Reference toxicant CV	67%	15%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹ Test date: December 19, 2016; ² Test date December 14, 2016



Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio
Senior Analyst

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) single concentration test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquarium
Test volume	10 to 20 L (depending on size of fish)
Test solution depth	≥15 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tapwater
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Zinc (added as ZnCl ₂)

Table 2. Summary of test conditions: 48-h *Daphnia magna* single concentration test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: Tedc

Start Date/Time: Dec 21 / 16 @ 1315h

Work Order No.: 161377

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: LC-LCDSSLCC-WS-2016-1219-NP
Sample Date: Dec 19 / 16
Date Received: Dec 21 / 16
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 9
Alkalinity (mg/L CaCO₃): 5

Test Organism Information:

Batch No.: 120516
Source: Spring Valley
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.34
Mean Length ± SD (mm): 36 ± 1
Mean Weight ± SD (g): 0.40 ± 0.05

Range: 34 - 39
Range: 0.33 - 0.49

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn57
Stock Solution ID: 16Zn02
Date Initiated: Dec 19 / 16
96-h LC50 (95% CL): 50.0 (40.2 - 62.2) µg/L Zn

Reference Toxicant Mean and Historical Range: 56.7 (20.2 - 159.0) µg/L Zn
Reference Toxicant CV (%): 67%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) samples

Reviewed by: [Signature]

Date reviewed: Jan 5, 2017

Rainbow Trout Summary Sheet

Client: Teck

Start Date/Time: Dec 21 /16 @ 1315h

Work Order No.: 161377

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: LC-225-WS-20167279-NP
Sample Date: Dec 19 /16
Date Received: Dec 21 /16
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 9
Alkalinity (mg/L CaCO₃): 5

Test Organism Information:

Batch No.: 120516
Source: Spring Valley
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.35
Mean Length ± SD (mm): 37 ± 1
Mean Weight ± SD (g): 0.42 ± 0.05
Range: 35 - 39
Range: 0.36 - 0.50

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn57
Stock Solution ID: 16Zn02
Date Initiated: Dec 19/16
96-h LC50 (95% CL): 50.0 (40.2 - 62.2) µg/L Zn

Reference Toxicant Mean and Historical Range: 56.7 (20.2 - 159.0) µg/L Zn
Reference Toxicant CV (%): 67%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature] Date reviewed: Jan. 5, 2017

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck
 Sample I.D.: CC-LCS-WS-2016-12-19-WP
 W.O. #: 161377
 RBT Batch #: 12516
 Date Collected/Time: 0221/16 @ Not available
 Date Setup/Time: 0221/16 @ 1315h
 Sample Setup By: EL

Number Fish/Volume: 10/12L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Parameters	Undiluted Sample WQ	
	Initial WQ	Adjustment
Temp °C	14.0	14.0
D.O. (mg/L)	10.3	10.2
pH	8.2	8.3
Cond. (µS/cm)	724	728
Salinity (ppt)	0.4	0.4

Thermometer: CEP #2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Concentration	# Survivors								Temperature (°C)								Dissolved Oxygen (mg/L)								pH								Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96					
(% v/v)																																		
1+1				10	10	10	10	14.0	15.0	15.0	15.0	14.5	14.5	14.5	14.5	14.5	14.5	10.1	9.9	9.9	9.9	7.0	7.1	7.1	7.2	7.3	38	43						
1:20				10	10	10	10	14.0	15.0	15.0	15.0	14.5	14.5	14.5	14.5	14.5	14.5	9.9	9.7	10.0	9.8	8.3	8.4	8.3	8.4	8.4	728	731						
Initials				EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL						

Sample Description/Comments: Clear, colorless, no odour, no particulates
 Fish Description at 96 h: all fish appear normal Number of Stressed Fish at 96 h: 0
 Other Observations: _____
 Reviewed by: [Signature] Date Reviewed: 11.5.2017

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 161378

Start Date/Time: December 21, 2016 @ 1530h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: LC-LCDSSLCC-WS-2016-12-19-NP
Sample Date: December 19, 2016
Date Received: December 21, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 113016A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 25
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC43
Stock Solution ID: 16Na02
Date Initiated: December 14, 2016
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Jan. 5, 2017

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck Start Date/Time: December 21, 2016 @ 1530h
 Sample ID: LC-LEDSSLCC WS-2016-12-19-N No. Organisms/volume: 10/200mL
 Work Order No.: 161378 Test Organism: D. magna
 Set up by: VMC

Thermometer: Temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		48		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48	48	0		24	48	0	24	48	0	24	48	0	48	
Control	A	10	10	0	18.5	19.0	19.0	8.6	8.5	8.3	7.6	7.6	7.6	356	362		
	B	10	10	0													
	C	10	10	0													
	D																
100	A	10	10	0	19.0	19.0	19.0	9.2	8.4	8.2	7.8	8.1	8.1	921	923		
	B	10	10	0													
	C	10	10	0													
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
Technician Initials		VMC	VMC	VMC	VMC	VMC	VMC	VMC	VMC	VMC	VMC	VMC	VMC	VMC	VMC		

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO ₃)	
Control (MHW)	96	70
Highest conc.	580	196
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.0		19.0
DO (mg/L)	9.6	(3 min)	9.2
pH	7.8	(aeration)	7.8
Cond (µS/cm)	918		921
Salinity (ppt)	0.5		0.5

Comments: _____ Mortality: Heartbeat checked under microscope not req'd.

Sample Description: clear, no colour, no odour, no particulates

Batch#: 113016A 7-d previous # young/brood: 25 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: [Signature] Date reviewed: Jan 5, 2017

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 161378

Start Date/Time: December 21, 2016 @ 1530h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: LC-LCS-WS-2016-12-19-NP
Sample Date: December 19, 2016
Date Received: December 21, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 113016A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 25
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC43
Stock Solution ID: 16NA02
Date Initiated: December 14, 2016
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Jan. 5, 2017

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: LC-LCS-WS-2016-12-19-N
 Work Order No.: 161378

Start Date/Time: December 21, 2016 @ 1530
 No. Organisms/Volume: 10/200mL
 Test Organism: D.magna
 Set up by: ML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	18.5	19.0	19.0	8.6	8.5	8.4	7.6	7.6	7.6	356	365
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.0	19.0	19.0	9.2	8.5	8.3	7.8	8.0	8.0	730	731
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		ML/ML		ML	ML	ML	ML	ML	ML	ML	ML	ML	ML	ML	ML

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO ₃)	
Control (MHW)	96	70
Highest conc.	410	186
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.5		19.0
DO (mg/L)	9.9	(5 min)	9.2
pH	7.8	(aeration)	7.8
Cond (µS/cm)	728		730
Salinity (ppt)	0.4		0.4

Comments: _____ Mortality: Heartbeat checked under microscope 15/10
 Sample Description: clear, no colour, no odour, no particulates.
 Batch#: 113016A 7-d previous # young/brood: 25 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10
 Reviewed by: ML Date reviewed: Jan 5 2017

APPENDIX C – Chain-of-custody form

END OF REPORT



Teck Coal / Coal Mountain Operations
ATTN: Carla Romero
2261 Corbin Rd.
Sparwood, BC
V0B 2G0

Report Date: February 16, 2016
Work Order: 16155 - 16156

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. with 2007 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000)

Table 1. Results for the 96-h rainbow trout acute toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
CM_CCPD_M_WS_20160203_N	February 3, 2016 @ 0943h	0
CM_SPD_M_WS_20160203_N	February 3, 2016 @ 1111h	0

Table 2. Results for the 48-h *Daphnia magna* acute toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
CM_CCPD_M_WS_20160203_N	February 3, 2016 @ 0943h	46.7
CM_SPD_M_WS_20160203_N	February 3, 2016 @ 1111h	13.3

The tests met all control performance criteria and no deviations from protocols were observed. The results relate only to the samples tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Julianna Kalocai, M.Sc., R.P.Bio
QA Officer

Rainbow Trout Summary Sheet

Client: Coal Mountain Operation Start Date/Time: Feb 5/16 @ 1100h

Work Order No.: 16155 Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: CM-CCPD-M-WS-20160203-N
Sample Date: Feb 5/16
Date Received: Feb 5/16
Sample Volume: 1X20L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 6

Test Organism Information:

Batch No.: 122915
Source: Aqua Farms
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.37
Mean Length ± SD (mm): 27 ± 3 Range: 24 - 32
Mean Weight ± SD (g): 0.45 ± 0.18 Range: 0.26 - 0.80

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn33
Stock Solution ID: 15Zn05
Date Initiated: Jan 20/16
96-h LC50 (95% CL): 80.5 (59.3 - 109.5) mg/L Zn
Reference Toxicant Mean and Historical Range: 71.0 (33.9 - 148.4) mg/L Zn
Reference Toxicant CV (%): 44.6%

Test Results: 100% survival at 96 hours in undiluted 100% (v/v) sample
0% mortality at 96 hours in undiluted 100% (v/v) sample

Reviewed by: JOU Date reviewed: Feb. 16/16

Rainbow Trout Summary Sheet

Client: Coal Mountain Operation Start Date/Time: Feb 5/16 @ 1100h

Work Order No.: 16155 Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: CM-SPD-M-WS.20160203-N
Sample Date: Feb 3/16
Date Received: Feb 5/16
Sample Volume: 1X 20L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 6

Test Organism Information:

Batch No.: 122915
Source: Aqua Farms
No. Fish/Volume (L): 10/12 L
Loading Density (g/L): 0.42
Mean Length ± SD (mm): 29 ± 2 Range: 24 - 31
Mean Weight ± SD (g): 0.50 ± 0.14 Range: 0.35 - 0.77

Zinc Reference Toxicant Results:

Reference Toxicant ID: RT Zn 33
Stock Solution ID: 15 Zn 05
Date Initiated: Jan 20/16
96-h LC50 (95% CL): 80.5 (59.8 - 109.5) mg/L Zn
Reference Toxicant Mean and Historical Range: 71.0 (33.9 - 148.4) mg/L Zn
Reference Toxicant CV (%): 44.6%

Test Results: 100% survival at 96 hours in the undiluted 100% (v/v) sample
0% mortality at 96 hours in the undiluted 100% (v/v) sample

Reviewed by: Job Date reviewed: Feb. 16/16

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Coal Mountain Operation
 Sample I.D. CM-SPD-M-W5-20160203-N
 W.O. # 16155
 RBT Batch #: 122915
 Date Collected/Time: Feb 3/16 @ 1111h
 Date Setup/Time: Feb 3/16 @ 1100h
 Sample Setup By: EC

Number Fish/Volume: 10/12 L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 60 mins
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

D.O. meter: 2
 pH meter: 1
 Cond. Meter: 2

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
pH	7.8	/	7.7
D.O. (mg/L)	11.1	/	10.6
Cond. (µS/cm)	1764	/	1764

Concentration (% v/v)	# Survivors								Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
100				10	10	10	10	14.0	14.5	14.6	14.5	14.5	10.3	9.8	9.8	9.9	9.9	6.5	6.9	6.8	6.8	6.8	25	28	
100				10	10	10	10	14.0	14.6	14.5	14.5	14.5	10.3	9.9	9.7	9.7	9.9	7.7	8.0	8.0	8.0	8.0	1764	1729	
Initials				EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	EC	

WQ Ranges: T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Sample Description/Comments: Clear, colorless, odourless, ^{no} particulates

Fish Description at 96 h OK Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: JGU

Date Reviewed: Feb. 16/16

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 161596
YML

Start Date/Time: February 5, 2016 @ 15:10h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: CM-CCPD-M-WS-20160203-N
Sample Date: February 3, 2016
Date Received: February 5, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 012016A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC27
Stock Solution ID: 15Na03
Date Initiated: February 1, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 46.7% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: Joh

Date reviewed: Feb. 16/16

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: CM-CCPD-MWS-20160203-N
 Work Order No.: 16159

Start Date/Time: February 5, 2016 @ 1515h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	20.5	20.5	8.6	8.6	8.2	7.6	7.8	7.9	359	364
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	40	0	19.5	20.5	20.5	9.0	8.9	8.4	7.6	8.0	8.1	1855	1826
	B	10	50	0											
	C	10	70	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials					YML			YML			YML			YML	

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO ₃)	
Control (MHW)	100	72
Highest conc.	1220	352
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		19.5
DO (mg/L)	9.6	(2 min)	9.0
pH	7.6	(aeration)	7.6
Cond (µS/cm)	1851		1855

Comments: ① white film on surface Mortality: Heartbeat checked under microscope yes

Sample Description: clear, colourless, no particulates, no odour

Batch#: 012016A 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: JCH Date reviewed: Feb-16/16

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 16159

Start Date/Time: February 5, 2016 @ 15:18h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: CM-SPD-M-WS-20160203-N
Sample Date: February 3, 2016
Date Received: February 5, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 012016A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC27
Stock Solution ID: ISNa03
Date Initiated: February 1, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.3-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 13.3% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: JGu

Date reviewed: Feb. 16/16

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: CMSPD_MWS_20160203_N
 Work Order No.: 161596
vml

Start Date/Time: February 5, 2016 @ 1510h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: vml

Thermometer: temp-5 DO meter: DO-213 pH meter: pH=113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	20.5	20.5	8.6	8.7	8.5	7.6	7.7	7.9	359	362
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	90	0	19.5	20.5	20.5	9.1	8.6	8.4	7.8	8.1	8.1	1767	1749
	B	10	80	0											
	C	10	90	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		A	A	A	vml	A	A	vml	A	A	vml	A	A	vml	A

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO ₃)	
Control (MHW)	100	72
Highest conc.	1090	260
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		19.5
DO (mg/L)	9.8	(2 min Aeration)	9.1
pH	7.8		7.8
Cond (µS/cm)	1772		1767

Comments: 0 white film on surface Mortality: Heartbeat checked under microscope 1/2 used

Sample Description: clear, colourless, no particulates, no odour

Batch#: 012016A 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: JOU Date reviewed: Feb. 16/16

Client: Teck

W.O.#: 16156

Hardness and Alkalinity Datasheet

Sample ID	Sample Date	Alkalinity				Hardness			
		Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO 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
CM CCPD_M_WS- 20160203-N	Feb 5/16	50	17.8	18.0	352	10 [Ⓢ]	12.2	1220	KL
CM SPD_M_WS 20160203-N	Feb 5/16	50	13.2	13.4	260	10 [Ⓢ]	10.9	1090	KL
MHW	Feb 5/16	50	3.7	3.8	72	50	5.0	100 100	YML

Notes: [Ⓢ] Sample diluted w/ DI up to 100ml

Reviewed by: JOH

Date Reviewed: Feb-16/16



Teck Coal / Coal Mountain Operations
ATTN: Carla Romero
2261 Corbin Rd.
Sparwood, BC
VOB 2G0

Report Date: March 7, 2016
Work Order: 16256

Data Report

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 48-h *Daphnia magna* acute toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
CM_CCPD_WS_20160223_N [tested at 20°C]	February 23, 2016 @ 1415h	0
CM_CCPD_WS_20160223_N [tested at 10°C]	February 23, 2016 @ 1415h	0

The sample was tested at the standard exposure temperature of 20°C, and also at 10°C as requested by client. These two separate *D. magna* tests were initiated concurrently following the standard test methods for this species.

Test results indicated similar survival responses in all the test treatments, including the controls. All control performance criteria were met and no deviations from the test protocols were observed. The results presented in this report relate only to the sample tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Daphnia magna Summary Sheet

Client: Teck (EMO)
Work Order No.: 16256

Start Date/Time: February 25, 2016 @ 1410h
Test Species: Daphnia magna
Set up by: VNL

Sample Information:

Sample ID: CM-CCPD-WS-20160223-N
Sample Date: February 23, 2016
Date Received: February 25, 2016
Sample Volume: 1 x 20 L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:


Broodstock No.: 021016B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC28
Stock Solution ID: 15NaO3
Date Initiated: February 23, 2016
48-h LC50 (95% CL): 4.5 (3.8-5.4) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.2-5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 0% mortality at 48h in the 100% (v/v) undisturbed sample, tested at 20°C.

Reviewed by: 

Date reviewed: March 3, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: CM CCPD WS-20160223-N
 Work Order No.: 16256

Start Date/Time: February 25, 2016 @ 14:0h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YUL

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	19.5	20.0	8.5	8.5	8.7	7.7	7.7	8.0	351	762
	B	10	10	0											
	C	10	10	0											
	D														
100 (100%) (20°C)	A	10	10 ⁰	0	19.0	19.5	20.0	9.0	8.5	8.6	7.8	7.9	8.0	1855	1816
	B	10	10 ⁰	0											
	C	10	10 ⁰	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YUL	A	~	YUL	YUL	A	YUL	YUL	~	YUL	YUL	A	YUL	~

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO ₃)	
Control (MHW)	100	66
Highest conc.	1280	290
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.0		19.0
DO (mg/L)	10.1	(3 min aeration)	9.0
pH	7.8		7.8
Cond (µS/cm)	1850		1855

Comments: ⁰ slight white film on surface. Mortality: Heartbeat checked under microscope N/A

Sample Description: clear, no colour, no odour, no particulates

Batch#: 0210 012016B 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: March 3, 2016

Daphnia magna Summary Sheet

Client: TECK (CMO)
Work Order No.: 16256

Start Date/Time: February 25, 2016 @ 1415h
Test Species: Daphnia magna
Set up by: JML

Sample Information:

Sample ID: CM-CCPD-WS-20160223-N
Sample Date: February 23, 2016
Date Received: February 25, 2016
Sample Volume: 1 x 20L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 021016B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC28
Stock Solution ID: 15NaO3
Date Initiated: February 23, 2016
48-h LC50 (95% CL): 4.5 (3.8 - 5.4) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.2 - 5.3) g/L NaCl
Reference Toxicant CV (%): 13

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample, tested at 10°C.

Reviewed by: 

Date reviewed: March 3, 2016

**Freshwater Acute
48 Hour Toxicity Test Data Sheet**

Client: Teck
 Sample ID: ML CCDP-WS-20160223-N
 Work Order No.: 16256

Start Date/Time: February 25, 2016 @ 14:54
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH=113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	10.5	9.5	10.0	10.6	11.0	10.8	7.6	7.6	8.0	363	375
	B	10	10	0											
	C	10	10	0											
	D														
100 (20°C) (10°C)	A	10	10	0	11.0	9.5	10.0	10.4	11.1	10.8	7.7	8.0	1844	1858	
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO3)	
Control (MHW)	100	68
Highest conc.	1270	280
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	11.0		
DO (mg/L)	10.4		
pH	7.7		
Cond (µS/cm)	1844		

Comments: _____ Mortality: Heartbeat checked under microscope N/A

Sample Description: clear, colourless, no odour, no particulates

Batch#: 212016B 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: YML Date reviewed: March 3, 2016

Client: Teck

W.O.#: 16256

Hardness and Alkalinity Datasheet

Sample ID	Sample Date	Alkalinity			Hardness			Technician	
		Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO 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)
CM-CCPD-WS- 20160223-N (at 20°C)	Feb 25/16	10 [Ⓛ]	3.0	3.1	290	10 [Ⓛ]	12.8	1280	WML
MHW (20°C)	Feb 25/16	50	3.4	3.5	66	50	5.0	100	WML
CM-CCPD-WS- 20160223-N (at 10°C)	Feb 25/16	10 [Ⓛ]	2.9	3.0	280	10 [Ⓛ]	12.7	1270	WML
MHW (10°C)	Feb 25/16	50	3.5	3.6	68	50	5.0	100	WML

Notes: [Ⓛ] Diluted to 100 mL w/ DI water.

Reviewed by: 

Date Reviewed: March 3, 2016

Chain Of Custody Record

COC ID: 20150622-0622

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 Percy/Armando Tang				Address:			
Address: 2261 Corbin Rd.				Address: 8664 Commerce Court							
City: Sparwood		Prov.: BC		City: Burnaby		State: BC		City:		State:	
Postal Code: V0B 2G0		Country: Canada		Postal Code: V5A4N7		Country: Canada		Postal Code:		Country:	
Phone Number: 250 425 7377				Postal Code: V5A4N7				Task Code:			
Email EDD To: Rick.Maglioocco@teck.com				Phone Number: 6044208773				Shipping Company:			
Don.Sacino@teck.com				Email Address: krysta@nautilusenvironmental.com				Tracking Number:			
Carla.Romero@teck.com				PO Number: 421710				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	10° + 20°	TIE																
CM_CCPD_WS_20160223_N	WS	Feb 23 2016	14:15	G	1		96 hr Rainbow trout Acute Toxicity - Single concentration (pass/fail)	x	①																Perform at 10 and 20oC
																									Only if mortalities observed, as per communication with Josh Baker

Additional Comments/Special Instructions	Relinquished By/Affiliation		Date	Time	Accepted By/Affiliation		Date	Time	Sample Receipt Conditions				
	① will be done if needed. NY					Nautilus		Feb 25/16	10:40	7.0	Y/N	Y/N	Y/N
						NY - Nan Yamamoto			NY		Y/N	Y/N	Y/N
						1x20L					Y/N	Y/N	Y/N
									Y/N	Y/N	Y/N		
Sampler's Name		C Romero / D Sacino		Mobile #	250 425 7350		temp in °C		Samples on ice?	Sample intact?	Trip Blank?		
Sampler's Signature				Date/Time	Feb 23, 2016 15:00 hrs								



Teck Coal / Coal Mountain Operations
ATTN: Carla Romero
2261 Corbin Rd.
Sparwood, BC
VOB 2G0

Report Date: June 16, 2016
Work Order: 16609 - 16610

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 96-h rainbow trout acute toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
CM_SPD_WS_20160601_N	June 1, 2016 @ 1054h	0
CM_PC2_WS_20160601_N	June 1, 2016 @ 1411h	0
CM_CCPD_WS_20160601_N	June 1, 2016 @ 1311h	0

Table 2. Results for the 48-h *Daphnia magna* acute toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
CM_SPD_WS_20160601_N	June 1, 2016 @ 1054h	0
CM_PC2_WS_20160601_N	June 1, 2016 @ 1411h	0
CM_CCPD_WS_20160601_N	June 1, 2016 @ 1311h	0

The tests met all control performance criteria and no deviations from protocols were observed. The results presented in this report relate only to the samples tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck (Coal Mountain operation)

Start Date/Time: June 6 / 16 @ 1000h

Work Order No.: 16609

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: CM-SPD-WS-20160601-N
Sample Date: June 1 / 16 @ 1054 h
Date Received: June 3 / 16 @ 1050 h
Sample Volume: 1 x 20L
Other: -

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 050416
Source: ~~NL Miracle Springs~~ Aqua Farms
No. Fish/Volume (L): 10 / 12 L
Loading Density (g/L): 0.30
Mean Length ± SD (mm): 27 ± 3 Range: 23 - 32
Mean Weight ± SD (g): 0.36 ± 0.11 Range: 0.24 - 0.61

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn 41
Stock Solution ID: 15 Zn 05
Date Initiated: May 26 / 16
96-h LC50 (95% CL): 37.9 (33.2 - 43.2) µg/L Zn

Reference Toxicant Mean and Historical Range: 66.7 (27.6 - 161.2) µg/L Zn

Reference Toxicant CV (%): 56

Test Results: 100 % survival at 96 hours in the undiluted 100 % (v/v) sample.
0 % mortality at 96h in the undiluted 100% (v/v) sample

Reviewed by: 

Date reviewed: June 14, 2016

Rainbow Trout Summary Sheet

Client: Teck - coal mountain operation

Start Date/Time: June 6 / 16 @ 1000h

Work Order No.: 16609

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: CM-PC2-WS-20160601-N

Sample Date: June 1 / 16 @ 1411h

Date Received: June 3 / 16 @ 1050h

Sample Volume: 1 x 20L

Other: -

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water

Hardness (mg/L CaCO₃): 10

Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 050416

Source: Miracle Springs Aquaculture Farms

No. Fish/Volume (L): 10 / 12 L

Loading Density (g/L): 0.32

Mean Length ± SD (mm): 26 ± 2

Range: 22 - 30

Mean Weight ± SD (g): 0.39 ± 0.09

Range: 0.26 - 0.58

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTzn 41

Stock Solution ID: 15 zn 05

Date Initiated: MAY 26 / 16

96-h LC50 (95% CL): 37.9 (33.2 - 43.2) µg/L zn

Reference Toxicant Mean and Historical Range: 66.7 (27.6 - 161.2) µg/L zn

Reference Toxicant CV (%): 56

Test Results: 100% survival at 96 hours in the undiluted 100% (v/v) sample.
0% mortality at 96h in the diluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: June 14, 2016

Rainbow Trout Summary Sheet

Client: Tack - coal Mountain operation

Start Date/Time: June 6 / 16 @ 1000h

Work Order No.: 16609

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: CM-CCPD-INS-20160601-N

Sample Date: June 1 / 16 @ 1311h

Date Received: June 3 / 16 @ 1050h

Sample Volume: 1 x 20L

Other: -

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water

Hardness (mg/L CaCO₃): 10

Alkalinity (mg/L CaCO₃): 8

Test Organism Information:

Batch No.: 050416

Source: 416 ~~Miracle Springs~~ Aqua Farms

No. Fish/Volume (L): 10 / 12 L

Loading Density (g/L): 0.33

Mean Length ± SD (mm): 29 ± 2

Mean Weight ± SD (g): 0.396 ± 0.089

Range: 26 - 30

Range: 0.265 - 0.502

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn 41

Stock Solution ID: 15 Zn 05

Date Initiated: MAY 26 / 16

96-h LC50 (95% CL): 37.9 (33.2 - 43.2) µg/L Zn

Reference Toxicant Mean and Historical Range: 66.7 (27.6 - 161.2) µg/L Zn

Reference Toxicant CV (%): 56

Test Results: 100% survival at 96 hours in the undiluted 100% (v/v) sample.
0% mortality at 96h in the undiluted 100% (v/v) sample.

Reviewed by: 

Date reviewed: June 14, 2016

Daphnia magna Summary Sheet

Client: Teck (CMO)
Work Order No.: 16610

Start Date/Time: June 3, 2016 @ 1455h
Test Species: Daphnia magna
Set up by: VMC

Sample Information:

Sample ID: CMSPD_WS_20160601-N
Sample Date: June 1, 2016
Date Received: June 3, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 051016B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 15
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC34
Stock Solution ID: 16Na01
Date Initiated: June 8, 2016
48-h LC50 (95% CL): 4.8 (4.0-5.9) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: 

Date reviewed: June 14, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: CM-SPD - WS-20160601-N
 Work Order No.: 16610

Start Date/Time: June 3/16 @ 1455h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: YyL

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	No. Immobilized		Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)		
		24	48	0	24	48	0	24	48	0	24	48	0	48	
Control	A	10	10	0	20.0	20.5	20.5	8.4	8.6	8.4	7.8	7.8	7.9	353	352
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	20.0	20.5	20.5	8.9	8.5	8.4	7.8	7.9	8.0	1898	1830
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		AS	AS	AS	YyL	AS	AS	YyL	A	A	YyL	AS	A	YyL	A

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO3)	
Control (MHW)	96	64
Highest conc.	1100	212
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		
DO (mg/L)	8.9		
pH	7.8		
Cond (µS/cm)	1898		
Salinity (ppt)	1.0		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: clear, no colour, no odour, no particulates

Batch#: 05101613 7-d previous # young/brood: 15 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: June 14, 2016

Daphnia magna Summary Sheet

Client: Teck (CMO)
Work Order No.: 16610

Start Date/Time: June 3, 2016 @ 145ch
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: CM-PC2-WS-20160601-N
Sample Date: June 1, 2016
Date Received: June 3, 2016
Sample Volume: 2x1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 051016B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 15
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC34
Stock Solution ID: 16NaCl
Date Initiated: June 8, 2016
48-h LC50 (95% CL): 4.8 (4.0-5.9) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: June 14, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: CM-PC2 - WS-20160601-N
 Work Order No.: 16610

Start Date/Time: June 3/16 @ 1450h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: Y.L.

Thermometer: Temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	20.0	20.5	20.5	8.4	8.6	8.4	7.8	7.8	7.9	353	356
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	20.0	20.5	20.5	8.9	8.5	8.4	7.6	7.8	7.9	260	280
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		Y.L.	Y.L.	Y.L.	Y.L.	Y.L.	Y.L.	Y.L.	Y.L.	Y.L.	Y.L.	Y.L.	Y.L.	Y.L.	Y.L.

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	96	64
Highest conc.	146	112
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		
DO (mg/L)	8.9		
pH	7.6		
Cond (µS/cm)	260		
Salinity (ppt)	0.1		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: clear, no colour, no odour, no particulates

Batch#: 051016B 7-d previous # young/brood: 15 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: June 14, 2016

Daphnia magna Summary Sheet

Client: Teck (CMO)
Work Order No.: 16610

Start Date/Time: June 3, 2016 @ 1445h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: CM-CCPD-WS-20160601-N
Sample Date: June 1, 2016
Date Received: June 3, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 051968
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 15
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC34
Stock Solution ID: 16NaCl
Date Initiated: June 8, 2016
48-h LC50 (95% CL): 4.8 (4.0-5.9) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: June 14, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: CM-CCPD-WS-20160601-N
 Work Order No.: 16610

Start Date/Time: June 3/16 @ 1445h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: YTL

Thermometer: Temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	20.0	20.5	20.5	8.4	8.5	8.3	7.8	7.8	7.9	353	349
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	22.0	20.5	20.5	9.1	8.4	8.4	7.4	7.5	7.9	1380	1369
	B	10	10	0	18.5										
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		AS	AS	AS	YTL	AS	AS	YTL	AS	AS	YTL	AS	AS	YTL	AS

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	96	64
Highest conc.	840	278
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.5		
DO (mg/L)	9.1		
pH	7.4		
Cond (µS/cm)	1380		
Salinity (ppt)	0.7		

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: clear, no colour, no odour, no particulates

Batch#: 051016B 7-d previous # young/brood: 15 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: June 14, 2016



Teck Coal/ Coal Mountain Operation
ATTN: Carla Romero
2261 Corbin Rd.
Sparwood, BC
V0B 2G0

Report Date: August 17, 2016
Work Order: 16822 - 16823

Data Report

Species: Rainbow trout (*Oncorhynchus mykiss*)
Protocol: EPS 1/RM/13 (Second Ed. 2000 with 2007 & 2016 amendments)

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 96-h rainbow trout acute toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
CM_SPD_WS_20160803_N	August 3, 2016 @ N/A	0
CM_CCPD_WS_20160803_N	August 3, 2016 @ N/A	0

N/A = Not Available.

Table 2. Results for the 48-h *Daphnia magna* acute toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
CM_SPD_WS_20160803_N	August 3, 2016 @ N/A	0
CM_CCPD_WS_20160803_N	August 3, 2016 @ N/A	0

N/A = Not Available.

The tests met all control performance criteria and no deviations from protocols were observed. The results presented in this report relate only to the samples tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio.
Senior Reviewer

Rainbow Trout Summary Sheet

Client: Teck Coal (Cmo)

Start Date/Time: Aug 05 116 @ 1215h

Work Order No.: 16822

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: CM-SPD-WS-20160803-N
Sample Date: Aug 03 / 16
Date Received: Aug 05 / 16
Sample Volume: 1 X20 L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 11
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 071816a
Source: Aqua Farms
No. Fish/Volume (L): 10/10
Loading Density (g/L): 0.32
Mean Length ± SD (mm): 28 ± 2
Mean Weight ± SD (g): 0.32 ± 0.08

Range: 24 - 31
Range: 0.18 - 0.42

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn45
Stock Solution ID: 15Zn05
Date Initiated: Aug 1 / 16
96-h LC50 (95% CL): 30.9 (23.3 - 40.9) µg/L Zn

Reference Toxicant Mean and Historical Range: 58.0 (29.4 - 114.4) µg/L Zn
Reference Toxicant CV (%): 40%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: 

Date reviewed: Aug 16, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (CMO)

Start Date/Time: Aug 05 116 @ 1215h

Work Order No.: 16822

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: CM_CIPP-WS-20160803-N
Sample Date: Aug 03 /16
Date Received: Aug 05 /16
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 11
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 071816a
Source: Aqua Farms
No. Fish/Volume (L): 10/10
Loading Density (g/L): 0.32
Mean Length ± SD (mm): 28 ± 2
Mean Weight ± SD (g): 0.32 ± 0.06

Range: 26 - 31
Range: 0.20 - 0.40

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn 45
Stock Solution ID: 15 Zn05
Date Initiated: Aug 1 /16
96-h LC50 (95% CL): 30.9 (23.3 - 40.9) µg/L Zn

Reference Toxicant Mean and Historical Range: 58.0 (29.4 - 114.4) µg/L Zn
Reference Toxicant CV (%): 40%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: Aug 16, 2016

Daphnia magna Summary Sheet

Client: Teck (emo)
Work Order No.: 16823

Start Date/Time: August 7, 2016 @ 1140h
Test Species: Daphnia magna
Set up by: AWD

Sample Information:

Sample ID: CM-SPD-WS-20160803-N
Sample Date: August 3, 2016
Date Received: August 5, 2016
Sample Volume: 1 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 071316B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 24
Mortality (%) in previous 7 d: 20
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16Na01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9 - 4.1) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Aug 16, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Tek (cmo) Start Date/Time: Aug 7/16 @ 1140h
 Sample ID: cm SPD-WS-20160803-N No. Organisms/volume: 10/200mL
 Work Order No.: 16823 Test Organism: D.magna
 Set up by: A
 Thermometer: temp-8¹¹ DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration	Number of Live Organisms	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)		
		24	48		48	0	24	48	0	24	48	0	24	48	0	48
90 (1/1)	Rep															
Control	A	10	10	0	20.5	20.5	20.0	2.8	2.7	2.6	7.5	7.8	7.7	358	375	
	B	10	10	0												
	C	10	10	0												
	D															
100	A	10	10	0	20.5	20.5	20.0	2.8	2.6	2.5	7.6	8.0	8.0	1932	1898	
	B	10	10	0												
	C	10	10	0												
	D															
	A															
	B															
	C															
	D															
	A															
	B															
	C															
	D															
	A															
	B															
	C															
	D															
Technician Initials		MM	MM	MM	AS	MM	MM	AS	MM	MM	AS	MM	MM	AS	MM	

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO3)	
Control (MHW)	96	68
Highest conc.	980	208
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.5		
DO (mg/L)	2.8		
pH	7.6		
Cond (µS/cm)	1932		
Salinity (ppt)	1.0		

Comments: _____ Mortality: Heartbeat checked under microscope not equal
 Sample Description: slight green colour, clear, no odour, no particulates
 Batch#: 071316 B 7-d previous # young/brood: 24 Previous 7-d Mortality (%): 20 Day of 1st Brood: 9
 Reviewed by: [Signature] Date reviewed: Aug 16, 2016

Daphnia magna Summary Sheet

Client: Teck (CMO)
Work Order No.: 16823

Start Date/Time: August 8, 2016 @ 0930h
Test Species: Daphnia magna
Set up by: YL

Sample Information:

Sample ID: CM-CCPD-WS-20160803-N
Sample Date: August 3, 2016
Date Received: August 5, 2016
Sample Volume: 1 x 1 L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 072016A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 24
Mortality (%) in previous 7 d: 10
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC37
Stock Solution ID: 16Na01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9 - 4.1) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.2 (3.2 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Aug 16, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (CMA)
 Sample ID: CM-CCPD-WS-20160803-N
 Work Order No.: 16826

Start Date/Time: August 8, 2016 @ 0930h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YHL

Thermometer: temp-11 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	20.0	20.0	20.0	8.9	8.5	8.5	7.8	7.7	7.7	355	370
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10 ⁰	0	20.5	20.0	20.0	8.7	8.6	8.4	7.6	7.9	7.9	1807	1700
	B	10	10 ⁰	0											
	C	10	10 ⁰	1											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YHL	YHL	YHL	YHL	YHL	YHL	YHL	YHL	YHL	YHL	YHL	YHL	YHL	YHL

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	96	68
Highest conc.	950	404
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.5		
DO (mg/L)	8.7		
pH	7.6		
Cond (µS/cm)	1807		
Salinity (ppt)	0.9		

Comments: some precipitate on organisms bodies Mortality: Heartbeat checked under microscope not

Sample Description: clear, no colour, no odour, no particulates.

Batch#: 072016A 7-d previous # young/brood: 24 Previous 7-d Mortality (%): 10 Day of 1st Brood: 10/9

Reviewed by: [Signature] Date reviewed: Aug 16, 2016



Acute Toxicity Test Results

Samples collected November 2, 2016

Final Report

November 18, 2016

Submitted to: **Teck Coal / Coal Mountain Operations**
Sparwood, BC

SAMPLE INFORMATION

Sample ID	Dates				Receipt temp.
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> test initiation	
CM_SPD_WS_20161102_N	02-Nov-16 at 1150h	04-Nov-16 at 1105h	07-Nov-16 at 1055h	05-Nov-16 at 1650h	8.4/7.0°C
CM_CCPD_WS_20161102_N	02-Nov-16 at 1400h	04-Nov-16 at 1105h	07-Nov-16 at 1055h	05-Nov-16 at 1650h	8.4/7.0°C
CM_PC2_WS_20161102_N	02-Nov-16 at 1322h	04-Nov-16 at 1105h	07-Nov-16 at 1055h	05-Nov-16 at 1650h	7.5/7.0°C

TESTS

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test

RESULTS

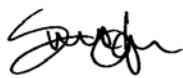
Toxicity test results

Sample ID	Percent mortality in 100% (v/v) sample	
	Rainbow trout	<i>Daphnia magna</i>
CM_SPD_WS_20161102_N	0	0
CM_CCPD_WS_20161102_N	0	3
CM_PC2_WS_20161102_N	20	0

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CI)	27.7 (19.1 – 38.7) µg/L Zn ¹	4.5 (3.8 – 5.4) g/L NaCl ²
Reference toxicant historical mean (2 SD range)	64.1 (24.8 – 166.0) µg/L Zn	4.1 (3.1 – 5.5) g/L NaCl
Reference toxicant CV	61%	15%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹ Test date November 7, 2016. ² Test date November 2, 2016.



Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio
Senior Analyst

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) single concentration test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquarium
Test volume	10 to 20 L (depending on size of fish)
Test solution depth	≥15 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tapwater
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Zinc (added as ZnCl ₂)

Table 2. Summary of test conditions: 48-h *Daphnia magna* single concentration test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: Teck (CMO)

Start Date/Time: November 7, 2016 @ 1055h

Work Order No.: 161210

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: CM-SPD-WS-20161102-N
Sample Date: November 2, 2016
Date Received: November 4, 2016
Sample Volume: 1 x 20L
Other: -

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 102416
Source: Mt. Lake Springs
No. Fish/Volume (L): 10 / 10L
Loading Density (g/L): 0.41
Mean Length ± SD (mm): 35 ± 4
Mean Weight ± SD (g): 0.41 ± 0.13

Range: 27-39
Range: 0.20-0.63

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn53
Stock Solution ID: 16Zn02
Date Initiated: November 7, 2016
96-h LC50 (95% CL): 27.7 (19.1-38.7) µg/L Zn

Reference Toxicant Mean and Historical Range: 64.1 µg/L Zn (24.8-166.0 µg/L Zn)
Reference Toxicant CV (%): 61

Test Results: 0% mortality at 96h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Nov. 17, 2016

Rainbow Trout Summary Sheet

Client: Teck (CMO)

Start Date/Time: November 7, 2016 @ 1055h

Work Order No.: 161210

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: CM-CCPDWS-20161102-N
Sample Date: November 2, 2016
Date Received: November 4, 2016
Sample Volume: 1 x 20L
Other: -

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 102416
Source: Mt. Rascal Springs
No. Fish/Volume (L): 10 / 10L
Loading Density (g/L): 0.39
Mean Length ± SD (mm): 35 ± 3
Mean Weight ± SD (g): 0.39 ± 0.12

Range: 30-39
Range: 0.25-0.58

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn53
Stock Solution ID: 16Zn02
Date Initiated: November 7, 2016
96-h LC50 (95% CL): 27.7 (19.1-38.7) µg/L Zn

Reference Toxicant Mean and Historical Range: 64.1 µg/L Zn (24.8-166.0 µg/L Zn)
Reference Toxicant CV (%): 61

Test Results: 0% mortality at 96h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Nov. 17, 2016

Rainbow Trout Summary Sheet

Client: Teck (CMA)

Start Date/Time: November 7, 2016 @ 1055h

Work Order No.: 161210

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: CM-PCZWS-20161102-N
Sample Date: November 2, 2016
Date Received: November 4, 2016
Sample Volume: 1 x 20L
Other: -

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 10
Alkalinity (mg/L CaCO₃): 11

Test Organism Information:

Batch No.: 102416
Source: Miracle Springs
No. Fish/Volume (L): 10 / 10L
Loading Density (g/L): 0.37
Mean Length ± SD (mm): 35 ± 3
Mean Weight ± SD (g): 0.37 ± 0.13

Range: 31-40
Range: 0.19-0.60

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn53
Stock Solution ID: 16Zn02
Date Initiated: November 7, 2016
96-h LC50 (95% CL): 27.7 (19.1-38.7) µg/L Zn

Reference Toxicant Mean and Historical Range: 64.1 µg/L Zn (24.8-166.0 µg/L Zn)
Reference Toxicant CV (%): 61

Test Results: 20% mortality at 96h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Nov. 17, 2016

Daphnia magna Summary Sheet

Client: Teck (CMO)
Work Order No.: 161211

Start Date/Time: November 5, 2016 @ 1650h
Test Species: Daphnia magna
Set up by: VJC

Sample Information:

Sample ID: CM_SPD_WS_20161102-N
Sample Date: November 2, 2016
Date Received: November 4, 2016
Sample Volume: 2 x 1 L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 101916A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 0
Days to first brood: 8

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC41
Stock Solution ID: 16NaO2
Date Initiated: November 2, 2016
48-h LC50 (95% CL): 4.5 (3.8 - 5.4) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.1 (3.1 - 5.5) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Nov - 17, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teek
 Sample ID: CM-SPD-WS-20161102-A
 Work Order No.: 161211

Start Date/Time: November 5, 2016 @ 1650h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-3 pH meter: pH-3 Cond./Salinity: C-3

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	19.5	19.0	19.2	8.5	8.5	8.4	7.9	7.7	7.6	355	363
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.5	19.0	19.2	8.7	8.6	8.5	8.0	7.9	7.8	1490	1471
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	99	66
Highest conc.	870	216
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		
DO (mg/L)	8.7		
pH	8.0		
Cond (µS/cm)	1490		
Salinity (ppt)	0.7		

Comments: _____ Mortality: Heartbeat checked under microscope not rec'd

Sample Description: clear, no colour, no odour, no particulates

Batch#: 101916A 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 0 Day of 1st Brood: 8

Reviewed by: [Signature] Date reviewed: Nov. 17, 2016

Daphnia magna Summary Sheet

Client: Teks (CMA)
Work Order No.: 161211

Start Date/Time: November 5, 2016 @ 1650h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: CM-CCPD-WS-20161102-N
Sample Date: November 2, 2016
Date Received: November 4, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 101916A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 0
Days to first brood: 8

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC41
Stock Solution ID: 16NaO2
Date Initiated: November 2, 2016
48-h LC50 (95% CL): 4.5 (3.8 - 5.4) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.1 (3.1 - 5.5) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 3% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Nov. 17, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teek
 Sample ID: CM-CCPD-WS-20161102-A
 Work Order No.: 161211

Start Date/Time: November 5, 2016 @ 1650h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-3 pH meter: pH-3 Cond./Salinity: C-3

Concentration (% v/v)	Number of Live Organisms Rep	24		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.5	19.0	19.0	8.5	8.4	8.5	7.9	7.7	7.6	355	364
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.5	19.0	19.0	8.4	8.5	8.5	7.6	7.6	7.6	1681	1647
	B	10	9	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO ₃)	
Control (MHW)	94	66
Highest conc.	870	306
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		
DO (mg/L)	8.4		
pH	7.6		
Cond (µS/cm)	1681		
Salinity (ppt)	0.9		

Comments: _____ Mortality: Heartbeat checked under microscope yes

Sample Description: clear, no colour, no odour, no particulates

Batch#: 101916A 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 0 Day of 1st Brood: 8

Reviewed by: [Signature] Date reviewed: Nov 17, 2016

Daphnia magna Summary Sheet

Client: Teck (Cmo)
Work Order No.: 161211

Start Date/Time: November 5, 2016 @ 1650h
Test Species: Daphnia magna
Set up by: YHC

Sample Information:

Sample ID: CM-PC2-WS-20161102-N
Sample Date: November 2, 2016
Date Received: November 4, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 101916A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 0
Days to first brood: 8

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC41
Stock Solution ID: 16NaO2
Date Initiated: November 2, 2016
48-h LC50 (95% CL): 4.5 (3.8 - 5.4) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.1 (3.1 - 5.5) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Nov 17, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teek
 Sample ID: CM-PCZ-W5-20161102-N
 Work Order No.: 161211

Start Date/Time: November 5, 2016 @ 1650h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-3 pH meter: pH-3 Cond./Salinity: C-3

Concentration (% v/v)	Number of Live Organisms Rep	24		48		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48	0	24		48	0	24	48	0	24	48	0	48		
Control	A	10	10	0	19.5	19.0	19.0	8.5	8.4	8.5	7.9	7.6	7.6	355	332		
	B	10	10	0													
	C	10	10	0													
	D																
100	A	10	10	0	19.5	19.0	19.0	8.8	8.7	8.5	7.9	7.9	7.9	328	333		
	B	10	10	0													
	C	10	10	0													
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML		

Concentration	Hardness* (mg/L as CaCO ₃)	Alkalinity* (mg/L as CaCO ₃)
Control (MHW)	94	66
Highest conc.	154	152
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		
DO (mg/L)	8.8		
pH	7.9		
Cond (µS/cm)	328		
Salinity (ppt)	0.2		

Comments: _____ Mortality: Heartbeat checked under microscope not noted

Sample Description: Clear, no colour, no odour, no particulates

Batch#: 101916A 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 0 Day of 1st Brood: 8

Reviewed by: [Signature] Date reviewed: Nov. 17, 2016


Client: Teck

W.O.#: 161211

Hardness and Alkalinity Datasheet

Sample ID	Alkalinity						Hardness			Technician
	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO 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)	
CM-SPD-WS- 20161102-N	Nov. 5/16	Nov. 5/16	50	11.0	11.2	216	100	8.7	870	YML
CM-CCPD-WS- 20161102-N	Nov. 5/16	Nov. 5/16	50	15.7	16.1	306	100	8.7	870	YML
CM-PC2-WS- 20161102-N	Nov. 5/16	Nov. 5/16	50	7.7	7.8	152	50	7.7	154	YML
MHW	Nov. 5/16	Nov. 5/16	50	3.4	3.5	66	50	4.7	94	YML

Notes: ⊙ Diluted to 100 mL w/ DI water.

Reviewed by: 

Date Reviewed: Nov. 17, 2016

APPENDIX C – Chain-of-custody form

Chain Of Custody Record

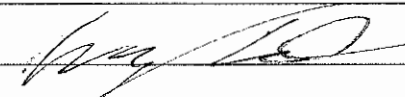
COC ID: 20161102-1102

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	Carla Romero			Contact Name	Krysta Percy/Armando Tang			Address			
Address	2261 Corbin Rd.			Address	8664 Commerce Court						
City	Sparwood	Prov.	BC	City	Burnaby	State	BC	City		State	
Postal Code	VOB 2G0	Country	Canada	City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425 7377			Postal Code	V5A4N7	Country	Canada	Task Code			
Email EDD To	Rick.Magliocco@teck.com			Phone Number	6044208773			Shipping Company			
	Don.Sacino@teck.com			Email Address	krysta@nautilusenvironmental.com			Tracking Number			
	Carla.Romero@teck.com			PO Number	421710			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								
CM_SPD_WS_20161102_N	WS	Nov 2 2016	11:50	G	3		96 hr Rainbow trout Acute Toxicity - Single concentration (pass/fail)						Temp °C - 1L	Temp °C - 20L	20L+2L containers
CM_CCPD_WS_20161102_N	WS	Nov 2 2016	14:00	G	3		48 hr Daphnia Magna Acute Toxicity - Single concentration (pass/fail)						7.0	8.4	20L+2L containers
CM_PC2_WS_20161102_N	WS	Nov 2 2016	13:22	G	3								7.0	7.5	20L+2L containers

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
<p>Sample desc - all samples appear clear, colourless, no odour, no particulates</p>				Nautilus - Burnaby	Nov 04/16	11:05	Y / N	Y / N	Y / N	
				NY - Nait Yamamoto			Y / N	Y / N	Y / N	
							Y / N	Y / N	Y / N	
							Y / N	Y / N	Y / N	
	Sampler's Name	J.Enns		Mobile #	919-4387		Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
	Sampler's Signature			Date/Time	11/2/2016 17:00:00 PM					

END OF REPORT



Acute Toxicity Test Results

Samples collected November 15, 2016

Final Report

November 30, 2016

Submitted to: **Teck Coal / Coal Mountain Operations**
Sparwood, BC

SAMPLE INFORMATION

Sample ID	Dates				Receipt temp.
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> test initiation	
CM_SPD_WS_20161115_N	15-Nov-16 at 1325h	16-Nov-16 at 1000h	17-Nov-16 at 1340h	16-Nov-16 at 1520h	4.3°C
CM_CC1_WS_20161115_N	15-Nov-16 at 1305h	16-Nov-16 at 1000h	17-Nov-16 at 1340h	16-Nov-16 at 1525h	4.3°C

TESTS

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test

RESULTS

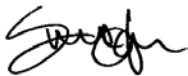
Toxicity test results

Sample ID	Percent mortality in 100% (v/v) sample	
	Rainbow trout	<i>Daphnia magna</i>
CM_SPD_WS_20161115_N	0	0
CM_CC1_WS_20161115_N	0	0

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CI)	40.6 (34.1 – 48.4) µg/L Zn ¹	4.5 (3.8 – 5.4) g/L NaCl ²
Reference toxicant historical mean (2 SD range)	60.8 (22.0 – 167.6) µg/L Zn	4.1 (3.1 – 5.5) g/L NaCl
Reference toxicant CV	66%	15%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹ Test date November 14, 2016. ² Test date November 2, 2016.



Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio
Senior Analyst

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) single concentration test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquarium
Test volume	10 to 20 L (depending on size of fish)
Test solution depth	≥15 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tapwater
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Zinc (added as ZnCl ₂)

Table 2. Summary of test conditions: 48-h *Daphnia magna* single concentration test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: Teck Coal (Cmo)

Start Date/Time: Nov 17 116 @ 1340h

Work Order No.: 161244a

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: CM-SPD-WS-20161115-N
Sample Date: Nov 15 116
Date Received: Nov 16 116
Sample Volume: 1 X 20 L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 4

Test Organism Information:

Batch No.: 110116
Source: AK Vancouver Island Trout Hatchery
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.25
Mean Length ± SD (mm): 31 ± 2
Mean Weight ± SD (g): 0.30 ± 0.03
Range: 27 - 33
Range: 0.27 - 0.35

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn54
Stock Solution ID: 16Zn02
Date Initiated: Nov 14 116
96-h LC50 (95% CL): 40.6 (34.1-48.4) µg/L

Reference Toxicant Mean and Historical Range: 60.8 (22.0-167.6) µg/L Zn
Reference Toxicant CV (%): 66.1%

Test Results: 100% survival at 96 hours in the undiluted
100% (v/v) sample. 0% mortality at 96h in the undiluted
100% (v/v) sample.

Reviewed by: [Signature] Date reviewed: Nov-28, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal (mo)
 Sample I.D. CM-SPD-WS-20161115-2
 W.O. # 161244 d
 RBT Batch #: 110116
 Date Collected/Time: Nov 15/16 @ 1325h
 Date Setup/Time: Nov 17/16 @ 1340h
 Sample Setup By: EC

Number Fish/Volume: 10/12 L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER#2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
D.O. (mg/L)	10.3	/	10.3
pH	7.9	/	8.0
Cond. (µS/cm)	1648	/	1648
Salinity (ppt)	0.8	/	0.8

Concentration (% v/v)	# Survivors							Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
10			10	10	10	10	10	14.0	15.0	14.8	14.5	15.0	10.0	10.0	9.8	9.9	9.9	6.8	6.9	6.9	7.0	7.0	26	32
100			10	10	10	10	10	14.0	15.0	14.5	14.5	15.0	10.3	9.9	9.9	9.8	9.9	8.0	8.3	8.4	8.3	8.1	1648	1607
Initials				EV	AD	AD	EL	EC	EV	AD	A	EL	EC	EV	AD	A	EL	EC	EV	AD	A	EL	EC	EV

Sample Description/Comments: Grey, Some particulates, O down etc, Turbid

Fish Description at 96 h All fish appear normal Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: Date Reviewed: Nov 28, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal

Start Date/Time: Nov 17, 116 @ 1340h

Work Order No.: 161244d

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: CM-CC1-WS-20161115-N
Sample Date: Nov 15 116
Date Received: Nov 16 116
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 4

Test Organism Information:

Batch No.: 110116
Source: AK Vancouver Island Trout Hatchery
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.26
Mean Length ± SD (mm): 31 ± 1 Range: 29-32
Mean Weight ± SD (g): 0.32 ± 0.03 Range: 0.27-0.38

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn54
Stock Solution ID: 16Zn02
Date Initiated: Nov 14/116
96-h LC50 (95% CL): 40.6 (34.1-48.4) µg/L

Reference Toxicant Mean and Historical Range: 60.8 (22.0-167.6) µg/L Zn
Reference Toxicant CV (%): 66.1%

Test Results: 100% survival at 96 hours in the undiluted
100% (v/v) sample - 0% mortality at 96h in the undiluted
100% (v/v) sample

Reviewed by: [Signature] Date reviewed: Nov-28, 2016

Daphnia magna Summary Sheet

Client: Teck (CMO)
Work Order No.: 161245 a

Start Date/Time: November 16, 2016 @ 1520h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: CMSPD-WS-2016115-N
Sample Date: November 15, 2016
Date Received: November 16, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.
WQ Ranges:
T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 102616A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC41
Stock Solution ID: 16NaO2
Date Initiated: November 2, 2016
48-h LC50 (95% CL): 4.5 (3.8 - 5.4) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.1 (3.1 - 5.5) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: [Signature]

Date reviewed: Nov. 28, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: CMSPD-WS-2016115-N
 Work Order No.: 161245 d

Start Date/Time: November 16, 2016 @ 1520h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-3 pH meter: pH-3 Cond./Salinity: C-3

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.0	19.0	18.5	8.6	8.5	8.2	7.6	7.6	7.7	352	356
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10 ⁰	0	18.5	19.0	18.5	9.2	8.4	8.3	7.9	7.9	7.9	1677	1623
	B	10	10 ⁰	0											
	C	10	10 ⁰	3											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO ₃)	
Control (MHW)	96	66
Highest conc.	1120	224
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.5		
DO (mg/L)	9.2		
pH	7.9		
Cond (µS/cm)	1677		
Salinity (ppt)	0.8		

Comments: Slight precipitate on surface Mortality: Heartbeat checked under microscope not rejected

Sample Description: slight grey colour, slightly turbid, slight particulates, no odour

Batch#: 102616A 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Nov-28, 2016

Daphnia magna Summary Sheet

Client: Teck (CMO)
Work Order No.: 161245 d

Start Date/Time: November 16, 2016 @ 1525h
Test Species: Daphnia magna
Set up by: YHL

Sample Information:

Sample ID: CM-~~SEPA~~^{CC1}-WS-20161115-N
Sample Date: November 15, 2016
Date Received: November 16, 2016
Sample Volume: 2 x 11

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 102616A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 17
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC41
Stock Solution ID: 16NaO2
Date Initiated: November 2, 2016
48-h LC50 (95% CL): 4.5 (3.8 - 5.4) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.1 (3.1 - 5.5) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Nov 28, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (CMA)
 Sample ID: CM-CC1-WS-20161115-N
 Work Order No.: 161245a

Start Date/Time: November 16, 2016 @ 1525h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-3 pH meter: pH-3 Cond./Salinity: C-3

Concentration (% v/v)	Number of Live Organisms Rep	24		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.0	19.0	18.5	8.6	8.5	8.2	7.6	7.6	7.7	352	360
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10 ⁰	0	18.0	19.0	18.5	9.3	8.5	8.3	7.9	7.9	7.9	1468	1415
	B	10	10 ⁰	0											
	C	10	10 ⁰	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	96	66
Highest conc.	870	246
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.0		
DO (mg/L)	9.3		
pH	7.9		
Cond (µS/cm)	1468		
Salinity (ppt)	0.7		

Comments: ① slight precipitate on surface Mortality: Heartbeat checked under microscope not required

Sample Description: clear, no colour, slight particulates, no odour.

Batch#: 102616A 7-d previous # young/brood: 17 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: EW Date reviewed: Nov. 28, 2016

APPENDIX C – Chain-of-custody form

Chain Of Custody Record

COC ID: 20161102-1102

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	Carla Romero			Contact Name	Krysta Peary/Armando Tang			Address			
Address	2261 Corbin Rd.			Address	8664 Commerce Court						
City	Sparwood	Prov.	BC	City	Burnaby	State	BC	City		State	
Postal Code	V0B 2G0	Country	Canada	City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425 7377			Postal Code	V5A4N7	Country	Canada	Task Code			
Email EDD To	Rick.Maglioocco@teck.com			Phone Number	6044208773			Shipping Company			
	Don.Sacino@teck.com			Email Address	krysta@nautilusenvironmental.com			Tracking Number			
	Carla.Romero@teck.com			PO Number	421710			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									
① CM_SPD_WS_20161115_N	WS	Nov 15 2016	13:25	G	3	96 hr Rainbow trout Acute Toxicity - Single concentration (pass/fail)	x	x						Temp. °C	20L+2L containers
② CM_CC1_WS_20161115_N	WS	Nov 15 2016	13:05	G	3	48 hr Daphnia Magna Acute Toxicity - Single concentration (pass/fail)	x	x						4.3	20L+2L containers

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
							Y/N	Y/N	Y/N	
① Grey, some particulates, Odourless, slightly turbid.				Nautilus - Burnaby	Nov 16/16	10:00				
				NY - Nain Yamamoto						
② Colorless, clear, some particulates, no odour.										
	Sampler's Name	Don Steens / Bob Wain		Mobile #	Nov 15/16		Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
	Sampler's Signature			Date/Time	14:00					

END OF REPORT



Acute Toxicity Test Results

Sample collected November 15, 2016

Final Report

November 30, 2016

Submitted to: **Teck Coal / Coal Mountain Operations**
Sparwood, BC

SAMPLE INFORMATION

Sample ID	Dates				Receipt temp.
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> test initiation	
CM_CCPD_WS_20161115_N	15-Nov-16 at 1500h	18-Nov-16 at 1040h	18-Nov-16 at 1545h	16-Nov-16 at 1600h	10.0°C

TESTS

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test

RESULTS

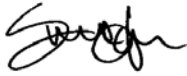
Toxicity test results

Sample ID	Percent mortality in 100% (v/v) sample	
	Rainbow trout	<i>Daphnia magna</i>
CM_CCPD_WS_20161115_N	0	0

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CI)	40.6 (34.1 – 48.4) µg/L Zn ¹	3.9 (2.8 – 5.5) g/L NaCl ²
Reference toxicant historical mean (2 SD range)	60.8 (22.0 – 167.6) µg/L Zn	4.1 (3.1 – 5.5) g/L NaCl
Reference toxicant CV	66%	16%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹ Test date November 14, 2016; ² Test date November 23, 2016



Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio
Senior Analyst

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) single concentration test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquarium
Test volume	10 to 20 L (depending on size of fish)
Test solution depth	≥15 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tapwater
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Zinc (added as ZnCl ₂)

Table 2. Summary of test conditions: 48-h *Daphnia magna* single concentration test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: Teck Coal (Cmo)

Start Date/Time: Nov 18 116 @ 1545h

Work Order No.: 161252

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: CM-CCPD-WS-20161115-N
Sample Date: Nov 15 116
Date Received: Nov 18 116
Sample Volume: 1 X 20 L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 4

Test Organism Information:

Batch No.: 110116
Source: AK Vancouver Island Trout Hatchery
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.26
Mean Length ± SD (mm): 29 ± 1 Range: 27 - 30
Mean Weight ± SD (g): 0.31 ± 0.03 Range: 0.27 - 0.36

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn54
Stock Solution ID: 16Zn02
Date Initiated: Nov 14 116
96-h LC50 (95% CL): 40.6 (34.1 - 48.4) µg/L

Reference Toxicant Mean and Historical Range: 60.8 (22.0 - 167.6) µg/L Zn
Reference Toxicant CV (%): 66.1%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature] Date reviewed: Nov 29, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal (CMO)
 Sample I.D. CM-CCPD-WS-20161115-N
 W.O. # 161252
 RBT Batch #: 110116
 Date Collected/Time: Nov 15/16 @ 1500h
 Date Setup/Time: Nov 18/16 @ 1545h
 Sample Setup By: EC

Number Fish/Volume: 10/12L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER#2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
D.O. (mg/L)	10.5	/	10.5
pH	7.8	/	7.9
Cond. (µS/cm)	1592	/	1600
Salinity (ppt)	0.8 + 54.2 µL	/	1600 + 0.8

Concentration (% v/v)	# Survivors							Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
CT1				10	10	10	10	14.0	14.5	14.5	15.0	15.0	10.0	9.8	9.8	10.0	9.8	6.7	6.9	6.9	7.0	7.0	26	30
100				10	10	10	10	14.0	14.5	14.5	15.0	15.0	10.3	9.9	9.7	9.9	9.9	7.9	8.1	8.2	8.1	8.2	1600	1422
Initials				AS	AS	EL	EL	EC	AS	AS	EL	EL	EL	AS	AS	EL	EL	EL	AS	AS	EL	EL	EL	EL

Sample Description/Comments: Yellow, clear, some particulates, no odour.

Fish Description at 96 h All fish appear normal Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by:

Date Reviewed: Nov 29, 2016

Daphnia magna Summary Sheet

Client: Teck (CMO)
Work Order No.: 161253

Start Date/Time: November 18, 2016 @ 1600h
Test Species: Daphnia magna
Set up by: YMc

Sample Information:

Sample ID: CM-CCPD-WS-20161115-N
Sample Date: November 15, 2016
Date Received: November 18, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 110216B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 23
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC42
Stock Solution ID: 16N902
Date Initiated: November 23, 2016
48-h LC50 (95% CL): 3.9 (2.8-5.5) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Nov 29, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: CM-CCP-WS-20161115-N
 Work Order No.: 161253

Start Date/Time: Nov 18/16 @ 1600⁰⁰ h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: YTL

Thermometer: Temp-11 DO meter: DO-2/3 pH meter: pH-1/3 Cond./Salinity: C-2/3

Concentration % (v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	18.5	20.0	19.5	8.6	9.0	8.7	7.7	7.9	8.0	348	353
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	18.5	20.0	19.5	8.4	8.8	8.6	7.6	7.8	7.9	1595	1637
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		A=	A=	A=	YTL	A=	A=	NWL	A=	A=	NWL	A=	A=	NWL	A=

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	96	66
Highest conc.	980	328
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.5		
DO (mg/L)	8.4		
pH	7.6		
Cond (µS/cm)	1595		
Salinity (ppt)	0.8		

Comments: _____ Mortality: Heartbeat checked under microscope no

Sample Description: clear, slightly yellow, no odour, slight particulates

Batch#: 110216B 7-d previous # young/brood: 23 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Nov 29, 2016

APPENDIX C – Chain-of-custody form

Chain Of Custody Record

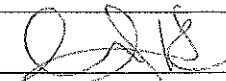
COC ID:

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		Carla Romero		Contact Name		Krysta Pearcy/Armando Tang		Address			
Address		2261 Corbin Rd.		Address		8664 Commerce Court					
City	Sparwood	Prov.	BC	City	Burnaby	State	BC	City		State	
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A4N7	Country	Canada	Postal Code		Country	
Phone Number	250 425 7377			Postal Code	V5A4N7		Country	Canada	Task Code		
Email EDD To	Rick.Magliocco@teck.com			Phone Number	6044208773				Shipping Company		
	Don.Sacino@teck.com			Email Address	krysta@nautilusenvironmental.com				Tracking Number		
	Carla.Romero@teck.com			PO Number	421710				CC Hardcopy To		
	Bob.Werner@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								
CM_CCPD_WS_20161115_N	WS	Nov 15 2016	15:00	G	3	96 hr Rainbow trout Acute Toxicity - Single concentration (pass/fail)									20L+2L containers
						48 hr Daphnia Magna Acute Toxicity-Single concentration (pass/fail)									

Additional Comments/Special Instructions	Relinquished By/Affiliation		Date	Time	Accepted By/Affiliation		Date	Time	Sample Receipt Conditions					
	yellow, clear some particulates, no odour					Nautilus - Burnaby		Nov 18/16	10:40	10.0	<input checked="" type="checkbox"/>	N	Y/N	Y/N
				NY - Nain Yamamoto							Y/N	Y/N	Y/N	
				1x20L							Y/N	Y/N	Y/N	
											Y/N	Y/N	Y/N	
Sampler's Name		C.Romero		Mobile #		250 425 7350		Temp in °C	Samples on ice?	Sample intact?	Trip Blank?			
Sampler's Signature				Date/Time		11/15/2016 15:00:00 PM								

END OF REPORT



Acute Toxicity Test Results

Samples collected November 23, 2016

Final Report

March 29, 2017

Submitted to: **Teck Coal / Coal Mountain Operations**
Sparwood, BC

SAMPLE INFORMATION

Sample ID	Dates				Receipt temp.
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> test initiation	
CM_SPD_WS_20161123_N	23-Nov-16 at 1500h	25-Nov-16 at 1038h	28-Nov-16 at 1400h	25-Nov-16 at 1530h	8.5/6.5°C
CM_CC1_WS_20161123_N	23-Nov-16 at 1435h	25-Nov-16 at 1038h	28-Nov-16 at 1400h	25-Nov-16 at 1530h	8.5/6.5°C

TESTS

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test

RESULTS

Toxicity test results

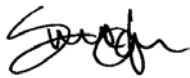
Sample ID	Percent mortality in 100% (v/v) sample	
	Rainbow trout	<i>Daphnia magna</i>
CM_SPD_WS_20161123_N	30	0
CM_CC1_WS_20161123_N	20	0

Data for all samples listed on the chain of custody have been provided in a separate report.

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CI)	40.5 (30.6 – 53.7) µg/L Zn ¹	3.9 (2.8 – 5.5) g/L NaCl ²
Reference toxicant historical mean (2 SD range)	60.6 (21.8 – 167.9) µg/L Zn	4.1 (3.1 – 5.5) g/L NaCl
Reference toxicant CV	66%	16%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹ Test date November 23, 2016. ² Test date November 23, 2016, LC = Lethal Concentration, SD = Standard Deviation, CV = Coefficient of Variation



Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio
Senior Analyst

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) single concentration test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquarium
Test volume	10 to 20 L (depending on size of fish)
Test solution depth	≥15 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tapwater
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Zinc (added as ZnCl ₂)

Table 2. Summary of test conditions: 48-h *Daphnia magna* single concentration test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: Teck Coal (mo)

Start Date/Time: Nov 28 116 @ 1400 h

Work Order No.: 161288

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: CM-SPRWS-20161123-N
Sample Date: Nov 23 116
Date Received: Nov 25 116
Sample Volume: 1 X 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 4

Test Organism Information:

Batch No.: 110916(A)
Source: Vancouver Island Trout Hatchery
No. Fish/Volume (L): 10/10
Loading Density (g/L): 0.28 ± 0.33
Mean Length ± SD (mm): 31 ± 2
Mean Weight ± SD (g): 0.33 ± 0.04

Range: 27 - 32
Range: 0.28 - 0.44

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn55
Stock Solution ID: 16Zn02
Date Initiated: Nov 23/16
96-h LC50 (95% CL): 40.5 (30.6 - 53.7) µg/L Zn

Reference Toxicant Mean and Historical Range: 60.6 (21.8 - 167.9) µg/L Zn
Reference Toxicant CV (%): 68.66%
EU

Test Results: 30 % mortality at 96 hours in the undiluted
100 % (v/v) sample.

Reviewed by: [Signature]

Date reviewed: Dec 7, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal (MS)
 Sample I.D. CM-SPD-W5-20161123-N
 W.O. # 161288
 RBT Batch #: 110916(A)
 Date Collected/Time: Nov 23/16 @ 1500h
 Date Setup/Time: Nov 28/16 @ 1400h
 Sample Setup By: EL

Number Fish/Volume: 10/10L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 45
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
D.O. (mg/L)	10.6	/	10.4
pH	8.0	/	8.0
Cond. (µS/cm)	1757	/	1757
Salinity (ppt)	0.9	/	0.9

Thermometer: CER#2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Concentration	# Survivors						Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)			
	(% v/v)	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
100				10	10	10	10	14.0	14.0	15.5	15.0	15.0	10.1	9.8	9.7	9.7	9.8	6.8	6.8	6.9	6.9	6.9	26	29	
100				10	8	8	7	14.0	14.0	15.5	15.0	15.0	10.3	9.8	9.8	9.7	9.7	8.0	8.1	8.3	8.3	8.3	1757	1724	
Initials				EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL

Sample Description/Comments: Clear, colorless, some ^{EL}particulate particulates, no odor

Fish Description at 96 h All surviving fish appear normal Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: 

Date Reviewed: Dec 7, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (CMA)

Start Date/Time: Nov 28 116 @ 1400h

Work Order No.: 161288

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: CM-CC1-WS-20161123-1N
Sample Date: Nov 23 116
Date Received: Nov 25 116
Sample Volume: 1 X 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 8
Alkalinity (mg/L CaCO₃): 4

Test Organism Information:

Batch No.: 110916(A)
Source: Vancouver Island Trout Hatchery
No. Fish/Volume (L): 10/10
Loading Density (g/L): 0.37
Mean Length ± SD (mm): 31 ± 1 Range: 30 - 33
Mean Weight ± SD (g): 0.37 ± 0.08 Range: 0.27 - 0.52

Zinc Reference Toxicant Results:

Reference Toxicant ID: R7Zn55
Stock Solution ID: 16Zn02
Date Initiated: Nov 23/16
96-h LC50 (95% CL): 40.5 (30.6 - 53.7) µg/L Zn

Reference Toxicant Mean and Historical Range: 60.6 (21.8 - 167.9) µg/L Zn
Reference Toxicant CV (%): 66%
EL

Test Results: 20 % mortality at 96 hours in the undiluted
100 % (v/v) sample.

Reviewed by: [Signature]

Date reviewed: Dec 7, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal (CMO)
 Sample I.D.: CM-CC1-WS-20161123-N
 W.O. #: 161288
 RBT Batch #: 110916(A)
 Date Collected/Time: Nov 23/16 @ 1435h
 Date Setup/Time: Nov 28/16 @ 1400h
 Sample Setup By: EL

Number Fish/Volume: 10/10L
 7-d % Mortality: 0
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
D.O. (mg/L)	10.5	/	10.3
pH	7.9	/	7.9
Cond. (µS/cm)	1472	/	1472
Salinity (ppt)	0.7	/	0.7

Thermometer: CER#2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Concentration	# Survivors							Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)	
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
(% v/v)								14.0	14.0	15.5	15.0	15.0	10.1	9.8	9.8	9.8	9.8	6.8	6.8	6.9	6.9	6.9	26	35
41				10	10	10	10	14.0	14.0	15.5	15.0	15.0	10.3	9.9	9.9	9.8	9.8	7.9	8.3	8.3	8.2	8.3	1520	1359
100				10	10	9	8	14.0	14.0	15.5	15.0	15.0	10.3	9.9	9.9	9.8	9.8	7.9	8.3	8.3	8.2	8.3	1520	1359
Initials				EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL

Sample Description/Comments: Clear, colorless, no particulates, no odors

Fish Description at 96 h: All surviving fish appear normal Number of Stressed Fish at 96 h: 0

Other Observations: precipitation formed @ 96 h on container bottom.

Reviewed by: [Signature]

Date Reviewed: Dec 7, 2016

Daphnia magna Summary Sheet

Client: Teck (CMO)
Work Order No.: 161289

Start Date/Time: November 25, 2016 @ 1530h
Test Species: Daphnia magna
Set up by: IME

Sample Information:

Sample ID: CM-SPD-WS-20161123-N
Sample Date: November 23, 2016
Date Received: November 25, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 1109103
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 18
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC42
Stock Solution ID: 16NR02
Date Initiated: November 23, 2016
48-h LC50 (95% CL): 3.9 (2.8-5.5) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: 0% ^{mortality} survival at 48h in the 100% (v/v) undiluted sample.

Reviewed by: EME

Date reviewed: Dec 7, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (CMO)
 Sample ID: CM-SPD-WQ-20161123-N
 Work Order No.: 161289

Start Date/Time: November 25, 2016 @ 1530h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	18.5	20.0	19.5	8.6	8.5	8.6	7.6	8.1	7.9	355	362
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	19.5	20.0	19.5	9.0	8.6	8.7	8.0	8.0	8.1	1748	1729
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		A	A	M	YML	M	M	YML	M	A	YML	A	A	YML	A

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO ₃)	
Control (MHW)	100	726
Highest conc.	930	746
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.5		/
DO (mg/L)	9.0		
pH	8.0		
Cond (µS/cm)	1748		
Salinity (ppt)	0.9		

Comments: _____ Mortality: Heartbeat checked under microscope no

Sample Description: clear, no colour, no odour, some particulates.

Batch#: 110916B 7-d previous # young/brood: 18 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: [Signature] Date reviewed: Dec-7, 2016

Daphnia magna Summary Sheet

Client: Teck (MO)
Work Order No.: 161289

Start Date/Time: November 25, 2016 @ 1530h
Test Species: Daphnia magna
Set up by: IMC

Sample Information:

Sample ID: CM_CCL_WS_20161123-N
Sample Date: November 23, 2016
Date Received: November 25, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 110916B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 18
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC42
Stock Solution ID: 16Na02
Date Initiated: November 23, 2016
48-h LC50 (95% CL): 3.9 (2.8-5.5) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl

Reference Toxicant CV (%): 16

Test Results:

0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by:

[Signature]

Date reviewed:

Dec. 7, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (CMO)
 Sample ID: CM-CCI-WS-20161123-N
 Work Order No.: 161289

Start Date/Time: November 25, 2016 @ 15:30
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-S DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	18.5	20.0	19.5	8.6	8.5	8.6	7.6	7.0	7.9	355	364
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	20.0	20.0	19.5	9.0	8.4	8.8	7.9	7.1	8.2	1480	1482
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		A	A	A	YML	A	A	YML	A	A	YML	A	A	YML	A

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCo3)	
Control (MHW)	100	68
Highest conc.	990	284
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		/
DO (mg/L)	9.0		
pH	7.9		
Cond (µS/cm)	1480		
Salinity (ppt)	0.7		

Comments: _____ Mortality: Heartbeat checked under microscope no

Sample Description: clear, no colour, no odour, no particulates

Batch#: 110916B 7-d previous # young/brood: 18 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: [Signature] Date reviewed: Dec-7-2016

Client: Teck

W.O.#: 161289

Hardness and Alkalinity Datasheet

Sample ID	Alkalinity						Hardness			Technician
	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO 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)	
CM-NDZ-WS-20161123-N	Nov. 25/16	Nov. 25/16	50	15.4	15.6	304	100	12.3	1230	SS
CM-SPD-WS-20161123-N	Nov. 25/16	Nov. 25/16	50	12.5	12.7	246	100	9.8	980	SS
CM-CC1-WS-20161123-N	Nov. 25/16	Nov. 25/16	50	14.4	14.6	288.4	100	9.9	990	SS
MHW	Nov. 25/16	Nov. 25/16	50	3.5	3.6	68	50	5.0	100	YMC

Notes: ① Diluted to 100 mL w/ DI water.

Reviewed by: 

Date Reviewed: Dec 7, 2016

APPENDIX C – Chain-of-custody form

END OF REPORT



Acute Toxicity Test Results

Samples collected November 30, 2016

Final Report

March 29, 2017

Submitted to: **Teck Coal / Coal Mountain Operations**
Sparwood, BC

SAMPLE INFORMATION

Sample ID	Dates				Receipt temp.
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> test initiation	
CM_SPD_WS_20161130_N	30-Nov-16 at 1340h	02-Dec-16 at 1050h	05-Dec-16 at 1100h	02-Dec-16 at 1445h	7.5°C
CM_CC1_WS_20161130_N	30-Nov-16 at 1312h	02-Dec-16 at 1050h	05-Dec-16 at 1100h	02-Dec-16 at 1445h	7.5°C
CM_CCPD_WS_20161130_N	30-Nov-16 at 1200h	02-Dec-16 at 1050h	05-Dec-16 at 1100h	02-Dec-16 at 1445h	7.5°C

TESTS

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test

RESULTS

Toxicity test results

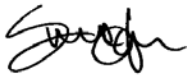
Sample ID	Percent mortality in 100% (v/v) sample	
	Rainbow trout	<i>Daphnia magna</i>
CM_SPD_WS_20161130_N	0	0
CM_CC1_WS_20161130_N	0	0
CM_CCPD_WS_20161130_N	0	0

Data for all samples listed on the chain of custody have been provided in a separate report.

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CI)	39.4 (32.2 – 48.4) µg/L Zn ¹	3.9 (2.8 – 5.5) g/L NaCl ²
Reference toxicant historical mean (2 SD range)	58.3 (21.0 – 161.7) µg/L Zn	4.1 (3.1 – 5.5) g/L NaCl
Reference toxicant CV	66%	16%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹ Test date: December 2, 2016; ² Test date November 23, 2016, LC = Lethal Concentration, SD = Standard Deviation, CV = Coefficient of Variation



Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio
Senior Analyst

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) single concentration test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquarium
Test volume	10 to 20 L (depending on size of fish)
Test solution depth	≥15 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tapwater
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Zinc (added as ZnCl ₂)

Table 2. Summary of test conditions: 48-h *Daphnia magna* single concentration test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: Tec/Coal (CMO)

Start Date/Time: Dec 5 / 16 @ 11:00h

Work Order No.: 161315

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: CM-SPD-WS-20161130-L
Sample Date: Nov 30 / 16
Date Received: Dec 2 / 16
Sample Volume: 1 X 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 9
Alkalinity (mg/L CaCO₃): 5

Test Organism Information:

Batch No.: 110916(B)
Source: Vancouver Island Trout Hatchery
No. Fish/Volume (L): 10 / 10
Loading Density (g/L): 0.31
Mean Length ± SD (mm): 30 ± 1
Mean Weight ± SD (g): 0.31 ± 0.03

Range: 27 - 32
Range: 0.27 - 0.37

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn56
Stock Solution ID: 16Zn02
Date Initiated: Dec 2 / 16
96-h LC50 (95% CL): 39.4 (32.2 - 48.4) µg/L Zn

Reference Toxicant Mean and Historical Range: 58.3 (21.0 - 161.7) µg/L Zn
Reference Toxicant CV (%): 66%

Test Results: 100% survival at 96 hours in the undiluted 100% (v/v) sample. 0% mortality at 96h in the methanol 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: Dec 13, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (CMO)

Start Date/Time: Dec 5 /16 @ 1100h

Work Order No.: 161315

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: CM CCI-WS-20161130-N
Sample Date: Nov 30 /16
Date Received: Dec 2 /16
Sample Volume: 1 X 20 L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 9
Alkalinity (mg/L CaCO₃): 5

Test Organism Information:

Batch No.: 110916(B)
Source: Vancouver Island Trout Hatchery
No. Fish/Volume (L): 10 / 10L
Loading Density (g/L): 0.31
Mean Length ± SD (mm): 31 ± 1
Mean Weight ± SD (g): 0.31 ± 0.05

Range: 29 - 31
Range: 0.26 - 0.37

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn56
Stock Solution ID: 16Zn02
Date Initiated: Dec 2 /16
96-h LC50 (95% CL): 39.4 (32.2 - 48.4) mg/L Zn

Reference Toxicant Mean and Historical Range: 58.3 (21.0 - 161.7) mg/L Zn
Reference Toxicant CV (%): 66%

Test Results: 100% survival at 96 hours in the undiluted 100% (v/v) sample. 0% mortality at 96h in the undiluted 100% (v/v) sample

Reviewed by: [Signature]

Date reviewed: Dec 13, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal (LMO)
 Sample I.D. CM-CC1-WS-20161130-N
 W.O. # 161315
 RBT Batch #: 110916(B)
 Date Collected/Time: Nov 30/16 @ 13:24
 Date Setup/Time: Dec 5/16 @ 1100h
 Sample Setup By: EC JS

Number Fish/Volume: 10/10L
 7-d % Mortality: 1.0
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER # 2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
D.O. (mg/L)	9.8	/	9.8
pH	7.8	/	7.9
Cond. (µS/cm)	155 1540	/	1536
Salinity (ppt)	0.8	/	0.8

Concentration (% v/v)	# Survivors						Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)		
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96
71				10	10	10	10	14.0	15.0	15.0	14.5	15.0	10.3	9.7	9.8	9.9	9.8	6.9	6.8	6.9	6.8	6.8	24	31
100				10	10	10	10	14.0	15.0	15.0	14.5	15.0	9.8	9.8	9.8	9.8	9.8	7.9	8.1	8.3	8.2	8.2	1536	1468
Initials				EL	EL	NM	EL	EL	EL	EL	NM	EL	EL	EL	EL	NM	EL	EL	EL	EL	NM	EL	EL	EL

Sample Description/Comments: Clear, colorless. No particulates. No odors

Fish Description at 96 h All fish appear normal Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: [Signature]

Date Reviewed: Dec 13, 2016

Rainbow Trout Summary Sheet

Client: Teck Coal (CMO)

Start Date/Time: Dec 5 /16 @ 11:00h

Work Order No.: 161315

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: CM-CCPD-WS-20161130-N
Sample Date: Nov 30 /16
Date Received: Dec 2 /16
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 9
Alkalinity (mg/L CaCO₃): 5

Test Organism Information:

Batch No.: 110916(B)
Source: Vancouver Island Trout Hatchery
No. Fish/Volume (L): 10 / 10L
Loading Density (g/L): 0.33
Mean Length ± SD (mm): 30 ± 1
Mean Weight ± SD (g): 0.33 ± 0.04

Range: 29 - 32
Range: 0.27 - 0.41

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn56
Stock Solution ID: 16Zn02
Date Initiated: Dec 2 /16
96-h LC50 (95% CL): 39.4 (32.2 - 48.4) µg/L Zn

Reference Toxicant Mean and Historical Range: 58.3 (21.0 - 161.7) µg/L Zn
Reference Toxicant CV (%): 66%

Test Results: 100% survival at 96 hours in the undiluted 100% (v/v) sample. 0% mortality at 96h in the undiluted (00% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: Dec 13, 2016

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Teck Coal (CNO)
 Sample I.D.: CM-C (PD-WS-20161130-N)
 W.O. #: 161315
 RBT Batch #: 110916 (R)
 Date Collected/Time: EL ~~Dec 30~~ NOV 30/16 @ 1200h
 Date Setup/Time: Dec 5/16 @ 1100h
 Sample Setup By: EL/JS

Number Fish/Volume: 10/10L
 7-d % Mortality: EL ~~1.0~~ 1.0
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Thermometer: CER# 2 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Undiluted Sample WQ			
Parameters	Initial WQ	Adjustment	30 min WQ
Temp °C	14.0	/	14.0
D.O. (mg/L)	9.9	/	³⁵ 10.3 9.8
pH	7.6	/	7.7
Cond. (µS/cm)	1589	/	1592
Salinity (ppt)	0.8	/	0.8

Concentration	# Survivors						Temperature (°C)					Dissolved Oxygen (mg/L)					pH					Conductivity (µS/cm)		
	(% v/v)	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0
(+)				10	10	10	10	14.0	15.0	15.0	14.5	15.0	10.3	9.8	9.8	9.9	9.8	6.9	6.8	6.9	6.9	6.9	2.4	3.1
100				10	10	10	10	14.0	15.0	15.0	14.5	15.0	9.8	9.9	9.8	9.8	9.9	7.7	8.0	8.3	8.2	8.2	1592	1584

Daphnia magna Summary Sheet

Client: Teck (cmo)
Work Order No.: 161316

Start Date/Time: December 2, 2016 @ 1445h
Test Species: Daphnia magna
Set up by: VML

Sample Information:

Sample ID: CM-SPD-WS-20161130-N
Sample Date: November 30, 2016
Date Received: December 2, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 110916A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 21
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC42
Stock Solution ID: 16N902
Date Initiated: November 23, 2016
48-h LC50 (95% CL): 3.9 (2.8-5.5) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Dec 13, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (CMA)
 Sample ID: CM-SPD-WS-20161130-N
 Work Order No.: 161316

Start Date/Time: December 2, 2016 @ 1445h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: VW

Thermometer: Temp-11 DO meter: DO-2/3 pH meter: pH-1/3 Cond./Salinity: C-2/3

Concentration % (v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	19.0	19.0	19.0	8.6	8.5	8.6	7.6	7.9	8.0	356	360
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	20.0	19.0	19.0	9.0	8.6	8.5	7.8	8.0	8.0	1957	1917
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		AV	AV	AV	VW	AV	AV	VW	AV	AV	VW	AV	AV	VW	AV

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	100	76
Highest conc.	310	220
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.5		20.0
DO (mg/L)	9.7	(4 min aeration)	9.0
pH	7.8		7.8
Cond (µS/cm)	1958		1957
Salinity (ppt)	1.0		1.0

Comments: _____ Mortality: Heartbeat checked under microscope NO

Sample Description: clear, no colour, no odour, no particulates

Batch#: 110916A 7-d previous # young/brood: 21 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: [Signature] Date reviewed: Dec 13, 2016

Daphnia magna Summary Sheet

Client: Teck (CMA)
Work Order No.: 161316

Start Date/Time: December 2, 2016 @ 1445h
Test Species: Daphnia magna
Set up by: MLL

Sample Information:

Sample ID: CM-CC1-WS-20161130-N
Sample Date: November 30, 2016
Date Received: December 2, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 110916 A+B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 20
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC42
Stock Solution ID: 16N902
Date Initiated: November 23, 2016
48-h LC50 (95% CL): 3.9 (2.8-5.5) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Dec. 13, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (CMO)
 Sample ID: CM-CC1-WS-20161130-N
 Work Order No.: 161316

Start Date/Time: December 2, 2016 @ 1445h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: VVC

Thermometer: Temp-11 DO meter: DO-2/3 pH meter: pH-1/3 Cond./Salinity: C-2/3

Concentration % (v/v)	Number of Live Organisms Rep	24		48		No. Immobilized 48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48	0	24		48	0	24	48	0	24	48	0	48		
Control	A	10	10	0	19.0	19.0	19.0	8.6	8.6	8.6	7.6	2.0	2.0	356	264		
	B	10	10	0													
	C	10	10	0													
	D																
100	A	10	10	0	20.5	19.0	19.0	9.0	8.7	8.6	7.9	2.1	2.2	1549	1481		
	B	10	10	0													
	C	10	10	0													
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
Technician Initials		A ₁₀	A ₁₀	A ₁₀	VVC	A ₁₀	A ₁₀	VVC	A ₁₀	A ₁₀	VVC	A ₁₀	A ₁₀	VVC	A ₁₀		

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	100	76
Highest conc.	370	180
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.5		
DO (mg/L)	9.0		
pH	7.9		
Cond (µS/cm)	1549		
Salinity (ppt)	0.8		

Comments: _____ Mortality: Heartbeat checked under microscope no

Sample Description: clear, no colour, no odour, no particulates

Batch#: 110916A4B 7-d previous # young/brood: 20 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: [Signature] Date reviewed: Dec 13, 2016

Daphnia magna Summary Sheet

Client: Teck (CMO)
Work Order No.: 161316

Start Date/Time: December 2, 2016 @ 1445h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: CM_CCPD_WS-20161130_N
Sample Date: November 30, 2016
Date Received: December 2, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 110916B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 20
Mortality (%) in previous 7 d: 0
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC42
Stock Solution ID: 16N902
Date Initiated: November 23, 2016
48-h LC50 (95% CL): 3.9 (2.8-5.5) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl
Reference Toxicant CV (%): 16

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample

Reviewed by: [Signature]

Date reviewed: Dec. 13, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (CMO)
 Sample ID: CM-CCPI-WS-20161130-N
 Work Order No.: 161316

Start Date/Time: December 2, 2016 @ 1445h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: YML

Thermometer: Temp-11 DO meter: DO-2/3 pH meter: pH-1/3 Cond/Salinity: C-2/3

Concentration % (v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	19.0	19.0	19.0	8.6	8.6	8.6	7.6	7.6	7.6	1586	1586
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	18.5	19.0	19.0	9.0	8.5	8.5	7.6	7.6	7.6	1586	1586
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	100	76
Highest conc.	210	240
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.5		18.5
DO (mg/L)	9.5	(3 min)	9.0
pH	7.6	(aerator)	7.6
Cond (µS/cm)	1592		1586
Salinity (ppt)	0.8		0.8

Comments: _____ Mortality: Heartbeat checked under microscope no

Sample Description: clear, no colour, no odour, no particulates.

Batch#: 110916B 7-d previous # young/brood: 20 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: [Signature] Date reviewed: Dec-13, 2016

Client: Teck

W.O.#: 161316

Hardness and Alkalinity Datasheet

Sample ID	Alkalinity						Hardness			
	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO 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
CM-CCI-WS-20161130-N	Dec 21/16	Dec 21/16	10 [Ⓢ]	2.0	2.2	180	10 [Ⓢ]	3.7	370	EL
CM-SPD-WS-20161130-N	Dec 21/16	Dec 21/16	10 [Ⓢ]	2.4	2.6	220	10 [Ⓢ]	3.1	310	EL
CM-ND2-WS-20161130-N	Dec 21/16	Dec 21/16	10 [Ⓢ]	2.7	2.9	250	10 [Ⓢ]	3.1	310	EL
CM-CCPD-WS-20161130-N	Dec 21/16	Dec 21/16	10 [Ⓢ]	2.5	2.6	240	10 [Ⓢ]	2.1	210	EL
MHW	Dec 21/16	Dec 21/16	50	3.9	4.0	76	50	50	100	VML

Notes: [Ⓢ] Diluted to 100 mL w/ DI water.

Reviewed by: 

Date Reviewed: Dec-12, 2016

APPENDIX C – Chain-of-custody form

Chain Of Custody Record

COC ID:

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	Carla Romero			Contact Name	Krysta Pearcy/Armando Tang			Address			
Address				Address							
City	Sparwood	Prov.	BC	City	Burnaby	Prov.	BC	City		State	
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A4N7	Country	Canada	Postal Code		Country	
Phone Number	250 425 7377			Postal Code	V5A4N7		Country		Task Code		
Email EDD To	Rick.Magliocco@teck.com			Phone Number	6044208773			Shipping Company			
	Don.Sacino@teck.com			Email Address	krysta@nautilusenvironmental.com			Tracking Number			
	Carla.Romero@teck.com			PO Number	421710			CC Hardcopy To			
	Bob.Werner@Teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED						ADDITIONAL INFORMATION			
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	96 hr Rainbow trout Acute Toxicity - Single concentration (pass/fail)	48 hr Daphnia Magna Acute Toxicity-Single concentration (pass/fail)								
① CM_ND2_WS_20161130_N	WS	Nov 30 2016	14:00	G	3	X	X								Temp °C 7.5
② CM_SPD_WS_20161130_N	WS	Nov 30 2016	13:40	G	3	X	X								↓
③ CM_CC1_WS_20161130_N	WS	Nov 30 2016	13:12	G	3	X	X								
④ CM_CCPD_WS_20161130_N	WS	Nov 30 2016	12:00	G	3	X	X								

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions					
① Clear, colorless, No odour, No particulate ② Clear, colorless, No odour, No particulate ③ Clear, colorless, No odour, No particulate ④ Clear, colorless, No odour, No particulate				Nautilus - Burnaby	Dec 02/16	10:50	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	<input checked="" type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N
				NY - Nain Yamamoto			<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N
							<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N
							<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N	<input type="checkbox"/> Y	<input type="checkbox"/> N
	Sampler's Name	D. Sacino/B. Werner		Mobile #			Temp in °C	Samples on ice?	Sample intact?	Trip Blank?		
	Sampler's Signature			Date/Time	11/30/2016 17:00:00 PM							

END OF REPORT



Acute Toxicity Test Results

Samples collected December 21, 2016

Final Report

March 29, 2017

Submitted to: **Teck Coal / Coal Mountain Operations**
Sparwood, BC

SAMPLE INFORMATION

Sample ID	Dates				Receipt temp.
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> test initiation	
CM_SPD_WS_20161221_N	21-Dec-16 at 1430h	23-Dec-16 at 0945h	23-Dec-16 at 1130h	23-Dec-16 at 1400h	6.0°C
CM_CC1_WS_20161221_N	21-Dec-16 at 1414h	23-Dec-16 at 0945h	23-Dec-16 at 1130h	23-Dec-16 at 1400h	6.0°C

TESTS

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test

RESULTS

Toxicity test results

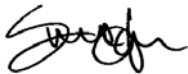
Sample ID	Percent mortality in 100% (v/v) sample	
	Rainbow trout	<i>Daphnia magna</i>
CM_SPD_WS_20161221_N	10	0
CM_CC1_WS_20161221_N	0	0

Data for all samples listed on the chain of custody have been provided in a separate report.

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CI)	50.0 (40.2 – 62.2) µg/L Zn ¹	4.2 (3.7 – 4.8) g/L NaCl ²
Reference toxicant historical mean (2 SD range)	56.7 (20.2 – 159.0) µg/L Zn	4.1 (3.1 – 5.5) g/L NaCl
Reference toxicant CV	67%	15%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹ Test date: December 19, 2016; ² Test date December 14, 2016, LC = Lethal Concentration, SD = Standard Deviation, CV = Coefficient of Variation



Report By:
Yvonne Lam, B.Sc.
Laboratory Biologist



Reviewed By:
Edmund Canaria, R.P.Bio
Senior Analyst

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) single concentration test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquarium
Test volume	10 to 20 L (depending on size of fish)
Test solution depth	≥15 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tapwater
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Zinc (added as ZnCl ₂)

Table 2. Summary of test conditions: 48-h *Daphnia magna* single concentration test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24-hour old neonates
Test type	Static
Test duration	48 hours
Test vessel	250-mL glass beaker
Test volume	200 mL
Test solution depth	6 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water + 2.5 µg/L Se
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen and pH measured daily; salinity, hardness and alkalinity measured in the undiluted sample at test initiation; conductivity measured at test initiation and termination; survival checked daily
Test protocol	Environment Canada (2000), EPS 1/RM/14, with 2016 amendments
Test endpoints	Survival
Test acceptability criterion for controls	Survival ≥90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: Treck

Start Date/Time: Dec 23 /16 @ 1130h

Work Order No.: 161387

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: CM-SPD-WS-20161221-N
Sample Date: Dec 21 /16
Date Received: Dec 23 /16
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 9
Alkalinity (mg/L CaCO₃): 5

Test Organism Information:

Batch No.: 120516
Source: Spring Valley
No. Fish/Volume (L): 10 / 12L
Loading Density (g/L): 0.42
Mean Length ± SD (mm): 35 ± 1
Mean Weight ± SD (g): 0.51 ± 0.02

Range: 34 - 36
Range: 0.48 - 0.53

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn57
Stock Solution ID: 16Zn02
Date Initiated: Dec 19 /16
96-h LC50 (95% CL): 50.0 (40.2 - 62.8) µg/L Zn

Reference Toxicant Mean and Historical Range: 56.7 (20.2 - 159.0) µg/L Zn
Reference Toxicant CV (%): 67%

Test Results: 10% ~~surv~~ mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: 

Date reviewed: Jan 6, 2017

Rainbow Trout Summary Sheet

Client: Teck (CMO)

Start Date/Time: Dec 23 1130h

Work Order No.: 161387

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: CM-CCI-WS-20161221-N
Sample Date: Dec 27 116
Date Received: Dec 23 116
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:
≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 9
Alkalinity (mg/L CaCO₃): 5

Test Organism Information:

Batch No.: 120516
Source: Spring Valley
No. Fish/Volume (L): 10/120
Loading Density (g/L): 0.42
Mean Length ± SD (mm): 35 ± 1
Mean Weight ± SD (g): 0.51 ± 0.02

Range: 33 - 36
Range: 0.46 - 0.53

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn57
Stock Solution ID: 16Zn02
Date Initiated: Dec 19 116
96-h LC50 (95% CL): 50.0 (40.2 - 62.8) µg/L Zn

Reference Toxicant Mean and Historical Range: 56.7 (20.2 - 159.0) µg/L Zn
Reference Toxicant CV (%): 67%

Test Results: 0% mortality at 96 hours in the undiluted 100% (v/v) sample.

Reviewed by: [Signature]

Date reviewed: Jan 6, 2017

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 161388

Start Date/Time: December 23, 2016 @ 1400h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: CMSPD-WS-2016122LN
Sample Date: December 21, 2016
Date Received: December 23, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 120716A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 18
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC43
Stock Solution ID: 16Na02
Date Initiated: December 14, 2016
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/L NaCl
Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Jan 6, 2017

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: CM SPD - WS 20161221-N
 Work Order No.: 161388

Start Date/Time: December 23, 2016 @ 1400h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: VML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		48		Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
						0	24	48	0	24	48	0	24	48	0	48
<u>Control</u>	A	<u>10</u>	<u>10</u>	<u>0</u>	<u>0</u>	<u>19.0</u>	<u>19.5</u>	<u>19.0</u>	<u>8.9</u>	<u>8.7</u>	<u>8.5</u>	<u>7.6</u>	<u>7.7</u>	<u>7.8</u>	<u>357</u>	<u>375</u>
	B	<u>10</u>	<u>10</u>	<u>0</u>	<u>0</u>											
	C	<u>10</u>	<u>10</u>	<u>0</u>	<u>0</u>											
	D															
<u>100</u>	A	<u>10</u>	<u>10</u>	<u>0</u>	<u>0</u>	<u>19.0</u>	<u>19.5</u>	<u>19.0</u>	<u>9.0</u>	<u>8.6</u>	<u>8.5</u>	<u>7.8</u>	<u>8.0</u>	<u>8.1</u>	<u>2150</u>	<u>2110</u>
	B	<u>10</u>	<u>10</u>	<u>0</u>	<u>0</u>											
	C	<u>10</u>	<u>10</u>	<u>0</u>	<u>0</u>											
	D															
	A															
	B															
	C															
	D															
	A															
	B															
	C															
	D															
	A															
	B															
	C															
	D															
Technician Initials		<u>KSL</u>	<u>VML</u>	<u>VML</u>		<u>VML</u>	<u>KSL</u>	<u>VML</u>	<u>VML</u>	<u>KSL</u>	<u>VML</u>	<u>VML</u>	<u>KSL</u>	<u>VML</u>	<u>VML</u>	<u>VML</u>

	Hardness*	Alkalinity*
Concentration	*(mg/L as CaCO ₃)	
Control (MHW)	<u>96</u>	<u>70</u>
Highest conc.	<u>1420</u>	<u>236</u>
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	<u>18.5</u>		<u>19.0</u>
DO (mg/L)	<u>9.8</u>	<u>(5 min)</u>	<u>9.0</u>
pH	<u>7.8</u>	<u>(aeration)</u>	<u>7.8</u>
Cond (µS/cm)	<u>2150</u>		<u>2150</u>
Salinity (ppt)	<u>1.1</u>		<u>1.1</u>

Comments: _____ Mortality: Heartbeat checked under microscope not req'd

Sample Description: clear, no colour, no odour, no particulates

Batch#: 120716A 7-d previous # young/brood: 13 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: JAN 6, 2017

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 161388

Start Date/Time: December 23, 2016 @ 1400h
Test Species: Daphnia magna
Set up by: YML

Sample Information:

Sample ID: CM-CC1-WS-2016/221-N
Sample Date: December 21, 2016
Date Received: December 23, 2016
Sample Volume: 2x1L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 120716A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 18
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC43
Stock Solution ID: 16Na02
Date Initiated: December 14, 2016
48-h LC50 (95% CL): 4.2 (3.7-4.8) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.1 (3.1-5.5) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h TN the 100% (v/v) undiluted sample.

Reviewed by: [Signature]

Date reviewed: Jan. 6, 2017

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: CM-CC-LWS-20161221-N
 Work Order No.: 161380

Start Date/Time: December 23, 2016 @ 14:00h
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: JM

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	No. Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.0	19.5	19.0	8.9	8.3	8.5	7.6	7.1	8.0	357	373
	B	10	10	0											
	C	10	10	0											
	D														
100	A	10	10	0	18.5	19.5	19.0	9.0	8.4	8.5	7.8	8.0	8.2	1701	1668
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		KSL	JM	JM	JM	KSL	JM	JM	KSL	JM	JM	KSL	JM	JM	JM

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO ₃)	
Control (MHW)	96	70
Highest conc.	1120	240
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.5		18.5
DO (mg/L)	9.9	(4 min aeration)	~9.9 9.0
pH	7.7		7.8
Cond (µS/cm)	1706		1701
Salinity (ppt)	0.9		0.9

Comments: _____ Mortality: Heartbeat checked under microscope not 100%

Sample Description: clear, no colour, no odour, no particulates.

Batch#: 120716A 7-d previous # young/brood: 18 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Jan 6, 2017

APPENDIX C – Chain-of-custody form

END OF REPORT



ATTN: Lyudmyla Shvets
ALS Laboratory Group
2559 29th St. N.E.
Calgary, Alberta
Canada T1Y 7B5

Received: 2016/01/06
Report Date: 2016/01/15
Version: FINAL

HydroQual Test Report

Client: ALS106
Reference: 16-0016
Billing: L1719808

A handwritten signature in cursive script that reads "Jacklyn Rose".

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., #4, 6125 12th Street SE, Calgary, Alberta, Canada T2H 2K1
Tel (403) 253-7121 fax (403) 252-9363 www.hydroqual.ca

Result Summary

 Client: ALS106
 Reference: 16-0016-01-DAD

Client: ALS Laboratory Group; operation Calgary

Sample: L1719808-2 LC_WTF_OUT_WS_2016-01-04_N

Collection: collected on 2016/01/04 at not given by not given

Receipt: received on 2016/01/06 at 1100 by MC

Containers: received 2 x 1 L bottle at 6 °C, in good condition with no seals and no initials

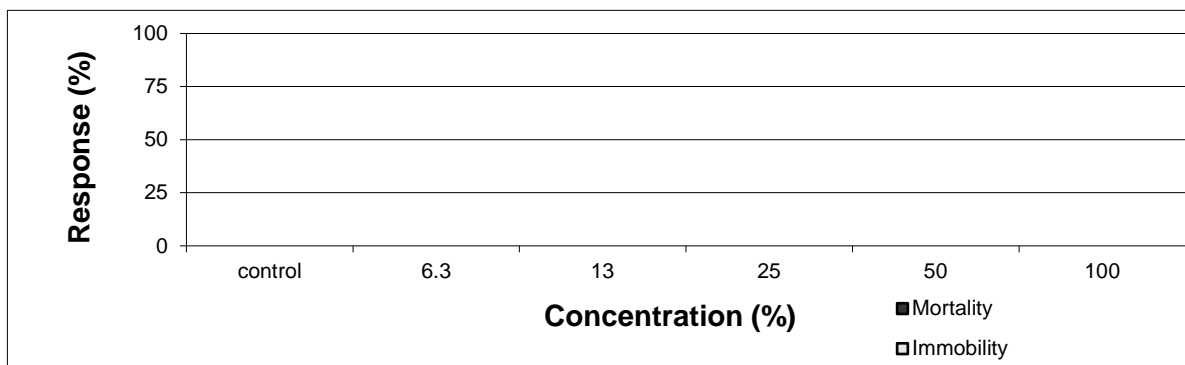
Description: type: water, collection method: not given

Test: started on 2016/01/06 ; ended on 2016/01/08

Result:

	Endpoint (48-hour)	Value (%)	Confidence Limits (95%) lower upper	Method Calculated
Acute: (mortality)	LC50	>100		could not be calculated
	LC25	>100		could not be calculated
Acute: (immobility)	EC50	>100		could not be calculated
	EC25	>100		could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: ALS106
Reference: 16-0016-01-DAD

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition.

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 11 days to first brood

20 neonates per average brood

Sample initial chemistry: pH: 7.4; EC: 1749 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.7 (mg/L); temperature: 18 °C
hardness (mg CaCO₃/L): 944; colour: colourless; odour: odourless

Sample holding time: 2 days (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control/dilution water: Moderately hard water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₃ (5 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 86 mg CaCO₃/L

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 20 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: ALS106 Reference: 16-0016-01-DAD

Endpoint: Mortality, 48-h LC50 (95% confidence limits)
Immobility, 48-h EC50 (95% confidence limits)

Test validity: The control had 100% survival (must \geq 90%)
Control had 0 percent (%) abnormal behaviour (must \leq 10%, immobility)

Reference toxicant: 48-h test with NaCl initiated January 6, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.72 (0.67-0.76) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.69-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: ALS106
Reference: 16-0016-01-DAD

Test Log:

Date	Day	Time	Technician
2016/01/06	0	1455	HS/JK
2016/01/07	1	1000	HS/JK
2016/01/08	2	1040	JK

Chemistry:

Conc. (%)	control	6.3	13	25	50	100		

Day

pH (units)

0	8.0	8.0	8.0	8.0	8.0	8.0		
2	8.0	8.0	8.0	8.1	8.2	8.1		

 Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	188	281	379	573	928	1579		
2	171	286	381	584	933	1601		

Dissolved Oxygen (mg/L)

0	8.1	8.0	8.0	7.9	7.9	7.9		
2	8.2	8.3	8.2	8.1	8.1	8.0		

Temperature (°C)

0	19	20	20	20	19	19		
2	19	19	20	20	20	20		

Biology:

Conc. (%)	control	6.3	13	25	50	100		

Day

Number Alive and Behavior (behavior is in brackets)

1	10	10	10	10	10	10		
2	10	10	10	10	10	10		

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris; nd, not done; na, not applicable;

Mortality (%)

2	0	0	0	0	0	0		
---	---	---	---	---	---	---	--	--

Immobility (%)

2	0	0	0	0	0	0		
---	---	---	---	---	---	---	--	--

Comments/Statistics

Client: ALS106 Reference: 16-0016-01-DAD

Test Result Comments:

None

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Endpoints for immobility could not be calculated. No effect occurred.

Protocol Deviations:

None

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, H₂S 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.



ATTN: Lyudmyla Shvets
ALS Laboratory Group
2559 29th St. N.E.
Calgary, Alberta
Canada T1Y 7B5

Received: 2016/01/06
Report Date: 2016/01/19
Version: FINAL

HydroQual Test Report

Client: ALS106
Reference: 16-0018
Billing: L1719808

A handwritten signature in black ink, appearing to read "Lyudmyla Shvets", is positioned above a horizontal line.

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., #4, 6125 12th Street SE, Calgary, Alberta, Canada T2H 2K1
Tel (403) 253-7121 fax (403) 252-9363 www.hydroqual.ca

Result Summary

Client: ALS106
Reference: 16-0018-01-TRD

Client: ALS Laboratory Group; operation Calgary

Sample: L1719808-2 LC_WTF_OUT_WS_2016-01-04_N

Collection: collected on 2016/01/04 at not given by not given

Receipt: received on 2016/01/06 at 1215 by MC

Containers: received 2 x 20 L carboys at 7 °C, in good condition with no seals and no initials

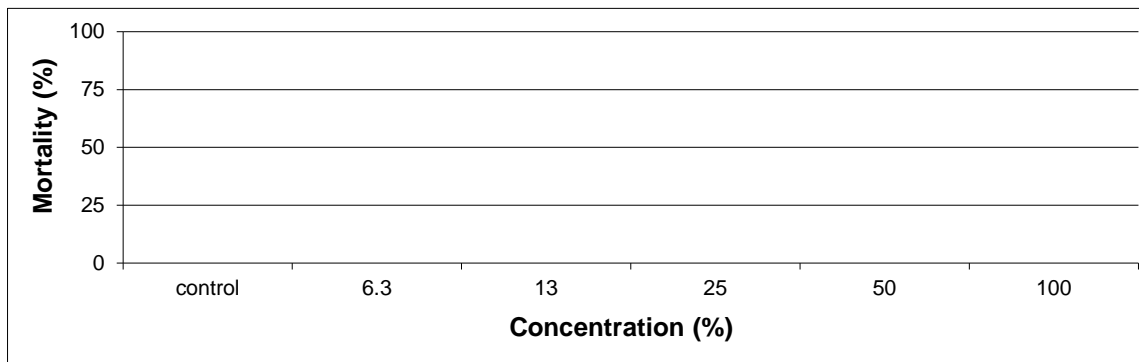
Description: type: water, collection method: not given

Test: started on 2016/01/08 ; ended on 2016/01/12

Result:

	Endpoint (96-hour)	Value (%)	Confidence Limits (95%)		Method Calculated
			lower	upper	
Acute:	LC50	>100			could not be calculated
(mortality)	LC25	>100			could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.



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.

Test Conditions

Client: ALS106
Reference: 16-0018-01-TRD

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (amended May 2007).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Sam Livingston (Batch 20151207TR)

Acclimation: 32 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.4; EC: 1749 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.7 (mg/L); temperature: 18 °C
hardness (mg CaCO₃/L): 944; colour: colourless; odour: odourless

Sample holding time: 4 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 120 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in 100 % sample was 9.4 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.17 g/Litre (must be ≤ 0.5 g/Litre)

Control/dilution water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and test termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, 96-h LC50 (with 95% confidence limits)

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated December 30, 2015; current result:
(96-h LC50 and 95% confidence limits) = 0.58 (0.54-0.62) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.56 (0.48-0.64) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume

Test Data

Client: ALS106
Reference: 16-0018-01-TRD

Test Log:

Date	Day	Time	Technician
2016/01/08	0	1000	CQ
2016/01/09	1	0940	JK
2016/01/10	2	0840	HS
2016/01/11	3	1030	EP
2016/01/12	4	0905	JK/EP

Chemistry:

Conc. (%)	control	6.3	13	25	50	100
-----------	---------	-----	----	----	----	-----

Day	pH (units)					
0	7.3	7.5	7.5	7.5	7.5	7.4
4	8.1	8.1	8.1	8.0	8.0	8.0

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	365	431	521	740	1051	1634
4	358	429	523	726	1024	1633

Day	Dissolved Oxygen (mg/L)					
0	9.2	9.6	9.6	9.5	9.4	9.4
4	8.7	8.6	8.6	8.6	8.6	8.7

Day	Temperature (°C)					
0	15	14	14	14	14	14
4	16	15	15	15	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	6.3	13	25	50	100
-----------	---------	-----	----	----	----	-----

Day	Number Alive (In brackets number stressed)					
0	10	10	10	10	10	10
1	10	10	10	10	10	10
2	10	10	10	10	10	10
3	10	10	10	10	10	10
4	10	10	10	10	10	10

Day	Mortality (%)					
4	0	0	0	0	0	0

Day	Stressed (%)					
4	0	0	0	0	0	0

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.

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.4	0.5
2	3.5	0.5
3	3.0	0.3
4	3.0	0.3
5	3.0	0.3
6	3.2	0.4
7	2.9	0.3
8	3.0	0.3
9	2.7	0.2
10	2.9	0.3

average	3.1	0.3
sd	0.2	0.1
cv(%)	7.9	28.4

Notes: nd, not done; na, not applicable;
 sd, standard deviation; cv(%), coefficient
 of variation

Test Data

Conc. (%)	Group Wet Weight (g)
control	3.4
6.3	3.9
13	3.7
25	3.5
50	3.4
100	3.6

Client: ALS106
Reference: 16-0018-01-TRD

Comments/Statistics

Test Result Comments:

None

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Protocol Deviations:

None

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, H₂S 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 OR 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.



ATTN: Lyudmyla Shvets
ALS Laboratory Group
2559 29th St. N.E.
Calgary, Alberta
Canada T1Y 7B5

Received: 2016/01/12
Report Date: 2016/01/22
Version: FINAL

Test Report

Client: ALS106
Reference: 16-0039
Billing: L1722235

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



Trout (96-h LC50) Test Report

Result Summary

Client: ALS106 Reference: 16-0039-01-TRD

Client: ALS Laboratory Group; operation Calgary

Sample: L1722235-2 LC_WTF_OUT_WS_2016-01-11_N

Collection: collected on 2016/01/11 at not given by not given

Receipt: received on 2016/01/12 at 1300 by JK

Containers: received 2 x 1 L bottle / 2 x 20 L carboys at 4 °C, in good condition with no seals and no initials

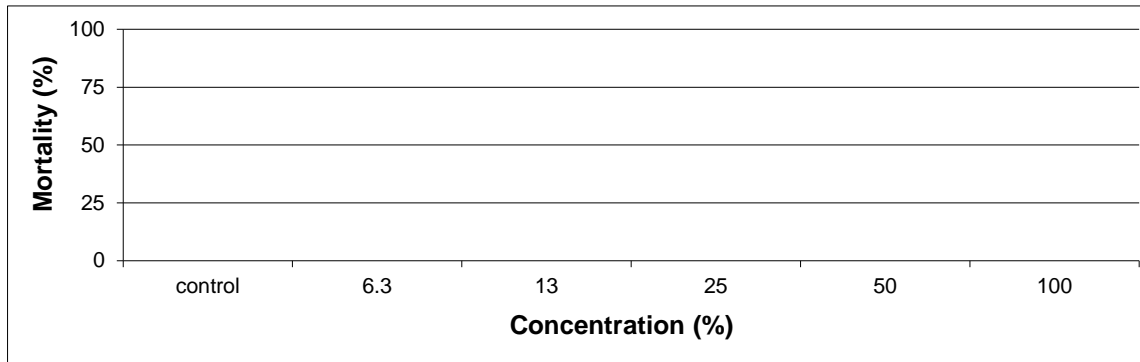
Description: type: water, collection method: not given

Test: started on 2016/01/13 ; ended on 2016/01/17

Result:

	Endpoint (96-hour)	Value (%)	Confidence Limits (95%)		Method Calculated
			lower	upper	
Acute:	LC50	>100			could not be calculated
(mortality)	LC25	>100			could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0039-01-TRD

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (amended May 2007).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Sam Livingston (Batch 20151207TR)

Acclimation: 37 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.6; EC: 1969 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.6 (mg/L); temperature: 16 °C
hardness (mg CaCO₃/L): 1040; colour: colourless; odour: odourless

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 120 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in 100 % sample was 9.3 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.15 g/Litre (must be ≤ 0.5 g/Litre)

Control/dilution water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and test termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, 96-h LC50 (with 95% confidence limits)

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated December 30, 2015; current results
(96-h LC50 and 95% confidence limits) = 0.58 (0.54-0.62) log (g/L KCl)
historical results:

(96-h LC50 and 95% confidence limits) = 0.56 (0.48-0.64) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (96-h LC50) Test Report

Test Data

Client: ALS106
Reference: 16-0039-01-TRD

Test Log:

Date	Day	Time	Technician
2016/01/13	0	1100	HS/JW
2016/01/14	1	0840	JK
2016/01/15	2	0935	JW
2016/01/16	3	0940	JK
2016/01/17	4	1040	JW

Chemistry:

Conc. (%)	control	6.3	13	25	50	100
-----------	---------	-----	----	----	----	-----

Day	pH (units)					
0	7.7	7.7	7.7	7.7	7.7	7.7
4	7.9	7.8	7.8	7.8	7.8	7.6

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	412	507	599	830	1198	1858
4	379	496	608	853	1212	1879

Day	Dissolved Oxygen (mg/L)					
0	9.2	9.2	9.2	9.2	9.3	9.3
4	8.7	8.8	8.9	8.9	8.9	8.9

Day	Temperature (°C)					
0	14	14	14	14	14	14
4	15	14	14	14	14	14

Number Alive (In brackets number stressed):

Conc. (%)	control	6.3	13	25	50	100
-----------	---------	-----	----	----	----	-----

Day	Number Alive (In brackets number stressed)					
0	10	10	10	10	10	10
1	10	10	10	10	10	10
2	10	10	10	10	10	10
3	10	10	10	10	10	10
4	10	10	10	10	10	10

Day	Mortality (%)					
4	0	0	0	0	0	0

Day	Stressed (%)					
4	0	0	0	0	0	0

Client: ALS106
Reference: 16-0039-01-TRD

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	2.8	0.2
2	2.0	0.3
3	3.3	0.5
4	2.8	0.2
5	3.0	0.3
6	3.0	0.3
7	3.3	0.4
8	2.4	0.1
9	3.2	0.4
10	3.1	0.3

average	2.9	0.3
sd	0.4	0.1
cv(%)	14.4	38.5

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Test Data

Conc. (%)	Group Wet Weight (g)
control	3.0
6.3	2.6
13	3.0
25	3.8
50	2.9
100	2.7

Comments/Statistics

Test Result Comments:

None

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Protocol Deviations:

None

Result Summary

Client: ALS106 Reference: 16-0039-01-DAD

Client: ALS Laboratory Group; operation Calgary

Sample: L1722235-2 LC_WTF_OUT_WS_2016-01-11_N

Collection: collected on 2016/01/11 at not given by not given

Receipt: received on 2016/01/12 at 1300 by JK

Containers: received 2 x 1 L bottle / 2 x 20 L carboys at 4 °C, in good condition with no seals and no initials

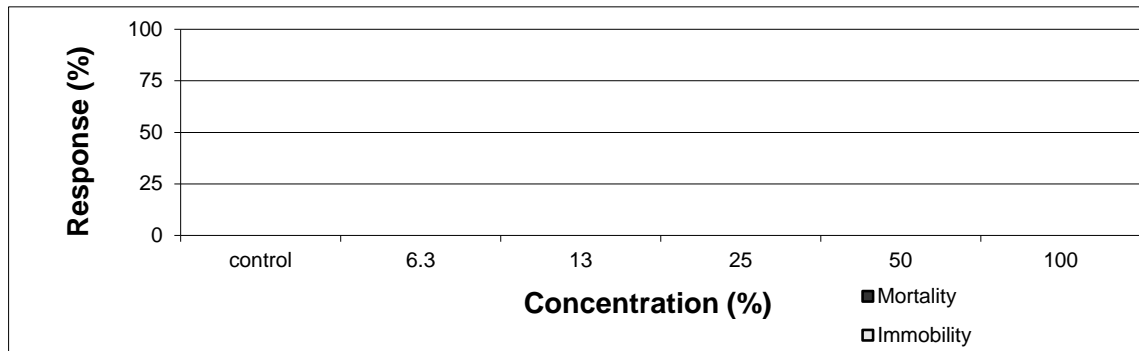
Description: type: water, collection method: not given

Test: started on 2016/01/12 ; ended on 2016/01/14

Result: _____

	Endpoint (48-hour)	Value (%)	Confidence Limits (95%) lower upper	Method Calculated
Acute: (mortality)	LC50	>100		could not be calculated
	LC25	>100		could not be calculated
Acute: (immobility)	EC50	>100		could not be calculated
	EC25	>100		could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0039-01-DAD

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition.

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 10 days to first brood
20 neonates per average brood

Sample initial chemistry: pH: 7.6; EC: 1969 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.6 (mg/L); temperature: 16 °C
hardness (mg CaCO₃/L): 1040; colour: colourless; odour: odourless

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control/dilution water: Moderately hard water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₃ (5 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 126 mg CaCO₃/L

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 20 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: ALS106 Reference: 16-0039-01-DAD

Endpoint: Mortality, 48-h LC50 (95% confidence limits)
Immobility, 48-h EC50 (95% confidence limits)
Test validity: The control had 100% survival (must \geq 90%)
Control had 0 percent (%) abnormal behaviour (must \leq 10%, immobility)

Reference toxicant: 48-h test with NaCl initiated January 6, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.72 (0.67-0.76) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.69-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: ALS106
Reference: 16-0039-01-DAD

Test Log:

Date	Day	Time	Technician
2016/01/12	0	1510	JK
2016/01/13	1	0835	JK
2016/01/14	2	1105	ML

Chemistry:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

pH (units)

0	8.2	8.1	8.1	8.1	8.0	8.0		
2	8.2	8.2	8.2	8.2	8.1	8.0		

Conductivity ($\mu\text{S/cm}$ @ 25°C)

0	256	351	451	661	1047	1754		
2	232	351	451	655	1080	1784		

Dissolved Oxygen (mg/L)

0	7.8	7.8	7.8	7.7	7.8	7.8		
2	7.8	7.9	7.9	7.8	7.6	7.8		

Temperature (°C)

0	21	21	21	21	21	21		
2	20	20	21	21	21	20		

Biology:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

Number Alive and Behavior (behavior is in brackets)

1	10	10	10	10	10	10		
2	10	10	10	10	10	10		

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris; nd, not done; na, not applicable;

Mortality (%)

2	0	0	0	0	0	0		
---	---	---	---	---	---	---	--	--

Immobility (%)

2	0	0	0	0	0	0		
---	---	---	---	---	---	---	--	--



Daphnia (48-h LC50/EC50) Test Report

Comments/Statistics

Client: ALS106 Reference: 16-0039-01-DAD

Test Result Comments:

None

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Endpoints for immobility could not be calculated. No effect occurred.

Protocol Deviations:

None

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, H₂S 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.



February 4, 2016

Lyudmyla Shvets
ALS Laboratories Group
2559 29 Street NE
Calgary, AB T1Y 7B5

Dear Lyudmyla:

On January 28, 2016, Pollutech EnviroQuatics Limited personnel received a water sample (LC WTF OUT WS 2016-01-26 N L1727615-2) from ALS Laboratories in Calgary. The following acute toxicity test was performed on this sample observing Environment Canada methods:

- Rainbow trout 96-hour LC50 toxicity test according to criteria outlined in "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout", Second Edition, Method Development and Applications Centre, Ottawa, Ontario, Report EPS 1/RM/13, 2000 (with 2007 Amendments).

The result of the acute toxicity test is summarized in the following table.

**Summary of LC50 Toxicity Results for LC WTF OUT WS 2016-01-26 N L1727615-2
Water Sample Collected January 26, 2016**

Sample Name and Sample #	Toxicity Test	Endpoint	Effect	Result ¹
LC WTF OUT WS 2016-01-26 N L1727615-2 #873101602	Rainbow Trout	96-Hour LC50 (95% Confidence)	Mortality	Non-lethal

1 - Results relate only to the sample tested

Toxicity Test Endpoint Descriptions

LC50 The estimated concentration which causes acute lethality to 50% of the test organisms.

The following pages contain the required details for reporting of the acute lethality toxicity tests. If there are any further details which you require, please do not hesitate to contact us.

Sincerely,
Pollutech EnviroQuatics Limited

Rachel (Abma) Giacomin, M.Sc.
QA/QC Leader

File ID: \bioassay\2016\8000\87310\87310ja1 T LC50

bringing clarity to your environment

Rainbow Trout 96-Hour LC50 Toxicity Test

METHOD: Environment Canada, "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout", Second Edition, Method Development and Applications Section, Ottawa, ON., Report EPS 1/RM/13, 2000 (with 2007 amendments) Pollutech Test Method RT-LC-R12.10.

Test Material

Client Name/Location: ALS Laboratories Group, Calgary, AB

Sample #: 873101602 **Sample Name:** LC WTF OUT WS 2016-01-26 N L1727615-2

Sample Method: Grab **Collected by:** N/A

Date/Time Collected: January 26, 2016; 0900 **Arrival Temp.:** 4.5°C

Date/Time Received: January 28, 2016; 1110 **Sample Description:** Clear, light green

Sample Point Description: Other **Sample Type:** N/A

Transportation: Road/Air

Storage: None

N/A – not available

Test Organisms

Species: Rainbow Trout (*Oncorhynchus mykiss*)

Source: Rainbow Springs Hatchery

Culture Temp.: 15 ± 2°C **Batch Number:** RS121715

Water Source: Dechlorinated municipal drinking water

Mean Weight: 0.56 g **Min:** 0.45 g **Max:** 0.87 g

Mean Fork Length: 39.9 mm **Min:** 35 mm **Max:** 45 mm

Loading Density: 0.28 g/L **Sample Size:** 10 fish

Life Stage: Fry

Number Dead Daily In Previous 7 Days For Fish Culture: 0+1+0+1+0+0+0=2

Previous 7-Day Holding Mortalities For Fish Culture: 0.3%

Rainbow Trout 96-Hour LC50 Toxicity Test - Continued

Sample Number: 873101602

Sample Name: LC WTF OUT WS
2016-01-26 N L1727615-2

Test Conditions

Date/Time Started: January 28, 2016; 1535

Test Volume: 20 L/Vessel **Number of Fish Per Vessel:** 10

of Vessels Per Conc.: 1 **Test Temperature:** 15 ± 1°C

Pre-aeration: Yes **Duration of Pre-aeration:** 120 minutes

Pre-aeration Rate: 6.5 ± 0.26 ml/min·L⁻¹ **Aeration Rate During Test:** 6.5 ± 0.26 ml/min·L⁻¹

Sample Adjustment: No **Sample pH Adjustment:** No

Test Method Deviations: None

Test Facilities



CALA
Testing
Accreditation No. A1225

Testing Laboratory:

Pollutech EnviroQuatics Limited, 704 Mara St.,
Suite 122, Point Edward, Ontario, N7V 1X4

This laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). The test included in this report is within the scope of this laboratory.

Test Performed By:

E. Pasiak/ K. Ferguson/ C. Hamill/ M. Long

Initial Measurement of Variables in Unadjusted Sample

Cond: 1800 µmhos **DO:** 11.6 mg/L **pH:** 7.8 **Temp:** 14.1 °C

Test Results

Conc'n (% Volume)	NUMBER OF MORTALITIES			
	Time (hours)			
	24	48	72	96
Control	0	0	0	0
6.25	0	0	0	0
12.5	0	0	0	0
25	0	0	0	0
50	0	0	0	0
100	0	0	0	0

Number of Control Fish Showing Atypical/Stressed Behaviour: 0

Rainbow Trout 96-Hour LC50 Toxicity Test - Continued

Sample Number: 873101602

Sample Name: LC WTF OUT WS
2016-01-26 N L1727615-2

Test Results

TOXICITY TEST VARIABLES

Conc'n (% Volume)	Variables	Time (hours)				
		0	24	48	72	96
Control	Cond. (μ mhos)	197				n/r
	DO (mg/L)	10.1				9.5
	pH (units)	7.5				7.8
	Temp. ($^{\circ}$ C)	14.8				15.1
6.25	Cond. (μ mhos)	355				n/r
	DO (mg/L)	10.1				9.3
	pH (units)	7.6				7.9
	Temp. ($^{\circ}$ C)	14.6				14.9
12.5	Cond. (μ mhos)	472				n/r
	DO (mg/L)	10.2				9.2
	pH (units)	7.7				8.0
	Temp. ($^{\circ}$ C)	14.4				14.9
25	Cond. (μ mhos)	674				n/r
	DO (mg/L)	10.3				9.7
	pH (units)	7.8				8.2
	Temp. ($^{\circ}$ C)	14.2				14.8
50	Cond. (μ mhos)	1105				n/r
	DO (mg/L)	10.5				9.7
	pH (units)	7.8				8.4
	Temp. ($^{\circ}$ C)	14.1				14.6
100	Cond. (μ mhos)	1778				n/r
	DO (mg/L)	10.8				9.7
	pH (units)	7.8				8.3
	Temp. ($^{\circ}$ C)	14.2				14.7

n/r = not required

Rainbow Trout 96-Hour LC50 Toxicity Test - Continued

Sample Number: 873101602

Sample Name: LC WTF OUT WS
2016-01-26 N L1727615-2

Summary of Test Results

96-Hour LC50: Non-lethal
95% Confidence Limits: Not Applicable
Analysis Method: No Mortality
Test Results Verified By: R. C. Ferguson

Reference Toxicant Results

Reference Chemical: Zinc **Date Test Initiated:** 01/07/16
Fish Lot #: RS121715 **Method:** Spearman-Kärber ($\alpha = 10\%$)
96-Hour LC50 (95% Confidence Limits): 0.41 mg/L (0.28 mg/L; 0.61 mg/L)
95% Historic Geometric Mean LC50: 0.35 mg/L (0.21 mg/L; 0.59 mg/L)
(Historic Warning Limits) (± 2 Standard Deviations)



Subcontract Request Form

Subcontract To:

POLLUTECH ENVIROQUATICS LTD

704 MARA STREET, SUITE 122
POINT EDWARD, ON N7V 1X4

NOTES: Please reference on final report and invoice: PO# L1727615
ALS requires QC data to be provided with your final results.
Spec. request : 96-hour Trout LC50 PK

Please see enclosed **1** sample(s) in **2** Container(s) *stabilized test RG*

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED	DUE DATE	Priority Flag
L1727615-2 LC_WTF_OUT_WS_2016 -01-26_N	Special Request Pollutech EnviroQuatics (SPECIAL REQUEST -PQ 14)	1/26/2016	2/17/2016	<i>No pH as per client</i>

Subcontract Info Contact: John Forbes (403) 291-9897
Analysis and reporting info contact: Lyudmyla Shvets, B.Sc.
2559 29 STREET NE
CALGARY, AB T1Y 7B5
Phone: (403) 291-9897 Email: Lyudmyla.Shvets@alsglobal.com

Please email confirmation of receipt to: **Lyudmyla.Shvets@alsglobal.com**

Shipped By: _____ Date Shipped: _____
Received By: _____ Date Received: _____
Verified By: _____ Date Verified: _____
Temperature: _____

Sample Integrity Issues: _____



ATTN: Lyudmyla Shvets
ALS Laboratory Group
2559 29th St. N.E.
Calgary, Alberta
Canada T1Y 7B5

Received: 2016/02/03
Report Date: 2016/02/16
Version: FINAL

Test Report

Client: ALS106
Reference: 16-0144
Billing: L1730190

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



Trout (96-h LC50) Test Report

Result Summary

Client: ALS106 Reference: 16-0144-01-TRD

Client: ALS Laboratory Group; operation Calgary

Sample: L1730190-2 LC_WTF_OUT_WS_2016-02-02_N

Collection: collected on 2016/02/02 at not given by not given

Receipt: received on 2016/02/03 at 1050 by MC

Containers: received 2016/02/03 at 6 °C, in good condition with no seals and no initials

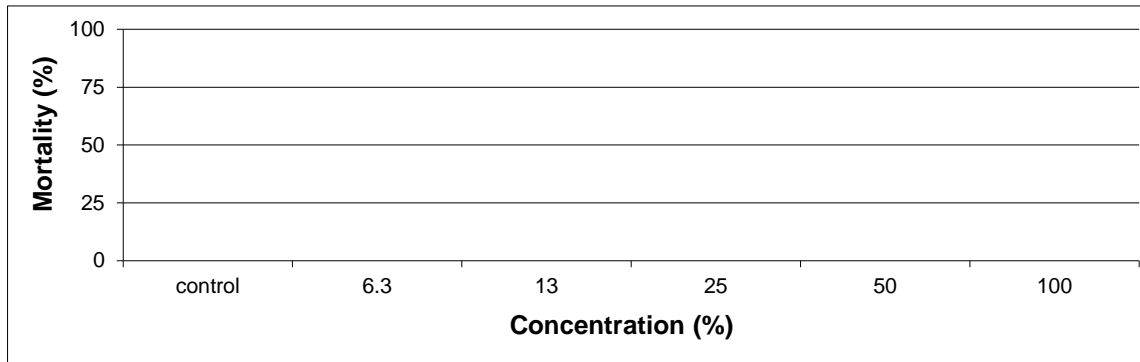
Description: type: water, collection method: not given

Test: started on 2016/02/04 ; ended on 2016/02/08

Result:

	Endpoint (96-hour)	Value (%)	Confidence Limits (95%)		Method Calculated
			lower	upper	
Acute:	LC50	>100			could not be calculated
(mortality)	LC25	>100			could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0144-01-TRD

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (amended May 2007).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Sam Livingston (Batch 20160113TR)

Acclimation: 21 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.7; EC: 1753 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.8 (mg/L); temperature: 14 °C
hardness (mg CaCO₃/L): 905; colour: Colourless; odour: Odourless

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 120 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in 100 % sample was 9.2 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.2 g/Litre (must be ≤ 0.5 g/Litre)

Control/dilution water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and test termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, 96-h LC50 (with 95% confidence limits)

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated January 28, 2016; current results (96-h LC50 and 95% confidence limits) = 0.61 (0.58-0.64) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.57 (0.49-0.65) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (96-h LC50) Test Report

Test Data

Client: ALS106
Reference: 16-0144-01-TRD

Test Log:

Date	Day	Time	Technician
2016/02/04	0	1020	HS/DS
2016/02/05	1	0825	ML/JN
2016/02/06	2	0915	ML/SY
2016/02/07	3	1025	DS/JW/BY
2016/02/08	4	0845	JN/EP

Chemistry:

Conc. (%)	control	6.3	13	25	50	100
-----------	---------	-----	----	----	----	-----

Day	pH (units)					
0	7.9	7.9	7.8	7.8	7.9	8.0
4	7.8	8.0	8.0	8.0	8.1	8.0

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	440	566	664	876	1239	1853
4	489	590	677	892	1263	1864

Day	Dissolved Oxygen (mg/L)					
0	9.0	9.1	9.2	9.2	9.1	9.2
4	8.9	9.0	9.0	9.0	9.0	9.0

Day	Temperature (°C)					
0	14	14	14	14	14	14
4	15	15	14	14	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	6.3	13	25	50	100
-----------	---------	-----	----	----	----	-----

Day	Number Alive (In brackets number stressed)					
0	10	10	10	10	10	10
1	10	10	10	10	10	10
2	10	10	10	10	10	10
3	10	10	10	10	10	10
4	10	10	10	10	10	10

Day	Mortality (%)					
4	0	0	0	0	0	0

Day	Stressed (%)					
4	0	0	0	0	0	0



Trout (96-h LC50) Test Report

Client: ALS106
Reference: 16-0144-01-TRD

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.5	0.6
2	3.2	0.4
3	3.0	0.3
4	3.3	0.4
5	2.9	0.4
6	3.0	0.4
7	2.3	0.2
8	3.6	0.6
9	2.8	0.3
10	3.2	0.4

average	3.1	0.4
sd	0.4	0.1
cv(%)	12.1	31.2

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Test Data

Conc. (%)	Group Wet Weight (g)
control	4.0
6.3	4.2
13	3.9
25	4.0
50	3.4
100	3.2

Comments/Statistics

Test Result Comments:

None

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Protocol Deviations:

None

Result Summary

Client: ALS106 Reference: 16-0144-01-DAD

Client: ALS Laboratory Group; operation Calgary

Sample: L1730190-2 LC_WTF_OUT_WS_2016-02-02_N

Collection: collected on 2016/02/02 at not given by not given

Receipt: received on 2016/02/03 at 1050 by MC

Containers: received 2016/02/03 at 6 °C, in good condition with no seals and no initials

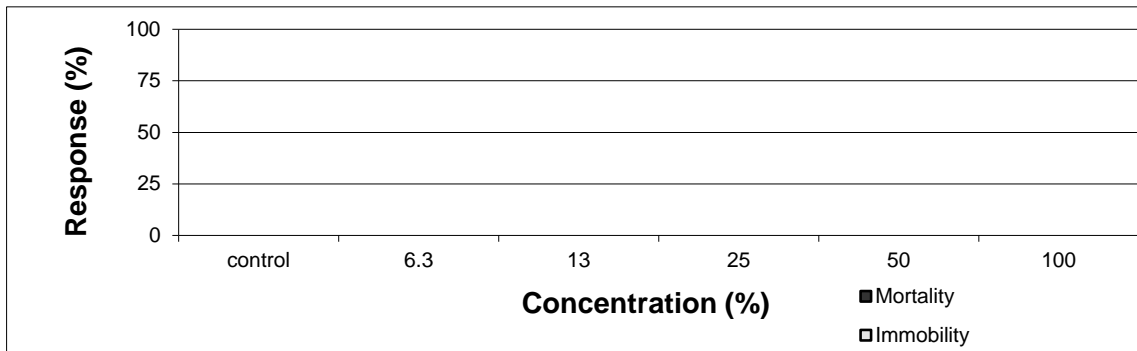
Description: type: water, collection method: not given

Test: started on 2016/02/03 ; ended on 2016/02/05

Result:

	Endpoint (48-hour)	Value (%)	Confidence Limits (95%) lower upper	Method Calculated
Acute: (mortality)	LC50	>100		could not be calculated
	LC25	>100		could not be calculated
Acute: (immobility)	EC50	>100		could not be calculated
	EC25	>100		could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0144-01-DAD

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition.

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 3%

Culture brood data: 10 days to first brood
20 neonates per average brood

Sample initial chemistry: pH: 7.7; EC: 1753 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.8 (mg/L); temperature: 14 °C
hardness (mg CaCO_3/L): 905; colour: Colourless; odour: Odourless

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control/dilution water: Moderately hard water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_3 (5 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 95 mg CaCO_3/L

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: ALS106 Reference: 16-0144-01-DAD

Endpoint: Mortality, 48-h LC50 (95% confidence limits)
Immobility, 48-h EC50 (95% confidence limits)
Test validity: The control had 100% survival (must \geq 90%)
Control had 0 percent (%) abnormal behaviour (must \leq 10%, immobility)

Reference toxicant: 48-h test with NaCl initiated January 25, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.79 (0.76-0.81) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.69-0.84) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: ALS106
Reference: 16-0144-01-DAD

Test Log:

Date	Day	Time	Technician
2016/02/03	0	1540	JK
2016/02/04	1	0900	JK
2016/02/05	2	1010	JK

Chemistry:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

pH (units)

0	8.1	8.1	8.1	8.2	8.1	8.1		
2	8.0	8.1	8.2	8.3	8.3	8.2		

Conductivity (μ S/cm @ 25°C)

0	173	286	401	630	992	1606		
2	173	284	405	627	975	1531		

Dissolved Oxygen (mg/L)

0	7.9	8.0	8.0	8.0	8.0	8.0		
2	7.9	8.0	7.9	8.0	8.1	7.9		

Temperature (°C)

0	19	19	19	19	19	19		
2	20	20	19	19	19	19		

Biology:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

Number Alive and Behavior (behavior is in brackets)

1	10	10	10	10	10	10(2F)		
2	10	10	10	10	10	10		

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris; nd, not done; na, not applicable;

Mortality (%)

2	0	0	0	0	0	0		
---	---	---	---	---	---	---	--	--

Immobility (%)

2	0	0	0	0	0	0		
---	---	---	---	---	---	---	--	--



Daphnia (48-h LC50/EC50) Test Report

Comments/Statistics

Client: ALS106 Reference: 16-0144-01-DAD

Test Result Comments:

None

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Endpoints for immobility could not be calculated. No effect occurred.

Protocol Deviations:

None

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, H₂S 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 OR 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.



ATTN: Lyudmyla Shvets
ALS Laboratory Group
2559 29th St. N.E.
Calgary, Alberta
Canada T1Y 7B5

Received: 2016/02/10
Report Date: 2016/02/23
Version: FINAL

Test Report

Client: ALS106
Reference: 16-0177
Billing: L1732882

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



Trout (96-h LC50) Test Report

Result Summary

Client: ALS106 Reference: 16-0177-01-TRD

Client: ALS Laboratory Group; operation Calgary

Sample: L1732882-4 LC_WTF_OUT_WS_2016-002-08_N

Collection: collected on 2016/02/08 at not given by not given

Receipt: received on 2016/02/10 at 1300 by MC

Containers: received 2 x 20 L carboys / 2 x 1 L bottles at 9 °C, in good condition with no seals and no initials

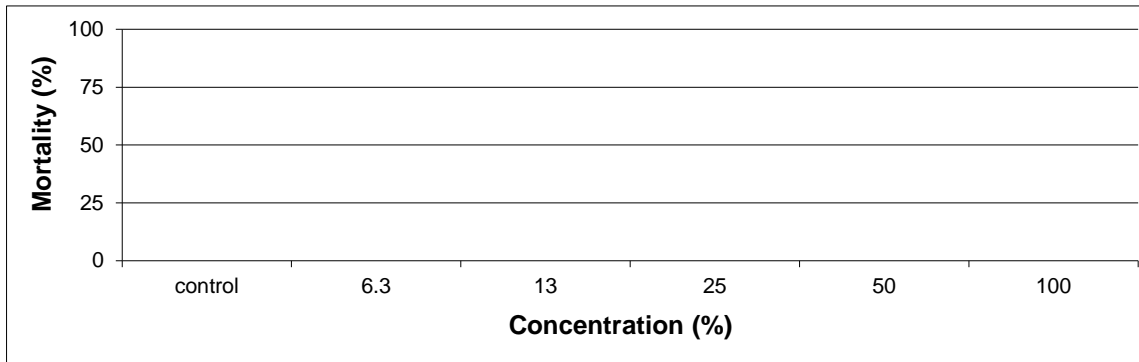
Description: type: water, collection method: not given

Test: started on 2016/02/12 ; ended on 2016/02/16

Result:

	Endpoint (96-hour)	Value (%)	Confidence Limits (95%)		Method Calculated
			lower	upper	
Acute:	LC50	>100			could not be calculated
(mortality)	LC25	>100			could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.

Jacklyn Poole

Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0177-01-TRD

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (amended May 2007).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Sam Livingston (Batch 20160113TR)

Acclimation: 29 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.5; EC: 1460 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.0 (mg/L); temperature: 18 °C
hardness (mg CaCO₃/L): 794; colour: colourless; odour: organic

Sample holding time: 4 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 120 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in 100 % sample was 9.4 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.23 g/Litre (must be ≤ 0.5 g/Litre)

Control/dilution water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and test termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, 96-h LC50 (with 95% confidence limits)

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated January 28, 2016; current results (96-h LC50 and 95% confidence limits) = 0.61 (0.58-0.64) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.57 (0.49-0.65) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (96-h LC50) Test Report

Test Data

Client: ALS106
Reference: 16-0177-01-TRD

Test Log:

Date	Day	Time	Technician
2016/02/12	0	1110	HS
2016/02/13	1	1005	JK
2016/02/14	2	1150	JW
2016/02/15	3	1230	EP
2016/02/16	4	0930	HS/EP/JK

Chemistry:

Conc. (%)	control	6.3	13	25	50	100
-----------	---------	-----	----	----	----	-----

Day	pH (units)					
0	7.8	7.9	8.0	8.0	8.0	8.0
4	8.3	8.3	8.3	8.3	8.4	8.3

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	451	513	584	785	1079	1600
4	450	574	578	775	1077	1571

Day	Dissolved Oxygen (mg/L)					
0	9.3	9.4	9.5	9.4	9.4	9.4
4	8.6	8.7	8.8	8.8	8.8	8.8

Day	Temperature (°C)					
0	14	14	14	14	14	14
4	15	15	15	15	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	6.3	13	25	50	100
-----------	---------	-----	----	----	----	-----

Day	Number Alive (In brackets number stressed)					
0	10	10	10	10	10	10
1	10	10 (1)	10	10	10	10
2	10	10 (1)	10	10	10	10
3	10	10 (1)	10	10	10	10
4	10	10 (1)	10	10	10	10

Day	Mortality (%)					
4	0	0	0	0	0	0

Day	Stressed (%)					
4	0	10	0	0	0	0



Trout (96-h LC50) Test Report

Client: ALS106
Reference: 16-0177-01-TRD

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.0	0.3
2	3.5	0.6
3	3.5	0.4
4	3.0	0.5
5	3.1	0.3
6	3.6	0.8
7	3.6	0.6
8	3.0	0.5
9	3.2	0.4
10	2.5	0.2

average	3.2	0.5
sd	0.4	0.2
cv(%)	11.0	38.6

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Test Data

Conc. (%)	Group Wet Weight (g)
control	4.6
6.3	3.7
13	4.1
25	4.2
50	4.2
100	3.9

Comments/Statistics

Test Result Comments:

None

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Protocol Deviations:

None

Result Summary

Client: ALS106 Reference: 16-0177-01-DAD

Client: ALS Laboratory Group; operation Calgary

Sample: L1732882-4 LC_WTF_OUT_WS_2016-002-08_N

Collection: collected on 2016/02/08 at not given by not given

Receipt: received on 2016/02/10 at 1300 by MC

Containers: received 2 x 20 L carboys / 2 x 1 L bottles at 9 °C, in good condition with no seals and no initials

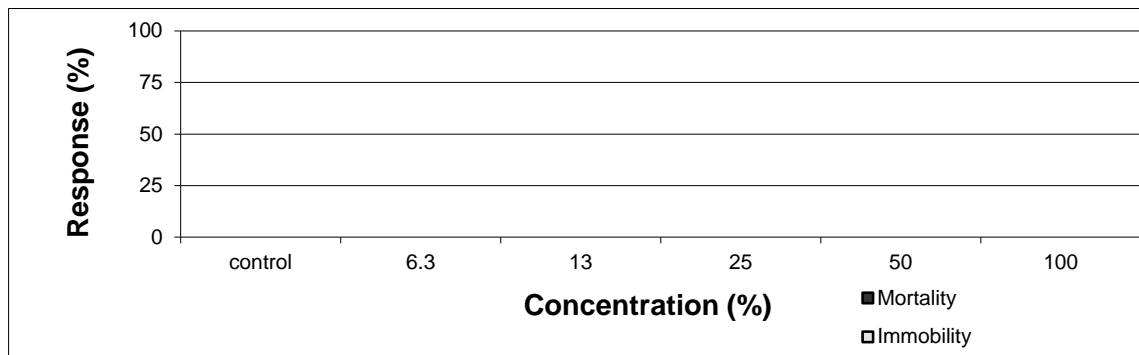
Description: type: water, collection method: not given

Test: started on 2016/02/10 ; ended on 2016/02/12

Result:

	Endpoint (48-hour)	Value (%)	Confidence Limits (95%)		Method Calculated
			lower	upper	
Acute: (mortality)	LC50	>100			could not be calculated
	LC25	>100			could not be calculated
Acute: (immobility)	EC50	>100			could not be calculated
	EC25	>100			could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0177-01-DAD

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition.

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 9 days to first brood

15 neonates per average brood

Sample initial chemistry: pH: 7.5; EC: 1460 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.0 (mg/L); temperature: 18 °C
hardness (mg CaCO_3/L): 794; colour: colourless; odour: organic

Sample holding time: 2 days (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing

The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)

The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control/dilution water: Moderately hard water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_3 (5 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 84 mg CaCO_3/L

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: ALS106 Reference: 16-0177-01-DAD

Endpoint: Mortality, 48-h LC50 (95% confidence limits)
Immobility, 48-h EC50 (95% confidence limits)
Test validity: The control had 100% survival (must \geq 90%)
Control had 0 percent (%) abnormal behaviour (must \leq 10%, immobility)

Reference toxicant: 48-h test with NaCl initiated February 9, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.76 (0.73-0.77) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.69-0.84) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: ALS106
Reference: 16-0177-01-DAD

Test Log:

Date	Day	Time	Technician
2016/02/10	0	1415	JK/JN
2016/02/11	1	0855	JK
2016/02/12	2	1020	JK

Chemistry:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

pH (units)

0	7.9	7.9	8.0	8.1	8.1	8.1		
2	7.7	7.8	7.9	8.0	8.2	8.0		

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	289	369	445	605	909	1419		
2	295	380	465	635	945	1448		

Dissolved Oxygen (mg/L)

0	8.0	8.1	8.0	8.0	8.0	8.0		
2	8.1	8.0	8.0	8.1	8.1	8.1		

Temperature (°C)

0	19	19	20	20	19	19		
2	20	20	20	20	19	19		

Biology:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

Number Alive and Behavior (behavior is in brackets)

1	10	10	10	10	10	10 (1F)		
2	10	10	10	10	10	10		

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris; nd, not done; na, not applicable;

Mortality (%)

2	0	0	0	0	0	0		
---	---	---	---	---	---	---	--	--

Immobility (%)

2	0	0	0	0	0	0		
---	---	---	---	---	---	---	--	--



Daphnia (48-h LC50/EC50) Test Report

Comments/Statistics

Client: ALS106 Reference: 16-0177-01-DAD

Test Result Comments:

None

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Endpoints for immobility could not be calculated. No effect occurred.

Protocol Deviations:

None

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, H₂S 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 OR 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.



ATTN: Lyudmyla Shvets
ALS Laboratory Group
2559 29th St. N.E.
Calgary, Alberta
Canada T1Y 7B5

Received: 2016/02/23
Report Date: 2016/03/02
Version: FINAL

Test Report

Client: ALS106
Reference: 16-0227
Billing: L1737046

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



Trout (96-h LC50) Test Report

Result Summary

Client: ALS106
Reference: 16-0227-01-TRD

Client: ALS Laboratory Group; operation Calgary

Sample: L1737046-4 LC_WTF_OUT_WS_2016-02-22_N

Collection: collected on 2016/02/22 at not given by not given

Receipt: received on 2016/02/23 at 1230 by MC

Containers: received 2 x 20 L carboys / 2 x 1 L bottle at 12 °C, in good condition with no seals and no initials

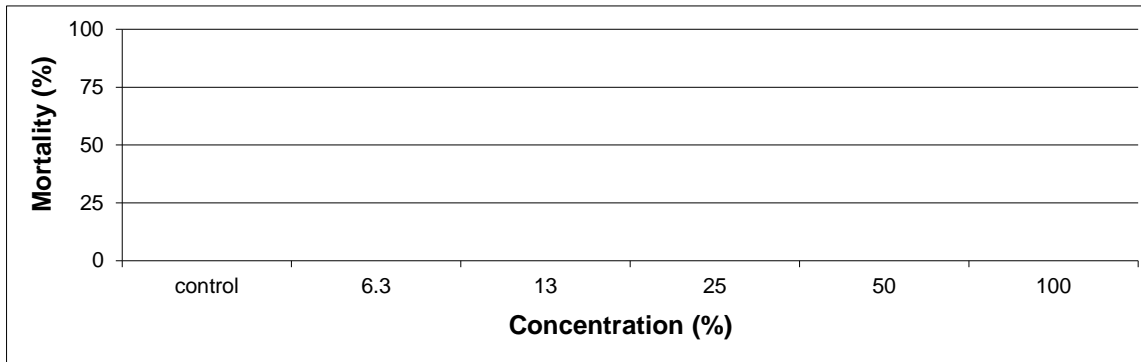
Description: type: water, collection method: not given

Test: started on 2016/02/24 ; ended on 2016/02/28

Result:

	Endpoint (96-hour)	Value (%)	Confidence Limits (95%)		Method Calculated
			lower	upper	
Acute:	LC50	>100			could not be calculated
(mortality)	LC25	>100			could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.

Jacqueline Poole

Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0227-01-TRD

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (amended May 2007).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Sam Livingston (Batch 20160121TR)

Acclimation: 34 days (must be ≥ 2 weeks)

Stock mortality: 0.06% (seven days preceding testing)

Sample initial chemistry: pH: 6.2; EC: 1510 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.6 (mg/L); temperature: 14 °C
hardness (mg CaCO₃/L): 662; colour: colourless; odour: odourless

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 120 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in 100 % sample was 10 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.23 g/Litre (must be ≤ 0.5 g/Litre)

Control/dilution water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and test termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, 96-h LC50 (with 95% confidence limits)

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated February 6, 2016; current results (96-h LC50 and 95% confidence limits) = 0.58 (0.53-0.62) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.57 (0.49-0.65) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (96-h LC50) Test Report

Test Data

Client: ALS106
Reference: 16-0227-01-TRD

Test Log:

Date	Day	Time	Technician
2016/02/24	0	1600	DS/HS
2016/02/25	1	0830	EP
2016/02/26	2	1025	JW
2016/02/27	3	0930	EP
2016/02/28	4	1100	BH/JK

Chemistry:

Conc. (%)	control	6.3	13	25	50	100
-----------	---------	-----	----	----	----	-----

Day	pH (units)					
0	8.1	7.9	7.8	7.8	7.9	7.8
4	8.4	8.4	8.4	8.4	8.3	8.3

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	488	554	622	815	1100	1604
4	511	585	634	840	1100	1598

Day	Dissolved Oxygen (mg/L)					
0	8.9	9.2	9.9	9.9	9.9	10.0
4	8.9	8.9	9.0	8.9	8.9	9.0

Day	Temperature (°C)					
0	15	14	15	15	14	15
4	14	14	14	14	14	14

Number Alive (In brackets number stressed):

Conc. (%)	control	6.3	13	25	50	100
-----------	---------	-----	----	----	----	-----

Day	Number Alive (In brackets number stressed)					
0	10	10	10	10	10	10
1	10	10	10	10	10	10
2	10	10	10	10	10	10
3	10	10	10	10	10	10
4	10	10	10	10	10	10

Day	Mortality (%)					
4	0	0	0	0	0	0

Day	Stressed (%)					
4	0	0	0	0	0	0



Trout (96-h LC50) Test Report

Client: ALS106
Reference: 16-0227-01-TRD

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.6	0.6
2	3.7	0.7
3	3.3	0.3
4	3.8	0.6
5	2.8	0.2
6	3.3	0.4
7	3.9	0.7
8	3.4	0.5
9	3.0	0.3
10	2.7	0.3

average	3.4	0.5
sd	0.4	0.2
cv(%)	12.4	40.0

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient
of variation

Test Data

Conc. (%)	Group Wet Weight (g)
control	4.6
6.3	3.7
13	4.8
25	4.8
50	4.1
100	4.1

Comments/Statistics

Test Result Comments:

None

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Protocol Deviations:

None

Result Summary

Client: ALS106
Reference: 16-0227-01-DAD

Client: ALS Laboratory Group; operation Calgary

Sample: L1737046-4 LC_WTF_OUT_WS_2016-02-22_N

Collection: collected on 2016/02/22 at not given by not given

Receipt: received on 2016/02/23 at 1230 by MC

Containers: received 2 x 20 L carboys / 2 x 1 L bottle at 12 °C, in good condition with no seals and no initials

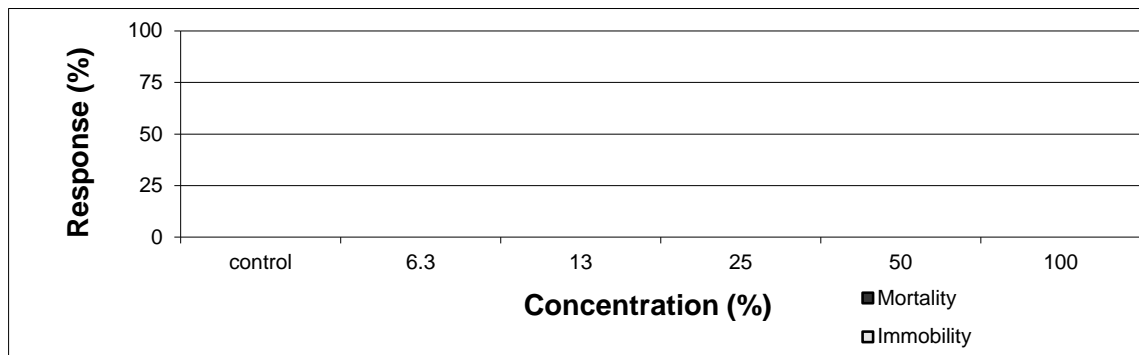
Description: type: water, collection method: not given

Test: started on 2016/02/23 ; ended on 2016/02/25

Result:

	Endpoint (48-hour)	Value (%)	Confidence Limits (95%) lower upper		Method Calculated
Acute: (mortality)	LC50	>100			could not be calculated
	LC25	>100			could not be calculated
Acute: (immobility)	EC50	>100			could not be calculated
	EC25	>100			could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0227-01-DAD

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition.

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 4%

Culture brood data: 9 days to first brood

15 neonates per average brood

Sample initial chemistry: pH: 6.2; EC: 1510 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.6 (mg/L); temperature: 14 °C
hardness (mg CaCO_3/L): 662; colour: colourless; odour: odourless

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing

The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)

The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must ≤ 1 organism/15 mL)

Control/dilution water: Moderately hard water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 84 mg CaCO_3/L

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: ALS106 Reference: 16-0227-01-DAD

Endpoint: Mortality, 48-h LC50 (95% confidence limits)
Immobility, 48-h EC50 (95% confidence limits)
Test validity: The control had 100% survival (must \geq 90%)
Control had 0 percent (%) abnormal behaviour (must \leq 10%, immobility)

Reference toxicant: 48-h test with NaCl initiated February 23, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.81 (0.78- 0.85) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.69-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: ALS106
Reference: 16-0227-01-DAD

Test Log:

Date	Day	Time	Technician
2016/02/23	0	1450	JK
2016/02/24	1	0940	JK
2016/02/25	2	1045	HS

Chemistry:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

pH (units)

0	7.8	7.9	8.0	8.2	8.2	8.2		
2	7.8	7.9	8.0	8.1	8.2	8.1		

Conductivity ($\mu\text{S/cm}$ @ 25°C)

0	292	375	458	622	919	1440		
2	309	380	470	630	905	1443		

Dissolved Oxygen (mg/L)

0	8.1	8.1	8.1	8.1	8.1	8.0		
2	8.0	8.1	8.0	7.9	7.9	7.8		

Temperature (°C)

0	19	19	19	19	19	19		
2	20	20	20	20	21	20		

Biology:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

Number Alive and Behavior (behavior is in brackets)

1	10	10	10	10	10	10		
2	10	10	10	10	10	10		

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris; nd, not done; na, not applicable;

Mortality (%)

2	0	0	0	0	0	0		
---	---	---	---	---	---	---	--	--

Immobility (%)

2	0	0	0	0	0	0		
---	---	---	---	---	---	---	--	--



Daphnia (48-h LC50/EC50) Test Report

Comments/Statistics

Client: ALS106 Reference: 16-0227-01-DAD

Test Result Comments:

None

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Endpoints for immobility could not be calculated. No effect occurred.

Protocol Deviations:

None

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, H₂S 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 OR 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.



ATTN: Lyudmyla Shvets
ALS Laboratory Group
2559 29th St. N.E.
Calgary, Alberta
Canada T1Y 7B5

Received: 2016/03/01
Report Date: 2016/03/10
Version: FINAL

Test Report

Client: ALS106
Reference: 16-0245
Billing: L1739521

A handwritten signature in cursive script that reads "Jacquelyn 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



Trout (96-h LC50) Test Report

Result Summary

Client: ALS106
Reference: 16-0245-01-TRD

Client: ALS Laboratory Group; operation Calgary

Sample: L1739521-4 LC_WTF_OUT_WS_02292016_N

Collection: collected on 2016/02/29 at not given by not given

Receipt: received on 2016/03/01 at 1130 by MC

Containers: received 2 x 20 L carboys / 2 x 1 L bottles at 6 °C, in good condition with no seals and no initials

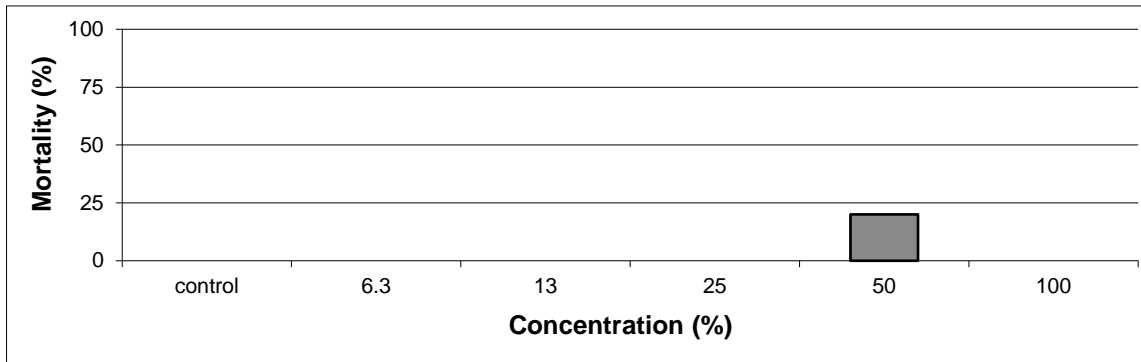
Description: type: water, collection method: not given

Test: started on 2016/03/02 ; ended on 2016/03/06

Result:

	Endpoint (96-hour)	Value (%)	Confidence Limits (95%)		Method Calculated
			lower	upper	
Acute:	LC50	>100			could not be calculated
(mortality)	LC25	>100			could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0245-01-TRD

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (amended May 2007).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Sam Livingston (Batch 20160121TR)

Acclimation: 41 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 6.4; EC: 1526 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 6.9 (mg/L); temperature: 18 °C
hardness (mg CaCO_3/L): 670; colour: yellow; odour: odourless

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 120 minutes at $6.5 \pm 1 \text{ mL}/\text{min}/\text{L}$
Dissolved oxygen in 100 % sample was 9.4 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.165 g/Litre (must be $\leq 0.5 \text{ g}/\text{Litre}$)

Control/dilution water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and test termination

Aeration: All treatments aerated at $6.5 \pm 1 \text{ mL}/\text{min}/\text{L}$ by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $15 \pm 1^\circ\text{C}$

Endpoint: Mortality, 96-h LC50 (with 95% confidence limits)

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated February 6, 2016; current results (96-h LC50 and 95% confidence limits) = 0.58 (0.53-0.62) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.57 (0.49-0.65) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume

Test Data

Client: ALS106
Reference: 16-0245-01-TRD

Test Log:

Date	Day	Time	Technician
2016/03/02	0	1600	HS/JN
2016/03/03	1	0830	HS
2016/03/04	2	0800	EP
2016/03/05	3	0855	JW
2016/03/06	4	1030	BH

Chemistry:

Conc. (%)	control	6.3	13	25	50	100
-----------	---------	-----	----	----	----	-----

Day	pH (units)					
0	8.1	8.0	7.9	7.9	7.9	7.8
4	8.2	8.2	8.2	8.2	8.2	8.1

Day	Conductivity (µS/cm @ 25°C)					
0	472	551	631	805	1057	1575
4	512	563	643	821	1077	1552

Day	Dissolved Oxygen (mg/L)					
0	8.9	9.3	9.3	9.4	9.3	9.4
4	8.8	8.9	9.0	9.0	9.0	9.1

Day	Temperature (°C)					
0	14	14	14	14	14	14
4	14	14	14	14	14	14

Number Alive (In brackets number stressed):

Conc. (%)	control	6.3	13	25	50	100
-----------	---------	-----	----	----	----	-----

Day	Number Alive (In brackets number stressed)					
0	10	10	10	10	10	10
1	10	10	10	10	10	10
2	10	10	10	10	9	10
3	10	10	10	10	8	10
4	10	10	10	10	8	10

Day	Mortality (%)					
4	0	0	0	0	20	0

Day	Stressed (%)					
4	0	0	0	0	0	0



Trout (96-h LC50) Test Report

Client: ALS106
Reference: 16-0245-01-TRD

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	2.8	0.2
2	2.6	0.2
3	2.9	0.3
4	3.2	0.4
5	3.0	0.3
6	2.8	0.3
7	2.8	0.3
8	3.1	0.4
9	3.3	0.5
10	3.2	0.4

average	3.0	0.3
sd	0.2	0.1
cv(%)	7.6	28.7

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient
of variation

Test Data

Conc. (%)	Group Wet Weight (g)
control	3.3
6.3	3.3
13	3.6
25	3.9
50	3.4
100	3.8

Comments/Statistics

Test Result Comments:

None

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Protocol Deviations:

None

Result Summary

Client: ALS106
Reference: 16-0245-01-DAD

Client: ALS Laboratory Group; operation Calgary

Sample: L1739521-4 LC_WTF_OUT_WS_02292016_N

Collection: collected on 2016/02/29 at not given by not given

Receipt: received on 2016/03/01 at 1130 by MC

Containers: received 2 x 20 L carboys / 2 x 1 L bottles at 6 °C, in good condition with no seals and no initials

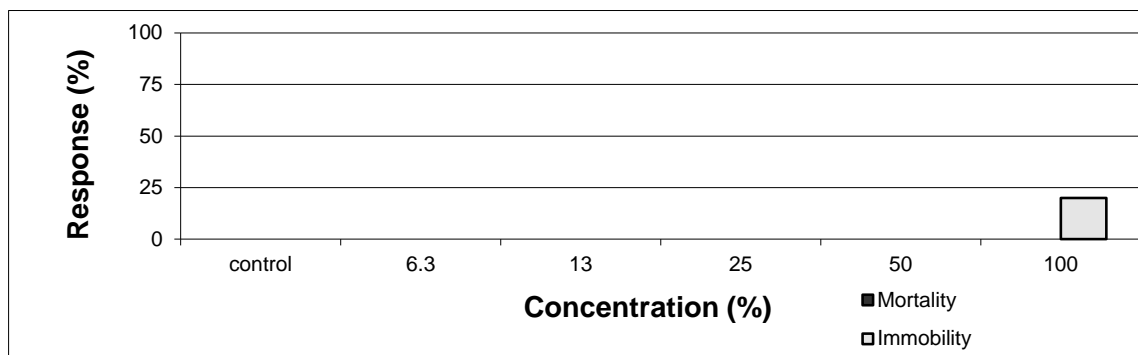
Description: type: water, collection method: not given

Test: started on 2016/03/02 ; ended on 2016/03/04

Result:

	Endpoint (48-hour)	Value (%)	Confidence Limits (95%)		Method Calculated
			lower	upper	
Acute: (mortality)	LC50	>100			could not be calculated
	LC25	>100			could not be calculated
Acute: (immobility)	EC50	>100			could not be calculated
	EC25	>100			could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0245-01-DAD

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition.

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 13%

Culture brood data: 9 days to first brood

15 neonates per average brood

Sample initial chemistry: pH: 6.4; EC: 1526 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 6.9 (mg/L); temperature: 18 °C
hardness (mg CaCO_3/L): 670; colour: yellow; odour: odourless

Sample holding time: 2 days (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing

The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)

The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control/dilution water: Moderately hard water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 82 mg CaCO_3/L

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: ALS106 Reference: 16-0245-01-DAD

Endpoint: Mortality, 48-h LC50 (95% confidence limits)
Immobility, 48-h EC50 (95% confidence limits)
Test validity: The control had 100% survival (must \geq 90%)
Control had 0 percent (%) abnormal behaviour (must \leq 10%, immobility)

Reference toxicant: 48-h test with NaCl initiated February 23, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.81 (0.78- 0.85) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.69-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: ALS106
Reference: 16-0245-01-DAD

Test Log:

Date	Day	Time	Technician
2016/03/02	0	1530	JK/EP
2016/03/03	1	0900	HS
2016/03/04	2	0905	DS

Chemistry:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

pH (units)

0	7.6	7.9	7.9	8.0	8.0	8.0		
2	8.0	8.0	8.0	8.2	8.3	8.2		

Conductivity ($\mu\text{S/cm}$ @ 25°C)

0	294	374	465	629	922	1455		
2	310	382	481	637	935	1400		

Dissolved Oxygen (mg/L)

0	7.8	7.8	7.9	7.9	7.9	7.9		
2	7.8	7.8	7.9	8.0	7.9	7.9		

Temperature (°C)

0	20	20	20	20	20	20		
2	20	20	20	20	20	20		

Biology:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

Number Alive and Behavior (behavior is in brackets)

1	10	10	10	10	10	10		
2	10	10	10	10	10 (2D)	10 (2I)		

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris; nd, not done; na, not applicable;

Mortality (%)

2	0	0	0	0	0	0		
---	---	---	---	---	---	---	--	--

Immobility (%)

2	0	0	0	0	0	20		
---	---	---	---	---	---	----	--	--



Daphnia (48-h LC50/EC50) Test Report

Comments/Statistics

Client: ALS106 Reference: 16-0245-01-DAD

Test Result Comments:

None

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Endpoints for immobility could not be calculated. No effect occurred.

Protocol Deviations:

None

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, H₂S 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 OR 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.



ATTN: Lyudmyla Shvets
ALS Laboratory Group
2559 29th St. N.E.
Calgary, Alberta
Canada T1Y 7B5

Received: 2016/03/08
Report Date: 2016/03/21
Version: FINAL

Test Report

Client: ALS106
Reference: 16-0290
Billing: L1741674

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



Trout (96-h LC50) Test Report

Result Summary

Client: ALS106 Reference: 16-0290-01-TRD

Client: ALS Laboratory Group; operation Calgary

Sample: L1741674-4 LC_WTF_OUT_WS_03032016_N

Collection: collected on 2016/03/07 at not given by not given

Receipt: received on 2016/03/08 at 1330 by EP

Containers: received 2 x 20 L carboys at 8 °C, in good condition with no seals and no initials

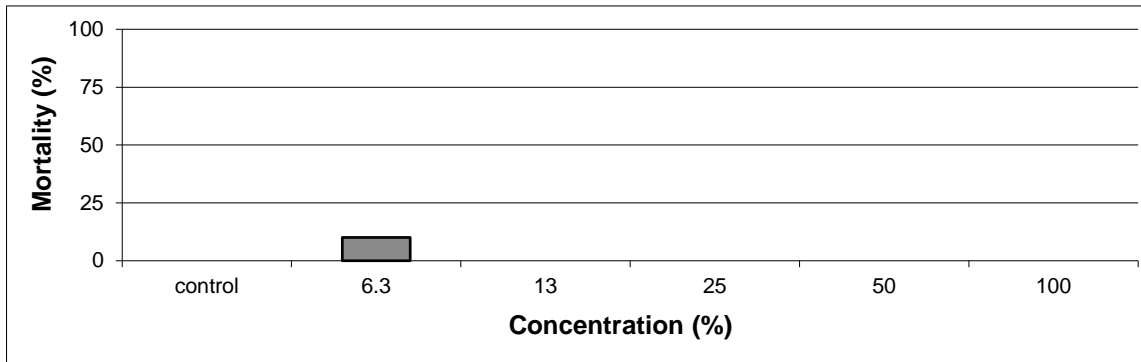
Description: type: water, collection method: not given

Test: started on 2016/03/09 ; ended on 2016/03/13

Result:

	Endpoint (96-hour)	Value (%)	Confidence Limits (95%)		Method Calculated
			lower	upper	
Acute:	LC50	>100			could not be calculated
(mortality)	LC25	>100			could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0290-01-TRD

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (amended May 2007).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Sam Livingston (Batch 20160121TR)

Acclimation: 48 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.4; EC: 1558 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.8 (mg/L); temperature: 12 °C
hardness (mg CaCO₃/L): 1360; colour: pale yellow; odour: organic

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 120 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in 100 % sample was 9.4 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.2 g/Litre (must be ≤ 0.5 g/Litre)

Control/dilution water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and test termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, 96-h LC50 (with 95% confidence limits)

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated March 7, 2016; current results (96-h LC50 and 95% confidence limits) = 0.51 (0.43-0.56) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.58 (0.49-0.67) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (96-h LC50) Test Report

Test Data

Client: ALS106
Reference: 16-0290-01-TRD

Test Log:

Date	Day	Time	Technician
2016/03/09	0	1230	DS/HS
2016/03/10	1	0800	EP
2016/03/11	2	0900	JW
2016/03/12	3	0900	EP
2016/03/13	4	0930	BH

Chemistry:

Conc. (%)	control	6.3	13	25	50	100
-----------	---------	-----	----	----	----	-----

Day	pH (units)					
0	8.1	7.8	7.8	7.8	7.8	7.9
4	8.3	8.4	8.4	8.4	8.4	8.2

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	487	598	693	857	1139	1747
4	508	605	697	861	1153	1693

Day	Dissolved Oxygen (mg/L)					
0	8.9	9.1	9.1	9.2	9.3	9.4
4	8.9	9.0	9.0	9.0	9.0	8.9

Day	Temperature (°C)					
0	14	14	14	14	14	14
4	14	14	14	14	14	14

Number Alive (In brackets number stressed):

Conc. (%)	control	6.3	13	25	50	100
-----------	---------	-----	----	----	----	-----

Day	Number Alive (In brackets number stressed)					
0	10	10	10	10	10	10
1	10	10	10	10	10	10
2	10	10	10	10	10	10
3	10	9	10	10	10	10
4	10	9	10	10	10	10

Day	Mortality (%)					
4	0	10	0	0	0	0

Day	Stressed (%)					
4	0	0	0	0	0	0



Trout (96-h LC50) Test Report

Client: ALS106
Reference: 16-0290-01-TRD

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.1	0.3
2	2.9	0.3
3	2.4	0.2
4	3.6	0.6
5	3.4	0.5
6	2.9	0.3
7	3.3	0.4
8	3.1	0.4
9	2.6	0.2
10	3.9	0.8

average	3.1	0.4
sd	0.5	0.2
cv(%)	14.5	47.1

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Test Data

Conc. (%)	Group Wet Weight (g)
control	4.0
6.3	3.0
13	3.3
25	3.3
50	3.4
100	2.8

Comments/Statistics

Test Result Comments:

None

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Protocol Deviations:

None

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, H₂S 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.



Daphnia Magna Bioassay Test Report - LC50

Sample ID:	L1744412-4
------------	------------

Summary Results

48-hour LC50:	Non-Lethal
95% Lower Confidence Interval:	n/a
95% Upper Confidence Interval:	n/a
Method of Calculation:	n/a
Confirmed by Graph:	n/a

Sample Information

Sample Origin:	Teck Coal Limited (West Line Creek)
Sample Description:	WL_WTF_OUT_WS_03142016_N
Sampling Date and Time:	14-Mar-16 09:00
Sampling Method:	Grab
Sampled By:	Jocelyn Traverse
Container(s) Description:	2 x 1L opaque plastic bottle
Sample Volume:	2L
Date and Time Received:	16-Mar-16 09:30
Transit Irregularities:	None
Storage Temperature (°C):	n/a

Test Information

Test Organism:	Daphnia magna
Test Description:	Acute, 48-hour, Static, LC50
Reference Method(s):	EPS 1/RM/14, 2nd Ed. Dec. 2000, Environment Canada
	EPS 1/RM/11, July 1990, Environment Canada
Performed By:	AGJ
Starting Date and Time:	16-Mar-16 16:30
Deviations from Reference Method:	None



Condition of Effluent at 100% v/v Before Preparing Dilutions

Observations

Colour:	Yellow		
Odour:	Mild		
Turbidity:	Low		
Solids:	Low		
Temperature (°C):	21	Thermometer	S/N 91154465
Dissolved Oxygen (mg/L):	10.29	YSI ProODO Meter	S/N 15M102668
Conductivity (µmhos/cm):	1839	VWR Portable Conductivity Meter	S/N 51071543
pH:	7.76	VWR SympHony pH Meter	S/N D01908
pH Adjustment:	Not Adjusted		
pH Adjustment Procedure:	n/a		
Hardness (mg/L) Before Adjustment:	1.4	mL Titration Solution/	<u>1</u> mL of Sample x 1000 = <u>1400</u>
Hardness (mg/L) After Adjustment:	n/a	mL Titration Solution/	<u>n/a</u> mL of Sample x 1000 = <u>n/a</u>
Alkalinity (mg/L):	2.5	mL Titration Solution/	<u>10</u> mL of Sample x 1000 = <u>250</u>

Pre-Aeration

Aeration Time (max. 30 minutes):	30	
Sample Test Concentration (v/v):	100%	0%
Aeration Rate (25-50 mL/min/L):	34.7 ± 1.5	34.7 ± 1.5
D.O. Before Pre-Aeration (target 40-100 %):	112.6	95.4
Average D.O. After Pre-Aeration (%):	102.2	96.2

Test Organism Data

Average age of daphnia at first brood (days):	9
Average number of neonates per brood:	36
Weekly Mortality Preceding Test (%):	2.5
Date Parents Born:	01-Mar-16
Loading Density (organisms/20 mL):	1
Age of test organisms at beginning of test (hrs):	<24

Conditions Common to All Concentrations During Test

Volume Tested:	200 mL
Duplicate solutions for control & 100%:	No
Neonates per Vessel:	10
Volume per Neonate:	20 mL
Test Solution Depth:	70 mm
Container Description:	Plastic Cups
Source of Holding/Dilution Water:	Reconstituted water



Conditions During Test

Concentration (% v/v)	Temperature (°C)			Dissolved Oxygen (mg/L)		pH		Conductivity (µmhos/cm)	Hardness (mg/L)	Immobility (# of daphnids)		Mortality (# of daphnids)
	0h	24h	48h	0h	48h	0h	48h			0h	48h	
0	20	20	20	8.83	8.88	7.70	7.59	292	86	0	0	0
12.5	20	20	20	8.85	8.88	7.83	7.82	514	n/a	0	0	0
25	20	20	20	8.86	8.87	7.89	7.96	740	n/a	0	0	0
50	20	20	20	8.89	8.88	7.92	8.09	1126	n/a	0	0	0
75	20	20	20	9.00	8.87	7.91	8.09	1519	n/a	0	0	0
100	20	20	20	9.28	8.89	7.88	7.97	1868	1400	0	0	0

Mortality and Immobility Information

Conc. (% v/v)	Mean Number of Daphnids at End of Test		Mean Rate of Daphnids at End of Test (%)	
	Dead	Immobile	Dead	Immobile
0	0	0	0	0
12.5	0	0	0	0
25	0	0	0	0
50	0	0	0	0
75	0	0	0	0
100	0	0	0	0

Median Lethal Concentration Results for Multi-Concentration Tests

LC50:	Non-Lethal
LC50 Lower 95% Confidence Limit:	n/a
LC50 Upper 95% Confidence Limit:	n/a
EC50:	n/a
EC50 Lower 95% Confidence Limit:	n/a
EC50 Upper 95% Confidence Limit:	n/a
Statistical Method:	n/a

Note: Non-lethal = 0 mortality
LC50 is for mortality. EC50 is for immobility.



Reference Toxicant Test Results

Reference Toxicant:	Sodium Chloride
Date Reference Toxicant Initiated:	14-Mar-16
Recent 48h Reference Toxicant Test LC50 (mg/L NaCl):	5108
Lower 95% Confidence Limit (mg/L NaCl):	4831
Upper 95% Confidence Limit (mg/L NaCl):	5326
Historic Geometric Mean LC50 (mg/L NaCl):	5371
Lower Warning Limit (-2 S.D.):	4821
Upper Warning Limit (+2 S.D.):	5983
Method of Calculation:	Stephan LC50 Program, Probit
Confirmed by Graph:	Yes

Observations/Comments

No toxicity observed.



Rainbow Trout Bioassay Test Report - LC50

Sample ID:	L1744412-4
------------	------------

Summary Results

96-hour LC50 v/v (%):	Non-Lethal
95% Lower Confidence Interval (%):	n/a
95% Upper Confidence Interval (%):	n/a
Method of Calculation:	n/a
Confirmed by Graph:	n/a

Sample Information

Sample Origin:	Teck Coal Limited (West Line Creek)
Sample Description:	WL_WTF_OUT_WS_03142016_N
Sampling Date and Time:	14-Mar-16 09:00
Sampling Method:	Grab
Sampled By:	Jocelyn Traverse
Container(s) Description:	2 x 20L cube containers
Sample Volume:	40L
Date and Time Received:	16-Mar-16 09:30
Transit Irregularities:	None
Storage Temperature (°C):	n/a

Test Information

Test Organism:	Oncorhynchus mykiss
Test Description:	Acute, 96-hour, Static, LC50
Reference Method(s):	EPS 1/RM/13, 2nd Ed. Dec. 2000, with May 2007 amendments, Environment Canada EPS 1/RM/9, May 1996 with May 2007 amendments, Environment Canada
Performed By:	AGJ
Starting Date and Time:	16-Mar-16 15:30
Deviations from Reference Method:	None



Initial Parameters

Observations

Colour:	Light Yellow		
Odour:	Mild		
Turbidity:	Low		
Solids:	Moderate		
Hardness (mg/L):	1.3	mL Titration Solution/	1 mL of Sample x 1000 = 1300
Alkalinity (mg/L):	2.6	mL Titration Solution/	10 mL of Sample x 1000 = 260
Temperature (°C):	14.2	Thermometer	S/N 91154465
Dissolved Oxygen (mg/L):	10.69	YSI Dissolved Oxygen Meter	S/N 15M102668
Conductivity (µmhos/cm):	1844	VWR Portable Conductivity Meter	S/N 51071543
pH (5.5-8.5 pH units):	7.93	VWR SympHony pH Meter	S/N D01908
pH Adjustment:	Not Adjusted		
pH Adjustment Procedure:	n/a		

Pre-Aeration

Aeration Time (min):	30					
Sample Test Concentration (v/v):	100%	50%	25%	12.5%	6.25%	0%
Aeration Rate (5.5-7.5 mL/min/L):	6.1 ± 0.2	6.1 ± 0.2	6.1 ± 0.2	6.1 ± 0.2	6.1 ± 0.2	6.1 ± 0.2
Oxygen (D.O.) Before Pre-Aeration (%):	97.4	n/a	n/a	n/a	n/a	93.5
Average D.O. After Pre-Aeration (%):	99.3	n/a	n/a	n/a	n/a	95.4

Test Organism Data

Lot Number:	05/11/15 T2
Weekly Mortality Preceding Test (%):	0.88
Sample Size:	10

Conditions Common to All Concentrations During Test

Source of Holding/Dilution Water:	Dechlorinated UV Treated City of Winnipeg Tap Water
Container Description:	20 L Polyethylene Pail with Liner
Aeration Method:	Compressed air bubbled through silica-glass air diffuser
Aeration Rate (5.5-7.5 mL/min/L):	(as set during pre-aeration above)
Test Solution Volume (L):	20
Test Solution Depth (cm):	34
Number of Test Organisms per Container:	10
Loading Density (g/L):	0.22



Conditions During Test

Concentration (% v/v)	Temperature (°C) (15 ± 1°C)					Dissolved Oxygen (mg/L)					pH (pH units)				
	0h	24h	48h	72h	96h	0h	24h	48h	72h	96h	0h	24h	48h	72h	96h
0	15	n/a	n/a	n/a	15	9.54	n/a	n/a	n/a	9.88	7.36	n/a	n/a	n/a	7.19
6.25	15	n/a	n/a	n/a	15	9.60	n/a	n/a	n/a	9.89	7.46	n/a	n/a	n/a	7.40
12.5	15	n/a	n/a	n/a	15	9.74	n/a	n/a	n/a	10.04	7.56	n/a	n/a	n/a	7.54
25	15	n/a	n/a	n/a	15	9.84	n/a	n/a	n/a	10.07	7.68	n/a	n/a	n/a	7.63
50	15	n/a	n/a	n/a	15	10.10	n/a	n/a	n/a	10.12	7.81	n/a	n/a	n/a	7.82
100	15	n/a	n/a	n/a	15	10.75	n/a	n/a	n/a	10.06	7.94	n/a	n/a	n/a	7.95

Conc. (% v/v)	Conductivity (µmhos/cm)	Number of Fish Dead				Number of Fish Stressed			
		0h	24h	48h	72h	96h	24h	48h	72h
0	351	0	0	0	0	0	0	0	0
6.25	478	0	0	0	0	0	0	0	0
12.5	597	0	0	0	0	0	0	0	0
25	798	0	0	0	0	0	0	0	0
50	1168	0	0	0	0	0	0	0	0
100	1803	0	0	0	0	0	0	0	0

Control Fish Information at End of Test

Mean Fork Length (mm):	38
Lower Range Fork Length (mm):	33
Upper Range Fork Length (mm):	42
Mean Wet Weight (g):	0.44



Mortality and Stressed Behaviour Information

Conc. (% v/v)	Mean Number of Fish at End of Test		Mean Rate of Fish at End of Test (%)	
	Dead	Stressed	Dead	Stressed
0	0	0	0	0
6.25	0	0	0	0
12.5	0	0	0	0
25	0	0	0	0
50	0	0	0	0
100	0	0	0	0

Median Lethal Concentration Results for Multi-Concentration Tests

LC50:	Non-Lethal
LC50 Lower 95% Confidence Limit:	n/a
LC50 Upper 95% Confidence Limit:	n/a
Statistical Method:	n/a

Note: Non-lethal = 0 mortality

Reference Toxicant Test Results

Reference Toxicant:	Zinc Sulfate
Date Reference Toxicant Initiated:	18-Feb-16
Recent 96h Reference Toxicant Test LC50 (mg/L Zinc):	1.01
Lower 95% Confidence Limit (mg/L Zinc):	0.70
Upper 95% Confidence Limit (mg/L Zinc):	1.53
Historic Geometric Mean LC50 (mg/L Zinc):	0.72
Lower 95% Confidence Limit (mg/L Zinc):	0.36
Upper 95% Confidence Limit (mg/L Zinc):	1.45
Method of Calculation:	Stephan LC50 Program, Probit
Confirmed by Graph:	Yes



Sublethal Biological Effects

No sublethal biological effects observed.

Observations/Comments

No toxicity observed.



ATTN: Lyudmyla Shvets
ALS Laboratory Group
2559 29th St. N.E.
Calgary, Alberta
Canada T1Y 7B5

Received: 2016/03/22
Report Date: 2016/03/30
Version: FINAL

Test Report

Client: ALS106
Reference: 16-0339
Billing: L1746940

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



Trout (96-h LC50) Test Report

Result Summary

Client: ALS106 Reference: 16-0339-01-TRD

Client: ALS Laboratory Group; operation Calgary

Sample: L1746940-3 LC_WTF_OUT_WS_03212016_N

Collection: collected on 2016/03/21 at not given by not given

Receipt: received on 2016/03/22 at 1055 by MC

Containers: received 2 x 20 L carboys / 2 x 1 L bottles at 7 °C, in good condition with no seals and no initials

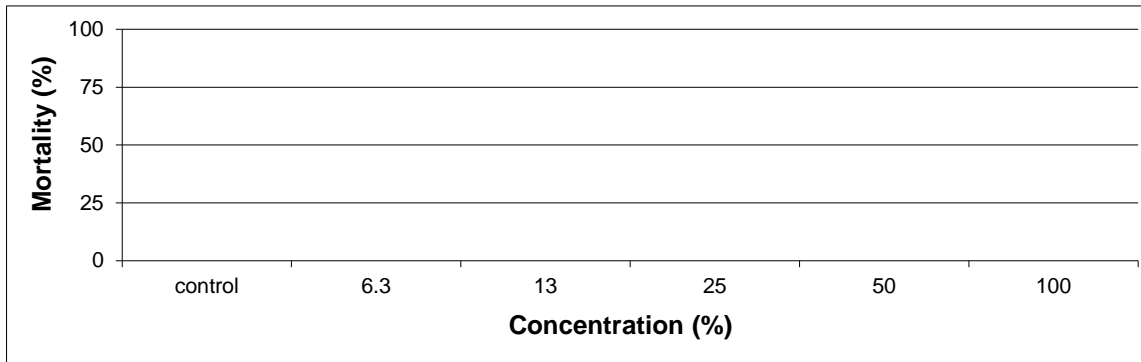
Description: type: water, collection method: not given

Test: started on 2016/03/23 ; ended on 2016/03/27

Result:

	Endpoint (96-hour)	Value (%)	Confidence Limits (95%)		Method Calculated
			lower	upper	
Acute:	LC50	>100			could not be calculated
(mortality)	LC25	>100			could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0339-01-TRD

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (amended May 2007).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Sam Livingston (Batch 20160212TR)

Acclimation: 40 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.3; EC: 1768 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.4 (mg/L); temperature: 16 °C
hardness (mg CaCO₃/L): 780; colour: colourless; odour: odourless

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 120 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in 100 % sample was 9 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.22 g/Litre (must be ≤ 0.5 g/Litre)

Control/dilution water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and test termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, 96-h LC50 (with 95% confidence limits)

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated March 10, 2016; current results (96-h LC50 and 95% confidence limits) = 0.57 (0.53-0.60) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.58 (0.49-0.67) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (96-h LC50) Test Report

Test Data

Client: ALS106
Reference: 16-0339-01-TRD

Test Log:

Date	Day	Time	Technician
2016/03/23	0	1040	ML/JW
2016/03/24	1	0845	ML/JW
2016/03/25	2	1100	JW
2016/03/26	3	1035	JW
2016/03/27	4	0900	HS

Chemistry:

Conc. (%)	control	6.3	13	25	50	100
-----------	---------	-----	----	----	----	-----

Day	pH (units)					
0	8.2	8.2	8.1	7.9	7.6	7.4
4	8.1	8.2	8.2	8.2	8.2	7.9

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	453	558	584	830	1179	1819
4	466	573	599	846	1193	1790

Day	Dissolved Oxygen (mg/L)					
0	9.0	9.1	9.0	9.0	9.1	9.0
4	8.9	8.9	8.9	8.9	8.9	8.8

Day	Temperature (°C)					
0	14	14	14	14	14	14
4	14	14	14	14	14	14

Number Alive (In brackets number stressed):

Conc. (%)	control	6.3	13	25	50	100
-----------	---------	-----	----	----	----	-----

Day	Number Alive (In brackets number stressed)					
0	10	10	10	10	10	10
1	10	10	10	10	10	10
2	10	10	10	10	10	10
3	10	10	10	10	10	10
4	10	10	10	10	10	10

Day	Mortality (%)					
4	0	0	0	0	0	0

Day	Stressed (%)					
4	0	0	0	0	0	0



Trout (96-h LC50) Test Report

Client: ALS106
Reference: 16-0339-01-TRD

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.4	0.4
2	3.5	0.4
3	3.4	0.5
4	3.4	0.4
5	3.6	0.5
6	3.9	0.6
7	2.9	0.3
8	3.2	0.4
9	3.3	0.4
10	3.4	0.5

average	3.4	0.4
sd	0.3	0.1
cv(%)	7.6	19.2

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Test Data

Conc. (%)	Group Wet Weight (g)
control	4.4
6.3	3.9
13	4.1
25	3.8
50	4.0
100	4.0

Comments/Statistics

Test Result Comments:

None

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Protocol Deviations:

None

Result Summary

Client: ALS106
Reference: 16-0339-01-DAD

Client: ALS Laboratory Group; operation Calgary

Sample: L1746940-3 LC_WTF_OUT_WS_03212016_N

Collection: collected on 2016/03/21 at not given by not given

Receipt: received on 2016/03/22 at 1055 by MC

Containers: received 2 x 20 L carboys / 2 x 1 L bottles at 7 °C, in good condition with no seals and no initials

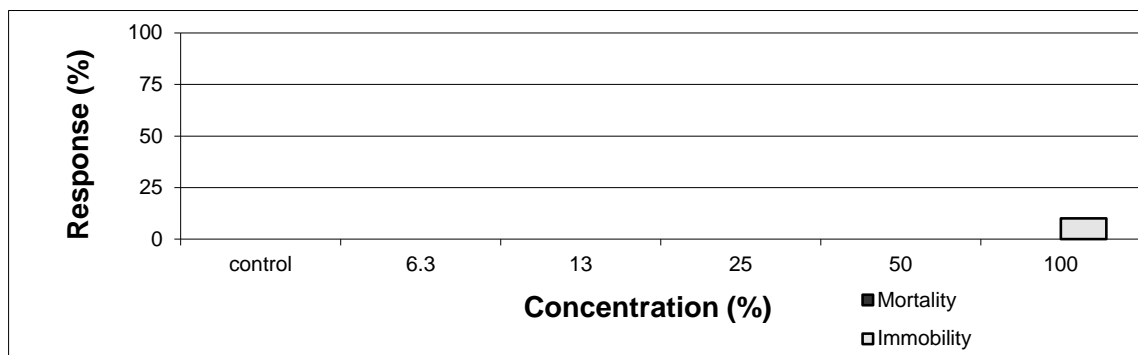
Description: type: water, collection method: not given

Test: started on 2016/03/22 ; ended on 2016/03/24

Result:

	Endpoint (48-hour)	Value (%)	Confidence Limits (95%)		Method Calculated
			lower	upper	
Acute: (mortality)	LC50	>100			could not be calculated
	LC25	>100			could not be calculated
Acute: (immobility)	EC50	>100			could not be calculated
	EC25	>100			could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0339-01-DAD

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition.

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 11 days to first brood

21 neonates per average brood

Sample initial chemistry: pH: 7.3; EC: 1768 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.4 (mg/L); temperature: 16 °C
hardness (mg CaCO_3/L): 780; colour: colourless; odour: odourless

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing

The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)

The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must ≤ 1 organism/15 mL)

Control/dilution water: Moderately hard water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 92 mg CaCO_3/L

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: ALS106 Reference: 16-0339-01-DAD

Endpoint: Mortality, 48-h LC50 (95% confidence limits)
Immobility, 48-h EC50 (95% confidence limits)
Test validity: The control had 100% survival (must \geq 90%)
Control had 0 percent (%) abnormal behaviour (must \leq 10%, immobility)

Reference toxicant: 48-h test with NaCl initiated March 22, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.85 (0.83-0.87) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.69-0.84) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: ALS106
Reference: 16-0339-01-DAD

Test Log:

Date	Day	Time	Technician
2016/03/22	0	1500	DS
2016/03/23	1	0900	HS/DS
2016/03/24	2	0900	EP

Chemistry:

Conc. (%)	control	6.3	13	25	50	100		
pH (units)								
Day								
0	7.9	8.0	8.0	8.0	8.1	8.1		
2	8.1	8.1	8.2	8.2	8.2	8.0		
Conductivity (µS/cm @ 25°C)								
0	322	430	537	720	1061	1721		
2	308	412	515	695	1012	1534		
Dissolved Oxygen (mg/L)								
0	7.8	7.8	7.8	7.8	7.8	7.7		
2	8.0	7.9	7.9	7.9	7.9	7.8		
Temperature (°C)								
0	20	20	20	20	20	20		
2	20	20	19	20	20	20		

Biology:

Conc. (%)	control	6.3	13	25	50	100		
Number Alive and Behavior (behavior is in brackets)								
Day								
1	10	10	10	10	10	10		
2	10	10	10	10	10	10 (1I)		
Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris; nd, not done; na, not applicable;								
Mortality (%)								
2	0	0	0	0	0	0		
Immobility (%)								
2	0	0	0	0	0	10		



***Daphnia* (48-h LC50/EC50) Test Report**

Comments/Statistics

Client: ALS106 Reference: 16-0339-01-DAD

Test Result Comments:

The result of the reference toxicant test initiated on 2016/03/22 was outside the warning limit. This is expected to happen 5% of the time. An investigation occurred and all testing and culturing procedures were followed appropriately.

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Endpoints for immobility could not be calculated. No effect occurred.

Protocol Deviations:

None

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, H₂S 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 OR 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.



ATTN: Lyudmyla Shvets
ALS Laboratory Group
2559 29th St. N.E.
Calgary, Alberta
Canada T1Y 7B5

Received: 2016/03/29
Report Date: 2016/04/07
Version: FINAL

Test Report

Client: ALS106
Reference: 16-0353
Billing: L1749211

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

Result Summary

Client: ALS106 Reference: 16-0353-01-TRD

Client: ALS Laboratory Group; operation Calgary

Sample: L1749211-3 LC_WTF_OUT_WS_03282016_N

Collection: collected on 2016/03/28 at not given by not given

Receipt: received on 2016/03/29 at 1300 by MC

Containers: received 2 x 20 L carboys / 2 x 1 L bottles at 12 °C, in good condition with no seals and no initials

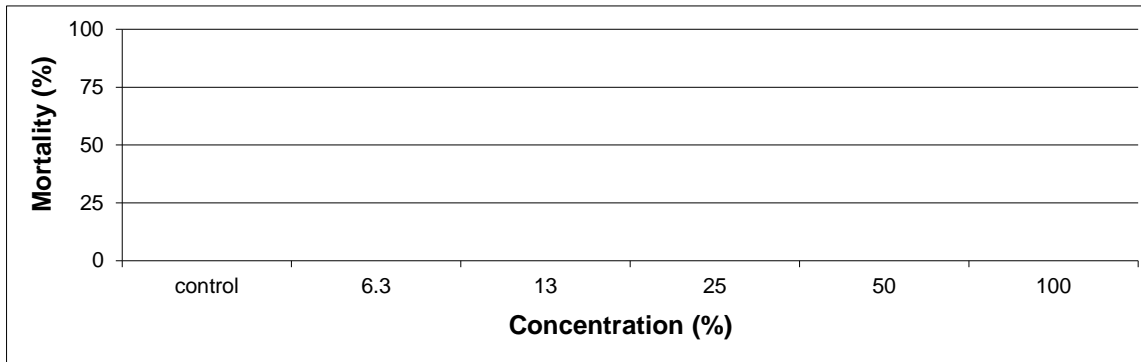
Description: type: water, collection method: not given

Test: started on 2016/03/30 ; ended on 2016/04/03

Result:

	Endpoint (96-hour)	Value (%)	Confidence Limits (95%)		Method Calculated
			lower	upper	
Acute:	LC50	>100			could not be calculated
(mortality)	LC25	>100			could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0353-01-TRD

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (amended May 2007).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160316R)

Acclimation: 14 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.8; EC: 1666 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.6 (mg/L); temperature: 16 °C
hardness (mg CaCO₃/L): 1059; colour: colourless; odour: -

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in 100 % sample was 9.1 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.16 g/Litre (must be ≤ 0.5 g/Litre)

Control/dilution water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and test termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, 96-h LC50 (with 95% confidence limits)

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated March 31, 2016; current results (96-h LC50 and 95% confidence limits) = 0.50 (0.43-0.55) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.58 (0.49-0.67) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (96-h LC50) Test Report

Test Data

Client: ALS106
Reference: 16-0353-01-TRD

Test Log:

Date	Day	Time	Technician
2016/03/30	0	1435	ML/BH
2016/03/31	1	0950	EP
2016/04/01	2	0940	JW
2016/04/02	3	1030	JW
2016/04/03	4	0850	BH

Chemistry:

Conc. (%)	control	6.3	13	25	50	100
-----------	---------	-----	----	----	----	-----

Day	pH (units)					
0	8.4	7.9	7.8	7.8	7.9	8.0
4	8.1	8.1	8.1	8.2	8.2	8.1

Day	Conductivity (µS/cm @ 25°C)					
0	438	526	631	863	1241	1924
4	456	531	637	880	1242	1888

Day	Dissolved Oxygen (mg/L)					
0	9.1	9.1	9.1	9.1	9.1	9.1
4	8.9	9.0	9.0	8.9	8.9	8.9

Day	Temperature (°C)					
0	14	14	14	14	14	14
4	14	14	14	14	14	14

Number Alive (In brackets number stressed):

Conc. (%)	control	6.3	13	25	50	100
-----------	---------	-----	----	----	----	-----

Day	Number Alive					
0	10	10	10	10	10	10
1	10	10	10	10	10	10
2	10	10	10	10	10	10
3	10	10	10	10	10	10
4	10	10	10	10	10	10

Day	Mortality (%)					
4	0	0	0	0	0	0

Day	Stressed (%)					
4	0	0	0	0	0	0



Trout (96-h LC50) Test Report

Client: ALS106
Reference: 16-0353-01-TRD

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.5	0.3
2	3.5	0.4
3	3.6	0.3
4	3.3	0.4
5	3.1	0.3
6	3.4	0.3
7	3.1	0.3
8	3.6	0.3
9	3.4	0.3
10	3.5	0.3

average	3.4	0.3
sd	0.2	0.0
cv(%)	5.4	13.2

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Test Data

Conc. (%)	Group Wet Weight (g)
control	3.2
6.3	3.3
13	3.6
25	3.7
50	3.9
100	3.7

Comments/Statistics

Test Result Comments:

None

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Protocol Deviations:

None

Result Summary

Client: ALS106
Reference: 16-0353-01-DAD

Client: ALS Laboratory Group; operation Calgary

Sample: L1749211-3 LC_WTF_OUT_WS_03282016_N

Collection: collected on 2016/03/28 at not given by not given

Receipt: received on 2016/03/29 at 1300 by MC

Containers: received 2 x 20 L carboys / 2 x 1 L bottles at 12 °C, in good condition with no seals and no initials

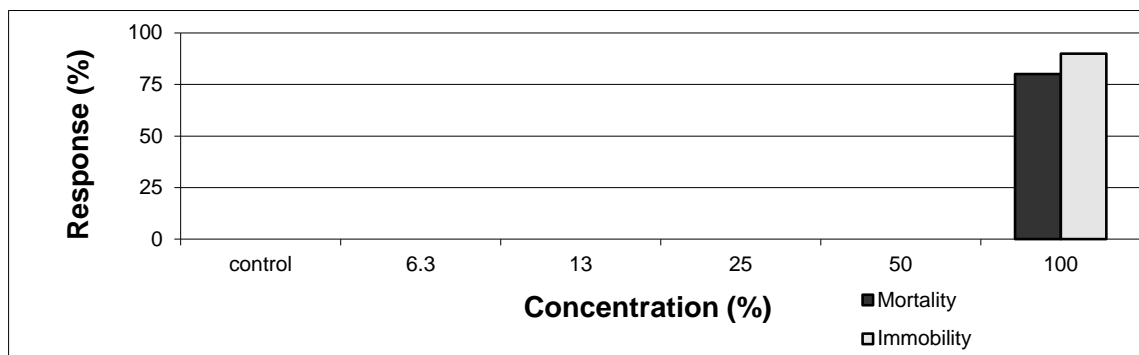
Description: type: water, collection method: not given

Test: started on 2016/03/29 ; ended on 2016/03/31

Result:

	Endpoint (48-hour)	Value (%)	Confidence Limits (95%)		Method Calculated
			lower	upper	
Acute: (mortality)	LC50	77	67	88	Spearman Karber
	LC25	62	na	na	Linear Interpolation
Acute: (immobility)	EC50	73	68	80	Spearman Karber
	EC25	61	na	na	Linear Interpolation

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0353-01-DAD

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition.

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 11 days to first brood

30 neonates per average brood

Sample initial chemistry: pH: 7.8; EC: 1666 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.6 (mg/L); temperature: 16 °C
hardness (mg CaCO_3/L): 1059; colour: colourless; odour: -

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing

The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)

The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must ≤ 1 organism/15 mL)

Control/dilution water: Moderately hard water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 88 mg CaCO_3/L

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: ALS106 Reference: 16-0353-01-DAD

Endpoint: Mortality, 48-h LC50 (95% confidence limits)
Immobility, 48-h EC50 (95% confidence limits)
Test validity: The control had 100% survival (must \geq 90%)
Control had 0 percent (%) abnormal behaviour (must \leq 10%, immobility)

Reference toxicant: 48-h test with NaCl initiated March 28, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.77 (0.75-0.79) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: ALS106
Reference: 16-0353-01-DAD

Test Log:

Date	Day	Time	Technician
2016/03/29	0	1445	JN/EP
2016/03/30	1	1030	HS/JW
2016/03/31	2	0900	HS

Chemistry:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

pH (units)

0	8.0	8.1	8.2	8.3	8.3	8.2		
2	7.9	7.9	7.9	8.1	8.2	8.0		

Conductivity ($\mu\text{S/cm}$ @ 25°C)

0	288	386	483	671	987	1605		
2	336	459	587	774	1137	1732		

Dissolved Oxygen (mg/L)

0	7.5	7.5	7.5	7.5	7.5	7.5		
2	7.9	7.9	8.0	8.0	7.9	7.8		

Temperature (°C)

0	22	22	22	22	22	22		
2	20	20	20	20	20	20		

Biology:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

Number Alive and Behavior (behavior is in brackets)

1	10	10	10	10	10	10 (6I)		
2	10	10	10	10	10	2 (1I)		

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris; nd, not done; na, not applicable;

Mortality (%)

2	0	0	0	0	0	80		
---	---	---	---	---	---	----	--	--

Immobility (%)

2	0	0	0	0	0	90		
---	---	---	---	---	---	----	--	--

Comments/Statistics

Client: ALS106 Reference: 16-0353-01-DAD

Test Result Comments:

None

Data Analysis:

Regression analysis was attempted on the data, but the assumptions of normality and homoscedasticity of residuals were not met. Therefore, endpoints for survival were calculated using Spearman-Kärber and Linear Interpolation models using CETIS v. 1.9.0.8

Regression analysis was attempted on the data, but the assumptions of normality and homoscedasticity of residuals were not met. Therefore, endpoints for immobility were calculated using Spearman-Kärber and Linear Interpolation models using CETIS v. 1.9.0.8

Protocol Deviations:

None

Result Summary

Client: ALS106
Reference: 16-0353-01-DAD

Client: ALS Laboratory Group; operation Calgary

Sample: L1749211-3 LC_WTF_OUT_WS_03282016_N

Collection: collected on 2016/03/28 at not given by not given

Receipt: received on 2016/03/29 at 1300 by MC

Containers: received 2 x 20 L carboys / 2 x 1 L bottles at 12 °C, in good condition with no seals and no initials

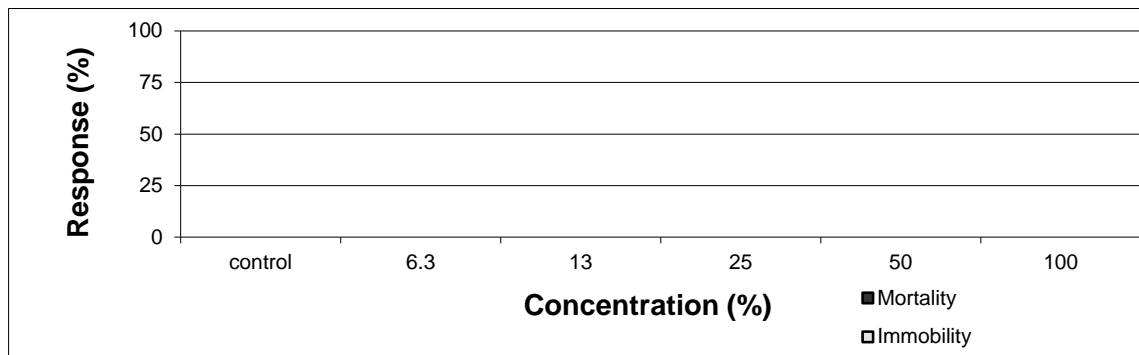
Description: type: water, collection method: not given

Test: started on 2016/03/29 ; ended on 2016/03/31

Result:

	Endpoint (48-hour)	Value (%)	Confidence Limits (95%)		Method Calculated
			lower	upper	
Acute: (mortality)	LC50	>100			could not be calculated
	LC25	>100			could not be calculated
Acute: (immobility)	EC50	>100			could not be calculated
	EC25	>100			could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0353-01-DAD

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition.

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 11 days to first brood

30 neonates per average brood

Sample initial chemistry: pH: 7.8; EC: 1666 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.6 (mg/L); temperature: 16 °C
hardness (mg CaCO_3/L): 1059; colour: colourless; odour: -

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing

The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)

The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must ≤ 1 organism/15 mL)

Control/dilution water: Moderately hard water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 88 mg CaCO_3/L

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $10 \pm 1^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: ALS106 Reference: 16-0353-01-DAD

Endpoint: Mortality, 48-h LC50 (95% confidence limits)
Immobility, 48-h EC50 (95% confidence limits)
Test validity: The control had 100% survival (must \geq 90%)
Control had 0 percent (%) abnormal behaviour (must \leq 10%, immobility)

Reference toxicant: 48-h test with NaCl initiated March 28, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.77 (0.75-0.79) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: ALS106
Reference: 16-0353-01-DAD

Test Log:

Date	Day	Time	Technician
2016/03/29	0	1710	JP/CQ
2016/03/30	1	1100	DS/EP
2016/03/31	2	1500	ML/JW

Chemistry:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

0	7.5	7.7	7.8	7.8	7.8	7.8		
2	7.3	7.5	7.7	7.8	7.9	8.0		

Conductivity ($\mu\text{S/cm}$ @ 25°C)

0	327	441	553	755	1137	1812		
2	338	455	585	778	1146	1827		

Dissolved Oxygen (mg/L)

0	8.6	8.6	8.6	8.7	8.8	8.8		
2	7.8	7.8	7.8	7.8	7.8	8.7		

Temperature (°C)

0	10	10	10	10	10	10		
2	11	11	11	11	11	11		

Biology:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

Number Alive and Behavior (behavior is in brackets)

1	10	10	10	10	10	10		
2	10	10	10	10	10	10 (7D)		

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris; nd, not done; na, not applicable;

Mortality (%)

2	0	0	0	0	0	0		
---	---	---	---	---	---	---	--	--

Immobility (%)

2	0	0	0	0	0	0		
---	---	---	---	---	---	---	--	--

Comments/Statistics

Client: ALS106 Reference: 16-0353-01-DAD

Test Result Comments:

Daphnia caught in brown debris and were attached together, which slowed their swimming, in 100% concentration.

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Endpoints for immobility could not be calculated. No effect occurred.

Protocol Deviations:

The test temperature was 10 +/- 1°C as per the client request.

Result Summary

Client: ALS106 Reference: 16-0353-01-DAD

Client: ALS Laboratory Group; operation Calgary

Sample: L1749211-3 LC_WTF_OUT_WS_03282016_N

Collection: collected on 2016/03/28 at not given by not given

Receipt: received on 2016/03/29 at 1300 by MC

Containers: received 2 x 20 L carboys / 2 x 1 L bottles at 12 °C, in good condition with no seals and no initials

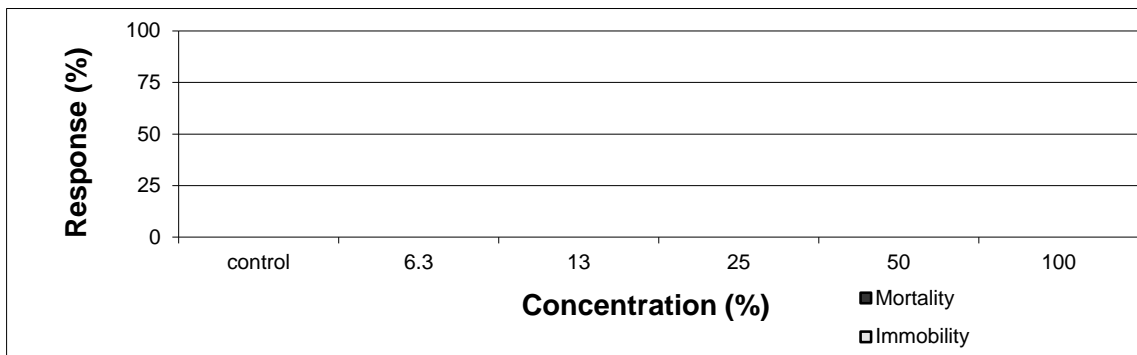
Description: type: water, collection method: not given

Test: started on 2016/03/29 ; ended on 2016/03/31

Result:

	Endpoint (48-hour)	Value (%)	Confidence Limits (95%) lower upper		Method Calculated
Acute: (mortality)	LC50	>100			could not be calculated
	LC25	>100			could not be calculated
Acute: (immobility)	EC50	>100			could not be calculated
	EC25	>100			could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0353-01-DAD

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition.

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 11 days to first brood

30 neonates per average brood

Sample initial chemistry: pH: 7.8; EC: 1666 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.6 (mg/L); temperature: 16 °C
hardness (mg CaCO_3/L): 1059; colour: colourless; odour: -

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: The tests were conducted in 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing

The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)

The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must ≤ 1 organism/15 mL)

Control/dilution water: Moderately hard water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 88 mg CaCO_3/L

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: ALS106 Reference: 16-0353-01-DAD

Endpoint: Mortality, 48-h LC50 (95% confidence limits)
Immobility, 48-h EC50 (95% confidence limits)
Test validity: The control had 100% survival (must \geq 90%)
Control had 0 percent (%) abnormal behaviour (must \leq 10%, immobility)

Reference toxicant: 48-h test with NaCl initiated March 28, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.77 (0.75-0.79) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: ALS106
Reference: 16-0353-01-DAD

Test Log:

Date	Day	Time	Technician
2016/03/29	0	1655	JP/CQ
2016/03/30	1	1100	DS/EP
2016/03/31	2	1500	ML

Chemistry:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

pH (units)

0	7.7	7.9	7.8	7.8	7.7	7.7		
2	7.9	7.9	8.0	8.1	8.2	8.0		

Conductivity ($\mu\text{S/cm}$ @ 25°C)

0	325	435	544	740	1115	1766		
2	304	450	570	747	1146	1723		

Dissolved Oxygen (mg/L)

0	7.9	8.0	8.0	8.0	7.9	7.8		
2	8.1	8.0	8.0	8.0	7.9	8.0		

Temperature (°C)

0	20	20	20	20	20	20		
2	19	19	19	19	19	19		

Biology:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

Number Alive and Behavior (behavior is in brackets)

1	10	10	10	10	10	10		
2	10	10	10	10	10	10		

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris; nd, not done; na, not applicable;

Mortality (%)

2	0	0	0	0	0	0		
---	---	---	---	---	---	---	--	--

Immobility (%)

2	0	0	0	0	0	0		
---	---	---	---	---	---	---	--	--



Daphnia (48-h LC50/EC50) Test Report

Comments/Statistics

Client: ALS106 Reference: 16-0353-01-DAD

Test Result Comments:

Debris attached to apical spine in 100% concentration, white layer on surface of water, precipitate can be felt on test vessel.

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Endpoints for immobility could not be calculated. No effect occurred.

Protocol Deviations:

None

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, H₂S 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 OR 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.



Teck Coal / Line Creek Operations
ATTN: Thomas Davidson
15 Km North HWY 43
Sparwood, BC
VOB 2G0

Report Date: April 7, 2016
Work Order: 16365

Data Report

Species: *Daphnia magna*
Protocol: EPS 1/RM/14 (Second Ed. 2000 with 2016 amendments)

Table 1. Results for the 48-h *Daphnia magna* acute toxicity tests.

Sample ID	Collection Date and Time	Mortality in the 100% v/v (%)
LC_WTF_OUT_WS_20160331_P [tested at 20°C]	March 31, 2016 @ 1730h	3.3
LC_WTF_OUT_WS_20160331_P [tested at 10°C]	March 31, 2016 @ 1730h	0

As requested by the client, the sample was also tested with *D. magna* at 10°C, which was initiated concurrently with the standard test (20°C). The tests met performance criteria and there were no deviations from the protocol. The results presented in this report relate only to the sample tested.

Yvonne Lam, B.Sc.
Laboratory Biologist

Reviewed By:
Edmund Canaria, R.P.Bio
Senior Reviewer

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 16365

Start Date/Time: April 1, 2016 @ 1435h
Test Species: Daphnia magna
Set up by: AWD/ME

Sample Information:

Sample ID: LC-WTF-OVT-WS-20160331-P
Sample Date: March 31, 2016
Date Received: April 1, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 030816B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 21
Mortality (%) in previous 7 d: 10
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC31
Stock Solution ID: 16Na01
Date Initiated: April 4, 2016
48-h LC50 (95% CL): 3.9(2.8-5.5) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2(3.5-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 3.3% mortality at 48h in the 100% (v/v) undiluted sample, tested at ~20°C

Reviewed by: [Signature] Date reviewed: April 7, 2016

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck (Lco) Start Date/Time: April 1, 2016 @ 1435h
 Sample ID: LC-WTF-OUT-WS-20160331-P No. Organisms/volume: 10/200mL
 Work Order No.: 76365 Test Organism: D.magna
 Set up by: AWD/YML
 Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	No. Immobilized		Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)		
		24	48	0	24	48	0	24	48	0	24	48	0	48	
Control	A	10	10	0	19.5	20.0	20.0	8.6	8.7	8.5	7.7	7.9	8.0	358	364
	B	10	10	0											
	C	10	10	0											
	D													1829	
100 (20°C)	A	10 ⁰	10 ⁰	10 ⁰	18.0	20.2	20.2	8.9	8.4	8.5	7.4	7.9	8.2	1825	1804
	B	10 ⁰	10 ⁰	7 ⁰											
	C	10 ⁰	10 ⁰	8 ⁰											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials					A	A	~	A	M	A	A	A	A	A	A

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO3)	
Control (MHW)	98	74
Highest conc.	1200	222
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	18.0		
DO (mg/L)	8.9		
pH	7.4		
Cond (µS/cm)	1825		
Salinity (ppt)	0.7		

Comments: ① daphnids daphnids stuck together
② daphnids covered in debris Mortality: Heartbeat checked under microscope yes
 Sample Description: clear, no colour, no particulates, hydrocarbon-like odour
 Batch#: 030816B 7-d previous # young/brood: 21 Previous 7-d Mortality (%): 10 Day of 1st Brood: 10
 Reviewed by: [Signature] Date reviewed: April 7, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 16365

Start Date/Time: April 1, 2016 @ 1425h
Test Species: Daphnia magna
Set up by: AWD/NYC

Sample Information:

Sample ID: LC-WTF-OVT-WS-2016033LP
Sample Date: March 31, 2016
Date Received: April 1, 2016
Sample Volume: 2 x 1L

Test Validity Criteria:

≥ 90% mean control survival (no more than 2 mortalities in any control replicate)

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 030816A
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 24
Mortality (%) in previous 7 d: 10
Days to first brood: 10

NaCl Reference Toxicant Results:

Reference Toxicant ID: DmTC31
Stock Solution ID: 16NaCl
Date Initiated: April 4, 2016
48-h LC50 (95% CL): 3.9 (2.8 - 5.5) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.5 - 5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results: 0% mortality at 48h in the 100% (v/v) undiluted sample, tested at ~10°C

Reviewed by: 

Date reviewed: April 7, 2016

**Freshwater Acute
48 Hour Toxicity Test Data Sheet**

Client: Teck (Lco) Start Date/Time: April 1, 2016 @ 1425h
 Sample ID: LC-WTF-OUT-WS-20160331-P No. Organisms/volume: 10/200mL
 Work Order No.: 16365 Test Organism: D.magna
 Set up by: AWD/YML
 Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		48		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		0	24	48	0		24	48	0	24	48	0	24	48	0	48	
Control	A	10	10	0	10.5	10.0	10.0	10.0	10.0	10.2	10.4	7.6	7.6	7.8	352	358	
	B	10	10	0													
	C	10	10	0													
	D																
100 (10°C)	A	10 ⁰	10 ⁰	4 ⁰	9.0	10.0	10.0	10.7	10.3	10.4	7.2	7.4	7.7	1848	1724		
	B	10 ⁰	10 ⁰	5 ⁰													
	C	10 ⁰	10 ⁰	4 ⁰													
	D																
	A																
	B																
	C																
	D																
	A																
	B																
	C																
	D																
Technician Initials		A	M	M	A	M	M	A	A	A	A	A	A	A	A	A	

Concentration	Hardness* (mg/L as CaCo3)	Alkalinity*
Control (MHW)	96	74
Highest conc.	1040	214
Hardness adjusted		

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	9.0		
DO (mg/L)	10.7		
pH	7.2		
Cond (µS/cm)	1848		
Salinity (ppt)	0.7		

Comments: (B) daphnids are stuck together
(D) daphnids covered in debris Mortality: Heartbeat checked under microscope Yes

Sample Description: clear, no colour, no particulates, hydrocarbon-like odour.

Batch#: 030816A 7-d previous # young/brood: 24 Previous 7-d Mortality (%): 10 Day of 1st Brood: 10

Reviewed by: [Signature] Date reviewed: April 7, 2016

Client: Teck

W.O.#: 16365

Hardness and Alkalinity Datasheet

Sample ID	Sample Date	Alkalinity				Hardness			Technician
		Sample Volume (mL)	(mL) 0.02N HCL/H ₂ SO ₄ used to pH 4.5	(mL) of 0.02N HCL/H ₂ SO 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)	
LC-WTF-OUT-WS- 20160331-P (20°C)	Apr 1/16	50	11.3	11.5	222	10 [Ⓛ]	12.0	1200	YML
LC-WTF-OUT-WS- 20160331-P (10°C)	Apr 1/16	50	10.9	11.1	214	10 [Ⓛ]	10.4	1040	YML
MHW (20°C)	Apr 1/16	50	3.8	3.9	74	50	4.8	98	YML
MHW (10°C)	↓		3.8	3.9	74	50	4.8	96	YML

Notes: [Ⓛ] Diluted to 100 mL w/ DI water

Reviewed by: 

Date Reviewed: April 6, 2016



ATTN: Lyudmyla Shvets
ALS Laboratory Group
2559 29th St. N.E.
Calgary, Alberta
Canada T1Y 7B5

Received: 2016/04/05
Report Date: 2016/04/14
Version: FINAL

Test Report

Client: ALS106
Reference: 16-0384
Billing: L1751568

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



Trout (Single Concentration) Test Report

Result Summary

Client: ALS106
Reference: 16-0384-01-TRS

Client: ALS Laboratory Group; operation Calgary

Sample: L1751568-3 LC_WTF_OUT_WS_04042016_N

Collection: collected on 2016/04/04 at not given by not given

Receipt: received on 2016/04/05 at 1325 by MC

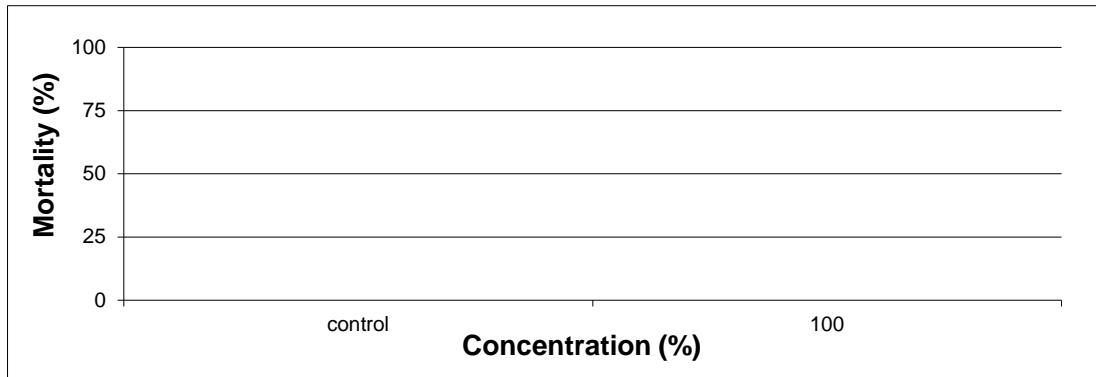
Containers: received 2 x 20 L carboys/ 4 x 1 L bottles at 12 °C, in good condition with no seals and no initials

Description: type: water, collection method: not given

Test: started on 2016/04/05 ; ended on 2016/04/09

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	LC_WTF_OUT_WS_0 4042016_N	0	none



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0384-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (amended 2007).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160316TR)

Acclimation: 20 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.5; EC: 1829 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.5 (mg/L); temperature: 13 °C
hardness (mg CaCO₃/L): 943; colour: yellow; odour: organic

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 15 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 9.1 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.167 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated March 31, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.50 (0.43-0.55) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.58 (0.49-0.67) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: ALS106
Reference: 16-0384-01-TRS

Test Log:

Date	Day	Time	Technician
2016/04/05	0	1430	EP
2016/04/06	1	0950	JN
2016/04/07	2	0900	DS
2016/04/08	3	0830	JW/KLO
2016/04/09	4	1340	JW/KLO

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	8.2	7.5
4	8.2	8.1

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	477	1895
4	453	1704

Dissolved Oxygen (mg/L)

0	9.1	9.1
4	9.0	9.1

Temperature (°C)

0	14	14
4	14	14

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: ALS106
Reference: 16-0384-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.0	0.3
2	2.8	0.2
3	2.9	0.3
4	3.1	0.3
5	2.7	0.2
6	2.8	0.2
7	3.0	0.3
8	2.7	0.2
9	3.0	0.3
10	2.8	0.2

Sample	Group Wet Weight (g)
control	2.5
100	3.0

average	2.9	0.3
sd	0.1	0.1
cv(%)	4.9	21.1

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: ALS106
Reference: 16-0384-01-DAS

Client: ALS Laboratory Group; operation Calgary

Sample: L1751568-3 LC_WTF_OUT_WS_04042016_N

Collection: collected on 2016/04/04 at not given by not given

Receipt: received on 2016/04/05 at 1325 by MC

Containers: received 2 x 20 L carboys/ 4 x 1 L bottles at 12 °C, in good condition with no seals and no

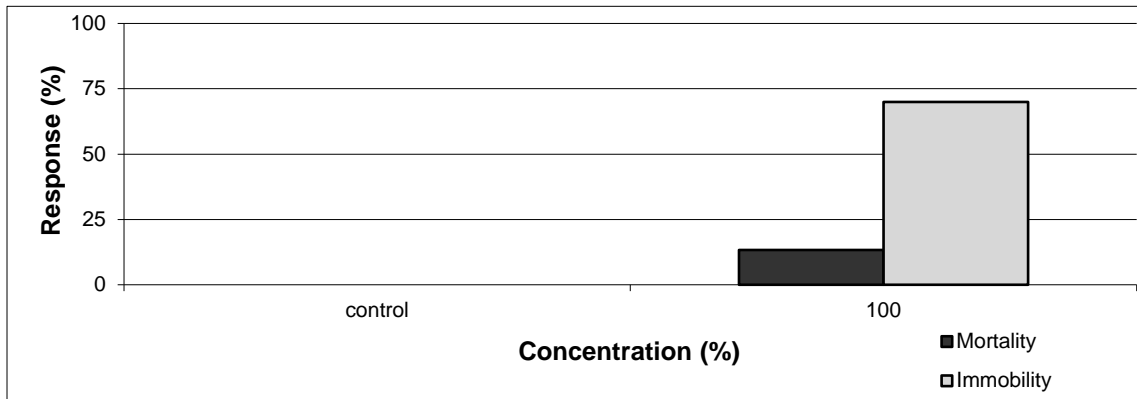
Description: type: water, collection method: not given

Test: started on 2016/04/05 ; ended on 2016/04/07

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	L1751568-3 LC_WTF_OUT_W S_04042016_N	13	70	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

**Test Conditions**

Client: ALS106 Reference: 16-0384-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition.

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
41 neonates per average brood

Sample initial chemistry: pH: 7.5; EC: 1829 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.5 (mg/L); temperature: 13 °C
hardness (mg CaCO_3/L): 943; colour: yellow; odour: organic

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must ≤ 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 96 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: ALS106 Reference: 16-0384-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated March 28, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.77 (0.75-0.79) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: ALS106
Reference: 16-0384-01-DAS

Test Log:

Date	Day	Time	Technician
2016/04/05	0	1500	JN/HS
2016/04/06	1	0945	DS/HS
2016/04/07	2	0915	HS

Chemistry:

Conc (%)	control			0		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.9	7.9	7.9	8.1	8.1	8.1
2	7.9	8.0	8.0	8.0	8.0	8.0

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	329	337	339	1688	1733	1762
2	294	321	321	1590	1543	1621

Day	Dissolved Oxygen (mg/L)					
0	8.0	8.0	8.0	7.8	7.8	7.8
2	8.0	8.0	8.1	8.0	8.1	8.0

Day	Temperature (°C)					
0	19	19	19	20	21	21
2	19	19	19	20	20	20

Biology:

Conc (%)	control			0		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10 (4D)	10 (4D)	10(5D,1I)
2	10	10	10	9 (6I,6D)	7 (6I,6D)	10 (5I, 5D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	10	30	0

Day	Immobility (%)					
2	0	0	0	70	90	50



Comments/Statistics

Client: ALS106 Reference: 16-0384-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None



Daphnia (Single Concentration) Test Report

Result Summary

Client: ALS106 Reference: 16-0384-01-DAS

Client: ALS Laboratory Group; operation Calgary

Sample: L1751568-3 LC_WTF_OUT_WS_04042016_N

Collection: collected on 2016/04/04 at not given by not given

Receipt: received on 2016/04/05 at 1325 by MC

Containers: received 2 x 20 L carboys/ 4 x 1 L bottles at 12 °C, in good condition with no seals and no

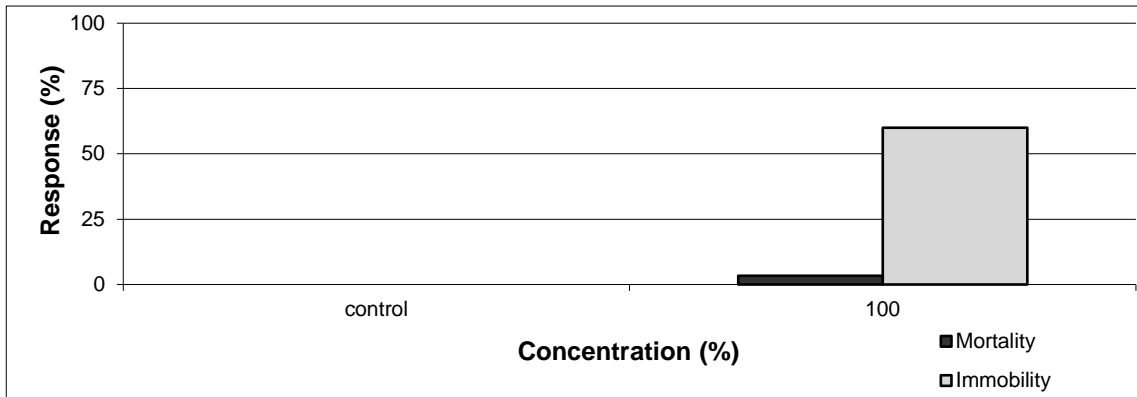
Description: type: water, collection method: not given

Test: started on 2016/04/05 ; ended on 2016/04/07

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	L1751568-3 LC_WTF_OUT_W S_04042016_N	3	60	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0384-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition.

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
41 neonates per average brood

Sample initial chemistry: pH: 7.5; EC: 1829 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.5 (mg/L); temperature: 13 °C
hardness (mg CaCO_3/L): 943; colour: yellow; odour: organic

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 96 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $10 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: ALS106 Reference: 16-0384-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated March 28, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.77 (0.75-0.79) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: ALS106
Reference: 16-0384-01-DAS

Test Log:

Date	Day	Time	Technician
2016/04/05	0	1500	JN/HS
2016/04/06	1	0945	DS/HS
2016/04/07	2	0915	HS

Chemistry:

Conc (%)	control			0		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	8.0	8.0	8.0	7.6	7.6	7.7
2	7.9	7.9	7.9	8.1	8.2	8.2

Day	Conductivity ($\mu\text{S/cm}$ @ 25°C)					
0	333	336	342	1710	1740	1760
2	317	326	329	1600	1641	1671

Day	Dissolved Oxygen (mg/L)					
0	9.8	9.8	9.8	9.5	9.5	9.6
2	9.8	9.8	9.7	9.3	9.3	9.4

Day	Temperature (°C)					
0	10	10	10	10	10	10
2	10	10	10	10	10	10

Biology:

Conc (%)	control			0		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10 (6D,4I)	10 (5D,4I)	10 (8D,9I)
2	10	10	10	9 (6D,6I)	10 (5I,5D)	10 (5D, 6I)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	10	0	0

Day	Immobility (%)					
2	0	0	0	70	50	60



***Daphnia* (Single Concentration) Test Report**

Comments/Statistics

Client: ALS106 Reference: 16-0384-01-DAS

Test Result Comments:

Immobile daphnids are clumped together in debris.

Data Analysis:

None

Protocol Deviations:

The test was run at 10 +/- 2°C as requested by the client.

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, H₂S 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 OR 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.



ATTN: Thomas Davidson
Teck
15 km North HWY 43
Sparwood, BC
Canada V0B 2G0

Received: 2016/04/12
Report Date: 2016/05/06
Version: FINAL

Test Report

Client: TEC164
Reference: 16-0420
Billing: PO: 430571

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



Trout (Single Concentration) Test Report

Result Summary

Client: TEC164
Reference: 16-0420-01-TRS

Client: Teck; operation SPO Operation

Sample: LC_WTF_OUT_WS_20160411_P

Collection: collected on 2016/04/11 at 0900 by not given

Receipt: received on 2016/04/12 at 0910 by MC

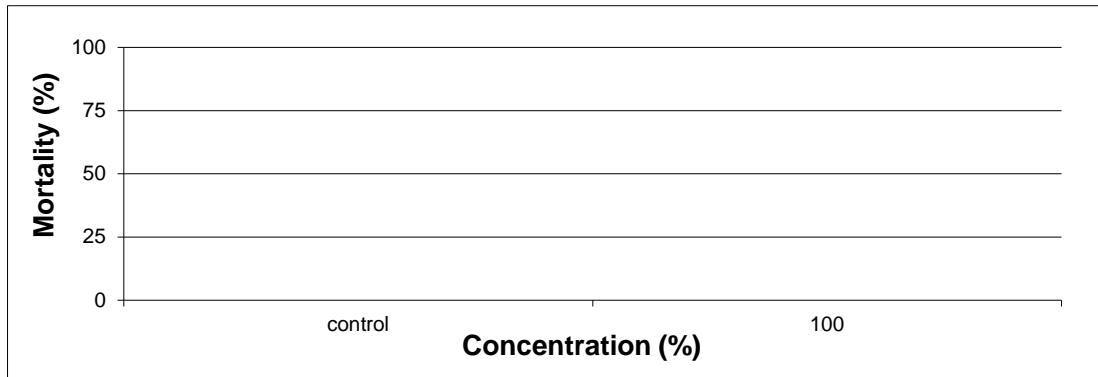
Containers: received 2 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/04/13 ; ended on 2016/04/17

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	LC_WTF_OUT_WS_20160411_P	0	none



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0420-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Sam Livingston (Batch 20160322TR)

Acclimation: 22 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.3; EC: 1690 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.8 (mg/L); temperature: 15 °C
hardness (mg CaCO₃/L): 681; colour: yellow; odour: odourless

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 9 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.18 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated April 12, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.54 (0.36-0.60) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.57 (0.46-0.68) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0420-01-TRS

Test Log:

Date	Day	Time	Technician
2016/04/13	0	1440	ML/CQ
2016/04/14	1	0800	EP
2016/04/15	2	1000	EP
2016/04/16	3	1200	ML/CQ
2016/04/17	4	1145	JN

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	8.4	7.7
4	8.2	8.1

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	431	1703
4	439	1704

Dissolved Oxygen (mg/L)

0	9.0	9.0
4	9.1	9.2

Temperature (°C)

0	14	14
4	14	14

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0420-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.9	0.4
2	3.7	0.3
3	3.6	0.3
4	3.8	0.4
5	4.0	0.5
6	3.9	0.3
7	4.2	0.5
8	3.6	0.3
9	3.7	0.3
10	3.4	0.3

Sample	Group Wet Weight (g)
control	3.6
100	3.8

average	3.8	0.4
sd	0.2	0.1
cv(%)	6.1	23.4

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient
of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-0420-01-DAS

Client: Teck; operation SPO Operation

Sample: LC_WTF_OUT_WS_20160411_P

Collection: collected on 2016/04/11 at 0900 by not given

Receipt: received on 2016/04/12 at 0910 by MC

Containers: received 2 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no

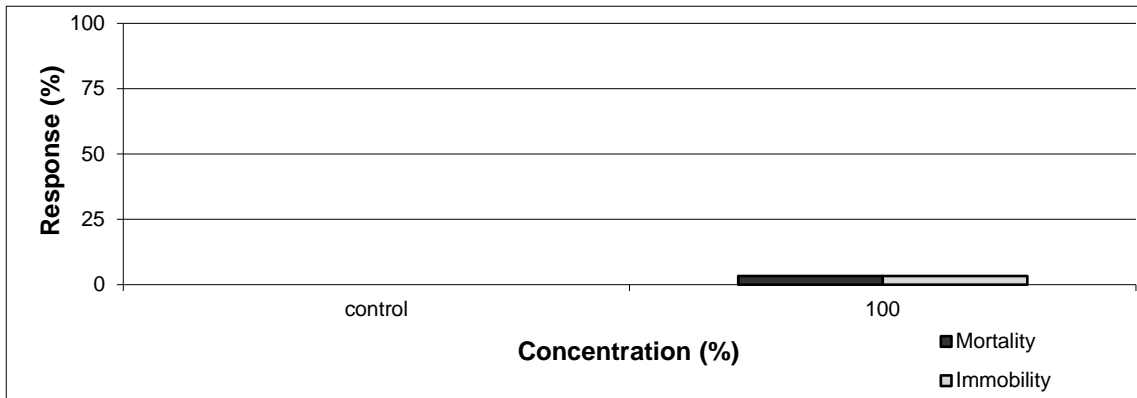
Description: type: water, collection method: grab

Test: started on 2016/04/12 ; ended on 2016/04/14

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	LC_WTF_OUT_W S_20160411_P	3	3	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0420-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
39 neonates per average brood

Sample initial chemistry: pH: 7.3; EC: 1690 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.8 (mg/L); temperature: 15 °C
hardness (mg CaCO_3/L): 681; colour: yellow; odour: odourless

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 82 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0420-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated April 14, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.74 (0.70-0.77) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.69-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0420-01-DAS

Test Log:

Date	Day	Time	Technician
2016/04/12	0	1530	HS/ML
2016/04/13	1	1000	JN
2016/04/14	2	1030	ML

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.9	7.9	7.9	7.3	7.3	7.3
2	8.2	8.0	8.0	8.1	8.0	8.1

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	320	322	325	1610	1636	1646
2	340	342	341	1623	1599	1671

Day	Dissolved Oxygen (mg/L)					
0	7.7	7.7	7.7	8.1	8.1	8.2
2	7.7	7.7	7.7	7.5	7.5	7.5

Day	Temperature (°C)					
0	20	20	20	19	19	19
2	20	20	20	21	21	21

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(5I, 5D)	10(4I, 4D)	10(6I, 6D)
2	10	10	10	9	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	10	0	0

Day	Immobility (%)					
2	0	0	0	10	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0420-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None



Result Summary

Client: TEC164
Reference: 16-0420-01-DAS

Client: Teck; operation SPO Operation

Sample: LC_WTF_OUT_WS_20160411_P

Collection: collected on 2016/04/11 at 0900 by not given

Receipt: received on 2016/04/12 at 0910 by MC

Containers: received 2 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no

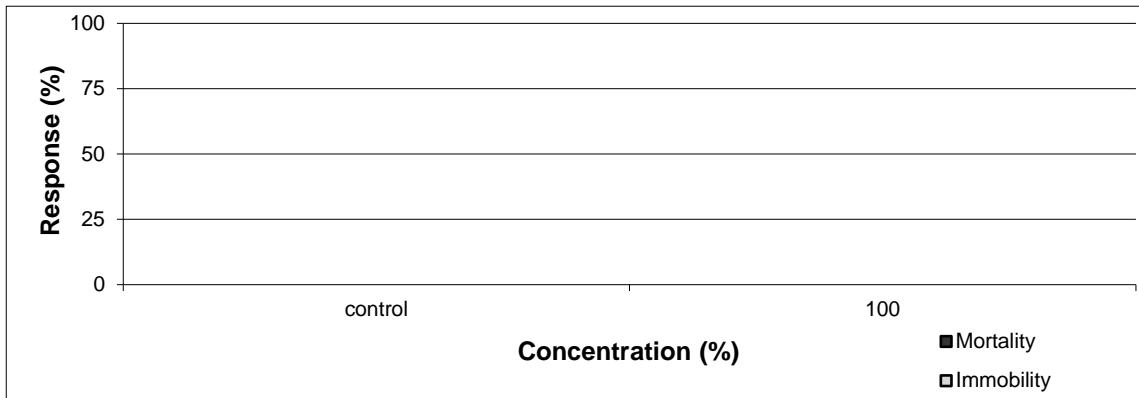
Description: type: water, collection method: grab

Test: started on 2016/04/12 ; ended on 2016/04/14

Result:

Sample	Client Code	Average		Comment
		Mortality (%)	Immobility (%)	
control	lab control	0	0	
100	LC_WTF_OUT_W S_20160411_P	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0420-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
39 neonates per average brood

Sample initial chemistry: pH: 7.3; EC: 1690 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.8 (mg/L); temperature: 15 °C
hardness (mg CaCO₃/L): 681; colour: yellow; odour: odourless

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 82 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 10 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0420-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated April 14, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.74 (0.70-0.77) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.69-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Test Data

Client: TEC164
Reference: 16-0420-01-DAS

Test Log:

Date	Day	Time	Technician
2016/04/12	0	1530	HS/ML
2016/04/13	1	1000	JN
2016/04/14	2	1030	ML

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.9	7.9	7.9	7.3	7.3	7.3
2	8.2	8.0	8.0	8.1	8.0	8.1

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	322	331	335	1645	1653	1659
2	353	359	365	1736	1763	1765

Day	Dissolved Oxygen (mg/L)					
0	7.9	7.9	8.0	8.4	8.4	8.5
2	8.6	8.8	8.9	9.0	9.0	9.0

Day	Temperature (°C)					
0	11	11	11	11	11	11
2	11	11	11	11	11	11

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(3D)	10(1D)	10(2D,1F)
2	10	10	10	10(5D)	10(3D)	10(4D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0420-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
The test temperature was 10 +/- 2°C as per the client request.

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, H₂S 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.



ATTN: Thomas Davidson
Teck
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/04/19
Report Date: 2016/05/05
Version: FINAL

Test Report

Client: TEC164
Reference: 16-0459
Billing: PO # 430571

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



Trout (Single Concentration) Test Report

Result Summary

Client: TEC164
Reference: 16-0459-01-TRS

Client: Teck; operation WLC

Sample: LC_WTF_OUT_WS_20160418_P

Collection: collected on 2016/04/18 at 1300 by not given

Receipt: received on 2016/04/19 at 1005 by MC

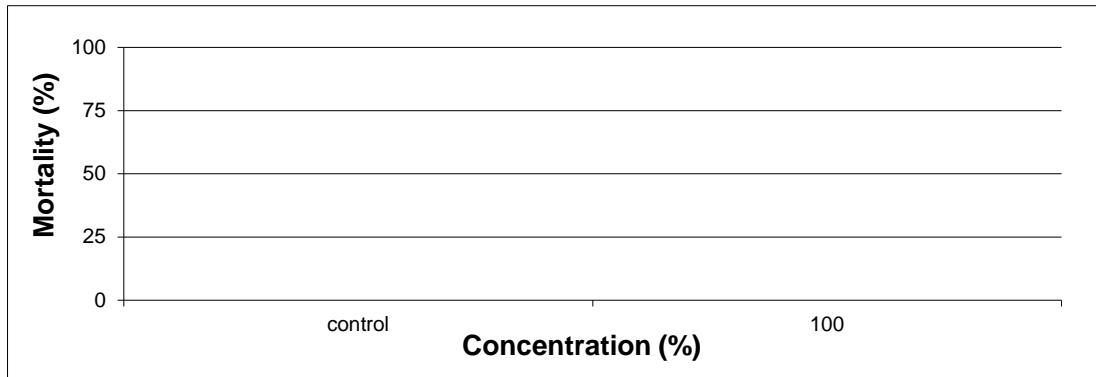
Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/04/20 ; ended on 2016/04/24

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	LC_WTF_OUT_WS_	0	none



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0459-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Sam Livingston Fish Hatchery (Batch 20160322TR)

Acclimation: 29 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.3; EC: 1741 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.9 (mg/L); temperature: 18 °C
hardness (mg CaCO₃/L): 913; colour: light yellow; odour: odourless

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 9.1 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.175 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated April 12, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.54 (0.36-0.60) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.57 (0.46-0.68) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume

Test Data

Client: TEC164
Reference: 16-0459-01-TRS

Test Log:

Date	Day	Time	Technician
2016/04/20	0	1500	EP/KLO
2016/04/21	1	1100	EP
2016/04/22	2	1200	EP
2016/04/23	3	0945	KLO
2016/04/24	4	0945	BH

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

pH (units)

0	8.0	7.7
4	8.1	8.2

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	389	1785
4	403	1717

Dissolved Oxygen (mg/L)

0	9.4	9.1
4	9.1	9.1

Temperature (°C)

0	14	14
4	14	14

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0459-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.0	0.4
2	3.0	0.3
3	3.4	0.4
4	3.1	0.3
5	3.3	0.4
6	3.2	0.3
7	3.1	0.4
8	3.2	0.3
9	3.5	0.3
10	3.0	0.4

Sample	Group Wet Weight (g)
control	3.5
100	3.6

average	3.2	0.4
sd	0.2	0.1
cv(%)	5.5	15.1

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient
of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-0459-01-DAS

Client: Teck; operation WLC

Sample: LC_WTF_OUT_WS_20160418_P

Collection: collected on 2016/04/18 at 1300 by not given

Receipt: received on 2016/04/19 at 1005 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no

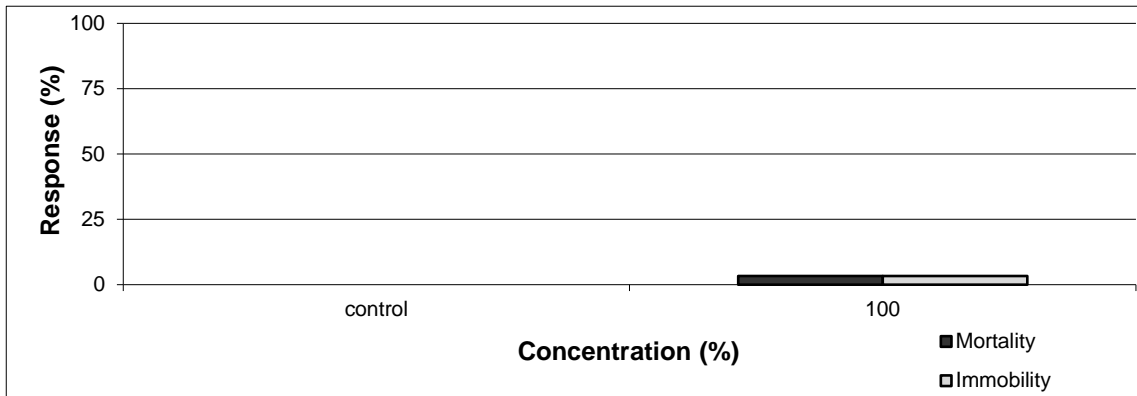
Description: type: water, collection method: grab

Test: started on 2016/04/19 ; ended on 2016/04/21

Result:

Sample	Client Code	Average		Comment
		Mortality (%)	Immortality (%)	
control	lab control	0	0	
100	LC_WTF_OUT_WS	3	3	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0459-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
27 neonates per average brood

Sample initial chemistry: pH: 7.3; EC: 1741 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.9 (mg/L); temperature: 18 °C
hardness (mg CaCO_3/L): 913; colour: light yellow; odour: odourless

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must ≤ 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 84 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 16-0459-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated April 14, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.74 (0.70-0.77) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.69-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Test Data

Client: TEC164
Reference: 16-0459-01-DAS

Test Log:

Date	Day	Time	Technician
2016/04/19	0	1430	HS
2016/04/20	1	0915	ML
2016/04/21	2	1035	ML

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.7	7.9	7.8	7.5	7.5	7.5
2	8.1	8.0	8.0	8.0	8.0	8.1

Day	Conductivity (µS/cm @ 25°C)					
0	325	349	357	1750	1760	1765
2	349	359	356	1700	1703	1711

Day	Dissolved Oxygen (mg/L)					
0	8.0	8.1	8.1	8.3	8.3	8.3
2	7.8	7.8	7.9	8.1	7.9	7.9

Day	Temperature (°C)					
0	18	18	18	18	18	18
2	21	21	21	20	20	20

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10 (1F)	10	10	10	10	10
2	10	10	10	10	9	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	10	0

Day	Immobility (%)					
2	0	0	0	0	10	0



Comments/Statistics

Client: TEC164 Reference: 16-0459-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None



Result Summary

Client: TEC164
Reference: 16-0459-01-DAS

Client: Teck; operation WLC

Sample: LC_WTF_OUT_WS_20160418_P

Collection: collected on 2016/04/18 at 1300 by not given

Receipt: received on 2016/04/19 at 1005 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no

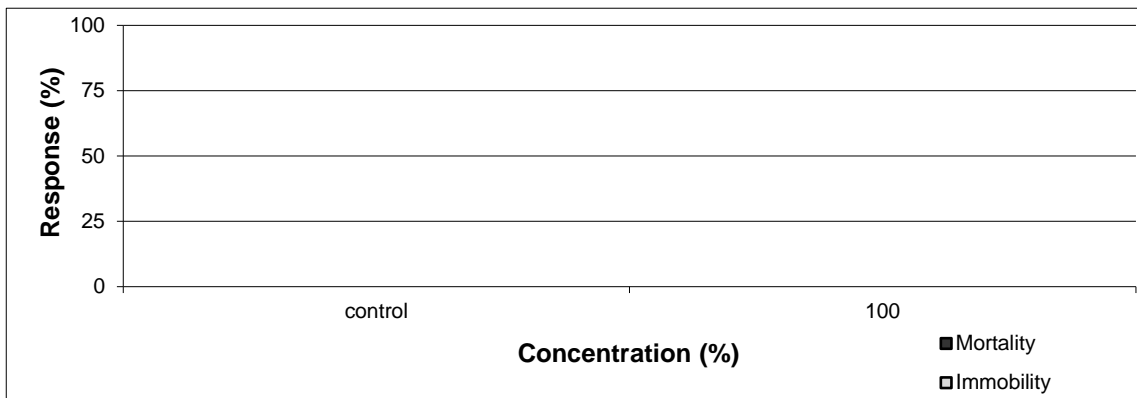
Description: type: water, collection method: grab

Test: started on 2016/04/19 ; ended on 2016/04/21

Result:

Sample	Client Code	Average		Comment
		Mortality (%)	Immobility (%)	
control	lab control	0	0	
100	LC_WTF_OUT_WS	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0459-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
27 neonates per average brood

Sample initial chemistry: pH: 7.3; EC: 1741 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.9 (mg/L); temperature: 18 °C
hardness (mg CaCO_3/L): 913; colour: light yellow; odour: odourless

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must ≤ 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 84 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $10 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0459-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated April 14, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.74 (0.70-0.77) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.69-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0459-01-DAS

Test Log:

Date	Day	Time	Technician
2016/04/19	0	1430	HS
2016/04/20	1	0915	ML
2016/04/21	2	1040	ML

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.6	7.7	7.7	7.4	7.5	7.5
2	7.9	7.9	7.9	8.2	8.2	8.2

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	347	353	360	1754	1779	1782
2	361	371	368	1848	1817	1831

Day	Dissolved Oxygen (mg/L)					
0	8.0	8.1	8.1	8.6	8.6	8.7
2	9.6	9.6	9.6	9.5	9.5	9.6

Day	Temperature (°C)					
0	11	11	11	11	11	11
2	11	11	11	11	11	11

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10 (1D)	10
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



***Daphnia* (Single Concentration) Test Report**

Comments/Statistics

Client: TEC164 Reference: 16-0459-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
The test temperature was 10 +/- 2^oC, as requested by the client

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, H₂S 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 OR 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.



ATTN: Thomas Davidson
Teck
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/04/26
Report Date: 2016/05/09
Version: FINAL

Test Report

Client: TEC164
Reference: 16-0483
Billing: PO 411634

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



Trout (Single Concentration) Test Report

Result Summary

Client: TEC164
Reference: 16-0483-01-TRS

Client: Teck; operation WLC AWTF

Sample: LC_WTF_OUT_WS_20160425_N

Collection: collected on 2016/04/25 at 0900 by not given

Receipt: received on 2016/04/26 at 0900 by MC

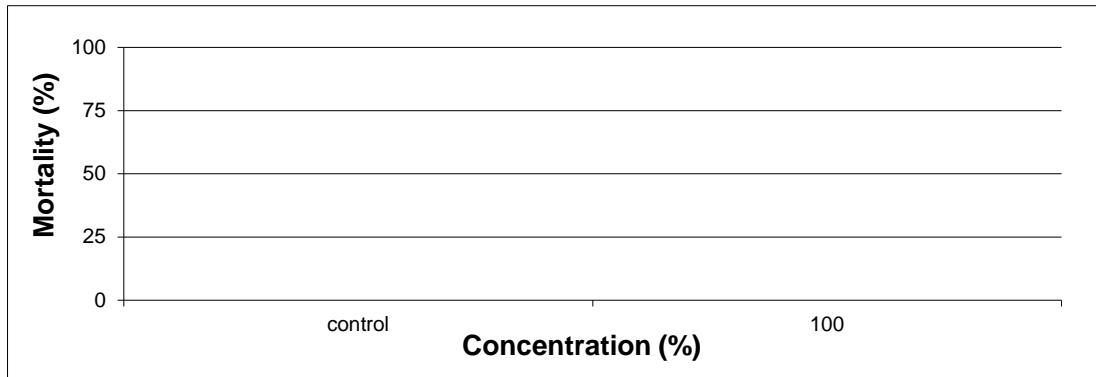
Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/04/27 ; ended on 2016/05/01

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	LC_WTF_OUT_WS_20160425_N	0	none



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0483-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160316TR)

Acclimation: 42 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.7; EC: 2150 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.4 (mg/L); temperature: 18 °C
hardness (mg CaCO₃/L): 895; colour: colourless; odour: odourless

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 9.1 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.17 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated March 31, 2016; current results (96-h LC50 and 95% confidence limits) = 0.50 (0.43-0.55) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.58 (0.49-0.67) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0483-01-TRS

Test Log:

Date	Day	Time	Technician
2016/04/27	0	1445	JW/KLO
2016/04/28	1	1215	BH
2016/04/29	2	1015	BH
2016/04/30	3	1215	EP
2016/05/01	4	1020	BH/JW

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	8.1	8.0
4	8.2	8.2

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	416	2100
4	434	1985

Dissolved Oxygen (mg/L)

0	9.1	9.1
4	8.9	9.0

Temperature (°C)

0	14	14
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0483-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.1	0.3
2	3.4	0.4
3	2.9	0.2
4	3.1	0.4
5	3.0	0.3
6	3.0	0.3
7	3.0	0.4
8	2.9	0.3
9	3.0	0.4
10	3.3	0.4

Sample	Group Wet Weight (g)
control	3.4
100	3.5

average	3.1	0.3
sd	0.2	0.1
cv(%)	5.3	20.6

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-0483-01-DAS

Client: Teck; operation WLC AWTF

Sample: LC_WTF_OUT_WS_20160425_N

Collection: collected on 2016/04/25 at 0900 by not given

Receipt: received on 2016/04/26 at 0900 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no

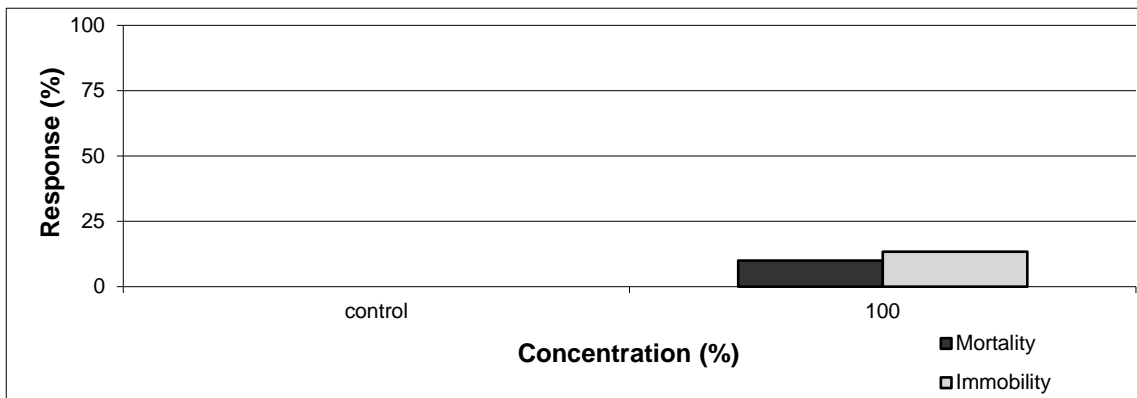
Description: type: water, collection method: grab

Test: started on 2016/04/27 ; ended on 2016/04/29

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	LC_WTF_OUT_W S_20160425_N	10	13	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0483-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
16 neonates per average brood

Sample initial chemistry: pH: 7.7; EC: 2150 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.4 (mg/L); temperature: 18 °C
hardness (mg CaCO_3/L): 895; colour: colourless; odour: odourless

Sample holding time: 2 days (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: The tests were conducted in 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 83 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 16-0483-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated April 25, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.70 (0.63-0.77) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.69-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0483-01-DAS

Test Log:

Date	Day	Time	Technician
2016/04/27	0	1505	JN/EP
2016/04/28	1	1115	EP
2016/04/29	2	1000	JW

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.9	7.9	7.9	7.8	7.9	7.9
2	8.0	8.0	8.0	8.0	8.0	7.9

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	307	311	308	1888	1933	1935
2	313	319	333	1792	1877	1849

Day	Dissolved Oxygen (mg/L)					
0	7.5	7.7	7.7	7.8	8.0	8.0
2	7.6	7.7	7.7	7.9	7.9	7.9

Day	Temperature (°C)					
0	20	20	21	21	20	20
2	20	20	20	20	21	21

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(1I)	10	10
2	10	10	10	8(2D)	9(1I,3D)	10(2D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	20	10	0

Day	Immobility (%)					
2	0	0	0	20	20	0



Comments/Statistics

Client: TEC164 Reference: 16-0483-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None



Result Summary

Client: TEC164
Reference: 16-0483-01-DAS

Client: Teck; operation WLC AWTF

Sample: LC_WTF_OUT_WS_20160425_N

Collection: collected on 2016/04/25 at 0900 by not given

Receipt: received on 2016/04/26 at 0900 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no

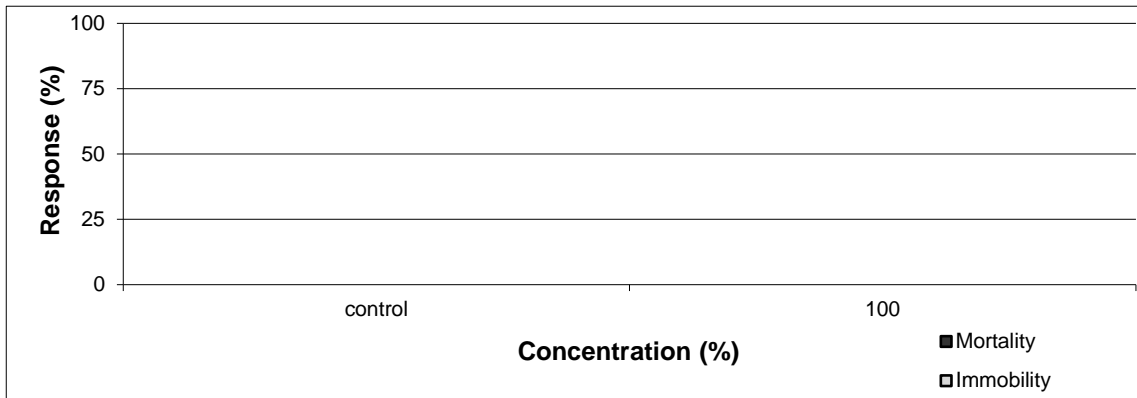
Description: type: water, collection method: grab

Test: started on 2016/04/27 ; ended on 2016/04/29

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	LC_WTF_OUT_WS	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

**Test Conditions**

Client: TEC164 Reference: 16-0483-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
16 neonates per average brood

Sample initial chemistry: pH: 7.7; EC: 2150 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.4 (mg/L); temperature: 18 °C
hardness (mg CaCO_3/L): 895; colour: colourless; odour: odourless

Sample holding time: 2 days (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: The tests were conducted in 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 83 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $10 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0483-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated April 25, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.70 (0.63-0.77) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.69-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0483-01-DAS

Test Log:

Date	Day	Time	Technician
2016/04/27	0	1510	JN/EP
2016/04/28	1	1115	EP
2016/04/29	2	0950	JW

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.8	7.9	7.9	7.7	7.7	7.7
2	7.9	7.9	7.9	8.2	8.2	8.3

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	308	317	319	1951	1948	1971
2	314	320	324	1807	1926	1968

Day	Dissolved Oxygen (mg/L)					
0	8.4	8.4	8.5	8.8	8.8	8.9
2	9.0	8.8	9.0	9.1	9.1	9.2

Day	Temperature (°C)					
0	10	10	10	10	10	10
2	13	14	13	13	14	14

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0483-01-DAS

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

The test temperature was 10 +/- 2°C, as requested by the client. Test temperature at test completion was higher due to solutions being out of 10 degree chamber prior to takedown. Test chamber temperature was set to 10 +/- 2°C

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, H₂S 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.



ATTN: Thomas Davidson
Teck
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/05/03
Report Date: 2016/05/12
Version: FINAL

Test Report

Client: TEC164
Reference: 16-0518
Billing: PO: 411634

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



Trout (Single Concentration) Test Report

Result Summary

Client: TEC164
Reference: 16-0518-01-TRS

Client: Teck; operation WLC AWTF

Sample: LC_WTF_OUT_WS_20160502_N

Collection: collected on 2016/05/02 at 0900 by not given

Receipt: received on 2016/05/03 at 1130 by MC

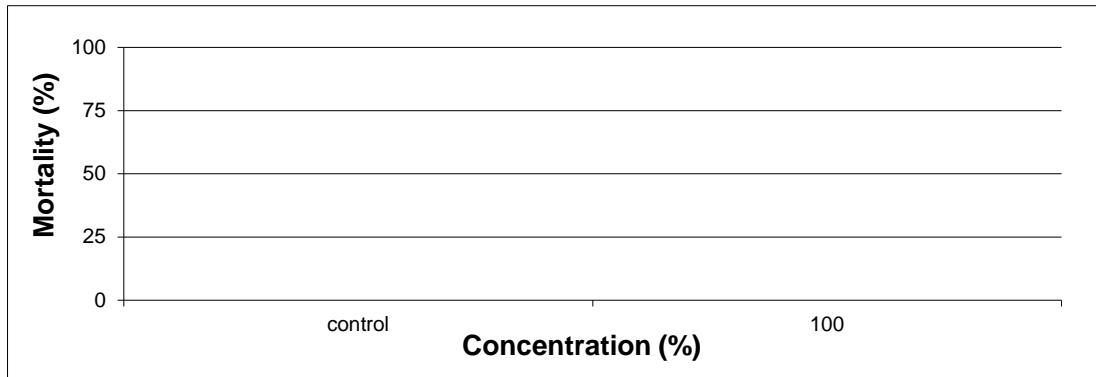
Containers: received 4 x 20 L carboys / 4 x 1 L bottle at 13 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/05/04 ; ended on 2016/05/08

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	LC_WTF_OUT_WS _20160502_N	0	none



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0518-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160316TR)

Acclimation: 49 days (must be ≥ 2 weeks)

Stock mortality: 0.2% (seven days preceding testing)

Sample initial chemistry: pH: 7.4; EC: 1755 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.5 (mg/L); temperature: 17 °C
hardness (mg CaCO₃/L): 804; colour: colourless; odour: odourless

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 9 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.215 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated April 27, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.43 (0.34-0.51) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.56 (0.46-0.37) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0518-01-TRS

Test Log:

Date	Day	Time	Technician
2016/05/04	0	1000	EP/JN
2016/05/05	1	0820	CB/KLO
2016/05/06	2	0940	BH
2016/05/07	3	0930	KLO
2016/05/08	4	1050	BH/JW

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	7.9	7.6
4	8.2	8.1

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	443	1815
4	459	1664

Dissolved Oxygen (mg/L)

0	9.0	9.0
4	8.6	8.7

Temperature (°C)

0	15	15
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0518-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.2	0.4
2	3.7	0.7
3	3.1	0.4
4	3.4	0.5
5	3.2	0.4
6	2.9	0.3
7	3.2	0.4
8	3.1	0.3
9	3.3	0.5
10	3.3	0.4

Sample	Group Wet Weight (g)
control	4.3
100	3.4

average	3.2	0.4
sd	0.2	0.1
cv(%)	6.5	27.0

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Comments/Statistics

Test Result Comments:

The result of the reference toxicant test initiated on 2016/04/27 was outside the warning limit. This is expected to happen 5% of the time. An investigation occurred and all testing and culturing procedures were followed appropriately.

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-0518-01-DAS

Client: Teck; operation WLC AWTF

Sample: LC_WTF_OUT_WS_20160502_N

Collection: collected on 2016/05/02 at 0900 by not given

Receipt: received on 2016/05/03 at 1130 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottle at 13 °C, in good condition with no seals and no

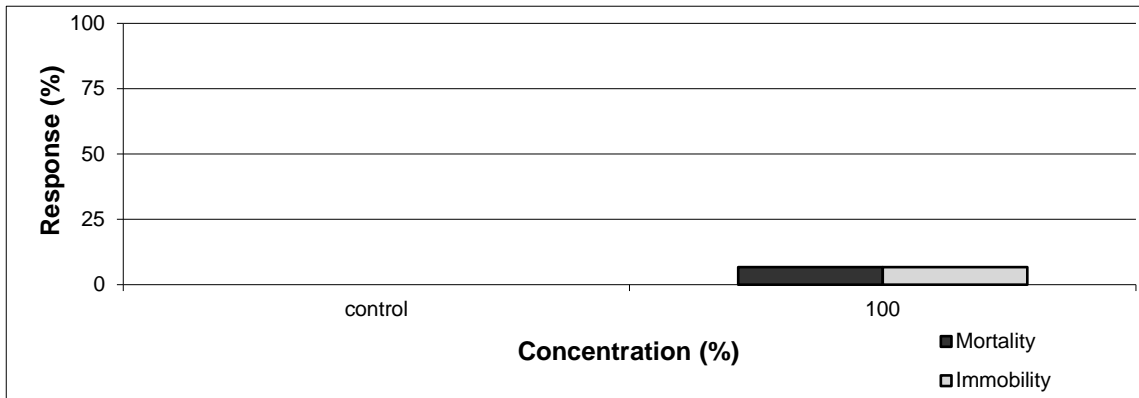
Description: type: water, collection method: grab

Test: started on 2016/05/04 ; ended on 2016/05/06

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	LC_WTF_OUT_W S_20160502_N	7	7	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0518-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
16 neonates per average brood

Sample initial chemistry: pH: 7.4; EC: 1755 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.5 (mg/L); temperature: 17 °C
hardness (mg CaCO_3/L): 804; colour: colourless; odour: odourless

Sample holding time: 2 days (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 86mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0518-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated April 25, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.70 (0.63-0.77) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.69-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0518-01-DAS

Test Log:

Date	Day	Time	Technician
2016/05/04	0	1550	JW/EP
2016/05/05	1	1000	HS
2016/05/06	2	0930	JW/KLO

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.8	7.9	7.9	7.6	7.6	7.6
2	7.8	8.0	8.0	8.0	8.0	8.0

Day	Conductivity ($\mu\text{S/cm}$ @ 25°C)					
0	301	321	324	1795	1837	1847
2	302	325	327	1655	1737	1749

Day	Dissolved Oxygen (mg/L)					
0	8.0	8.0	8.0	8.2	8.2	8.2
2	7.9	7.9	7.9	7.5	7.7	7.7

Day	Temperature (°C)					
0	19	19	19	19	19	19
2	20	20	20	20	20	20

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(5D)	10(5D)	10(4D)
2	10	10	10	10(1D)	8(3D)	10(3D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	20	0

Day	Immobility (%)					
2	0	0	0	0	20	0



Comments/Statistics

Client: TEC164 Reference: 16-0518-01-DAS

Test Result Comments:

Daphnids clumped together in debris on day 1, could not free from debris on day 2 takedown

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-0518-01-DAS

Client: Teck; operation WLC AWTF

Sample: LC_WTF_OUT_WS_20160502_N

Collection: collected on 2016/05/02 at 0900 by not given

Receipt: received on 2016/05/03 at 1130 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottle at 13 °C, in good condition with no seals and no

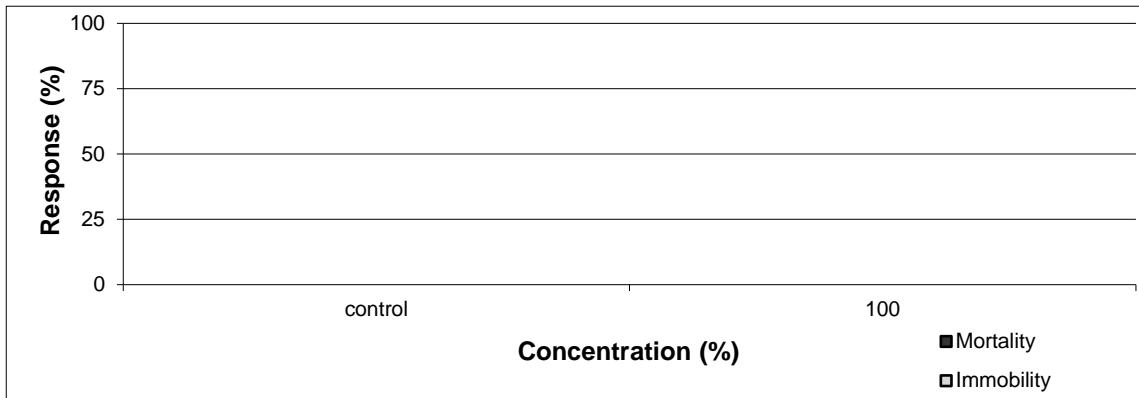
Description: type: water, collection method: grab

Test: started on 2016/05/04 ; ended on 2016/05/06

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	LC_WTF_OUT_W S_20160502_N	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0518-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
16 neonates per average brood

Sample initial chemistry: pH: 7.4; EC: 1755 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.5 (mg/L); temperature: 17 °C
hardness (mg CaCO₃/L): 804; colour: colourless; odour: odourless

Sample holding time: 2 days (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 86 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 10 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0518-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated April 25, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.70 (0.63-0.77) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.69-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0518-01-DAS

Test Log:

Date	Day	Time	Technician
2016/05/04	0	1550	JW/EP
2016/05/05	1	1000	HS
2016/05/06	2	0930	JW/KLO

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	8.0	8.0	8.0	7.6	7.6	7.6
2	7.8	7.9	7.9	8.2	8.2	8.2

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	307	328	330	1758	1872	1890
2	313	328	330	1779	1819	1823

Day	Dissolved Oxygen (mg/L)					
0	7.7	7.8	7.8	7.7	7.8	7.9
2	8.9	8.8	8.9	8.9	8.8	8.8

Day	Temperature (°C)					
0	12	12	12	12	12	12
2	12	12	12	12	12	12

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(10D,10I)	10(10D,10I)	10(10D,10I)
2	10	10	10	10	10(3D)	10(3D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0518-01-DAS

Test Result Comments:

Day 1: Daphnids clumped together in debris; immobile because they are clumped
Day 2: Tried to unclump, some DA still stuck in debris

Data Analysis:

None

Protocol Deviations:

The test temperature was 10 +/- 2^oC, as requested by the client

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, H₂S 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.



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/05/10
Report Date: 2016/05/19
Version: FINAL

Test Report

Client: TEC164
Reference: 16-0559
Billing: PO # 430571

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

Result Summary

Client: TEC164
Reference: 16-0559-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: LC_BFWB_OUT_SP21_20160502_N

Collection: collected on 2016/05/09 at 0900 by not given

Receipt: received on 2016/05/10 at 1120 by MC

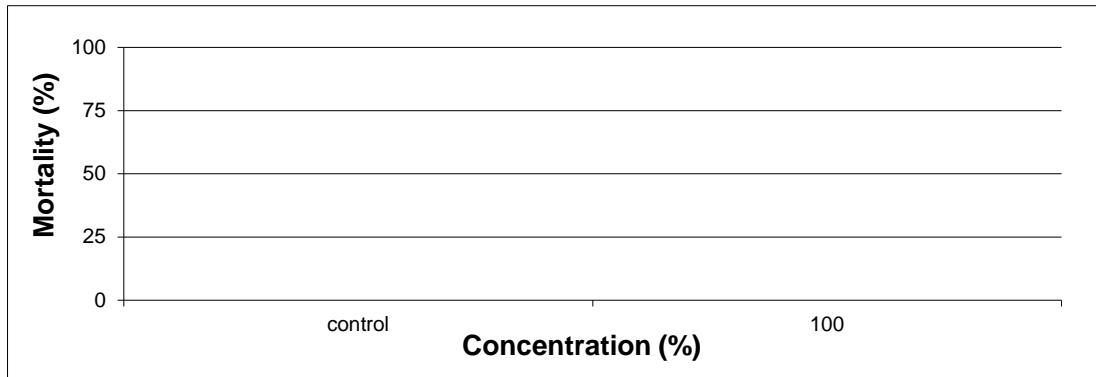
Containers: received 4 x 20 L carboys / 4 x 1 L bottle at 12 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/05/10 ; ended on 2016/05/15

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	LC_BFWB_OUT_S P21_20160502_N	0	none



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0559-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160413TR)

Acclimation: 28 days (must be ≥ 2 weeks)

Stock mortality: 0.41% (seven days preceding testing)

Sample initial chemistry: pH: 6.8; EC: 1572 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.4 (mg/L); temperature: 17 °C
hardness (mg CaCO₃/L): 601; colour: colourless; odour: odourless

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 9.1 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.16 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated April 28, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.45 (0.36-0.51) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.55 (0.43-0.68) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0559-01-TRS

Test Log:

Date	Day	Time	Technician
2016/05/10	0	1045	EP/KLO
2016/05/11	1	0920	CB
2016/05/12	2	0845	CB
2016/05/13	3	1010	KLO
2016/05/14	4	1125	KLO/JW

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	8.1	7.7
4	8.2	8.2

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	460	1708
4	462	1393

Dissolved Oxygen (mg/L)

0	9.1	9.1
4	8.7	8.7

Temperature (°C)

0	14	14
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0559-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	2.9	0.3
2	2.9	0.2
3	3.2	0.3
4	3.0	0.3
5	3.3	0.4
6	3.1	0.4
7	3.0	0.3
8	3.2	0.4
9	3.1	0.3
10	3.0	0.3

Sample	Group Wet Weight (g)
control	3.2
100	2.8

average	3.1	0.3
sd	0.1	0.1
cv(%)	4.4	19.8

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-0559-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: LC_BFWB_OUT_SP21_20160502_N

Collection: collected on 2016/05/09 at 0900 by not given

Receipt: received on 2016/05/10 at 1120 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottle at 12 °C, in good condition with no seals and no

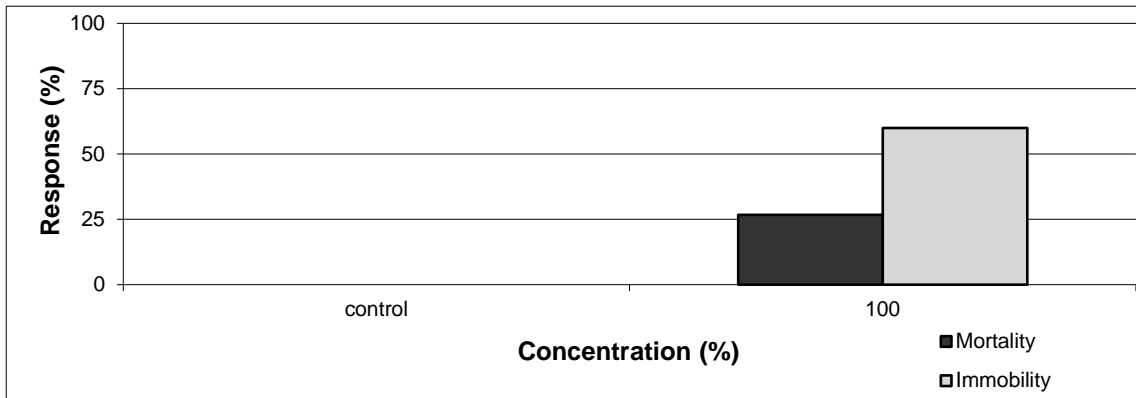
Description: type: water, collection method: grab

Test: started on 2016/05/10 ; ended on 2016/05/12

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	LC_BFWB_OUT_SP21_20160502_	27	60	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0559-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
21 neonates per average brood

Sample initial chemistry: pH: 6.8; EC: 1572 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.4 (mg/L); temperature: 17 °C
hardness (mg CaCO₃/L): 601; colour: colourless; odour: odourless

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 88 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 20 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 16-0559-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated May 10, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.75 (0.63-0.78) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0559-01-DAS

Test Log:

Date	Day	Time	Technician
2016/05/10	0	1415	HS/CB
2016/05/11	1	0925	ML/CB
2016/05/12	2	0900	EP/JW

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.8	7.8	7.8	7.4	7.4	7.4
2	7.9	8.0	7.9	8.0	8.0	8.0

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	331	337	341	1551	1549	1575
2	334	352	361	1539	1549	1591

Day	Dissolved Oxygen (mg/L)					
0	7.8	7.8	7.8	8.0	8.0	8.1
2	7.8	7.8	7.8	7.8	7.8	7.8

Day	Temperature (°C)					
0	21	21	21	20	20	20
2	20	20	21	21	21	21

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(8I,5F,4D)	10(9I,5D,2F)	10(8I,5D)
2	10	10	10	8(3I,7D)	7(2I,6D)	7(5I,7D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	20	30	30

Day	Immobility (%)					
2	0	0	0	50	50	80



Comments/Statistics

Client: TEC164 Reference: 16-0559-01-DAS

Test Result Comments:

Day 1 100% sample observed to have air bubbles throughout.
Day 2 100% all immobility due to debris.

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-0559-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: LC_BFWB_OUT_SP21_20160502_N

Collection: collected on 2016/05/09 at 0900 by not given

Receipt: received on 2016/05/10 at 1120 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottle at 12 °C, in good condition with no seals and no

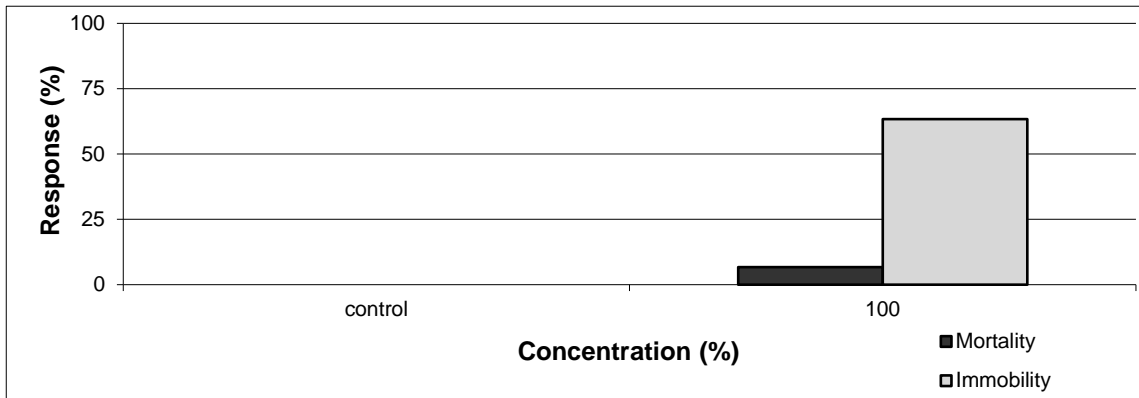
Description: type: water, collection method: grab

Test: started on 2016/05/10 ; ended on 2016/05/12

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	LC_BFWB_OUT_SP21_20160502_	7	63	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0559-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
21 neonates per average brood

Sample initial chemistry: pH: 6.8; EC: 1572 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.4 (mg/L); temperature: 17 °C
hardness (mg CaCO_3/L): 601; colour: colourless; odour: odourless

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 385 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 88 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $10 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0559-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated May 10, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.75 (0.63-0.78) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Test Data

Client: TEC164
Reference: 16-0559-01-DAS

Test Log:

Date	Day	Time	Technician
2016/05/10	0	1430	HS/CB
2016/05/11	1	0935	ML/CB
2016/05/12	2	0945	EP/JW

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.8	7.9	7.9	7.4	7.4	7.4
2	7.8	7.8	7.9	8.1	8.2	8.2

Day	Conductivity (µS/cm @ 25°C)					
0	342	353	353	1603	1635	1647
2	383	381	374	1641	1656	1673

Day	Dissolved Oxygen (mg/L)					
0	8.5	8.4	8.4	8.9	8.9	8.9
2	9.5	9.5	9.4	9.5	9.5	9.4

Day	Temperature (°C)					
0	10	10	11	11	11	11
2	11	11	11	12	11	12

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(8I,10D)	10(7I,4D)	10(5I,6D)
2	10	10	10	9(6I,6D)	10(4I,9D)	9(7I,9D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	10	0	10

Day	Immobility (%)					
2	0	0	0	70	40	80



***Daphnia* (Single Concentration) Test Report**

Comments/Statistics

Client: TEC164 Reference: 16-0559-01-DAS

Test Result Comments:

Clumping in 100%. Some immobile daphnids in 100A and 100B were covered in debris.

Data Analysis:

None

Protocol Deviations:

The test temperature was 10 +/- 2°C as per the client request.

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, H₂S 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 OR 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.



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/05/17
Report Date: 6/2/2016
Version: FINAL

Test Report

Client: TEC164
Reference: 16-0582
Billing: PO # 411634

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



Trout (Single Concentration) Test Report

Result Summary

Client: TEC164
Reference: 16-0582-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160516_N

Collection: collected on 2016/05/16 at 0900 by not given

Receipt: received on 2016/05/17 at 1135 by MC

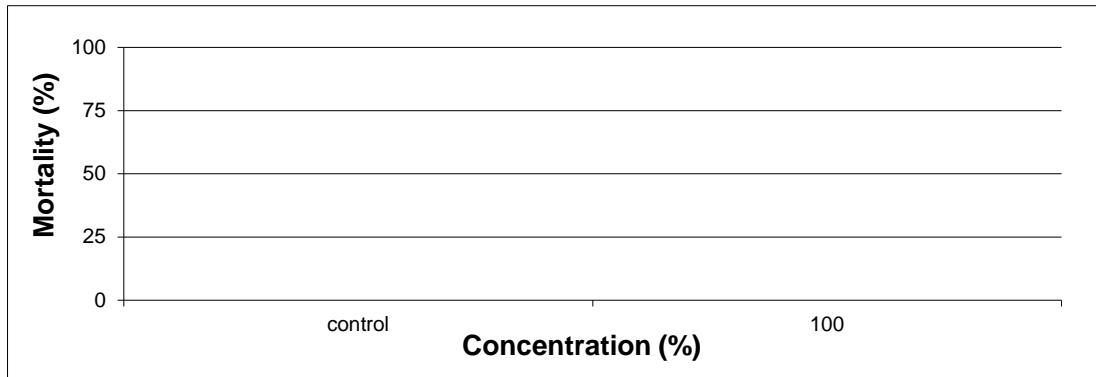
Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/05/18 ; ended on 2016/05/22

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	WL_BFWB_OUT_S P21_20160516_N	0	none



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0582-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160413TR)

Acclimation: 35 days (must be \geq 2 weeks)

Stock mortality: 0.85% (seven days preceding testing)

Sample initial chemistry: pH: 6.9; EC: 1746 (μ S/cm @ 25°C); DO: 8.1 (mg/L); temperature: 16 °C
hardness (mg CaCO₃/L): 740; colour: colourless; odour: -

Sample holding time: 2 days (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel \geq 15cm)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 8.8 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.185 g/Litre (must be \leq 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must \geq 90%)

The control had 0 percent (%) stressed behaviour (must \leq 10%)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated April 28, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.45 (0.36-0.51) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.55 (0.43-0.68) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0582-01-TRS

Test Log:

Date	Day	Time	Technician
2016/05/18	0	0930	CB/BH
2016/05/19	1	0800	BH
2016/05/20	2	0930	CB/BH
2016/05/21	3	1130	BH
2016/05/22	4	1000	JW

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	7.6	7.4
4	8.0	8.0

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	454	1594
4	456	1515

Dissolved Oxygen (mg/L)

0	8.6	8.8
4	8.3	8.5

Temperature (°C)

0	14	15
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0582-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.2	0.4
2	3.4	0.4
3	3.6	0.5
4	2.6	0.2
5	3.0	0.3
6	3.4	0.5
7	3.2	0.4
8	3.2	0.3
9	3.3	0.4
10	3.1	0.3

Sample	Group Wet Weight (g)
control	3.7
100	4.4

average	3.2	0.4
sd	0.3	0.1
cv(%)	8.5	25.6

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: TEC164 Reference: 16-0582-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160516_N

Collection: collected on 2016/05/16 at 0900 by not given

Receipt: received on 2016/05/17 at 1135 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no

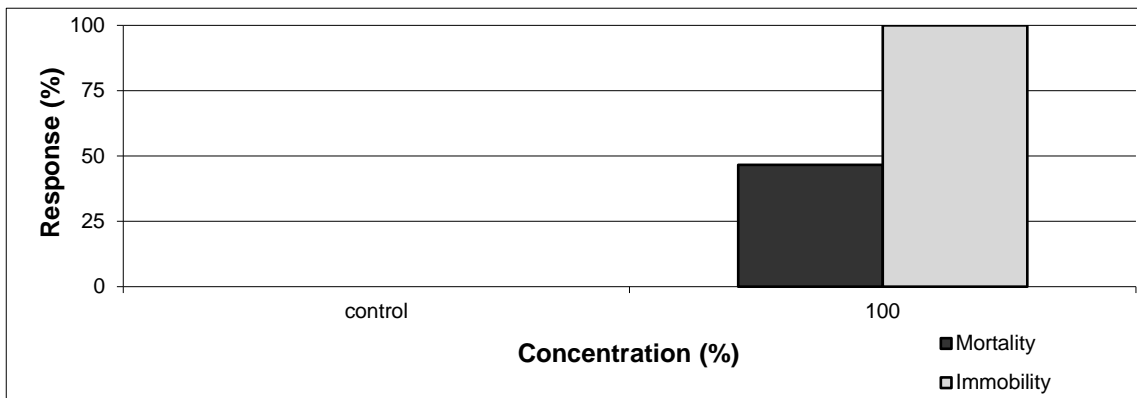
Description: type: water, collection method: grab

Test: started on 2016/05/19 ; ended on 2016/05/21

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160516_	47	100	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0582-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
17.8 neonates per average brood

Sample initial chemistry: pH: 6.9; EC: 1746 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.1 (mg/L); temperature: 16 °C
hardness (mg CaCO₃/L): 740; colour: colourless; odour: -

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 88 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 20 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0582-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated May 10, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.75 (0.63-0.78) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0582-01-DAS

Test Log:

Date	Day	Time	Technician
2016/05/17	0	1445	JW/BH
2016/05/18	1	1140	JW/BH
2016/05/19	2	0840	JW/BH

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.7	7.7	7.8	7.9	8.0	8.0
2	7.9	8.0	8.0	8.1	8.1	8.1

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	318	339	344	1683	1652	1660
2	338	357	351	1573	1586	1588

Day	Dissolved Oxygen (mg/L)					
0	8.1	8.0	8.0	8.0	8.1	8.1
2	8.0	8.0	8.0	7.6	7.7	7.5

Day	Temperature (°C)					
0	19	19	20	19	19	19
2	19	19	19	19	19	19

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(10D,5I)	10(10D,10I)	10(10D,7I)
2	10	10	10	10(10D,10I)	2(2D,2I)	4(4D,4I)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	80	60

Day	Immobility (%)					
2	0	0	0	100	100	100



Comments/Statistics

Client: TEC164 Reference: 16-0582-01-DAS

Test Result Comments:

100% concentration contained debris, nearly all daphnia were found in large clump.

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-0582-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160516_N

Collection: collected on 2016/05/16 at 0900 by not given

Receipt: received on 2016/05/17 at 1135 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no

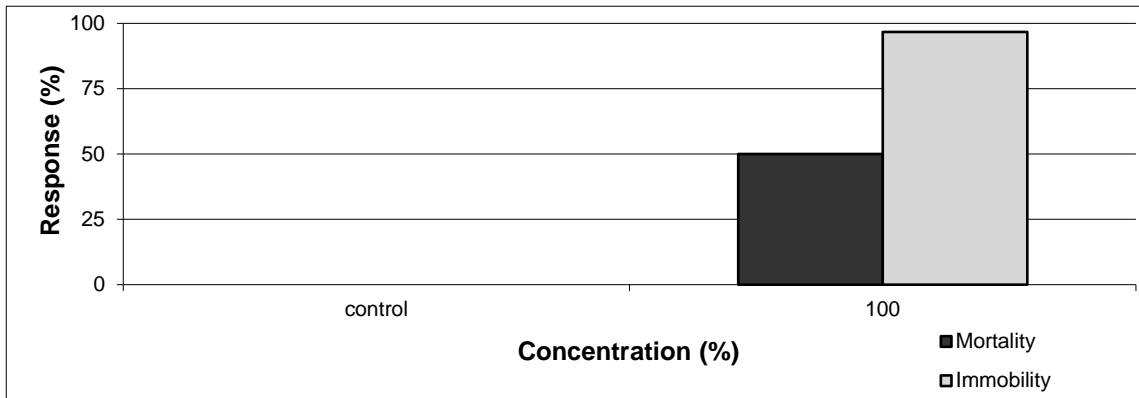
Description: type: water, collection method: grab

Test: started on 2016/05/19 ; ended on 2016/05/21

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160516_	50	97	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0582-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
17 neonates per average brood

Sample initial chemistry: pH: 6.9; EC: 1746 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.1 (mg/L); temperature: 16 °C
hardness (mg CaCO₃/L): 740; colour: colourless; odour: -

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 88 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 10 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0582-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated May 10, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.75 (0.63-0.78) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0582-01-DAS

Test Log:

Date	Day	Time	Technician
2016/05/17	0	1440	JW/BH
2016/05/18	1	1140	JW/BH
2016/05/19	2	0900	JW/BH

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.9	7.9	7.8	7.3	7.3	7.3
2	7.7	7.7	7.7	8.0	8.1	8.1

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	324	343	348	1646	1697	1708
2	344	358	358	1658	1705	1724

Day	Dissolved Oxygen (mg/L)					
0	8.9	9.0	8.9	8.9	8.9	9.0
2	9.6	8.9	9.3	9.6	9.5	9.3

Day	Temperature (°C)					
0	12	12	12	11	11	11
2	11	12	11	12	12	12

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	0(1F,9D,10)	10(10D,10I)	10(10D,10I)
2	10	10	10	4(3I)	6(6I,6D)	5(5I,5D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	60	40	50

Day	Immobility (%)					
2	0	0	0	90	100	100



Comments/Statistics

Client: TEC164 Reference: 16-0582-01-DAS

Test Result Comments:

Day 1 - Daphnids in 100B+C all stuck in one together, all 100 concentration were immobile.
Day 2 - 100% Daphnia caught together in debris

Data Analysis:

None

Protocol Deviations:

The test was run at $10 \pm 2^{\circ}\text{C}$, as requested by the client.



Result Summary

Client: TEC164
Reference: 16-0582-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160516_N

Collection: collected on 2016/05/16 at 0900 by not given

Receipt: received on 2016/05/17 at 1135 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no

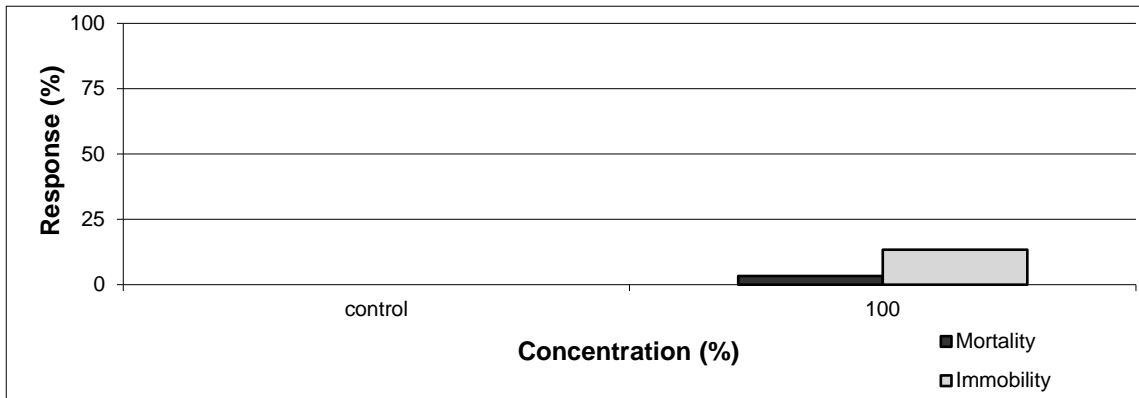
Description: type: water, collection method: grab

Test: started on 2016/05/19 ; ended on 2016/05/21

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160516_	3	13	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0582-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
20 neonates per average brood

Sample initial chemistry: pH: 6.9; EC: 1746 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.1 (mg/L); temperature: 16 °C
hardness (mg CaCO_3/L): 740; colour: colourless; odour: -

Sample holding time: 3 days (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 98 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0582-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated May 10, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.75 (0.63-0.78) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0582-01-DAS

Test Log:

Date	Day	Time	Technician
2016/05/19	0	1600	EP/JW
2016/05/20	1	0940	JN
2016/05/21	2	1030	JN

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.9	7.9	7.9	8.0	8.0	8.0
2	8.1	8.0	8.0	8.0	8.0	8.1

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	327	346	351	1530	1636	1651
2	354	369	370	1572	1605	1616

Day	Dissolved Oxygen (mg/L)					
0	8.1	8.2	8.2	8.2	8.2	8.2
2	7.7	7.6	7.8	7.7	7.7	7.2

Day	Temperature (°C)					
0	19	19	19	19	19	19
2	20	20	20	20	20	20

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10(10F)	10	10	10(2F)	10(2D,1I)	10
2	10(10F)	10	10	10(1I,8D)	9(4F,8D,1I)	10(1I,1D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	10	0

Day	Immobility (%)					
2	0	0	0	10	20	10



Comments/Statistics

Client: TEC164 Reference: 16-0582-01-DAS

Test Result Comments:

Day 1 - Debris looks like small thread attached to back of some daphnids

Day 2 - Debris in 100% completely covering bodies. 3 daphnids stuck together.

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-0582-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160516_N

Collection: collected on 2016/05/16 at 0900 by not given

Receipt: received on 2016/05/17 at 1135 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no

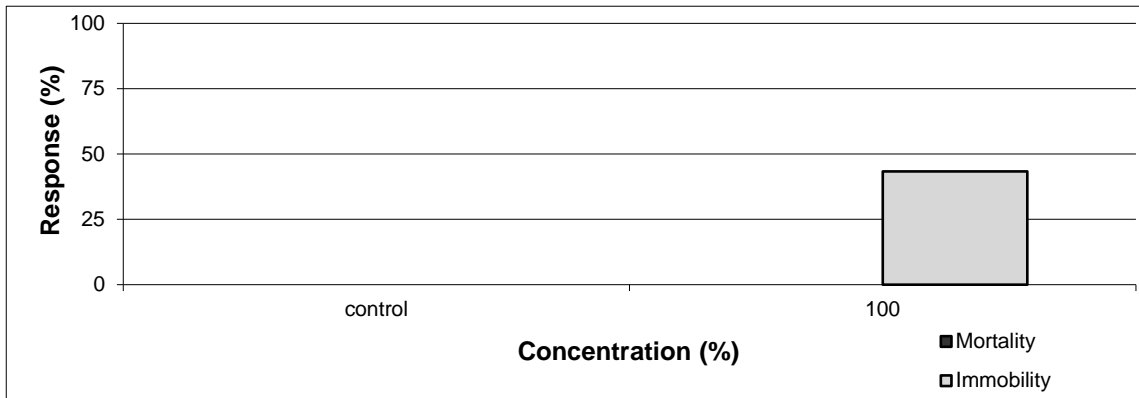
Description: type: water, collection method: grab

Test: started on 2016/05/19 ; ended on 2016/05/21

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160516_	0	43	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0582-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
19 neonates per average brood

Sample initial chemistry: pH: 6.9; EC: 1746 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.1 (mg/L); temperature: 16 °C
hardness (mg CaCO_3/L): 740; colour: colourless; odour: -

Sample holding time: 3 days (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 98 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $10 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0582-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated May 10, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.75 (0.63-0.78) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0582-01-DAS

Test Log:

Date	Day	Time	Technician
2016/05/19	0	1555	EP/JW
2016/05/20	1	1010	JN
2016/05/21	2	1040	JN

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.7	7.8	7.8	7.4	7.4	7.3
2	7.8	7.8	7.9	8.2	8.2	8.2

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	339	353	361	1605	1691	1695
2	350	355	363	1653	1678	1670

Day	Dissolved Oxygen (mg/L)					
0	8.9	8.9	8.9	9.0	8.9	9.0
2	9.6	9.6	9.5	9.6	9.4	9.4

Day	Temperature (°C)					
0	11	11	11	11	10	10
2	11	11	11	11	11	11

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10(10F)	10	10	10(1F,4D,1I)	10(14,2I,3D)	10(2F,3I,7D)
2	10(10F)	10	10	10(7I)	10(6I)	10(9D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	70	60	0



Comments/Statistics

Client: TEC164 Reference: 16-0582-01-DAS

Test Result Comments:

Day 1 - debris thread like. 2 daphnids stuck together in 100C.

Day 2 - In 100A, 6 stuck to bottom of jar. In 100B, 8 stuck to bottom of jar.

Data Analysis:

None

Protocol Deviations:

The test was run at $10 \pm 2^{\circ}\text{C}$, as requested by the client.

Result Summary

Client: TEC164
Reference: 16-0582-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160516_N

Collection: collected on 2016/05/16 at 0900 by not given

Receipt: received on 2016/05/17 at 1135 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no initials

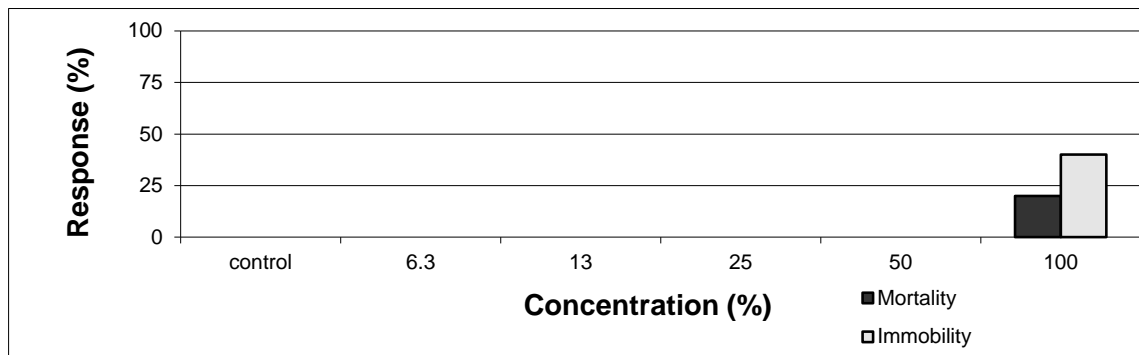
Description: type: water, collection method: grab

Test: started on 2016/05/19 ; ended on 2016/05/21

Result:

	Endpoint (48-hour)	Value (%)	Confidence Limits (95%)		Method Calculated
			lower	upper	
Acute: (mortality)	LC50	>100			could not be calculated
Acute: (immobility)	EC50	>100			could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0582-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 7%

Culture brood data: 8 days to first brood

19 neonates per average brood

Sample initial chemistry: pH: 6.9; EC: 1746 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.1 (mg/L); temperature: 16 °C
hardness (mg CaCO₃/L): 740; colour: colourless; odour: -

Sample holding time: 3 days (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing

The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)

The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control/dilution water: Moderately hard water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 98 mg CaCO₃/L

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 20 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 16-0582-01-DAS

Endpoint: Mortality, 48-h LC50 (95% confidence limits)
Immobility, 48-h EC50 (95% confidence limits)
Test validity: The control had 100% survival (must \geq 90%)
Control had 0 percent (%) abnormal behaviour (must \leq 10%, immobility)

Reference toxicant: 48-h test with NaCl initiated May 10, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.75 (0.63-0.78) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 16-0582-01-DAS

Test Log:

Date	Day	Time	Technician
2016/05/19	0	1600	EP/JW
2016/05/20	1	0950	JN
2016/05/21	2	1040	JN

Chemistry:

Conc. (%)	control	6.3	13	25	50	100
-----------	---------	-----	----	----	----	-----

Day	pH (units)					
0	7.9	7.9	8.0	8.0	8.1	8.0
2	7.1	7.9	8.1	8.2	8.3	8.1

	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	327	434	530	693	1010	1575
2	336	437	547	695	987	1436

	Dissolved Oxygen (mg/L)					
0	8.0	8.0	8.0	8.0	8.0	8.0
2	7.7	7.7	7.7	7.6	7.5	7.5

	Temperature (°C)					
0	20	20	20	20	20	20
2	21	21	21	21	21	21

Biology:

Conc. (%)	control	6.3	13	25	50	100
-----------	---------	-----	----	----	----	-----

Day	Number Alive and Behavior (behavior is in brackets)					
1	10(10F)	10	10	10(1D)	10(1D)	10(2I,6D)
2	10(10F)	10	10	10(2D)	10(4D)	8(4I,8D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris; nd, not done; na, not applicable;

	Mortality (%)					
2	0	0	0	0	0	20

	Immobility (%)					
2	0	0	0	0	0	40



***Daphnia* (48-h LC50/EC50) Test Report**

Comments/Statistics

Client: TEC164 Reference: 16-0582-01-DAS

Test Result Comments:

Day 1 - Debris looked thread-like. In 100C, 2 of the floating daphnids stuck on debris together.

Day 2 - Debris in 100 completely covering bodies. 3 stuck together.

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Endpoints for immobility could not be calculated. No effect occurred.

Protocol Deviations:

None

Result Summary

Client: TEC164 Reference: 16-0582-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160516_N

Collection: collected on 2016/05/16 at 0900 by not given

Receipt: received on 2016/05/17 at 1135 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no initials

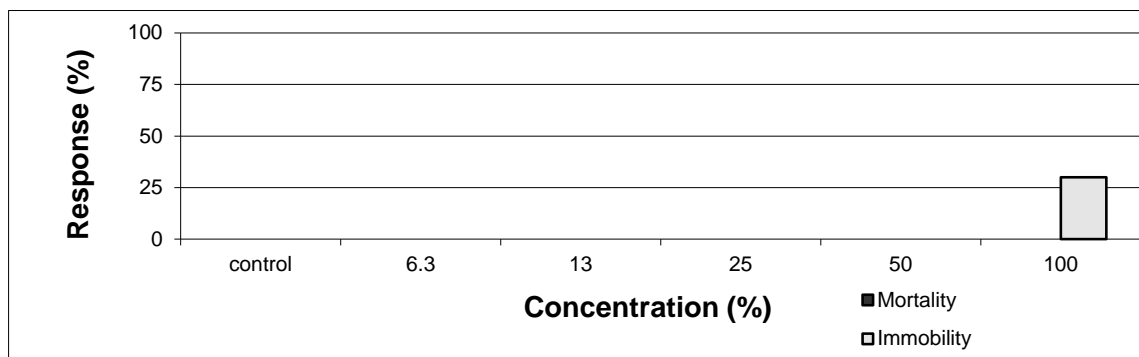
Description: type: water, collection method: grab

Test: started on 2016/05/19 ; ended on 2016/05/21

Result:

	Endpoint (48-hour)	Value (%)	Confidence Limits (95%) lower upper	Method Calculated
Acute: (mortality)	LC50	>100		could not be calculated
Acute: (immobility)	EC50	>100		could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0582-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood

17.9 neonates per average brood

Sample initial chemistry: pH: 6.9; EC: 1746 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.1 (mg/L); temperature: 16 °C
hardness (mg CaCO₃/L): 740; colour: colourless; odour: -

Sample holding time: 3 days (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing

The sample was pre-aerated for 0 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)

The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control/dilution water: Moderately hard water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 98 mg CaCO₃/L

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 10 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 16-0582-01-DAS

Endpoint: Mortality, 48-h LC50 (95% confidence limits)
Immobility, 48-h EC50 (95% confidence limits)
Test validity: The control had 100% survival (must \geq 90%)
Control had 0 percent (%) abnormal behaviour (must \leq 10%, immobility)

Reference toxicant: 48-h test with NaCl initiated May 10, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.75 (0.63-0.78) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 16-0582-01-DAS

Test Log:

Date	Day	Time	Technician
2016/05/19	0	1555	EP/JW
2016/05/20	1	1000	JN
2016/05/21	2	1120	JN

Chemistry:

Conc. (%)	control	6.3	13	25	50	100
-----------	---------	-----	----	----	----	-----

Day	pH (units)					
0	7.9	7.9	7.8	7.7	7.6	7.5
2	7.3	7.6	7.8	7.9	8.0	8.2

	Conductivity (µS/cm @ 25°C)					
0	334	433	523	708	1029	1616
2	341	439	526	705	1029	1606

	Dissolved Oxygen (mg/L)					
0	8.9	9.0	8.9	9.0	9.0	9.0
2	9.3	9.4	9.5	9.6	9.6	9.7

	Temperature (°C)					
0	11	11	11	11	11	11
2	12	12	12	12	12	12

Biology:

Conc. (%)	control	6.3	13	25	50	100
-----------	---------	-----	----	----	----	-----

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10(2D)	10(2D)	10(4D)	10(5D)	10(8D)
2	10	10(2D)	10(6D)	10(6D)	10(6D)	10(10D,3I)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris; nd, not done; na, not applicable;

	Mortality (%)					
2	0	0	0	0	0	0

	Immobility (%)					
2	0	0	0	0	0	30

Comments/Statistics

Client: TEC164 Reference: 16-0582-01-DAS

Test Result Comments:

None

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Endpoints for immobility could not be calculated. No effect occurred.

Protocol Deviations:

The test was run at $10 \pm 2^{\circ}\text{C}$, as requested by the client.

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, H₂S 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 OR 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.



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/05/20
Report Date: 5/27/2016
Version: FINAL

Test Report

Client: TEC164
Reference: 16-0594
Billing: PO # 00411634

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



Result Summary

Client: TEC164
Reference: 16-0594-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_05192016_N, WL_BFWB_OUT_SP21_05192016_N

Collection: collected on 2016/05/19 at 1400 by not given

Receipt: received on 2016/05/20 at 0845 by MC

Containers: received 6 x 1 L bottles at 7 °C, in good condition with no seals and no initials

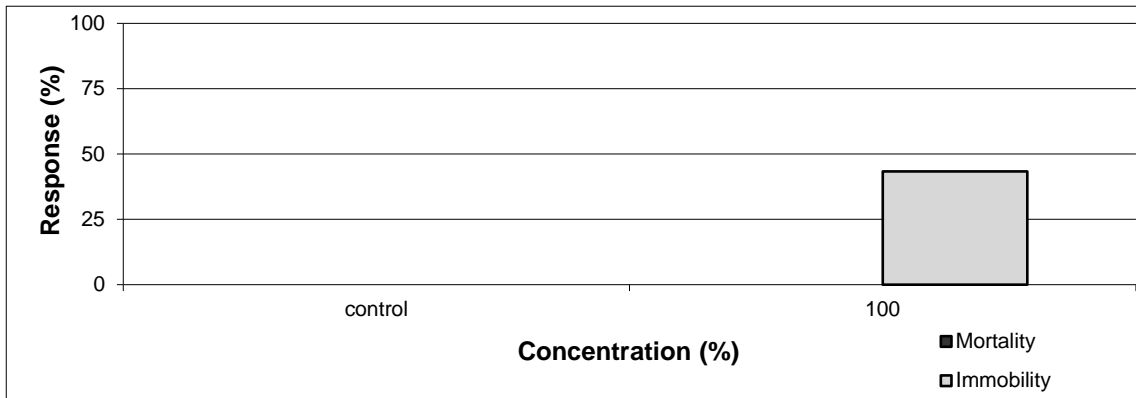
Description: type: water, collection method: grab

Test: started on 2016/05/20 ; ended on 2016/05/22

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_05192016_	0	43	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0594-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 7%

Culture brood data: 8 days to first brood
18.5 neonates per average brood

Sample initial chemistry: pH: 7.2; EC: 1611 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.7 (mg/L); temperature: 17 °C
hardness (mg CaCO_3/L): 917; colour: colourless; odour: organic

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was filtered with a 110 μm nitrex screen prior to testing
The sample was not pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 84 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0594-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated May 10, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.75 (0.63-0.78) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0594-01-DAS

Test Log:

Date	Day	Time	Technician
2016/05/20	0	1445	EP/BH
2016/05/21	1	1010	JN
2016/05/22	2	0905	JW

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	8.1	8.2	8.2	8.1	8.1	8.1
2	8.0	8.0	8.0	8.0	8.0	8.0

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	345	350	353	1653	1683	1695
2	337	353	355	1528	1594	1617

Day	Dissolved Oxygen (mg/L)					
0	7.8	7.9	7.9	8.0	8.0	8.1
2	7.3	7.3	7.3	7.4	7.4	7.4

Day	Temperature (°C)					
0	20	20	20	19	19	19
2	21	21	21	21	21	21

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10(2F)	10(2F)	10	10(3F,2I,5D)	10(1F,6D)	10(4D,3I)
2	10	10	10	10(7I,7D)	10(4I,4D)	10(2I,4D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	70	40	20



Comments/Statistics

Client: TEC164 Reference: 16-0594-01-DAS

Test Result Comments:

Day 1 - debris is threadlike, stuck to apical spine of daphnids

Day 2 - all daphnids that are immobile are stuck in debris

(string-like precipitate that appears sticky, sticking to jar, bottom, and pipette)

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: TEC164
Reference: 16-0594-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_05192016_N, WL_BFWB_OUT_SP21_05192016_N

Collection: collected on 2016/05/19 at 1400 by not given

Receipt: received on 2016/05/20 at 0845 by MC

Containers: received 6 x 1 L bottles at 7 °C, in good condition with no seals and no initials

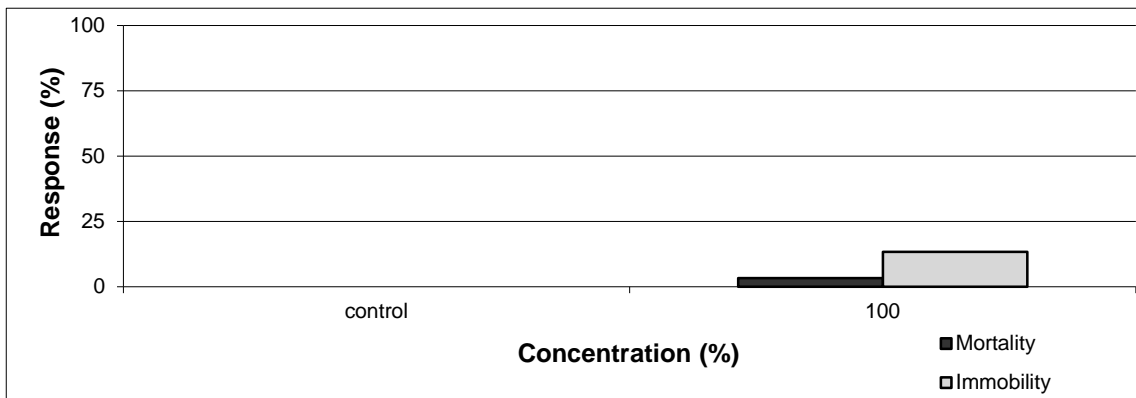
Description: type: water, collection method: grab

Test: started on 2016/05/20 ; ended on 2016/05/22

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_05192016_	3	13	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0594-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 4%

Culture brood data: 8 days to first brood
24.8 neonates per average brood

Sample initial chemistry: pH: 7.2; EC: 1611 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.7 (mg/L); temperature: 17 °C
hardness (mg CaCO_3/L): 917; colour: colourless; odour: organic

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was filtered with a 110 μm nitrex screen prior to testing
The sample was not pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must ≤ 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 84 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $10 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0594-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated May 10, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.75 (0.63-0.78) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Test Data

Client: TEC164
Reference: 16-0594-01-DAS

Test Log:

Date	Day	Time	Technician
2016/05/20	0	1310	EP/BH
2016/05/21	1	1055	JN
2016/05/22	2	0950	JW/ML

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	8.0	8.0	8.1	7.6	7.6	7.6
2	8.1	8.0	8.0	8.1	8.2	8.2

Day	Conductivity (µS/cm @ 25°C)					
0	343	358	362	1639	1712	1764
2	361	360	360	1645	1634	1700

Day	Dissolved Oxygen (mg/L)					
0	8.0	7.9	7.9	8.1	8.3	8.4
2	9.0	9.0	8.9	9.0	9.0	9.0

Day	Temperature (°C)					
0	11	11	11	11	11	11
2	11	11	11	11	11	11

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10(1F)	10	10	10(6D)	10(2F,3I,2D)	10(9D,3I)
2	10	10	10	9(5D)	10(3I,1I)	10(4D,2I)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	10	0	0

Day	Immobility (%)					
2	0	0	0	10	10	20



Comments/Statistics

Client: TEC164 Reference: 16-0594-01-DAS

Test Result Comments:

Day 2 - all daphnids that are immobile are stuck in debris

Data Analysis:

None

Protocol Deviations:

The test temperature was $10 \pm 2^{\circ}\text{C}$, as requested by the client



Daphnia (Single Concentration) Test Report

Result Summary

Client: TEC164 Reference: 16-0594-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_05192016_N, WL_BFWB_OUT_SP21_05192016_N
, Filtered

Collection: collected on 2016/05/19 at 1400 by not given

Receipt: received on 2016/05/20 at 0845 by MC

Containers: received 6 x 1 L bottles at 7 °C, in good condition with no seals and no initials

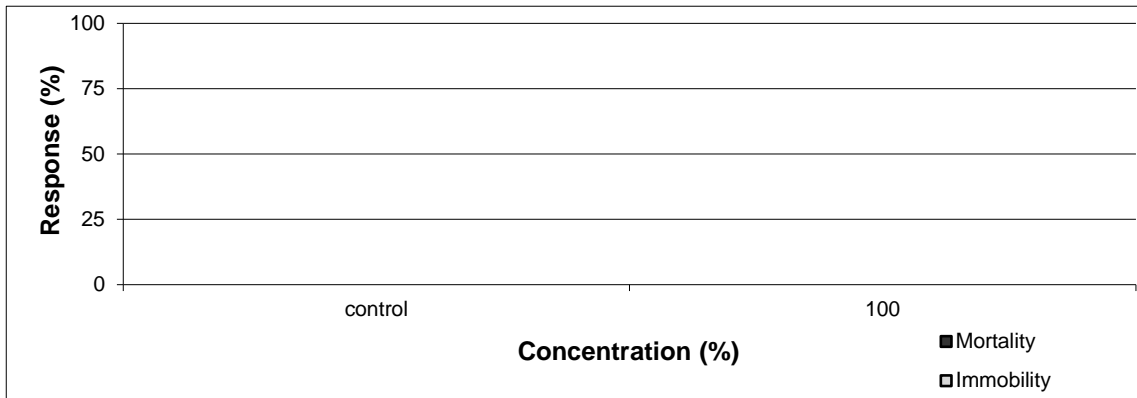
Description: type: water, collection method: grab

Test: started on 2016/05/20 ; ended on 2016/05/22

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_05192016_	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0594-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
18.5 neonates per average brood

Sample initial chemistry: pH: 7.3; EC: 1617 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.2 (mg/L); temperature: 16 °C
hardness (mg CaCO_3/L): 908; colour: colourless; odour: organic

Sample holding time: 2 days (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 84 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0594-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated May 10, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.75 (0.63-0.78) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0594-01-DAS

Test Log:

Date	Day	Time	Technician
2016/05/21	0	1150	JN/CB
2016/05/22	1	0900	JW
2016/05/23	2	1015	HS

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	8.0	8.1	8.1	7.8	7.8	7.8
2	8.0	8.0	8.0	8.1	8.1	8.1

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	350	358	359	1661	1690	1696
2	350	358	359	1587	1596	1618

Day	Dissolved Oxygen (mg/L)					
0	8.0	8.0	8.0	7.9	8.0	7.9
2	7.8	7.7	7.8	7.8	7.8	7.7

Day	Temperature (°C)					
0	19	19	19	20	20	20
2	20	20	20	20	20	20

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10(1F,3D)	10(5F,4D)
2	10	10	10	10(2D)	10(3D)	10(1D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0594-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None



Daphnia (Single Concentration) Test Report

Result Summary

Client: TEC164 Reference: 16-0594-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_05192016_N, WL_BFWB_OUT_SP21_05192016_N
, Filtered

Collection: collected on 2016/05/19 at 1400 by not given

Receipt: received on 2016/05/20 at 0845 by MC

Containers: received 6 x 1 L bottles at 7 °C, in good condition with no seals and no initials

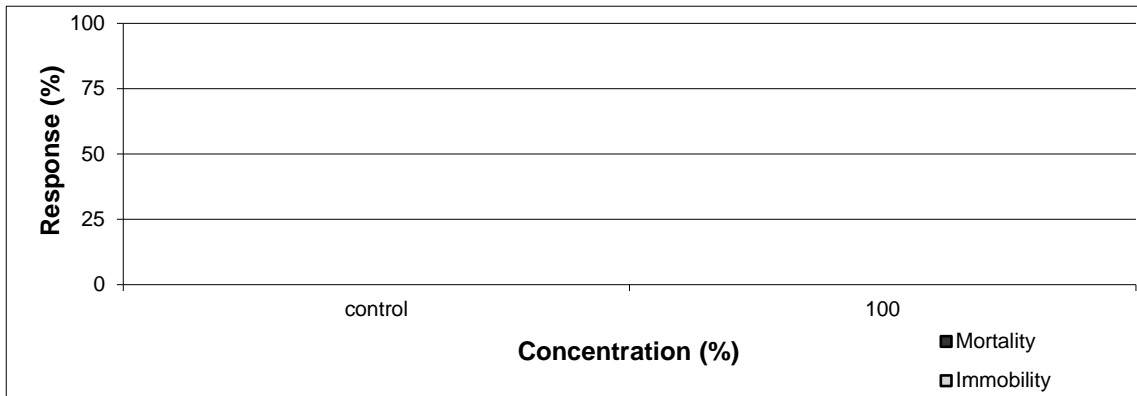
Description: type: water, collection method: grab

Test: started on 2016/05/20 ; ended on 2016/05/22

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_05192016_	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0594-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
18.5 neonates per average brood

Sample initial chemistry: pH: 7.3; EC: 1617 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.2 (mg/L); temperature: 16 °C
hardness (mg CaCO_3/L): 908; colour: colourless; odour: organic

Sample holding time: 2 days (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 84 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $10 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0594-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated May 10, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.75 (0.63-0.78) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Test Data

Client: TEC164
Reference: 16-0594-01-DAS

Test Log:

Date	Day	Time	Technician
2016/05/21	0	1140	JN/CB
2016/05/22	1	0900	JW
2016/05/23	2	1015	HS

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	8.0	8.1	8.1	7.6	7.7	7.7
2	7.8	7.8	7.9	8.3	8.3	8.3

Day	Conductivity (µS/cm @ 25°C)					
0	347	362	363	1707	1730	1734
2	357	369	370	1689	1713	1743

Day	Dissolved Oxygen (mg/L)					
0	8.5	8.5	8.5	8.4	8.3	8.3
2	8.7	8.6	8.6	8.6	8.6	8.5

Day	Temperature (°C)					
0	11	11	11	11	11	11
2	11	11	11	11	11	11

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(1F,2D)	10(2D)	10(1D)
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0594-01-DAS

Test Result Comments:

Day 1: Thread-like debris stuck on daphnid ends.

Data Analysis:

None

Protocol Deviations:

The test temperature was $10 \pm 2^{\circ}\text{C}$, as requested by the client

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, H₂S 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.

Your P.O. #: 441369
Site Location: WLC AWTF
Your C.O.C. #: 1 of 1

Attention:Greg Ross

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/05/30
Report #: R2188226
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B640541

Received: 2016/05/26, 09:57

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Daphnia magna Single Concentration-100%	1	N/A	2016/05/27	EENVSOP-00154	EPS 1/RM/14 2000

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====

This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B640541
Report Date: 2016/05/30

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: AD

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		OR7056	
Sampling Date		2016/05/25 09:00	
COC Number		1 of 1	
	UNITS	WL_BFWB_OUT_SP21_2016 0525_N	QC Batch
Daphnia Magna Bioassay			
Mortality	%	ATTACHED	8280969

Maxxam Job #: B640541
Report Date: 2016/05/30

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: AD

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.3°C
-----------	-------

Results relate only to the items tested.

Maxxam Job #: B640541
Report Date: 2016/05/30

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: AD

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B640541
Sample Number: OR7056-01

Test Result:

48 hrs Mortality % 0% Statistical Method:

Mean percent mortality:	<u>Sample</u>	0	<u>Control</u>	0
Sample Name :	WL_BFWB_OUT_SP21_20160525_N			Sample Matrix : Water
Description:	clear			<u>Sample Prior to Analysis:</u>
Sample Collected:	May 25, 2016 09:00 AM	Sampling Method :	N/A	pH: 7.4
Sample Collected By:	AD	Site Collection:	N/A	Temperature : 20 °C
Sample Received:	May 26, 2016 09:57 AM	Volume Received:	1 L	Dissolved Oxygen: 9.3 mg/L
Analysis Start :	May 27, 2016 10:19 AM	Temp.Upon Arrival:	4 °C	Sample Conductance: 1467 µS/cm
End :	May 29, 2016 10:07 AM	Storage:	2-6°C	Hardness: 800 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	21	8.1	372	8.0	0	0	0	0	20	8.1	371	7.6
0	21	8.3	374	7.9	0	0	0	0	20	8.2	374	7.6
0	21	8.3	374	8.0	0	0	0	0	20	8.3	378	7.8
100	20	7.7	1459	8.7	0	0	0	0	20	8.2	1437	7.6
100	20	7.6	1473	8.8	0	0	0	0	20	8.2	1429	7.5
100	20	7.6	1473	8.8	0	0	1	10.0	20	8.3	1442	7.6

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	0	0
100	0	0	1	10.0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 160 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
 Organisms per Vessel : 10 Pre-aeration Time : 30 min Rate of Pre-aeration : 25-50 mL/min/L
 Total # of Organisms Used : 60 Test Temperature : 20 ± 2 °C Test Hardness Adjusted : No
 Test Volume : 150 mL Vessel Volume : 225 mL Test pH Adjusted: No
 Loading Density : 15.0 mL/Daphnia Photoperiod : 16:8 (light: dark)

Test Organism : *Daphnia magna* Source : In House Culture
 Age at Test Initiation : <24 hrs Average Brood Size : 23.9
 Culture Photoperiod : 16:8 (light: dark) % Mortality within 7 days : 0
 Culture Temperature : 20 ± 2 °C Time To First Brood : 8 Days
 Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B640541
Sample Number: OR7056-01

Reference chemical: Sodium Chloride
Test Date: May 24, 2016
Test Endpoint 48 hrs LC50 (95% confidence interval) : 6.30 (5.38, 7.38)g/L
Statistical Method : Untrimmed Spearman-Kärber
Historical Mean LC50 (warning limits) : 6.36 (4.60, 8.79) g/L
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Arthur Juan Mathias, Chelsea Tessier, Natasha Mouck

Verified By : _____
Arthur Juan Mathias, Analyst I

Date: May 30, 2016 02:48 PM



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/05/26
Report Date: 6/6/2016
Version: FINAL

Test Report

Client: TEC164
Reference: 16-0615
Billing: PO # 430571

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

Result Summary

Client: TEC164
Reference: 16-0615-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160525_N

Collection: collected on 2016/05/25 at 0900 by not given

Receipt: received on 2016/05/26 at 0900 by MC

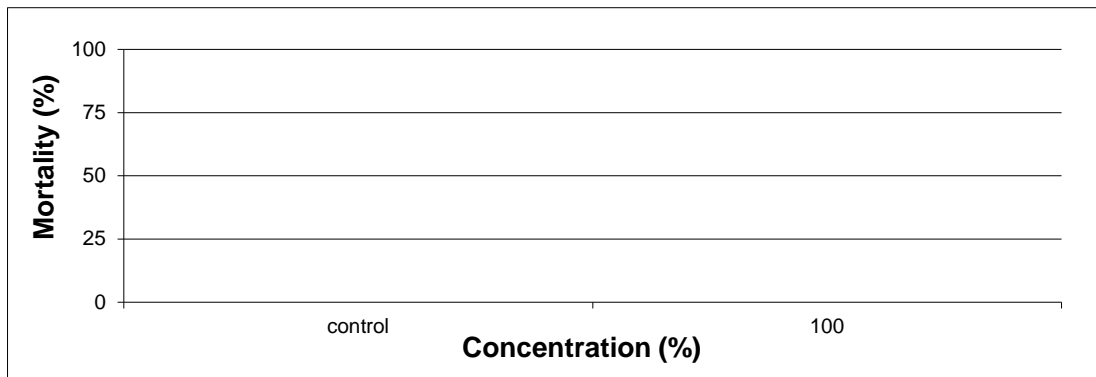
Containers: received 4 x 20 L carboys/ 4 x 1 L bottles at 13 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/05/27 ; ended on 2016/05/31

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	WL_BFWB_OUT_S P21_20160525_N	0	none



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0615-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160413TR)

Acclimation: 44 days (must be ≥ 2 weeks)

Stock mortality: 0.3% (seven days preceding testing)

Sample initial chemistry: pH: 7.4; EC: 1512 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.1 (mg/L); temperature: 17 °C
hardness (mg CaCO₃/L): 919; colour: colourless; odour: -

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 8.7 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.2 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated May 25, 2016; current results (96-h LC50 and 95% confidence limits) = 0.48 (0.41-0.54) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.55 (0.42-0.68) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0615-01-TRS

Test Log:

Date	Day	Time	Technician
2016/05/27	0	1450	JN
2016/05/28	1	1020	BH
2016/05/29	2	0930	KLO
2016/05/30	3	0800	JW
2016/05/31	4	1045	BH

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	8.0	7.6
4	8.0	8.1

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	471	1647
4	494	1590

Dissolved Oxygen (mg/L)

0	8.8	8.7
4	9.1	9.2

Temperature (°C)

0	15	15
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0615-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	2.8	0.3
2	3.0	0.4
3	3.2	0.4
4	3.2	0.4
5	2.9	0.3
6	3.1	0.4
7	3.6	0.7
8	3.0	0.4
9	3.1	0.4
10	2.7	0.3

Sample	Group Wet Weight (g)
control	4.0
100	3.5

average	3.1	0.4
sd	0.3	0.1
cv(%)	8.2	28.9

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient
of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-0615-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160525_N

Collection: collected on 2016/05/25 at 0900 by not given

Receipt: received on 2016/05/26 at 0900 by MC

Containers: received 4 x 20 L carboys/ 4 x 1 L bottles at 13 °C, in good condition with no seals and no

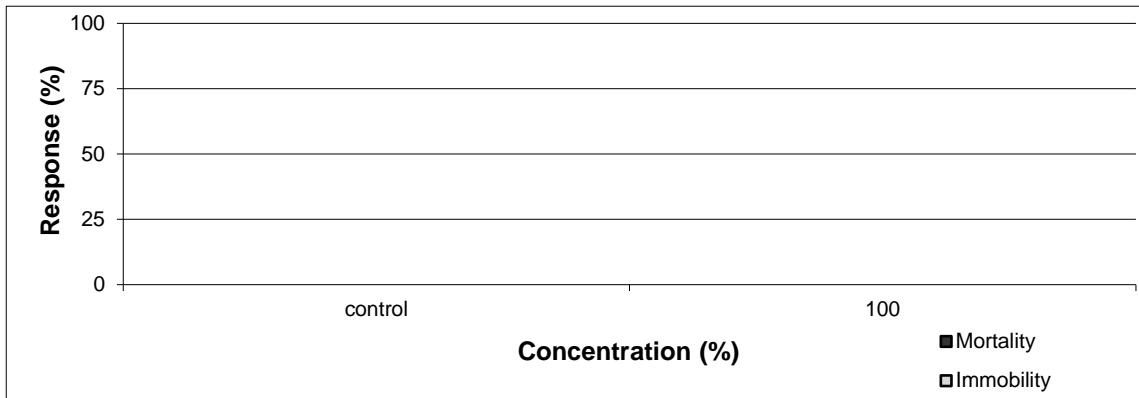
Description: type: water, collection method: grab

Test: started on 2016/05/26 ; ended on 2016/05/28

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160525_	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0615-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 9 days to first brood
27 neonates per average brood

Sample initial chemistry: pH: 7.4; EC: 1512 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.1 (mg/L); temperature: 17 °C
hardness (mg CaCO_3/L): 919; colour: colourless; odour: -

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must ≤ 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 86 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 16-0615-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated May 23, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.73 (0.69-0.76) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Test Data

Client: TEC164
Reference: 16-0615-01-DAS

Test Log:

Date	Day	Time	Technician
2016/05/26	0	1455	JW/BH
2016/05/27	1	1000	HS
2016/05/28	2	1005	JN

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.8	7.8	7.9	8.1	8.2	8.2
2	8.0	8.0	8.0	8.2	8.3	8.1

Day	Conductivity (µS/cm @ 25°C)					
0	311	327	330	1549	1587	1619
2	342	335	342	1581	1622	1559

Day	Dissolved Oxygen (mg/L)					
0	7.8	7.8	7.8	7.9	7.9	8.0
2	7.5	7.4	7.5	7.4	7.4	7.4

Day	Temperature (°C)					
0	20	21	21	20	20	20
2	22	22	22	22	22	22

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10(2D)	10(1D)	10(10D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



***Daphnia* (Single Concentration) Test Report**

Comments/Statistics

Client: TEC164 Reference: 16-0615-01-DAS

Test Result Comments:

Observed tails of debris on daphnids on days 1 and 2.

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-0615-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160525_N

Collection: collected on 2016/05/25 at 0900 by not given

Receipt: received on 2016/05/26 at 0900 by MC

Containers: received 4 x 20 L carboys/ 4 x 1 L bottles at 13 °C, in good condition with no seals and no

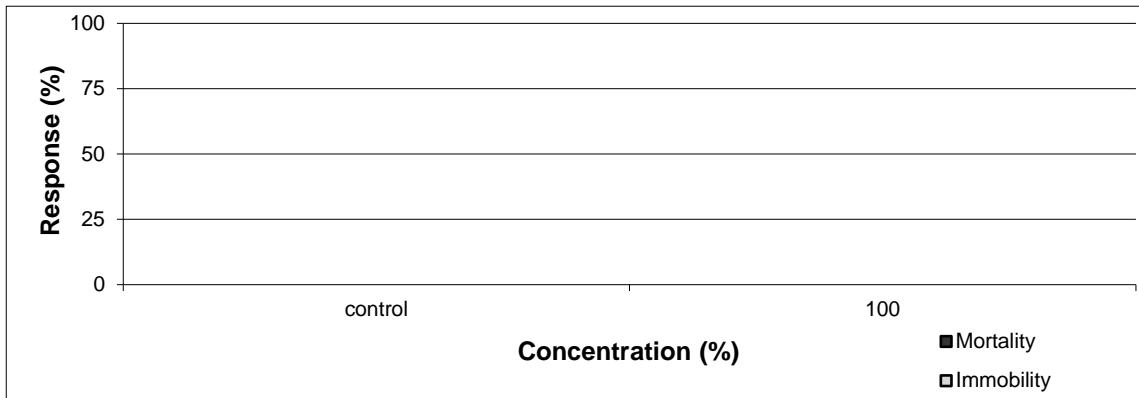
Description: type: water, collection method: grab

Test: started on 2016/05/26 ; ended on 2016/05/28

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160525_	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0615-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 9 days to first brood
27 neonates per average brood

Sample initial chemistry: pH: 7.4; EC: 1512 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.1 (mg/L); temperature: 17 °C
hardness (mg CaCO_3/L): 919; colour: colourless; odour: -

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must ≤ 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 86 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0615-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated May 23, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.73 (0.69-0.76) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 16-0615-01-DAS

Test Log:

Date	Day	Time	Technician
2016/05/26	0	1500	JW/BH
2016/05/27	1	1000	HS
2016/05/28	2	1000	JN

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.6	7.7	7.7	7.4	7.5	7.5
2	8.2	8.0	8.0	8.1	8.2	8.2

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	324	336	337	1551	1652	1679
2	345	338	335	1601	1622	1582

Day	Dissolved Oxygen (mg/L)					
0	7.7	7.7	7.7	8.1	8.2	8.2
2	8.9	8.9	8.7	8.6	8.6	8.6

Day	Temperature (°C)					
0	11	11	11	11	11	11
2	11	11	11	11	11	11

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(9I)	10(7I)	10(8I)
2	10	10	10	10(10D)	10(10D)	10(10D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0615-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None

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, H₂S 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 OR 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.

Your P.O. #: 441369
Site Location: WLC AWTF

Attention:Greg Ross

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/06/09
Report #: R2193985
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B642681

Received: 2016/06/01, 09:45

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Daphnia magna Single Concentration-100%	1	N/A	2016/06/02	EENVSOP-00154	EPS 1/RM/14 2000

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====

This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B642681
Report Date: 2016/06/09

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: TW

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		OS7545	
Sampling Date		2016/05/30 09:00	
	UNITS	WL_BFWB_OUT_SP21_2016 0530_N	QC Batch
Daphnia Magna Bioassay			
Mortality	%	ATTACHED	8286312

Maxxam Job #: B642681
Report Date: 2016/06/09

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: TW

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	10.0°C
-----------	--------

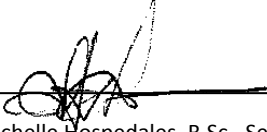
Results relate only to the items tested.

Maxxam Job #: B642681
Report Date: 2016/06/09

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: TW

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Michelle Hospedales, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B642681
Sample Number: OS7545-01

Test Result:

48 hrs Mortality % 0% Statistical Method:

Mean percent mortality:	<u>Sample</u>	0	<u>Control</u>	0
Sample Name :	WL_BFWB_OUT_SP21_20160530_N			Sample Matrix : Water
Description:	Clear			<u>Sample Prior to Analysis:</u>
Sample Collected:	May 30, 2016 09:00 AM	Sampling Method :	N/A	pH: 7.5
Sample Collected By:	TW	Site Collection:	N/A	Temperature : 19 °C
Sample Received:	Jun 01, 2016 09:45 AM	Volume Received:	1 L	Dissolved Oxygen: 8.9 mg/L
Analysis Start :	Jun 02, 2016 10:15 AM	Temp.Upon Arrival:	10 °C	Sample Conductance: 1404 µS/cm
End :	Jun 04, 2016 09:56 AM	Storage:	2-6°C	Hardness: 800 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	21	8.3	412	8.0	0	0	0	0	20	7.9	386	8.0
0	20	8.3	413	8.1	0	0	0	0	20	7.9	389	8.0
0	20	8.3	413	8.0	0	0	0	0	20	7.9	393	8.0
100	20	7.7	1416	8.5	0	0	0	0	20	8.2	1313	7.8
100	20	7.7	1422	8.6	0	0	1	10.0	20	8.2	1327	7.8
100	20	7.7	1425	8.5	0	0	0	0	20	8.2	1340	7.7

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	0	0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 140 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
 Organisms per Vessel : 10 Pre-aeration Time : 30 min Rate of Pre-aeration : 25-50 mL/min/L
 Total # of Organisms Used : 60 Test Temperature : 20 ± 2 °C Test Hardness Adjusted : No
 Test Volume : 150 mL Vessel Volume : 225 mL Test pH Adjusted: No
 Loading Density : 15.0 mL/Daphnia Photoperiod : 16:8 (light: dark)

Test Organism : *Daphnia magna* Source : In House Culture
 Age at Test Initiation : <24 hrs Average Brood Size : 17.3
 Culture Photoperiod : 16:8 (light: dark) % Mortality within 7 days : 0
 Culture Temperature : 20 ± 2 °C Time To First Brood : 8 Days
 Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

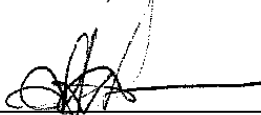
Job Number: B642681
Sample Number: OS7545-01

Reference chemical: Sodium Chloride
Test Date: May 24, 2016
Test Endpoint 48 hrs LC50 (95% confidence interval) : 6.30 (5.38, 7.38)g/L
Statistical Method : Untrimmed Spearman-Kärber
Historical Mean LC50 (warning limits) : 6.36 (4.60, 8.79) g/L
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Natasha Mouck



Verified By : Michelle Hospedales, Senior Analyst

Date: Jun 09, 2016 03:48 PM



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/05/31
Report Date: 2016/06/14
Version: FINAL

Test Report

Client: TEC164
Reference: 16-0630
Billing: PO # 430571

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

Result Summary

Client: TEC164
Reference: 16-0630-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160530_N

Collection: collected on 2016/05/30 at 0900 by not given

Receipt: received on 2016/05/31 at 1300 by MC

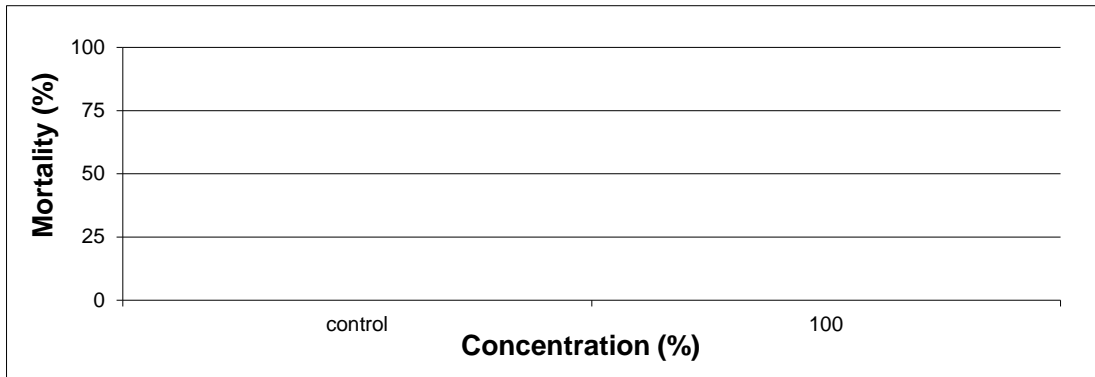
Containers: received 4 x 20 L carboys/ 4 x 1 L bottles at 8 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/06/01 ; ended on 2016/06/05

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	WL_BFWB_OUT_S P21_20160530_N	0	none



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0630-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160511TR)

Acclimation: 21 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.1; EC: 1552 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.7 (mg/L); temperature: 15 °C
hardness (mg CaCO₃/L): 785; colour: colourless; odour: -

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 8.8 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.2 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated May 25, 2016; current results (96-h LC50 and 95% confidence limits) = 0.48 (0.41-0.54) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.55 (0.42-0.68) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0630-01-TRS

Test Log:

Date	Day	Time	Technician
2016/06/01	0	0830	EP
2016/06/02	1	0900	KLO
2016/06/03	2	0900	BH
2016/06/04	3	1100	BH
2016/06/05	4	0915	KLO

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	7.8	7.6
4	7.9	8.2

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	363	1615
4	364	1602

Dissolved Oxygen (mg/L)

0	8.6	8.8
4	8.7	8.8

Temperature (°C)

0	15	14
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0630-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.7	0.6
2	3.1	0.4
3	3.4	0.5
4	3.0	0.3
5	3.4	0.4
6	3.6	0.5
7	3.4	0.5
8	3.0	0.3
9	3.1	0.3
10	2.9	0.2

Sample	Group Wet Weight (g)
control	4.0
100	3.7

average	3.3	0.4
sd	0.3	0.1
cv(%)	8.5	31.2

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient
of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-0630-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160530_N

Collection: collected on 2016/05/30 at 0900 by not given

Receipt: received on 2016/05/31 at 1300 by MC

Containers: received 4 x 20 L carboys/ 4 x 1 L bottles at 8 °C, in good condition with no seals and no

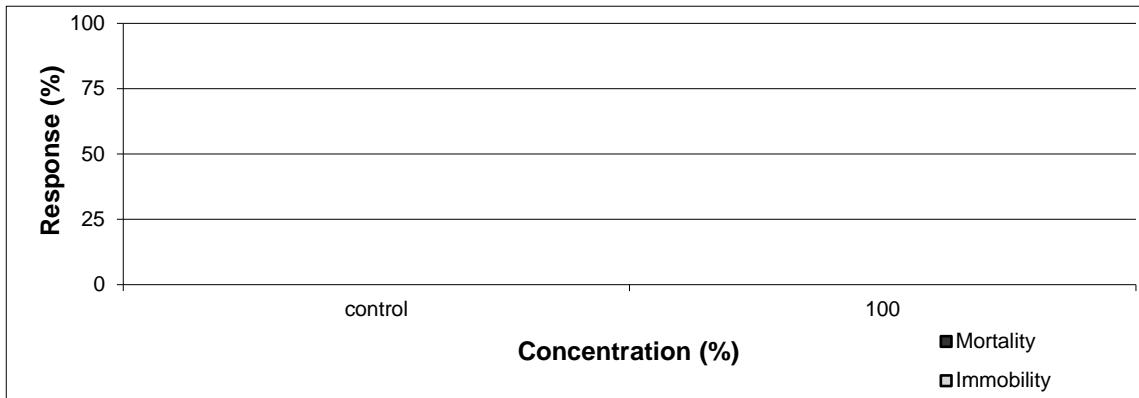
Description: type: water, collection method: grab

Test: started on 2016/05/31 ; ended on 2016/06/02

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160530_	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0630-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 7%

Culture brood data: 8 days to first brood
26 neonates per average brood

Sample initial chemistry: pH: 7.1; EC: 1552 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.7 (mg/L); temperature: 15 °C
hardness (mg CaCO_3/L): 785; colour: colourless; odour: -

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 84 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0630-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated May 23, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.73 (0.69-0.76) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0630-01-DAS

Test Log:

Date	Day	Time	Technician
2016/05/31	0	1520	JW
2016/06/01	1	1045	EP/JW
2016/06/02	2	1015	JW

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.8	7.9	7.9	8.2	8.2	8.2
2	7.7	7.8	7.9	8.1	8.2	8.2

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	323	328	330	1499	1558	1563
2	327	346	350	1490	1584	1600

Day	Dissolved Oxygen (mg/L)					
0	8.0	8.0	8.1	8.0	8.2	8.3
2	7.7	7.7	7.7	7.7	7.7	7.7

Day	Temperature (°C)					
0	20	20	20	19	18	18
2	20	21	21	21	21	21

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10 (3D)	10 (2D)	10 (4D)
2	10	10	10	10 (1D)	10	10 (2D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



***Daphnia* (Single Concentration) Test Report**

Comments/Statistics

Client: TEC164 Reference: 16-0630-01-DAS

Test Result Comments:

Day 1: Daphnids w/ debris have small thread/hair-like debris off their ends.

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-0630-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160530_N

Collection: collected on 2016/05/30 at 0900 by not given

Receipt: received on 2016/05/31 at 1300 by MC

Containers: received 4 x 20 L carboys/ 4 x 1 L bottles at 8 °C, in good condition with no seals and no

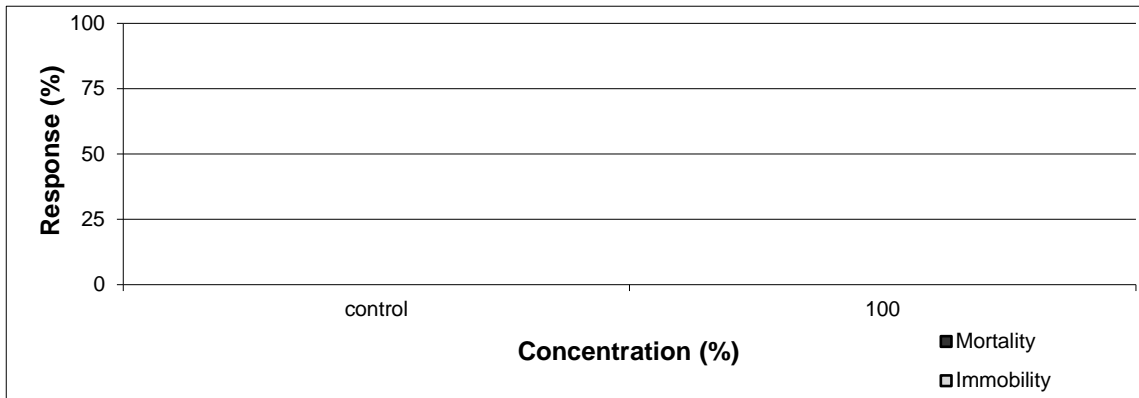
Description: type: water, collection method: grab

Test: started on 2016/05/31 ; ended on 2016/06/02

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160530_	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

**Test Conditions**

Client: TEC164 Reference: 16-0630-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 7%

Culture brood data: 8 days to first brood
26 neonates per average brood

Sample initial chemistry: pH: 7.1; EC: 1552 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.7 (mg/L); temperature: 15 °C
hardness (mg CaCO_3/L): 785; colour: colourless; odour: -

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 84 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $10 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0630-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated May 23, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.73 (0.69-0.76) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0630-01-DAS

Test Log:

Date	Day	Time	Technician
2016/05/31	0	1515	JW
2016/06/01	1	1045	EP/JW
2016/06/02	2	1020	JW

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.4	7.5	7.5	7.3	7.3	7.4
2	7.9	7.9	7.9	8.1	8.2	8.2

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	312	323	330	1570	1581	1605
2	348	358	359	1570	1660	1711

Day	Dissolved Oxygen (mg/L)					
0	8.1	8.1	8.1	9.0	9.0	8.9
2	9.2	9.3	9.4	9.6	9.6	9.6

Day	Temperature (°C)					
0	11	11	11	11	11	11
2	11	11	11	11	11	11

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(2D)	10(1F,2D)	10(1F,1D)
2	10	10	10	10(4D)	10(5D)	10(4D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



***Daphnia* (Single Concentration) Test Report**

Comments/Statistics

Client: TEC164 Reference: 16-0630-01-DAS

Test Result Comments:

Day 1: Daphnids stuck on debris have small thread-like debris off their ends.

Day 2: All 100 concentration daphnids swimming well and are not stuck together, but still have quite a bit of debris stuck to their ends, both thread and hair-like with some parts fuzzier/ thicker

Data Analysis:

None

Protocol Deviations:

The test temperature was $10 \pm 2^{\circ}\text{C}$, as requested by the client

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, H₂S 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 OR 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.

Your P.O. #: 441369
Site Location: WLC AWTF

Attention:Greg Ross

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/06/21
Report #: R2203060
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B644803

Received: 2016/06/07, 09:34

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Daphnia magna Single Concentration-100%	1	N/A	2016/06/09	EENVSOP-00154	EPS 1 RM14 2nd ed

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====

This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B644803
Report Date: 2016/06/21

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: AC

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		OT9054	
Sampling Date		2016/06/06 09:00	
	UNITS	WL_BFWB_OUT_SP21_2016 0606_N	QC Batch
Daphnia Magna Bioassay			
Mortality	%	ATTACHED	8293389

Maxxam Job #: B644803
Report Date: 2016/06/21

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: AC

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	9.0°C
-----------	-------

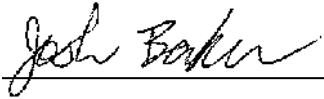
Results relate only to the items tested.

Maxxam Job #: B644803
Report Date: 2016/06/21

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: AC

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Joshua Baker, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B644803
Sample Number: OT9054-01

Test Result:

48 hrs Mortality % 0 Statistical Method:

Mean percent mortality:	<u>Sample</u>	0	<u>Control</u>	0
Sample Name :	WL_BFWB_OUT_SP21_20160606_N			Sample Matrix : Water
Description:	clear			<u>Sample Prior to Analysis:</u>
Sample Collected:	Jun 06, 2016 09:00 AM	Sampling Method :	N/A	pH: 7.7
Sample Collected By:	AC	Site Collection:	N/A	Temperature : 15 °C
Sample Received:	Jun 07, 2016 09:34 AM	Volume Received:	1 L	Dissolved Oxygen: 8.8 mg/L
Analysis Start :	Jun 09, 2016 09:22 AM	Temp.Upon Arrival:	9 °C	Sample Conductance: 1210 µS/cm
End :	Jun 11, 2016 09:36 AM	Storage:	2-6°C	Hardness: 800 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	20	7.9	353	7.9	0	0	0	0	20	7.9	354	7.9
0	20	8.0	356	8.0	0	0	0	0	20	8.0	357	8.0
0	20	8.0	356	8.0	0	0	0	0	20	8.0	357	7.9
100	20	7.7	1374	8.3	0	0	1	10.0	19	7.8	1308	7.8
100	20	7.7	1383	8.2	0	0	0	0	20	7.9	1327	7.6
100	20	7.7	1383	8.3	0	0	0	0	20	7.9	1326	7.6

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	0	0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 160 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
 Organisms per Vessel : 10 Pre-aeration Time : 0 min Rate of Pre-aeration : 25-50 mL/min/L
 Total # of Organisms Used : 60 Test Temperature : 20 ± 2 °C Test Hardness Adjusted : No
 Test Volume : 150 mL Vessel Volume : 225 mL Test pH Adjusted: No
 Loading Density : 15.0 mL/Daphnia Photoperiod : 16:8 (light: dark)

Test Organism : *Daphnia magna* Source : In House Culture
 Age at Test Initiation : <24 hrs Average Brood Size : 21.1
 Culture Photoperiod : 16:8 (light: dark) % Mortality within 7 days : 1.6
 Culture Temperature : 20 ± 2 °C Time To First Brood : 8 Days
 Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

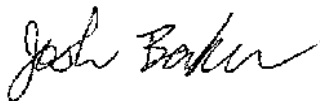
Job Number: B644803
Sample Number: OT9054-01

Reference chemical: Sodium Chloride
Test Date: Jun 02, 2016
Test Endpoint 48 hrs LC50 (95% confidence interval) : 6.16 (5.17, 7.34)g/L
Statistical Method : Untrimmed Spearman-Kärber
Historical Mean LC50 (warning limits) : 6.37 (4.61, 8.79) g/L
Concentration : 0,1,25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Chelsea Tessier



Verified By : Joshua Baker, Senior Analyst

Date: Jun 18, 2016 03:05 PM



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/06/07
Report Date: 2016/06/17
Version: FINAL

Test Report

Client: TEC164
Reference: 16-0651
Billing: PO # 430571

A handwritten signature in black ink, appearing to read "A. R. ...", is positioned above a horizontal line.

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



Trout (Single Concentration) Test Report

Result Summary

Client: TEC164
Reference: 16-0651-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160606_N

Collection: collected on 2016/06/06 at 0900 by not given

Receipt: received on 2016/06/07 at 1300 by MC

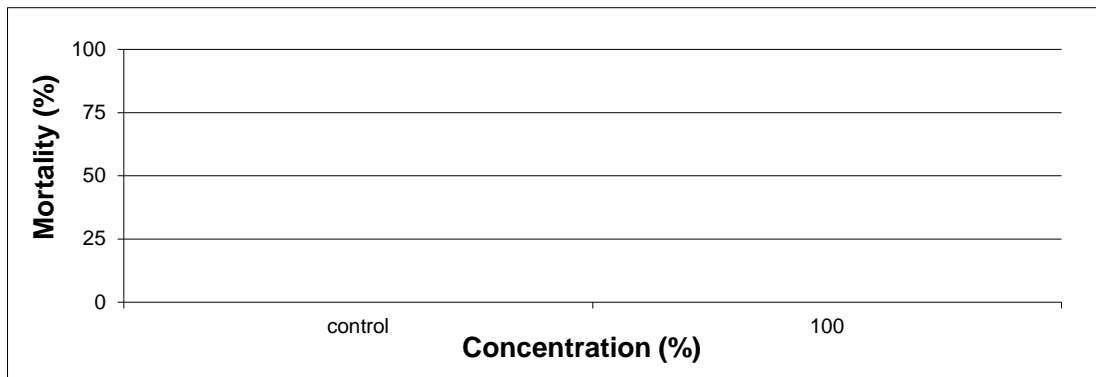
Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 14 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/06/08 ; ended on 2016/06/12

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	WL_BFWB_OUT_S P21_20160606_N	0	none



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0651-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160511TR)

Acclimation: 28 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.9; EC: 1669 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.7 (mg/L); temperature: 17 °C
hardness (mg CaCO₃/L): 721; colour: colourless; odour: -

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 8.5 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.19 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated May 25, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.48 (0.41-0.54) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.55 (0.42-0.68) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0651-01-TRS

Test Log:

Date	Day	Time	Technician
2016/06/08	0	1000	EP/BH
2016/06/09	1	0930	KLO
2016/06/10	2	1040	CB
2016/06/11	3	1225	CB
2016/06/12	4	1130	EP

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	7.4	7.9
4	7.8	8.0

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	486	1726
4	477	1704

Dissolved Oxygen (mg/L)

0	8.0	8.5
4	8.7	8.7

Temperature (°C)

0	15	15
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0651-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.0	0.3
2	3.0	0.2
3	3.5	0.6
4	3.2	0.4
5	3.0	0.3
6	3.2	0.4
7	3.4	0.5
8	3.1	0.4
9	3.0	0.3
10	3.2	0.4

Sample	Group Wet Weight (g)
control	3.8
100	4.0

average	3.2	0.4
sd	0.2	0.1
cv(%)	5.6	29.9

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient
of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: TEC164 Reference: 16-0651-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160606_N

Collection: collected on 2016/06/06 at 0900 by not given

Receipt: received on 2016/06/07 at 1300 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 14 °C, in good condition with no seals and no

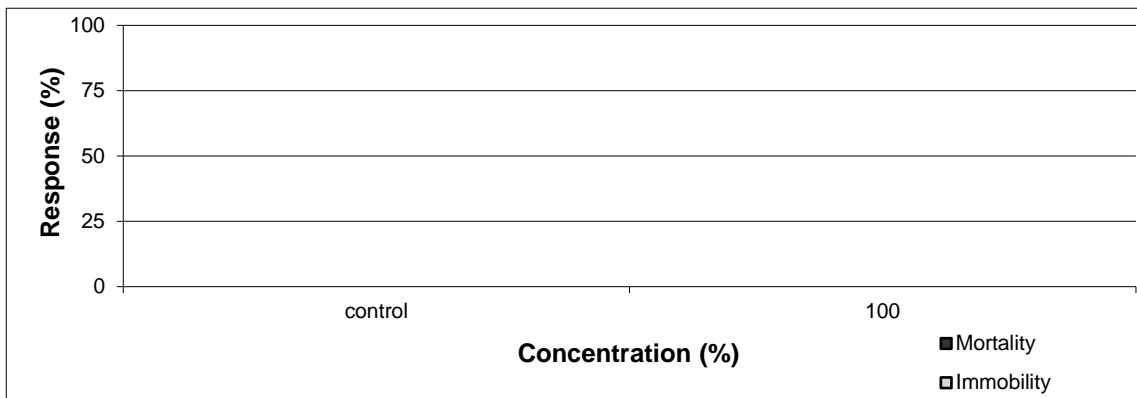
Description: type: water, collection method: grab

Test: started on 2016/06/07 ; ended on 2016/06/09

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160606_	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.



Senior Verifier

**Test Conditions**

Client: TEC164 Reference: 16-0651-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 6 days to first brood
17 neonates per average brood

Sample initial chemistry: pH: 7.9; EC: 1669 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.7 (mg/L); temperature: 17 °C
hardness (mg CaCO_3/L): 721; colour: colourless; odour: -

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 86 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0651-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated June 6, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.68 (0.65-0.70) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Test Data

Client: TEC164
Reference: 16-0651-01-DAS

Test Log:

Date	Day	Time	Technician
2016/06/07	0	1430	HS/EP
2016/06/08	1	1000	JW
2016/06/09	2	0930	HS

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.7	7.8	7.8	7.8	7.8	7.9
2	7.7	7.8	7.9	7.8	7.9	7.9

Day	Conductivity ($\mu\text{S/cm}$ @ 25°C)					
0	346	352	353	1634	1651	1648
2	335	345	344	1547	1552	1561

Day	Dissolved Oxygen (mg/L)					
0	7.9	7.8	7.8	7.9	7.9	8.0
2	7.7	7.7	7.8	7.2	7.2	7.2

Day	Temperature (°C)					
0	20	21	20	18	18	18
2	20	20	20	21	21	21

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10 (1F)	10	10 (2D)	10	10
2	10	10	10	10 (6D)	10 (3D)	10 (2D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0651-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None



Result Summary

Client: TEC164
Reference: 16-0651-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160606_N

Collection: collected on 2016/06/06 at 0900 by not given

Receipt: received on 2016/06/07 at 1300 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 14 °C, in good condition with no seals and no

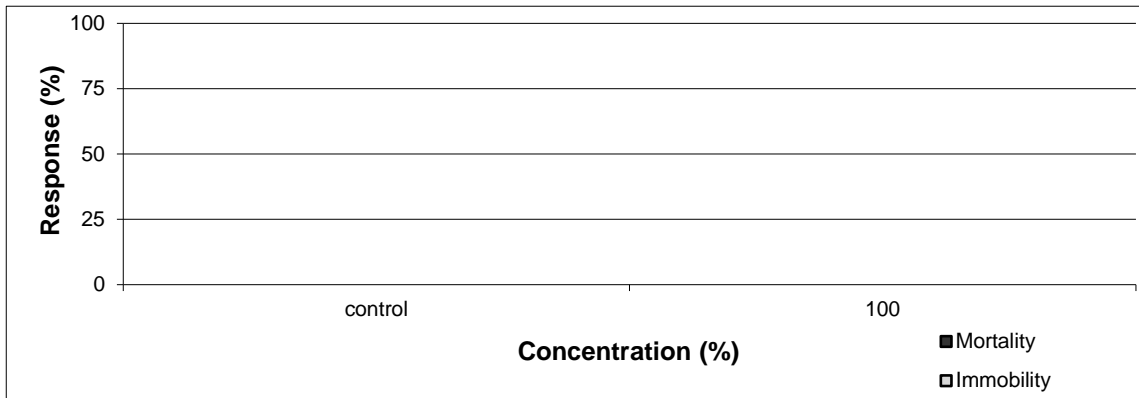
Description: type: water, collection method: grab

Test: started on 2016/06/07 ; ended on 2016/06/09

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160606_	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0651-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 6 days to first brood
17 neonates per average brood

Sample initial chemistry: pH: 7.9; EC: 1669 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.7 (mg/L); temperature: 17 °C
hardness (mg CaCO_3/L): 721; colour: colourless; odour: -

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must ≤ 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 86 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $10 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0651-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated June 6, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.68 (0.65-0.70) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Test Data

Client: TEC164
Reference: 16-0651-01-DAS

Test Log:

Date	Day	Time	Technician
2016/06/07	0	1430	HS/EP
2016/06/08	1	1005	JW
2016/06/09	2	0930	HS

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.8	7.9	7.8	7.8	7.8	7.8
2	7.6	7.7	7.7	8.1	8.2	8.2

Day	Conductivity (µS/cm @ 25°C)					
0	355	362	361	1644	1674	1682
2	352	359	366	1595	1653	1660

Day	Dissolved Oxygen (mg/L)					
0	9.2	9.2	9.2	9.4	9.4	9.3
2	9.4	9.3	9.3	9.4	9.3	9.3

Day	Temperature (°C)					
0	11	11	11	11	11	11
2	10	10	10	10	10	10

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10 (1D)	10	10
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0651-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
The test temperature was $10 \pm 2^{\circ}\text{C}$, as requested by the client

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, H₂S 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 OR 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.

Your P.O. #: 441369
Site Location: WLC AWTF

Attention:Greg Ross

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/06/23
Report #: R2204698
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B645519

Received: 2016/06/09, 09:36

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Daphnia magna Single Concentration-100%	1	N/A	2016/06/09	EENVSOP-00154	EPS 1 RM14 2nd ed

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====

This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B645519
Report Date: 2016/06/23

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: AK

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		OU2674	
Sampling Date		2016/06/08 09:00	
	UNITS	WL_BFWB_OUT_SP21_2016 0608_N	QC Batch
Daphnia Magna Bioassay			
Mortality	%	ATTACHED	8293389

Maxxam Job #: B645519
Report Date: 2016/06/23

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: AK

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.0°C
-----------	-------

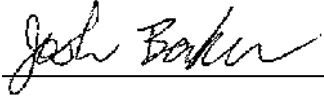
Results relate only to the items tested.

Maxxam Job #: B645519
Report Date: 2016/06/23

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: AK

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Joshua Baker, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B645519
Sample Number: OU2674-01

Test Result:

48 hrs Mortality % 20.0 Statistical Method:

Mean percent mortality:	<u>Sample</u>	20	<u>Control</u>	0
Sample Name :	WL_BFWB_OUT_SP21_20160608_N			Sample Matrix : Water
Description:	clear			<u>Sample Prior to Analysis:</u>
Sample Collected:	Jun 08, 2016 09:00 AM	Sampling Method :	N/A	pH: 7.5
Sample Collected By:	AK	Site Collection:	N/A	Temperature : 16 °C
Sample Received:	Jun 09, 2016 09:36 AM	Volume Received:	1 L	Dissolved Oxygen: 8.7 mg/L
Analysis Start :	Jun 09, 2016 11:51 AM	Temp.Upon Arrival:	8 °C	Sample Conductance: 1390 µS/cm
End :	Jun 11, 2016 11:34 AM	Storage:	2-6°C	Hardness: 600 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	21	7.8	355	7.7	0	0	0	0	20	7.8	351	7.9
0	21	7.9	360	7.8	0	0	0	0	20	7.9	355	7.9
0	21	8.0	360	7.8	0	0	0	0	20	7.9	357	7.9
100	21	7.6	1525	8.1	0	0	4	40.0	20	8.0	1455	7.9
100	21	7.6	1536	8.1	0	0	2	20.0	20	8.0	1459	8.0
100	21	7.6	1541	8.1	0	0	5	50.0	20	7.9	1473	7.9

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	2	20.0	2	20.0
100	4	40.0	3	30.0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 160 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
 Organisms per Vessel : 10 Pre-aeration Time : 0 min Rate of Pre-aeration : 25-50 mL/min/L
 Total # of Organisms Used : 60 Test Temperature : 20 ± 2 °C Test Hardness Adjusted : No
 Test Volume : 150 mL Vessel Volume : 225 mL Test pH Adjusted: No
 Loading Density : 15.0 mL/Daphnia Photoperiod : 16:8 (light: dark)

Test Organism : *Daphnia magna* Source : In House Culture
 Age at Test Initiation : <24 hrs Average Brood Size : 20.4
 Culture Photoperiod : 16:8 (light: dark) % Mortality within 7 days : 3.2
 Culture Temperature : 20 ± 2 °C Time To First Brood : 10 Days
 Culture Diet Pseudokirchnriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

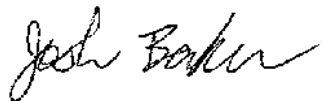
Job Number: B645519
Sample Number: OU2674-01

Reference chemical: Sodium Chloride
Test Date: Jun 02, 2016
Test Endpoint 48 hrs LC50 (95% confidence interval) : 6.16 (5.17, 7.34)g/L
Statistical Method : Untrimmed Spearman-Kärber
Historical Mean LC50 (warning limits) : 6.37 (4.61, 8.79) g/L
Concentration : 0,1,2.5,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Chelsea Tessier, Natasha Mouck



Verified By : Joshua Baker, Senior Analyst

Date: Jun 23, 2016 08:40 AM

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B678820
Sample Number: PM4565-01

Test Result:

48 hrs Mortality % 26% Statistical Method:

Mean percent mortality: Sample 26.7 Control 3.333

Sample Name : WL_BFWB_OUT_SP21_20160912_N

Sample Matrix : Water

Description: clear, colourless

Sample Prior to Analysis:

Sample Collected: Sep 12, 2016 09:00 AM

Sampling Method : N/A

pH: 7.5

Sample Collected By: AC

Site Collection: N/A

Temperature : 20 °C

Sample Received: Sep 13, 2016 09:51 AM

Volume Received: 1 L

Dissolved Oxygen: 8.9 mg/L

Analysis Start : Sep 14, 2016 02:10 PM

Temp.Upon Arrival: 2 °C

Sample Conductance: 1578 µS/cm

End : Sep 16, 2016 01:15 PM

Storage: 2-6°C

Hardness: 600 mg CaCO₃/L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	20	7.8	414	7.6	0	0	0	0	20	8.2	412	8.4
0	20	7.8	417	7.6	0	0	1	10.0	20	8.0	420	8.3
0	20	7.9	417	7.5	0	0	0	0	20	8.2	423	8.5
100	21	7.6	1610	7.9	0	0	1	10.0	19	8.2	1496	8.4
100	21	7.6	1620	7.9	0	0	0	0	20	8.2	1495	8.2
100	21	7.6	1619	7.9	0	0	0	0	20	8.1	1494	8.1

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	1	10.0	0	0
0	0	0	0	0
100	4	40.0	2	20.0
100	1	10.0	3	30.0
100	3	30.0	4	40.0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water

Hardness: 160 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)

Organisms per Vessel : 10 **Pre-aeration Time :** 30 min **Rate of Pre-aeration :** 25-50 mL/min/L

Total # of Organisms Used : 60 **Test Temperature :** 20 ± 2 °C **Test Hardness Adjusted :** No

Test Volume : 150 mL **Vessel Volume :** 225 mL **Test pH Adjusted:** No

Loading Density : 15.0 mL/Daphnia **Photoperiod :** 16:8 (light: dark)

Test Organism : *Daphnia magna* **Source :** In House Culture

Age at Test Initiation : <24 hrs **Average Brood Size :** 21.9

Culture Photoperiod : 16:8 (light: dark) **% Mortality within 7 days :** 0

Culture Temperature : 20 ± 2 °C **Time To First Brood :** 9 Days

Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

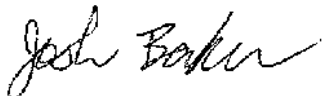
Job Number: B678820
Sample Number: PM4565-01

Reference chemical: Sodium Chloride
Test Endpoint 48 hrs LC50 (95% confidence interval) : 7.07 (5.00, 10.0)g/L
Historical Mean LC50 (warning limits) : 6.59 (5.17, 8.40) g/L
Test Date: Sep 12, 2016
Statistical Method : Binomial
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Chelsea Tessier, Michelle Hospedales, Natasha Mouck



Verified By : Joshua Baker, Senior Analyst

Date: Sep 22, 2016 02:44 PM

Your P.O. #: 441369
Site Location: WLC AWTF
Your C.O.C. #: 1 of 1

Attention:Greg Ross

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/06/23
Report #: R2204722
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B647204

Received: 2016/06/14, 09:40

Sample Matrix: SURFACE WATER
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Daphnia magna Single Concentration-100%	1	N/A	2016/06/15	EENVSOP-00154	EPS 1 RM14 2nd ed

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====

This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B647204
Report Date: 2016/06/23

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369

RESULTS OF CHEMICAL ANALYSES OF SURFACE WATER

Maxxam ID		OV2140	
Sampling Date		2016/06/13 09:00	
COC Number		1 of 1	
	UNITS	WL_BFWB_OUT_SP21_2016 0613_N	QC Batch
Daphnia Magna Bioassay			
Mortality	%	ATTACHED	8300486

Maxxam Job #: B647204
Report Date: 2016/06/23

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.0°C
-----------	-------

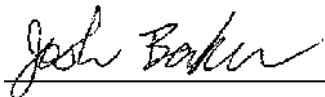
Results relate only to the items tested.

Maxxam Job #: B647204
Report Date: 2016/06/23

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Joshua Baker, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B647204
Sample Number: OV2140-01

Test Result:

48 hrs Mortality % 0 Statistical Method:

Mean percent mortality:	<u>Sample</u>	0	<u>Control</u>	0
Sample Name :	WL_BFWB_OUT_SP21_20160613_N			Sample Matrix : SURFACE WATER
Description:	Clear			Sample Prior to Analysis:
Sample Collected:	Jun 13, 2016 09:00 AM	Sampling Method :	N/A	pH: 7.9
Sample Collected By:	N/A	Site Collection:	N/A	Temperature : 19 °C
Sample Received:	Jun 14, 2016 09:40 AM	Volume Received:	1 L	Dissolved Oxygen: 9.4 mg/L
Analysis Start :	Jun 15, 2016 11:56 AM	Temp.Upon Arrival:	5 °C	Sample Conductance: 1451 µS/cm
End :	Jun 17, 2016 10:58 AM	Storage:	2-6°C	Hardness: 1000 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	20	8.0	349	8.1	0	0	0	0	20	7.9	355	7.7
0	20	8.0	352	8.1	0	0	0	0	20	8.0	354	7.7
0	20	8.0	352	8.2	0	0	0	0	19	8.1	376	8.1
100	20	7.9	1457	8.9	0	0	5	50.0	20	8.0	1400	7.7
100	20	7.9	1471	8.9	0	0	4	40.0	19	8.0	1446	7.5
100	20	7.9	1471	8.9	0	0	2	20.0	20	8.0	1440	7.3

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	1	10.0
100	0	0	1	10.0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 180 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
Organisms per Vessel : 10 **Pre-aeration Time :** 30 min **Rate of Pre-aeration :** 25-50 mL/min/L
Total # of Organisms Used : 60 **Test Temperature :** 20 ± 2 °C **Test Hardness Adjusted :** No
Test Volume : 150 mL **Vessel Volume :** 225 mL **Test pH Adjusted:** No
Loading Density : 15.0 mL/Daphnia **Photoperiod :** 16:8 (light: dark)

Test Organism : *Daphnia magna* **Source :** In House Culture
Age at Test Initiation : <24 hrs **Average Brood Size :** 27.6
Culture Photoperiod : 16:8 (light: dark) **% Mortality within 7 days :** 3.2
Culture Temperature : 20 ± 2 °C **Time To First Brood :** 8 Days
Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

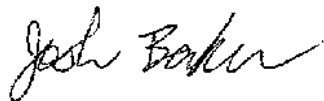
Job Number: B647204
Sample Number: OV2140-01

Reference chemical: Sodium Chloride
Test Date: Jun 02, 2016
Test Endpoint 48 hrs LC50 (95% confidence interval) : 6.16 (5.17, 7.34)g/L
Statistical Method : Untrimmed Spearman-Kärber
Historical Mean LC50 (warning limits) : 6.37 (4.61, 8.79) g/L
Concentration : 0,1,25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Arthur Juan Mathias, Chelsea Tessier, Natasha Mouck



Verified By : Joshua Baker, Senior Analyst

Date: Jun 23, 2016 09:00 AM



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/06/14
Report Date: 2016/06/23
Version: FINAL

Test Report

Client: TEC164
Reference: 16-0684
Billing: PO # 411634

A handwritten signature in black ink, appearing to read "Chris Rutz", is positioned above a horizontal line.

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



Trout (Single Concentration) Test Report

Result Summary

Client: TEC164
Reference: 16-0684-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160613_N

Collection: collected on 2016/06/13 at 0900 by not given

Receipt: received on 2016/06/14 at 0930 by MC

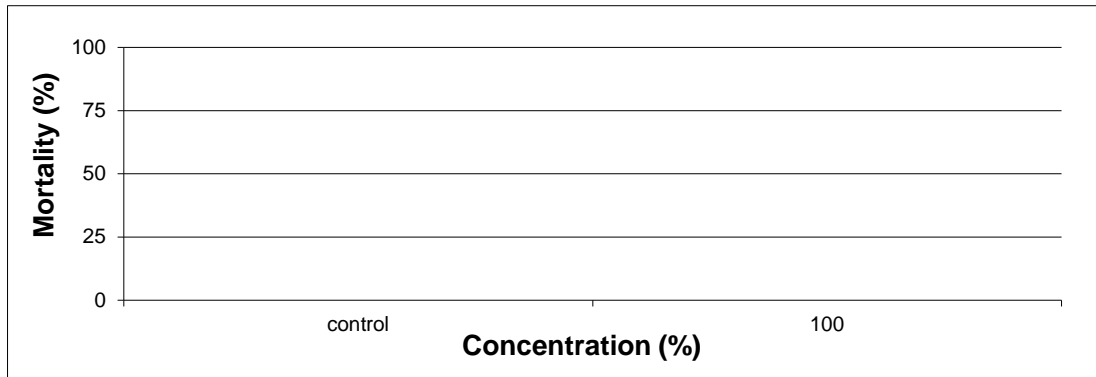
Containers: received 4 x 20 L carboys / 4 x 1 L bottle at 12 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/06/15 ; ended on 2016/06/19

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	WL_BFWB_OUT_S P21_20160613_N	0	none



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0684-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160511TR)

Acclimation: 35 days (must be ≥ 2 weeks)

Stock mortality: 0.0% (seven days preceding testing)

Sample initial chemistry: pH: 8.0; EC: 1807 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.5 (mg/L); temperature: 18 °C
hardness (mg CaCO₃/L): 807; colour: colourless; odour: -

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 8.7 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.17 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated May 25, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.48 (0.41-0.54) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.55 (0.42-0.68) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0684-01-TRS

Test Log:

Date	Day	Time	Technician
2016/06/15	0	0805	HS/JW
6/16/2016	1	0750	JW
6/17/2016	2	0945	CB
6/18/2016	3	1015	CB
6/19/2016	4	1015	BH

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	7.9	8.1
4	7.8	8.0

Conductivity ($\mu\text{S/cm}$ @ 25°C)

0	472	1864
4	481	1766

Dissolved Oxygen (mg/L)

0	8.7	8.7
4	8.7	8.9

Temperature (°C)

0	15	15
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0684-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.4	0.4
2	3.2	0.4
3	3.0	0.3
4	3.1	0.3
5	2.9	0.3
6	3.0	0.3
7	3.2	0.4
8	3.0	0.3
9	3.1	0.3
10	3.3	0.4

Sample	Group Wet Weight (g)
control	3.4
100	3.7

average	3.1	0.3
sd	0.2	0.1
cv(%)	5.0	15.2

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-0684-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160613_N

Collection: collected on 2016/06/13 at 0900 by not given

Receipt: received on 2016/06/14 at 0930 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottle at 12 °C, in good condition with no seals and no initials

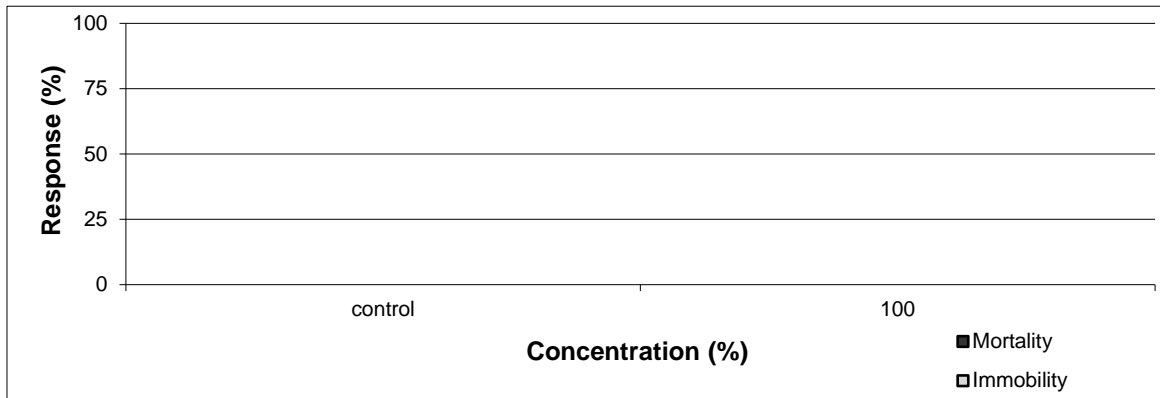
Description: type: water, collection method: grab

Test: started on 2016/06/14 ; ended on 2016/06/16

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_S P21_20160613_N	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0684-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 5 days to first brood
18 neonates per average brood

Sample initial chemistry: pH: 8.0; EC: 1807 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.5 (mg/L); temperature: 18 °C
hardness (mg CaCO_3/L): 807; colour: colourless; odour: -

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 92 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0684-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated June 6, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.68 (0.65-0.70) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0684-01-DAS

Test Log:

Date	Day	Time	Technician
2016/06/14	0	1545	KLO/BH
6/15/2016	1	1100	JW/EP
6/16/2016	2	1000	EP

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	8.0	7.9	7.9	8.3	8.3	8.3
2	8.1	8.0	8.0	8.1	8.2	8.2

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	360	365	365	1754	1825	1845
2	386	378	381	1765	1775	1815

Day	Dissolved Oxygen (mg/L)					
0	8.0	8.0	8.0	8.0	8.1	8.1
2	8.0	7.9	7.8	7.6	7.7	7.7

Day	Temperature (°C)					
0	19	19	19	19	18	18
2	19	20	20	20	20	20

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0684-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None



Result Summary

Client: TEC164
Reference: 16-0684-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160613_N

Collection: collected on 2016/06/13 at 0900 by not given

Receipt: received on 2016/06/14 at 0930 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottle at 12 °C, in good condition with no seals and no initials

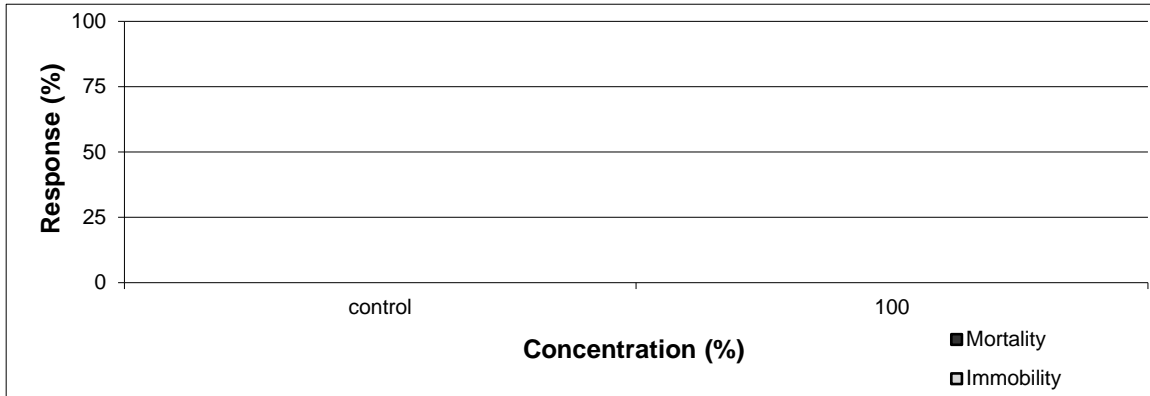
Description: type: water, collection method: grab

Test: started on 2016/06/14 ; ended on 2016/06/16

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_S P21_20160613_N	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0684-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 5 days to first brood
18 neonates per average brood

Sample initial chemistry: pH: 8.0; EC: 1807 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.5 (mg/L); temperature: 18 °C
hardness (mg CaCO₃/L): 807; colour: colourless; odour: -

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 92 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 10 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0684-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated June 6, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.68 (0.65-0.70) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0684-01-DAS

Test Log:

Date	Day	Time	Technician
2016/06/14	0	1550	KLO/BH
6/15/2016	1	1100	JW/EP
6/16/2016	2	1000	EP

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.9	7.9	7.9	8.1	8.1	8.1
2	6.9	7.4	7.6	8.1	8.2	8.2

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	350	364	365	1831	1897	1896
2	404	378	381	1870	1934	1915

Day	Dissolved Oxygen (mg/L)					
0	8.0	8.0	8.0	8.6	8.7	8.9
2	8.7	8.6	8.6	8.7	8.8	9.1

Day	Temperature (°C)					
0	12	12	12	11	11	11
2	12	12	11	11	11	11

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(1D)	10(2D)	10(3D)
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0684-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
The test temperature was $10 \pm 2^{\circ}\text{C}$, as requested by the client

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, H₂S 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.

Your P.O. #: 441369
Site Location: WLC AWTF

Attention:Greg Ross

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/06/29
Report #: R2208095
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B649648

Received: 2016/06/21, 09:15

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Daphnia magna Single Concentration-100%	1	N/A	2016/06/22	EENVSOP-00154	EPS 1 RM14 2nd ed

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====

This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B649648
Report Date: 2016/06/29

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: GF

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		OW4292	
Sampling Date		2016/06/20 09:00	
	UNITS	WL_BFWB_OUT_SP21_2016 0620_N	QC Batch
Daphnia Magna Bioassay			
Mortality	%	ATTACHED	8307650

Maxxam Job #: B649648
Report Date: 2016/06/29

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: GF

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.0°C
-----------	-------

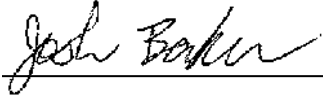
Results relate only to the items tested.

Maxxam Job #: B649648
Report Date: 2016/06/29

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: GF

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Joshua Baker, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B649648
Sample Number: OW4292-01

Test Result:

48 hrs Mortality % 0 Statistical Method:

Mean percent mortality:	<u>Sample</u>	0	<u>Control</u>	0
Sample Name :	WL_BFWB_OUT_SP21_20160620_N			Sample Matrix : Water
Description:	clear			<u>Sample Prior to Analysis:</u>
Sample Collected:	Jun 20, 2016 09:00 AM	Sampling Method :	N/A	pH: 7.5
Sample Collected By:	GF	Site Collection:	N/A	Temperature : 19 °C
Sample Received:	Jun 21, 2016 09:15 AM	Volume Received:	1 L	Dissolved Oxygen: 9.3 mg/L
Analysis Start :	Jun 22, 2016 12:03 PM	Temp.Upon Arrival:	5 °C	Sample Conductance: 1497 µS/cm
End :	Jun 24, 2016 11:35 AM	Storage:	2-6°C	Hardness: 380 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	21	7.9	358	7.8	0	0	0	0	20	7.8	356	7.6
0	21	7.9	360	7.8	0	0	0	0	20	7.8	362	7.6
0	21	8.0	360	7.8	0	0	0	0	20	8.0	364	7.7
100	20	7.6	1527	8.5	0	0	2	20.0	19	8.1	1491	7.6
100	20	7.6	1537	8.5	0	0	2	20.0	20	8.0	1497	7.4
100	20	7.6	1541	8.5	0	0	2	20.0	20	8.0	1502	7.3

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	1	10.0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 160 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
 Organisms per Vessel : 10 Pre-aeration Time : 30 min Rate of Pre-aeration : 25-50 mL/min/L
 Total # of Organisms Used : 60 Test Temperature : 20 ± 2 °C Test Hardness Adjusted : No
 Test Volume : 150 mL Vessel Volume : 225 mL Test pH Adjusted: No
 Loading Density : 15.0 mL/Daphnia Photoperiod : 16:8 (light: dark)

Test Organism : *Daphnia magna* Source : In House Culture
 Age at Test Initiation : <24 hrs Average Brood Size : 19.6
 Culture Photoperiod : 16:8 (light: dark) % Mortality within 7 days : 0
 Culture Temperature : 20 ± 2 °C Time To First Brood : 8 Days
 Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

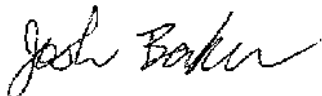
Job Number: B649648
Sample Number: OW4292-01

Reference chemical: Sodium Chloride
Test Endpoint 48 hrs LC50 (95% confidence interval) : 7.07 (5.00, 10.0)g/L
Historical Mean LC50 (warning limits) : 6.32 (4.59, 8.70) g/L
Test Date: Jun 18, 2016
Statistical Method : Binomial
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Chelsea Tessier, Natasha Mouck



Verified By : Joshua Baker, Senior Analyst

Date: Jun 29, 2016 02:53 PM



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/06/21
Report Date: 2016/07/04
Version: FINAL

Test Report

Client: TEC164
Reference: 16-0716
Billing: PO # 411634

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



Trout (Single Concentration) Test Report

Result Summary

Client: TEC164
Reference: 16-0716-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160620_N

Collection: collected on 2016/06/20 at 0900 by not given

Receipt: received on 2016/06/21 at 1100 by MC

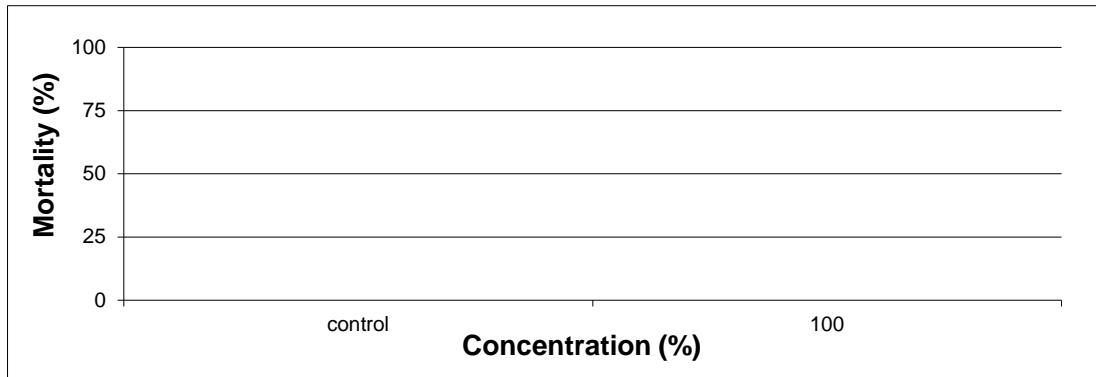
Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/06/21 ; ended on 2016/06/25

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	WL_BFWB_OUT_S P21_20160620_N	0	none



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0716-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160526TR)

Acclimation: 26 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.6; EC: 1946 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.9 (mg/L); temperature: 19 °C
hardness (mg CaCO₃/L): 698; colour: colourless; odour: -

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 60 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 8.9 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.225 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated June 9, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.38 (0.30-0.45) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.54 (0.41-0.68) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0716-01-TRS

Test Log:

Date	Day	Time	Technician
2016/06/21	0	1530	BH
2016/06/22	1	0800	EP
2016/06/23	2	0830	KLO
2016/06/24	3	0830	CB
2016/06/25	4	0900	CB

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	7.8	7.8
4	8.2	8.2

	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)	
--	--	--

0	476	1947
4	456	1830

	Dissolved Oxygen (mg/L)	
--	-------------------------	--

0	8.2	8.9
4	8.8	8.7

	Temperature (°C)	
--	------------------	--

0	16	14
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

	Mortality (%)	
--	---------------	--

4	0	0
---	---	---

	Stressed (%)	
--	--------------	--

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0716-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.8	0.6
2	3.7	0.5
3	3.5	0.4
4	3.4	0.4
5	3.2	0.4
6	3.4	0.4
7	3.7	0.5
8	3.7	0.6
9	3.2	0.3
10	3.3	0.4

Sample	Group Wet Weight (g)
control	4.5
100	4.7

average	3.5	0.5
sd	0.2	0.1
cv(%)	6.4	21.6

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Comments/Statistics

Test Result Comments:

The result of the reference toxicant test initiated on 2016/06/09 was outside the warning limit. This is expected to happen 5% of the time. An investigation occurred and all testing and culturing procedures were followed appropriately.

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-0716-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160620_N

Collection: collected on 2016/06/20 at 0900 by not given

Receipt: received on 2016/06/21 at 1100 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no

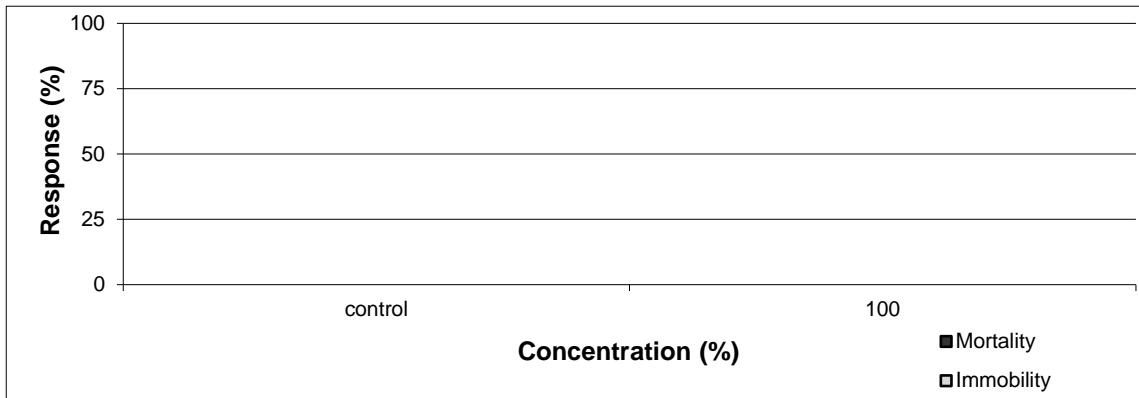
Description: type: water, collection method: grab

Test: started on 2016/06/21 ; ended on 2016/06/23

Result:

Sample	Client Code	Average		Comment
		Mortality (%)	Immortality (%)	
control	lab control	0	0	
100	WL_BFWB_OUT_S P21_20160620_N	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0716-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 7 days to first brood
28 neonates per average brood

Sample initial chemistry: pH: 7.6; EC: 1946 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.9 (mg/L); temperature: 19 °C
hardness (mg CaCO_3/L): 698; colour: colourless; odour: -

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 84 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0716-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated June 20, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.72 (0.70-0.74) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.67-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Test Data

Client: TEC164
Reference: 16-0716-01-DAS

Test Log:

Date	Day	Time	Technician
2016/06/21	0	1500	HS/LC
2016/06/22	1	0900	HS/LC
2016/06/23	2	1055	JN/LC

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.9	8.0	8.0	8.2	8.2	8.2
2	7.7	7.7	7.8	8.2	8.2	8.2

Day	Conductivity (μ S/cm @ 25°C)					
0	347	362	364	1952	1964	1963
2	312	322	329	1652	1688	1666

Day	Dissolved Oxygen (mg/L)					
0	8.0	8.0	8.0	8.6	8.6	8.6
2	7.7	7.7	7.6	7.6	7.6	7.6

Day	Temperature (°C)					
0	18	18	18	18	18	18
2	21	21	21	21	21	21

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0716-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None



Result Summary

Client: TEC164
Reference: 16-0716-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160620_N

Collection: collected on 2016/06/20 at 0900 by not given

Receipt: received on 2016/06/21 at 1100 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no

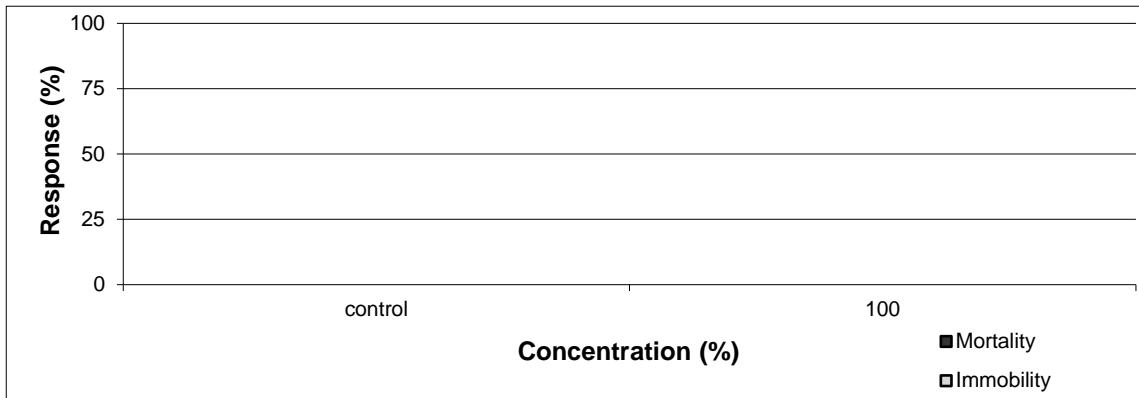
Description: type: water, collection method: grab

Test: started on 2016/06/21 ; ended on 2016/06/23

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_S P21_20160620_N	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0716-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
28 neonates per average brood

Sample initial chemistry: pH: 7.6; EC: 1946 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.9 (mg/L); temperature: 19 °C
hardness (mg CaCO_3/L): 698; colour: colourless; odour: -

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 84 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $10 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0716-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated June 20, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.72 (0.70-0.74) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.67-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0716-01-DAS

Test Log:

Date	Day	Time	Technician
2016/06/21	0	1530	HS/LC
2016/06/22	1	0900	HS/LC
2016/06/23	2	1055	JN/LC

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.9	7.9	7.9	8.1	8.1	8.1
2	7.7	7.7	7.8	8.3	8.3	8.3

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	368	365	368	1961	1989	2050
2	320	317	324	1721	1727	1726

Day	Dissolved Oxygen (mg/L)					
0	8.9	8.9	9.0	9.5	9.5	9.5
2	9.0	9.0	9.1	9.2	9.1	9.1

Day	Temperature (°C)					
0	11	11	11	11	11	11
2	11	11	11	11	11	11

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0716-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
The test temperature was $10 \pm 2^{\circ}\text{C}$, as requested by the client

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, H₂S 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.

Your P.O. #: 441369
Site Location: WLC AWTF

Attention:Greg Ross

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/07/12
Report #: R2214026
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B652002

Received: 2016/06/28, 09:20

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Daphnia magna Single Concentration-100%	1	N/A	2016/06/28	EENVSOP-00154	EPS 1 RM14 2nd ed

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====

This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B652002
Report Date: 2016/07/12

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: GF

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		OX6954	
Sampling Date		2016/06/27 09:00	
	UNITS	WL_BFWB_OUT_SP21_2016 0627_N	QC Batch
Daphnia Magna Bioassay			
Mortality	%	ATTACHED	8313597

Maxxam Job #: B652002
Report Date: 2016/07/12

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: GF

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.0°C
-----------	-------

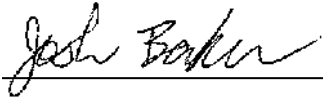
Results relate only to the items tested.

Maxxam Job #: B652002
Report Date: 2016/07/12

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: GF

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Joshua Baker, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B652002
Sample Number: OX6954-01

Test Result:

48 hrs Mortality % 0 Statistical Method:

Mean percent mortality:	<u>Sample</u>	0	<u>Control</u>	0
Sample Name :	WL_BFWB_OUT_SP21_20160627_N			Sample Matrix : Water
Description:	clear			Sample Prior to Analysis:
Sample Collected:	Jun 27, 2016 09:00 AM	Sampling Method :	N/A	pH: 7.5
Sample Collected By:	GF	Site Collection:	N/A	Temperature : 20 °C
Sample Received:	Jun 28, 2016 09:20 AM	Volume Received:	1 L	Dissolved Oxygen: 9.0 mg/L
Analysis Start :	Jun 28, 2016 11:54 AM	Temp.Upon Arrival:	8 °C	Sample Conductance: 1515 µS/cm
End :	Jun 30, 2016 11:53 AM	Storage:	2-6°C	Hardness: 1000 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	21	8.3	359	7.8	0	0	0	0	20	8.0	357	7.8
0	21	8.1	360	7.8	0	0	0	0	20	8.0	363	7.8
0	21	8.1	360	7.8	0	0	0	0	20	8.0	357	7.8
100	20	7.5	1542	8.4	0	0	1	10.0	20	7.8	1522	7.5
100	20	7.5	1549	8.5	0	0	0	0	20	8.0	1474	7.6
100	20	7.5	1550	8.5	0	0	0	0	20	7.8	1489	7.6

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	0	0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 180 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
Organisms per Vessel : 10 **Pre-aeration Time :** 30 min **Rate of Pre-aeration :** 25-50 mL/min/L
Total # of Organisms Used : 60 **Test Temperature :** 20 ± 2 °C **Test Hardness Adjusted :** No
Test Volume : 150 mL **Vessel Volume :** 225 mL **Test pH Adjusted:** No
Loading Density : 15.0 mL/Daphnia **Photoperiod :** 16:8 (light: dark)

Test Organism : *Daphnia magna* **Source :** In House Culture
Age at Test Initiation : <24 hrs **Average Brood Size :** 31.0
Culture Photoperiod : 16:8 (light: dark) **% Mortality within 7 days :** 0
Culture Temperature : 20 ± 2 °C **Time To First Brood :** 8 Days
Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

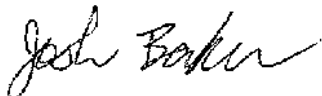
Job Number: B652002
Sample Number: OX6954-01

Reference chemical: Sodium Chloride
Test Endpoint 48 hrs LC50 (95% confidence interval) : 7.07 (5.00, 10.0)g/L
Historical Mean LC50 (warning limits) : 6.32 (4.59, 8.70) g/L
Test Date: Jun 18, 2016
Statistical Method : Binomial
Concentration : 0,1,25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Arthur Juan Mathias, Chelsea Tessier



Verified By : Joshua Baker, Senior Analyst

Date: Jul 12, 2016 04:26 PM



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/06/28
Report Date: 2016/07/07
Version: FINAL

Test Report

Client: TEC164
Reference: 16-0743
Billing: PO # 411634

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



Trout (Single Concentration) Test Report

Result Summary

Client: TEC164
Reference: 16-0743-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160627_N

Collection: collected on 2016/06/27 at 0900 by JT

Receipt: received on 2016/06/28 at 0930 by MC

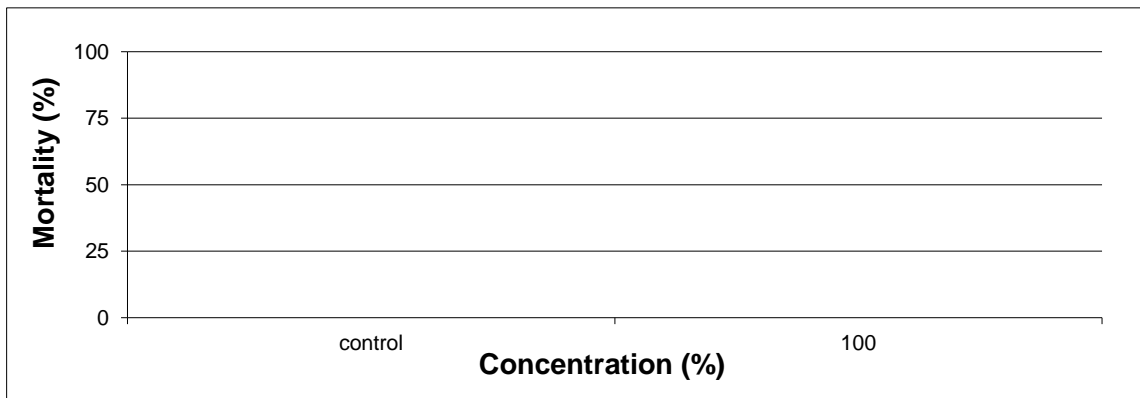
Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/06/29 ; ended on 2016/07/03

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	WL_BFWB_OUT_S P21_20160627_N	0	none



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0743-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160526TR)

Acclimation: 34 days (must be ≥ 2 weeks)

Stock mortality: 0.3% (seven days preceding testing)

Sample initial chemistry: pH: 7.5; EC: 1620 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.8 (mg/L); temperature: 21 °C
hardness (mg CaCO₃/L): 746; colour: colourless; odour: organic

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 8.8 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.145 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated June 9, 2016; current results (96-h LC50 and 95% confidence limits) = 0.38 (0.30-0.45) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.54 (0.41-0.68) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0743-01-TRS

Test Log:

Date	Day	Time	Technician
2016/06/29	0	1435	JW/LC
2016/06/30	1	1000	CB
2016/07/01	2	0945	ML
2016/07/02	3	0850	JW
2016/07/03	4	0945	EP

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

pH (units)

0	8.0	7.8
4	8.0	8.1

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	394	1807
4	393	1681

Dissolved Oxygen (mg/L)

0	8.8	8.8
4	8.6	8.7

Temperature (°C)

0	15	15
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0743-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.0	0.3
2	3.1	0.3
3	3.0	0.2
4	3.1	0.3
5	3.2	0.4
6	3.1	0.3
7	3.0	0.2
8	3.0	0.3
9	2.9	0.3
10	3.0	0.3

Sample	Group Wet Weight (g)
control	2.9
100	2.8

average	3.0	0.3
sd	0.1	0.1
cv(%)	2.8	19.6

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient
of variation

Comments/Statistics

Test Result Comments:

The result of the reference toxicant test initiated on 2016/06/09 was outside the warning limit. This is expected to happen 5% of the time. An investigation occurred and all testing and culturing procedures were followed appropriately.

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-0743-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160627_N

Collection: collected on 2016/06/27 at 0900 by JT

Receipt: received on 2016/06/28 at 0930 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no

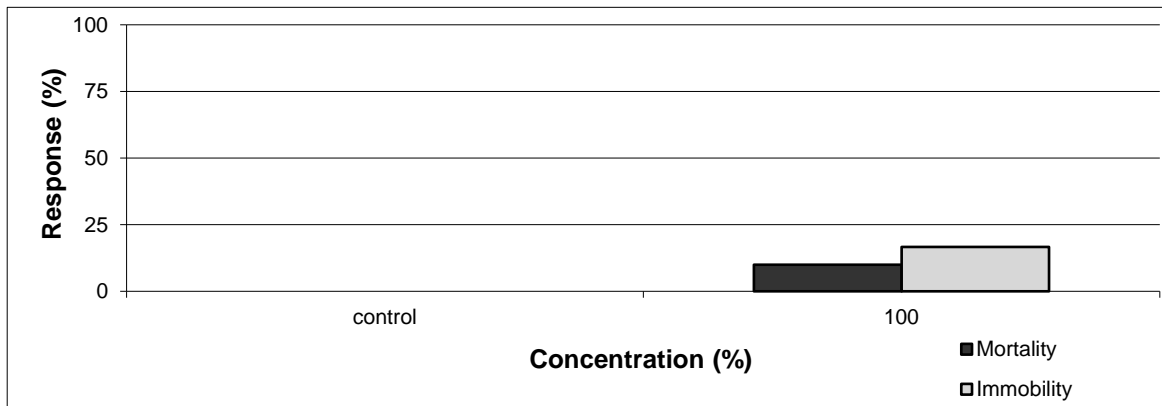
Description: type: water, collection method: grab

Test: started on 2016/06/28 ; ended on 2016/06/30

Result:

Sample	Client Code	Average		Comment
		Mortality (%)	Immobility (%)	
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160627_	10	17	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0743-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 9 days to first brood
25 neonates per average brood

Sample initial chemistry: pH: 7.5; EC: 1620 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.8 (mg/L); temperature: 21 °C
hardness (mg CaCO₃/L): 746; colour: colourless; odour: organic

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 83 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 20 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0743-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated June 20, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.72 (0.70-0.74) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.67-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Test Data

Client: TEC164 Reference: 16-0743-01-DAS

Test Log:

Date	Day	Time	Technician
2016/06/28	0	1445	HS
2016/06/29	1	0915	JW
2016/06/30	2	0900	JW/LC

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.7	7.7	7.8	8.1	8.1	8.1
2	7.6	7.7	7.8	7.8	8.0	8.0

Day	Conductivity (µS/cm @ 25°C)					
0	314	319	321	1663	1683	1692
2	346	357	359	1693	1831	1801

Day	Dissolved Oxygen (mg/L)					
0	7.7	7.8	7.8	8.1	8.1	8.1
2	7.6	7.6	7.7	7.8	7.6	7.6

Day	Temperature (°C)					
0	20	20	20	19	19	19
2	21	20	20	21	21	21

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(2D)	10(3D)	10(3F,6D)
2	10	10	10	9(2I,9D)	10(10D)	8(5D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	10	0	20

Day	Immobility (%)					
2	0	0	0	30	0	20



Comments/Statistics

Client: TEC164 Reference: 16-0743-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None



Result Summary

Client: TEC164
Reference: 16-0743-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160627_N

Collection: collected on 2016/06/27 at 0900 by JT

Receipt: received on 2016/06/28 at 0930 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no

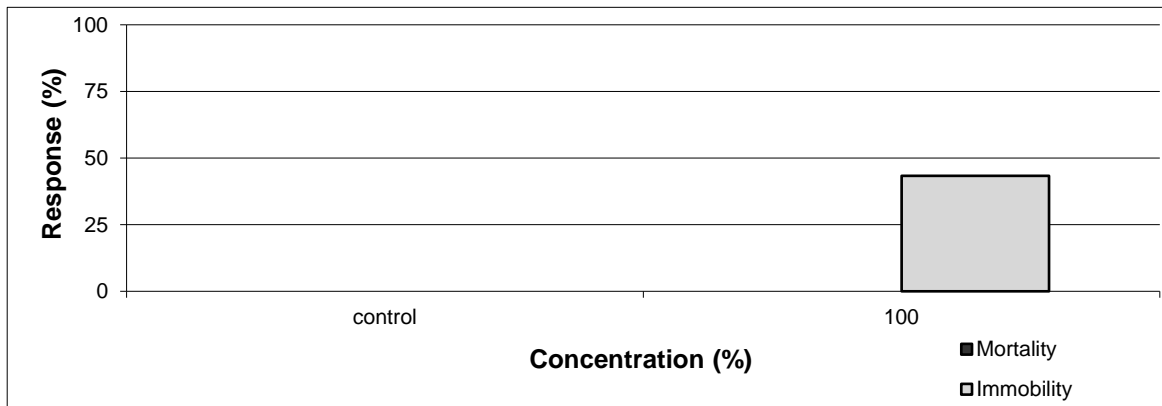
Description: type: water, collection method: grab

Test: started on 2016/06/28 ; ended on 2016/06/30

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160627_	0	43	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0743-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 9 days to first brood
25 neonates per average brood

Sample initial chemistry: pH: 7.5; EC: 1620 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.8 (mg/L); temperature: 21 °C
hardness (mg CaCO₃/L): 746; colour: colourless; odour: organic

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 83 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 10 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0743-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated June 20, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.72 (0.70-0.74) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.67-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Test Data

Client: TEC164 Reference: 16-0743-01-DAS

Test Log:

Date	Day	Time	Technician
2016/06/28	0	1415	HS
2016/06/29	1	0920	JW
2016/06/30	2	0900	JW/LC

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.7	7.8	7.8	7.4	7.4	7.5
2	7.5	7.6	7.7	8.1	8.2	8.2

Day	Conductivity (µS/cm @ 25°C)					
0	319	325	328	1712	1738	1754
2	365	363	336	1889	1922	1945

Day	Dissolved Oxygen (mg/L)					
0	8.5	8.5	8.6	9.1	9.1	9.1
2	8.6	8.5	8.7	8.9	8.9	9.0

Day	Temperature (°C)					
0	11	11	11	11	11	11
2	11	11	11	11	11	11

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(6D)	10(3F,7D)	10(2F,9D)
2	10	10	10	10(4D,3I)	10(6D,5I)	10(6D,5I)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	30	50	50



Comments/Statistics

Client: TEC164 Reference: 16-0743-01-DAS

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

The test temperature was $10 \pm 2^{\circ}\text{C}$, as requested by the client

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, H₂S 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 OR 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.



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/07/05
Report Date: 2016/07/14
Version: FINAL

Test Report

Client: TEC164
Reference: 16-0777
Billing: PO # 411634

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



Trout (Single Concentration) Test Report

Result Summary

Client: TEC164
Reference: 16-0777-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160704_N

Collection: collected on 2016/07/04 at 0900 by not given

Receipt: received on 2016/07/05 at 1110 by MC

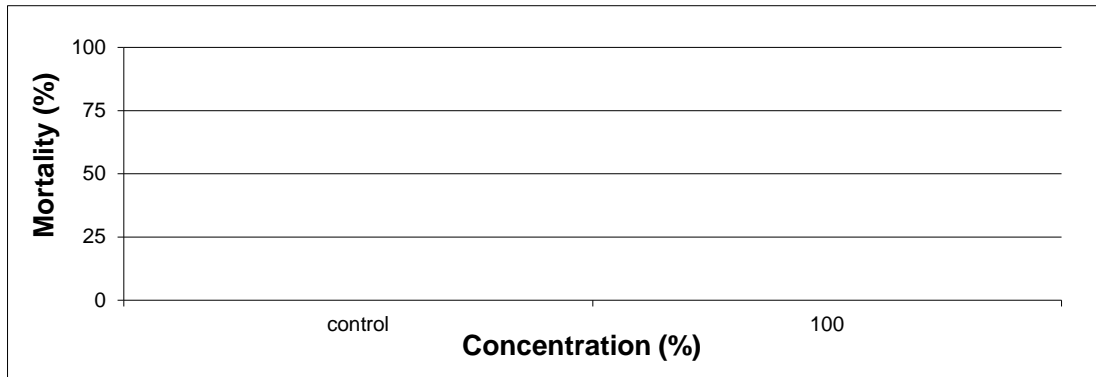
Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/07/06 ; ended on 2016/07/10

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	WL_BFWB_OUT_S P21_20160704_N	0	none



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0777-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Sam Livingston (Batch 20160526TR)

Acclimation: 41 days (must be ≥ 2 weeks)

Stock mortality: 0.2% (seven days preceding testing)

Sample initial chemistry: pH: 7.4; EC: 1962 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.5 (mg/L); temperature: 14 °C
hardness (mg CaCO₃/L): 950; colour: colourless; odour: -

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 8.8 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.15 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated June 9, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.38 (0.30-0.45) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.54 (0.41-0.68) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0777-01-TRS

Test Log:

Date	Day	Time	Technician
2016/07/06	0	0820	JW/EP
2016/07/07	1	0745	KLO
2016/07/08	2	1030	CB
2016/07/09	3	1030	ML
2016/07/10	4	1045	HS/LC

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	7.8	7.6
4	8.1	8.0

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	466	1936
4	490	1850

Dissolved Oxygen (mg/L)

0	8.8	8.8
4	8.7	8.8

Temperature (°C)

0	15	15
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0777-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.2	0.3
2	2.7	0.3
3	3.2	0.4
4	3.3	0.4
5	3.2	0.3
6	3.3	0.4
7	3.0	0.2
8	3.1	0.3
9	3.0	0.2
10	2.9	0.2

Sample	Group Wet Weight (g)
control	3.0
100	3.3

average	3.1	0.3
sd	0.2	0.1
cv(%)	6.2	27.2

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient
of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-0777-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160704_N

Collection: collected on 2016/07/04 at 0900 by not given

Receipt: received on 2016/07/05 at 1110 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no

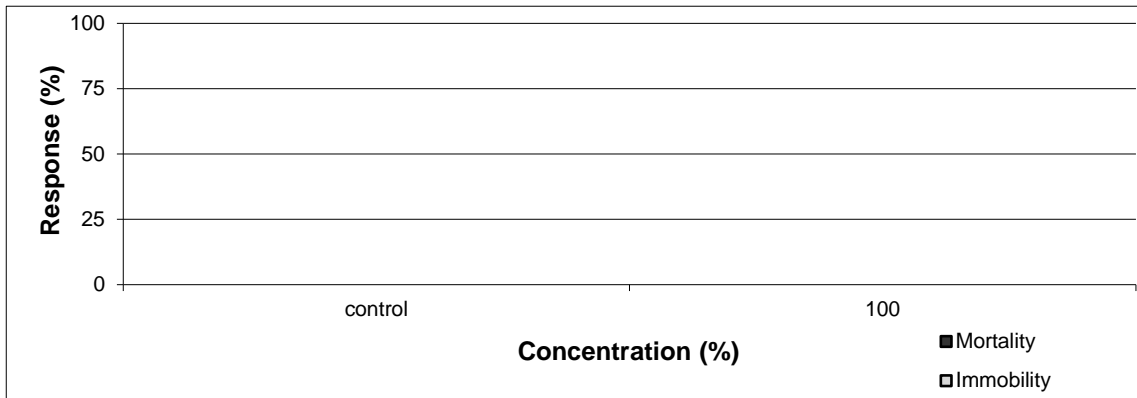
Description: type: water, collection method: grab

Test: started on 2016/07/05 ; ended on 2016/07/07

Result:

Sample	Client Code	Average		Comment
		Mortality (%)	Immortality (%)	
control	lab control	0	0	
100	WL_BFWB_OUT_S P21_20160704_N	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0777-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
25 neonates per average brood

Sample initial chemistry: pH: 7.4; EC: 1962 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.5 (mg/L); temperature: 14 °C
hardness (mg CaCO_3/L): 950; colour: colourless; odour: -

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 88 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0777-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated July 7, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.69 (0.66-0.71) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.66-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0777-01-DAS

Test Log:

Date	Day	Time	Technician
2016/07/05	0	1450	EP/LC
2016/07/06	1	1030	JW/LC
2016/07/07	2	0945	EP/LC

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.7	7.8	7.8	8.1	8.1	8.1
2	7.7	8.0	7.9	8.1	8.2	8.2

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	335	346	349	1932	1954	1956
2	346	352	354	1736	1831	1859

Day	Dissolved Oxygen (mg/L)					
0	7.7	7.7	7.8	7.8	7.9	8.0
2	7.6	7.7	7.7	7.7	7.7	7.7

Day	Temperature (°C)					
0	19	19	19	20	20	20
2	21	21	21	21	21	21

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10 (6D)	10 (1F,7D)	10 (6D)
2	10	10	10	10 (8D)	10 (9D)	10 (10D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0777-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None



Result Summary

Client: TEC164
Reference: 16-0777-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160704_N

Collection: collected on 2016/07/04 at 0900 by not given

Receipt: received on 2016/07/05 at 1110 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no

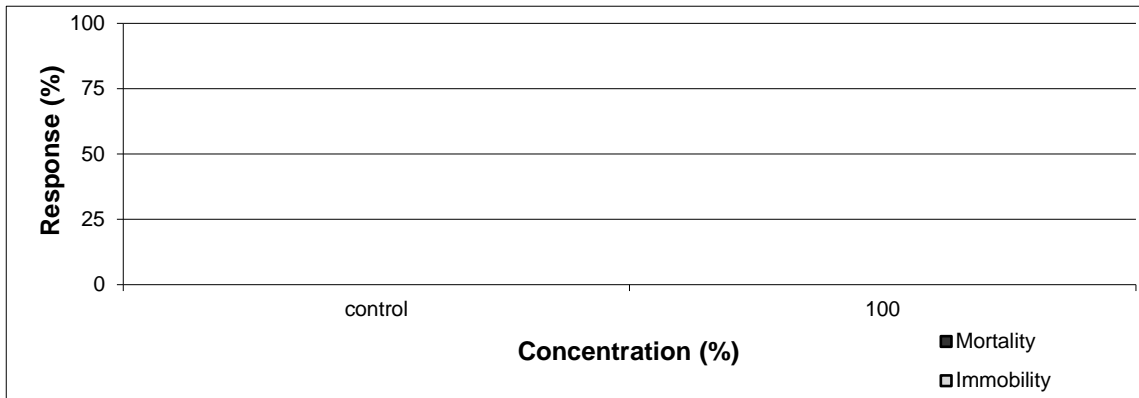
Description: type: water, collection method: grab

Test: started on 2016/07/05 ; ended on 2016/07/07

Result:

Sample	Client Code	Average		Comment
		Mortality (%)	Immortality (%)	
control	lab control	0	0	
100	WL_BFWB_OUT_S P21_20160704_N	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0777-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 7%

Culture brood data: 9 days to first brood
28 neonates per average brood

Sample initial chemistry: pH: 7.4; EC: 1962 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.5 (mg/L); temperature: 14 °C
hardness (mg CaCO_3/L): 950; colour: colourless; odour: -

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 88 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $10 \pm 3^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0777-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated July 7, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.69 (0.66-0.71) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.66-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Test Data

Client: TEC164
Reference: 16-0777-01-DAS

Test Log:

Date	Day	Time	Technician
2016/07/05	0	1530	EP/LC
2016/07/06	1	1030	JW/LC
2016/07/07	2	0930	EP/LC

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.9	7.9	7.9	8.1	8.1	8.1
2	7.6	7.6	7.6	8.2	8.3	8.3

Day	Conductivity (µS/cm @ 25°C)					
0	361	363	363	1964	2060	2060
2	348	356	348	1939	1977	1937

Day	Dissolved Oxygen (mg/L)					
0	8.1	8.2	8.1	8.3	8.4	8.4
2	8.6	8.5	9.0	9.1	9.1	9.1

Day	Temperature (°C)					
0	10	10	10	10	10	10
2	12	13	13	13	13	13

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10(6D)	10(8D)	10(7D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0777-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
The test temperature was $10 \pm 3^{\circ}\text{C}$, as requested by the client

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, H₂S 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.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B654274
Sample Number: OY8918-01

Test Result:

48 hrs Mortality % 6.67 Statistical Method:

Mean percent mortality: Sample 6.67 Control 0

Sample Name : WL_BFWB_OUT_SP21_20160704_N

Sample Matrix : Water

Description: clear

Sample Prior to Analysis:

Sample Collected: Jul 04, 2016 09:00 AM

Sampling Method : N/A

pH: 7.3

Sample Collected By: KC

Site Collection: N/A

Temperature : 19 °C

Sample Received: Jul 05, 2016 08:52 AM

Volume Received: 1 L

Dissolved Oxygen: 8.6 mg/L

Analysis Start : Jul 06, 2016 10:21 AM

Temp.Upon Arrival: 0 °C

Sample Conductance: 1552 µS/cm

End : Jul 08, 2016 09:30 AM

Storage: 2-6°C

Hardness: 1000 mg CaCO₃/L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	21	7.9	361	7.4	0	0	0	0	20	7.9	355	7.4
0	21	7.9	364	7.5	0	0	0	0	20	8.0	362	7.5
0	21	8.0	364	7.5	0	0	0	0	20	8.0	360	7.5
100	21	7.4	1608	7.9	0	0	0	0	20	8.0	1503	7.5
100	21	7.5	1619	7.9	0	0	0	0	20	8.0	1519	7.6
100	21	7.5	1626	8.0	0	0	0	0	20	8.0	1527	7.3

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	1	10.0
100	2	20.0	0	0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water

Hardness: 180 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)

Organisms per Vessel : 10 **Pre-aeration Time :** 30 min **Rate of Pre-aeration :** 25-50 mL/min/L

Total # of Organisms Used : 60 **Test Temperature :** 20 ± 2 °C **Test Hardness Adjusted :** No

Test Volume : 150 mL **Vessel Volume :** 225 mL **Test pH Adjusted:** No

Loading Density : 15.0 mL/Daphnia **Photoperiod :** 16:8 (light: dark)

Test Organism : *Daphnia magna* **Source :** In House Culture

Age at Test Initiation : <24 hrs **Average Brood Size :** 30.9

Culture Photoperiod : 16:8 (light: dark) **% Mortality within 7 days :** 4.8

Culture Temperature : 20 ± 2 °C **Time To First Brood :** 8 Days

Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

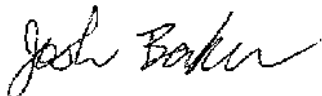
Job Number: B654274
Sample Number: OY8918-01

Reference chemical: Sodium Chloride
Test Endpoint 48 hrs LC50 (95% confidence interval) : 7.07 (5.00, 10.0)g/L
Historical Mean LC50 (warning limits) : 6.34 (4.59, 8.76) g/L
Test Date: Jul 01, 2016
Statistical Method : Binomial
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Chelsea Tessier



Verified By : Joshua Baker, Senior Analyst

Date: Jul 12, 2016 05:21 PM

Your P.O. #: 441369
Site Location: WLC AWTF

Attention:CHRIS STROICH

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/07/26
Report #: R2222675
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B656693

Received: 2016/07/12, 09:31

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Daphnia magna Single Concentration-100%	1	N/A	2016/07/13	EENVSOP-00154	EPS 1 RM14 2nd ed

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====

This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B656693
Report Date: 2016/07/26

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: AK

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		PA1657	
Sampling Date		2016/07/11 09:00	
	UNITS	WL_BFWB_OUT_SP21_2016 0711_N	QC Batch
Daphnia Magna Bioassay			
Mortality	%	ATTACHED	8328250

Maxxam Job #: B656693
Report Date: 2016/07/26

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: AK

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.7°C
-----------	-------

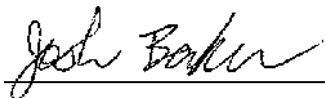
Results relate only to the items tested.

Maxxam Job #: B656693
Report Date: 2016/07/26

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: AK

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Joshua Baker, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B656693
Sample Number: PA1657-01

Test Result:

48 hrs Mortality % 0% Statistical Method:

Mean percent mortality: Sample 0 Control 3.333

Sample Name : WL_BFWB_OUT_SP21_20160711_N

Sample Matrix : Water

Description: Clear, colourless

Sample Prior to Analysis:

Sample Collected: Jul 11, 2016 09:00 AM

Sampling Method : N/A

pH: 7.4

Sample Collected By: AK

Site Collection: N/A

Temperature : 18 °C

Sample Received: Jul 12, 2016 09:31 AM

Volume Received: 1 L

Dissolved Oxygen: 9.0 mg/L

Analysis Start : Jul 13, 2016 10:47 AM

Temp.Upon Arrival: 7 °C

Sample Conductance: 1535 µS/cm

End : Jul 15, 2016 10:13 AM

Storage: 2-6°C

Hardness: 1000 mg CaCO₃/L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	21	7.8	360	7.2	0	0	0	0	20	7.9	355	7.6
0	21	7.9	362	7.3	0	0	0	0	20	8.0	358	7.6
0	21	7.9	363	7.3	0	0	0	0	20	8.0	358	7.6
100	20	7.6	1580	8.0	0	0	0	0	20	7.9	1552	7.2
100	20	7.6	1592	8.0	0	0	0	0	20	8.1	1550	7.4
100	19	7.6	1587	8.0	0	0	0	0	20	8.1	1557	7.4

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	1	10.0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	0	0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water

Hardness: 180 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)

Organisms per Vessel : 10 **Pre-aeration Time :** 30 min **Rate of Pre-aeration :** 25-50 mL/min/L

Total # of Organisms Used : 60 **Test Temperature :** 20 ± 2 °C **Test Hardness Adjusted :** No

Test Volume : 150 mL **Vessel Volume :** 225 mL **Test pH Adjusted:** No

Loading Density : 15.0 mL/Daphnia **Photoperiod :** 16:8 (light: dark)

Test Organism : *Daphnia magna* **Source :** In House Culture

Age at Test Initiation : <24 hrs **Average Brood Size :** 27.2

Culture Photoperiod : 16:8 (light: dark) **% Mortality within 7 days :** 0

Culture Temperature : 20 ± 2 °C **Time To First Brood :** 8 Days

Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

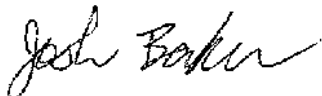
Job Number: B656693
Sample Number: PA1657-01

Reference chemical: Sodium Chloride
Test Endpoint 48 hrs LC50 (95% confidence interval) : 7.07 (5.00, 10.0)g/L
Historical Mean LC50 (warning limits) : 6.34 (4.59, 8.76) g/L
Test Date: Jul 01, 2016
Statistical Method : Binomial
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Chelsea Tessier, Natasha Mouck



Verified By : Joshua Baker, Senior Analyst

Date: Jul 26, 2016 09:14 AM



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/07/12
Report Date: 2016/07/21
Version: FINAL

Test Report

Client: TEC164
Reference: 16-0819
Billing: PO # 430571

A handwritten signature in black ink, appearing to read "C. R. R. R.", is positioned above a horizontal line.

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



Trout (Single Concentration) Test Report

Result Summary

Client: TEC164
Reference: 16-0819-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160711_N

Collection: collected on 2016/07/11 at 0900 by not given

Receipt: received on 2016/07/12 at 1130 by MC

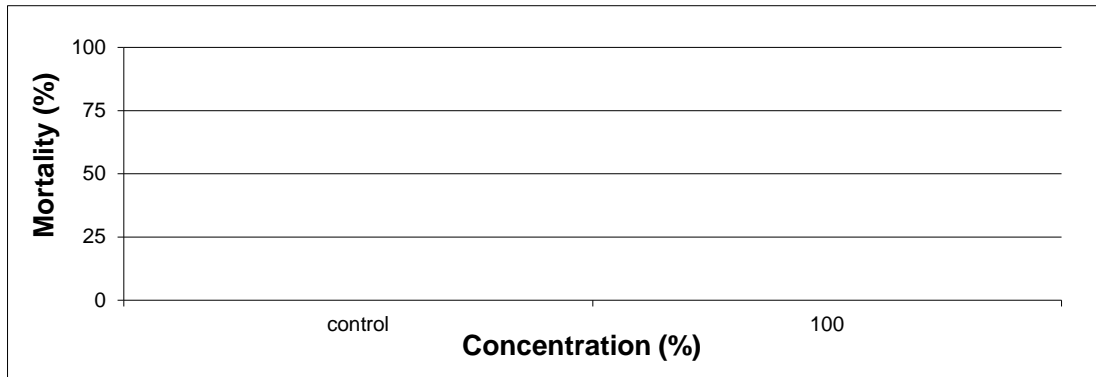
Containers: received 4 x 20 L carboys / 4 x 1 L bottle at 11 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/07/13 ; ended on 2016/07/17

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	WL_BFWB_OUT_S P21_20160711_N	0	none



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0819-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160615TR)

Acclimation: 28 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.4; EC: 1956 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.3 (mg/L); temperature: 18 °C
hardness (mg CaCO₃/L): 817; colour: colourless; odour: -

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 8.6 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.255 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated July 3, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.41 (0.34-0.48) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.53 (0.38-0.68) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0819-01-TRS

Test Log:

Date	Day	Time	Technician
2016/07/13	0	0945	JW/EP
2016/07/14	1	0830	LC
2016/07/15	2	0845	KLO
2016/07/16	3	0905	KLO
2016/07/17	4	0950	HS/LC

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	7.5	7.6
4	7.8	7.9

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	504	2140
4	539	1996

Dissolved Oxygen (mg/L)

0	7.7	8.6
4	8.7	8.7

Temperature (°C)

0	16	15
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0819-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.4	0.5
2	3.4	0.4
3	3.3	0.5
4	3.4	0.6
5	3.5	0.6
6	3.5	0.5
7	3.4	0.4
8	3.4	0.5
9	3.4	0.5
10	3.5	0.6

Sample	Group Wet Weight (g)
control	5.1
100	3.8

average	3.4	0.5
sd	0.1	0.1
cv(%)	1.8	14.5

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient
of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-0819-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160711_N

Collection: collected on 2016/07/11 at 0900 by not given

Receipt: received on 2016/07/12 at 1130 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottle at 11 °C, in good condition with no seals and no

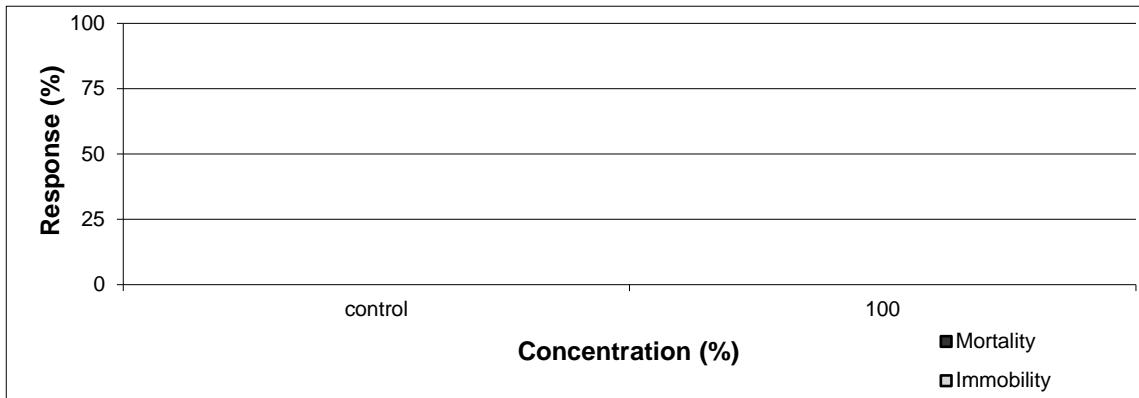
Description: type: water, collection method: grab

Test: started on 2016/07/12 ; ended on 2016/07/14

Result:

Sample	Client Code	Average		Comment
		Mortality (%)	Immortality (%)	
control	lab control	0	0	
100	WL_BFWB_OUT_S P21_20160711_N	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0819-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
21 neonates per average brood

Sample initial chemistry: pH: 7.4; EC: 1956 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.3 (mg/L); temperature: 18 °C
hardness (mg CaCO_3/L): 817; colour: colourless; odour: -

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 82 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0819-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated July 7, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.69 (0.66-0.71) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.66-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0819-01-DAS

Test Log:

Date	Day	Time	Technician
2016/07/12	0	1420	HS/JW
2016/07/13	1	0730	HS
2016/07/14	2	1145	EP/LC

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.7	7.8	7.8	8.2	8.2	8.2
2	7.8	7.8	7.8	7.9	8.0	8.0

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	319	347	350	1943	1960	1967
2	367	368	378	1845	1906	1933

Day	Dissolved Oxygen (mg/L)					
0	8.1	8.1	8.1	8.3	8.3	8.3
2	8.2	8.0	7.9	7.9	7.9	7.9

Day	Temperature (°C)					
0	18	18	18	19	19	19
2	19	20	20	20	20	20

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10 (8D)	10 (7D)	10 (8D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0819-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None



Result Summary

Client: TEC164
Reference: 16-0819-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160711_N

Collection: collected on 2016/07/11 at 0900 by not given

Receipt: received on 2016/07/12 at 1130 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottle at 11 °C, in good condition with no seals and no

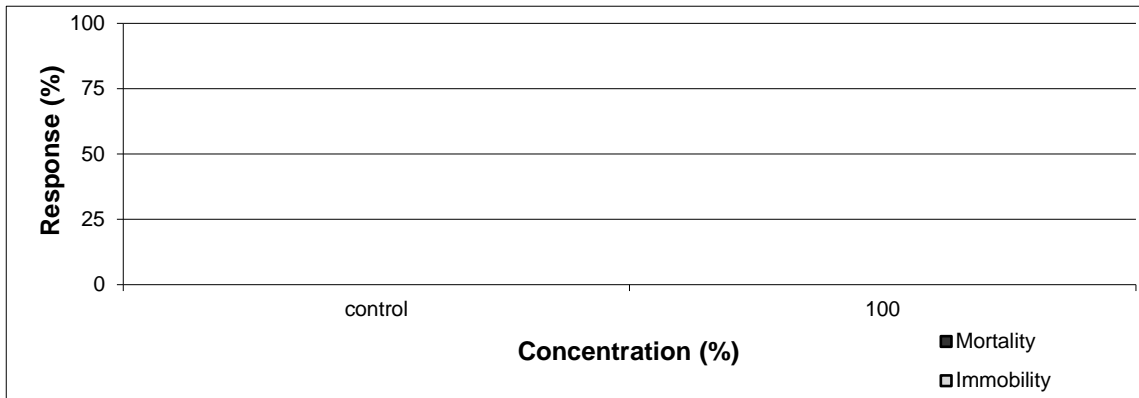
Description: type: water, collection method: grab

Test: started on 2016/07/12 ; ended on 2016/07/14

Result:

Sample	Client Code	Average		Comment
		Mortality (%)	Immortality (%)	
control	lab control	0	0	
100	WL_BFWB_OUT_S P21_20160711_N	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0819-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 9 days to first brood
20 neonates per average brood

Sample initial chemistry: pH: 7.4; EC: 1956 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.3 (mg/L); temperature: 18 °C
hardness (mg CaCO_3/L): 817; colour: colourless; odour: -

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 82 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $10 \pm 5^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0819-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated July 7, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.69 (0.66-0.71) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.66-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0819-01-DAS

Test Log:

Date	Day	Time	Technician
2016/07/12	0	1400	HS/JW
2016/07/13	1	0730	HS
2016/07/14	2	1130	EP/LC

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.7	7.8	7.7	7.5	7.5	7.5
2	7.7	7.8	7.8	8.1	8.1	8.1

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	334	344	353	1938	2070	2090
2	382	376	375	1925	2060	2090

Day	Dissolved Oxygen (mg/L)					
0	8.6	8.7	8.7	9.5	9.5	9.5
2	9.1	8.8	8.9	9.0	9.1	9.2

Day	Temperature (°C)					
0	11	11	11	11	11	11
2	15	14	14	14	15	15

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10 (2D, 2I)	10 (4D, 4I)
2	10	10	10	10 (8D)	10 (10D)	10 (8D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



***Daphnia* (Single Concentration) Test Report**

Comments/Statistics

Client: TEC164 Reference: 16-0819-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
The test was set at 10 degrees as per the clients request.

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, H₂S 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 OR 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.

Your P.O. #: 441369
Site Location: WLC AWTF

Attention:CHRIS STROICH

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/07/28
Report #: R2224414
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B658893

Received: 2016/07/19, 09:35

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Daphnia magna Single Concentration-100%	1	N/A	2016/07/20	EENVSOP-00154	EPS 1 RM14 2nd ed

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====

This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B658893
Report Date: 2016/07/28

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: GF

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		PB2468	
Sampling Date		2016/07/18 09:59	
	UNITS	WL_BFWB_OUT_SP21_2016 0718_N	QC Batch
Daphnia Magna Bioassay			
Mortality	%	ATTACHED	8334874

Maxxam Job #: B658893
Report Date: 2016/07/28

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: GF

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.7°C
-----------	-------

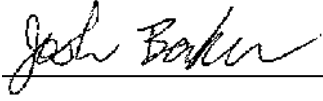
Results relate only to the items tested.

Maxxam Job #: B658893
Report Date: 2016/07/28

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: GF

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Joshua Baker, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B658893
Sample Number: PB2468-01

Test Result:

48 hrs Mortality % 0 Statistical Method:

Mean percent mortality: Sample 0 Control 0

Sample Name : WL_BFWB_OUT_SP21_20160718_N

Sample Matrix : Water

Description: clear, colourless

Sample Prior to Analysis:

Sample Collected: Jul 18, 2016 09:59 AM

Sampling Method : N/A

pH: 7.3

Sample Collected By: GF

Site Collection: N/A

Temperature : 17 °C

Sample Received: Jul 19, 2016 09:35 AM

Volume Received: 1 L

Dissolved Oxygen: 8.3 mg/L

Analysis Start : Jul 20, 2016 08:01 AM

Temp.Upon Arrival: 9 °C

Sample Conductance: 1463 µS/cm

End : Jul 22, 2016 08:35 AM

Storage: 2-6°C

Hardness: 1000 mg CaCO₃/L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	21	7.9	364	7.8	0	0	0	0	19	8.0	369	7.7
0	21	7.9	366	7.8	0	0	0	0	20	8.0	368	7.4
0	21	7.9	366	7.8	0	0	0	0	20	8.0	371	7.6
100	20	7.4	1551	8.1	0	0	0	0	20	8.0	1498	7.2
100	20	7.4	1559	8.1	0	0	0	0	20	8.0	1505	7.4
100	20	7.4	1558	8.0	0	0	0	0	21	7.9	1503	7.2

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	0	0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water

Hardness: 160 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)

Organisms per Vessel : 10 **Pre-aeration Time :** 0 min **Rate of Pre-aeration :** 25-50 mL/min/L

Total # of Organisms Used : 60 **Test Temperature :** 20 ± 2 °C **Test Hardness Adjusted :** No

Test Volume : 150 mL **Vessel Volume :** 225 mL **Test pH Adjusted:** No

Loading Density : 15.0 mL/Daphnia **Photoperiod :** 16:8 (light: dark)

Test Organism : *Daphnia magna* **Source :** In House Culture

Age at Test Initiation : <24 hrs **Average Brood Size :** 26.9

Culture Photoperiod : 16:8 (light: dark) **% Mortality within 7 days :** 1.6

Culture Temperature : 20 ± 2 °C **Time To First Brood :** 8 Days

Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

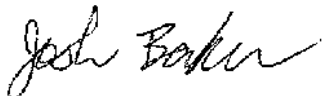
Job Number: B658893
Sample Number: PB2468-01

Reference chemical: Sodium Chloride
Test Endpoint 48 hrs LC50 (95% confidence interval) : 7.07 (5.00, 10.0)g/L
Historical Mean LC50 (warning limits) : 6.52 (5.09, 8.36) g/L
Test Date: Jul 14, 2016
Statistical Method : Binomial
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Chelsea Tessier, Natasha Mouck



Verified By : Joshua Baker, Senior Analyst

Date: Jul 28, 2016 10:55 AM



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/07/19
Report Date: 2016/07/28
Version: FINAL

Test Report

Client: TEC164
Reference: 16-0859
Billing: PO # 430571

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



Trout (Single Concentration) Test Report

Result Summary

Client: TEC164
Reference: 16-0859-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160718_N

Collection: collected on 2016/07/18 at 0900 by JT

Receipt: received on 2016/07/19 at 1010 by MC

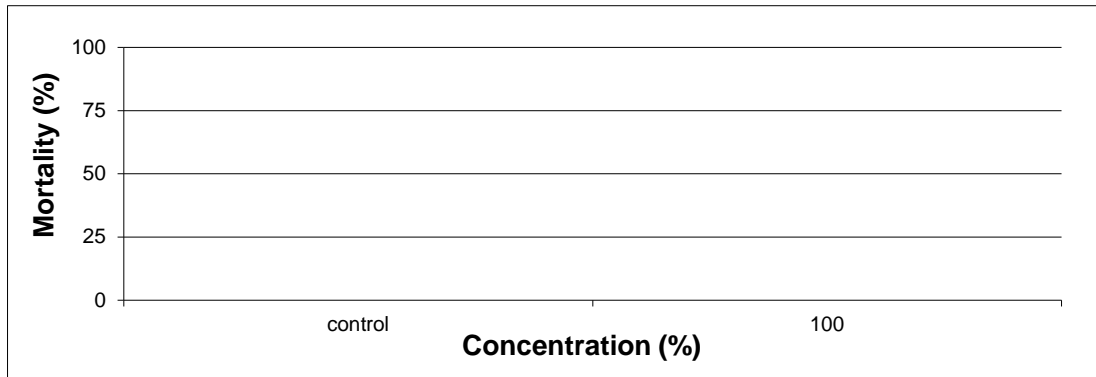
Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/07/20 ; ended on 2016/07/24

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	WL_BFWB_OUT_S P21_20160718_N	0	none



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0859-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160615TR)

Acclimation: 35 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.6; EC: 1966 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.4 (mg/L); temperature: 19 °C
hardness (mg CaCO₃/L): 1024; colour: colourless; odour: -

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 8.7 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.175 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated July 3, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.41 (0.34-0.48) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.53 (0.38-0.68) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0859-01-TRS

Test Log:

Date	Day	Time	Technician
2016/07/20	0	1220	EP
2016/07/21	1	0820	LC
2016/07/22	2	0840	JW
2016/07/23	3	0850	EP
2016/07/24	4	1415	JN/EP

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	8.0	8.1
4	8.3	8.3

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	459	1859
4	462	1587

Dissolved Oxygen (mg/L)

0	8.7	8.7
4	8.6	8.7

Temperature (°C)

0	15	15
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0859-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	2.7	0.2
2	3.6	0.6
3	2.7	0.2
4	2.8	0.2
5	3.1	0.4
6	3.2	0.4
7	2.6	0.2
8	3.9	0.7
9	3.0	0.3
10	3.2	0.3

Sample	Group Wet Weight (g)
control	3.5
100	3.8

average	3.1	0.4
sd	0.4	0.2
cv(%)	13.6	50.8

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient
of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-0859-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160718_N

Collection: collected on 2016/07/18 at 0900 by JT

Receipt: received on 2016/07/19 at 1010 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no

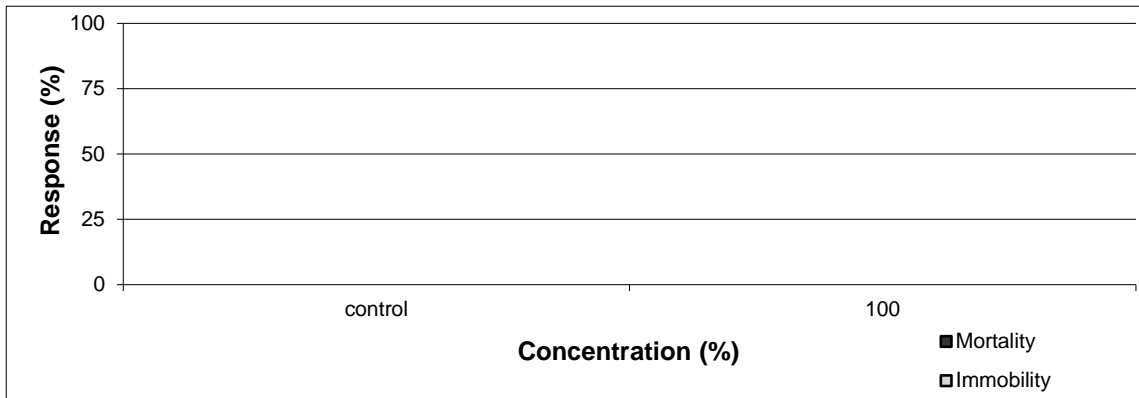
Description: type: water, collection method: grab

Test: started on 2016/07/19 ; ended on 2016/07/21

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_S P21_20160718_N	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0859-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
25 neonates per average brood

Sample initial chemistry: pH: 7.6; EC: 1966 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.4 (mg/L); temperature: 19 °C
hardness (mg CaCO_3/L): 1024; colour: colourless; odour: -

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must ≤ 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 82 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0859-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated July 18, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.74 (0.70-0.77) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.75 (0.65-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0859-01-DAS

Test Log:

Date	Day	Time	Technician
2016/07/19	0	1440	EP/JW
2016/07/20	1	0935	JW
2016/07/21	2	1025	JW

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.6	7.7	7.7	7.5	7.5	7.5
2	7.9	7.9	7.9	7.9	8.0	8.0

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	356	362	364	1958	1997	2060
2	319	333	333	1599	1696	1676

Day	Dissolved Oxygen (mg/L)					
0	8.0	7.9	8.0	8.3	8.1	8.1
2	7.6	7.7	7.7	7.7	7.7	7.7

Day	Temperature (°C)					
0	20	19	19	18	18	18
2	21	21	21	21	21	20

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10 (1D)	10 (2D)	10 (1D)
2	10	10	10	10	10 (2D)	10 (1D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0859-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None



Daphnia (Single Concentration) Test Report

Result Summary

Client: TEC164 Reference: 16-0859-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160718_N

Collection: collected on 2016/07/18 at 0900 by JT

Receipt: received on 2016/07/19 at 1010 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 12 °C, in good condition with no seals and no

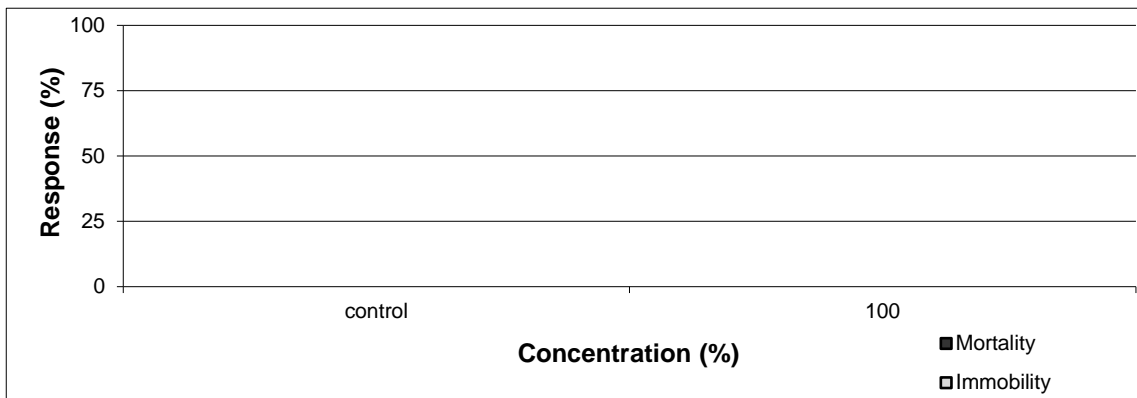
Description: type: water, collection method: grab

Test: started on 2016/07/19 ; ended on 2016/07/21

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_S P21_20160718_N	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0859-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
25 neonates per average brood

Sample initial chemistry: pH: 7.6; EC: 1966 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.4 (mg/L); temperature: 19 °C
hardness (mg CaCO₃/L): 1024; colour: colourless; odour: -

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 82 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 10 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0859-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated July 18, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.74 (0.70-0.77) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.75 (0.65-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0859-01-DAS

Test Log:

Date	Day	Time	Technician
2016/07/19	0	1445	EP/JW
2016/07/20	1	0935	JW
2016/07/21	2	1025	JW

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.7	7.8	7.8	7.5	7.5	7.6
2	7.4	7.4	7.5	8.1	8.2	8.2

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	366	372	366	1904	2050	2110
2	320	330	333	1667	1795	1817

Day	Dissolved Oxygen (mg/L)					
0	8.1	8.2	8.2	8.6	8.8	8.9
2	8.8	8.8	8.9	8.9	9.1	9.1

Day	Temperature (°C)					
0	12	12	12	12	11	11
2	11	11	11	11	11	11

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10 (1D)	10	10 (1D)
2	10	10	10	10	10	10 (1D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0859-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
The test was performed at 10 ± 2 as per the client's request.

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, H₂S 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 OR 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.

Your P.O. #: 441369
Site Location: WLC AWTF

Attention:CHRIS STROICH

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/08/04
Report #: R2228997
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B661317

Received: 2016/07/26, 09:30

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Daphnia magna Single Concentration-100%	1	N/A	2016/07/27	EENVSOP-00154	EPS 1 RM14 2nd ed

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====

This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B661317
Report Date: 2016/08/04

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: KA

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		PC4087	
Sampling Date		2016/07/25 09:00	
	UNITS	WL_BFWB_OUT_SP21_2016 0725_N	QC Batch
Daphnia Magna Bioassay			
Mortality	%	ATTACHED	8342893

Maxxam Job #: B661317
Report Date: 2016/08/04

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: KA

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	14.7°C
-----------	--------

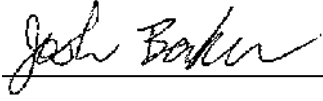
Results relate only to the items tested.

Maxxam Job #: B661317
Report Date: 2016/08/04

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: KA

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Joshua Baker, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B661317
Sample Number: PC4087-01

Test Result:

48 hrs Mortality % 0 Statistical Method:

Mean percent mortality: Sample 0 Control 0

Sample Name : WL_BFWB_OUT_SP21_20160725_N

Sample Matrix : Water

Description: clear

Sample Prior to Analysis:

Sample Collected: Jul 25, 2016 09:00 AM

Sampling Method : N/A

pH: 7.3

Sample Collected By: KA

Site Collection: N/A

Temperature : 17 °C

Sample Received: Jul 26, 2016 09:30 AM

Volume Received: 1 L

Dissolved Oxygen: 8.0 mg/L

Analysis Start : Jul 27, 2016 09:21 AM

Temp.Upon Arrival: 15 °C

Sample Conductance: 1571 µS/cm

End : Jul 29, 2016 09:52 AM

Storage: 2-6°C

Hardness: 1200 mg CaCO₃/L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	21	7.9	404	7.8	0	0	0	0	20	8.2	396	7.8
0	21	7.9	407	7.8	0	0	0	0	20	8.1	403	7.7
0	21	7.9	407	7.8	0	0	0	0	20	8.1	401	7.8
100	20	7.5	1653	8.0	0	0	0	0	20	7.9	1543	7.3
100	19	7.5	1653	8.1	0	0	0	0	20	7.8	1561	7.2
100	19	7.5	1654	8.1	0	0	0	0	20	7.8	1570	7.3

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	0	0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water

Hardness: 200 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)

Organisms per Vessel : 10 **Pre-aeration Time :** 0 min **Rate of Pre-aeration :** 25-50 mL/min/L

Total # of Organisms Used : 60 **Test Temperature :** 20 ± 2 °C **Test Hardness Adjusted :** No

Test Volume : 150 mL **Vessel Volume :** 225 mL **Test pH Adjusted:** No

Loading Density : 15.0 mL/Daphnia **Photoperiod :** 16:8 (light: dark)

Test Organism : *Daphnia magna* **Source :** In House Culture

Age at Test Initiation : <24 hrs **Average Brood Size :** 24.2

Culture Photoperiod : 16:8 (light: dark) **% Mortality within 7 days :** 0

Culture Temperature : 20 ± 2 °C **Time To First Brood :** 8 Days

Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

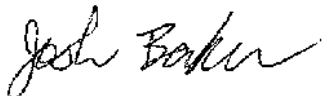
Job Number: B661317
Sample Number: PC4087-01

Reference chemical: Sodium Chloride
Test Endpoint 48 hrs LC50 (95% confidence interval) : 7.07 (5.00, 10.0)g/L
Historical Mean LC50 (warning limits) : 6.52 (5.09, 8.36) g/L
Test Date: Jul 14, 2016
Statistical Method : Binomial
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Arthur Juan Mathias, Chelsea Tessier



Verified By : Joshua Baker, Senior Analyst

Date: Aug 04, 2016 03:17 PM



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/07/26
Report Date: 2016/08/15
Version: FINAL

Test Report

Client: TEC164
Reference: 16-0893 Re Test
Billing: 411634

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



Trout (Single Concentration) Test Report

Result Summary

Client: TEC164
Reference: 16-0893-01-TRS
RE-TEST

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160725_N

Collection: collected on 2016/07/25 at 0900 by not given

Receipt: received on 2016/07/26 at 1000 by MC

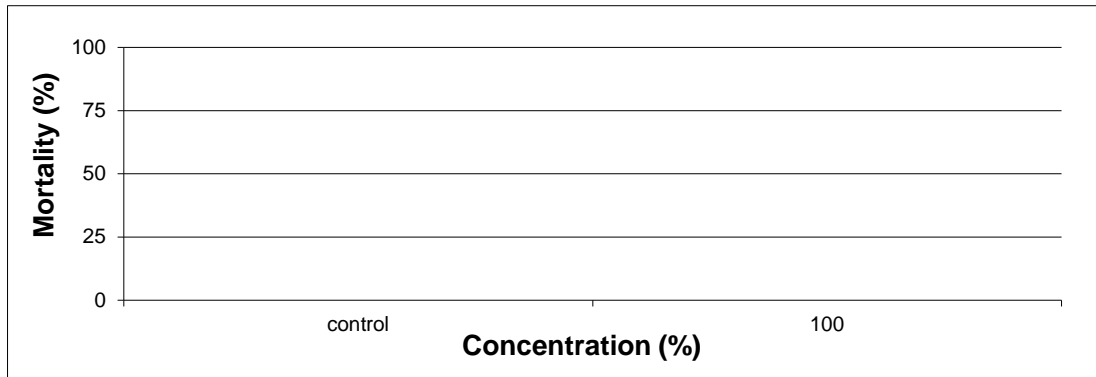
Containers: received 4 x 20 L carboy / 4 x 1 L bottle at 12 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/08/03 ; ended on 2016/08/07

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	WL_BFWB_OUT_S P21_20160725_N	0	none



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164
Reference: 16-0893-01-TRS
RE-TEST

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160706TR)

Acclimation: 28 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.6; EC: 1825 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.1 (mg/L); temperature: 20 °C
hardness (mg CaCO₃/L): 1077; colour: colourless; odour: -

Sample holding time: 9 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 8.8 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.175 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated July 20, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.47 (0.38-0.53) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.52 (0.37-0.68) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0893-01-TRS
RE-TEST

Test Log:

Date	Day	Time	Technician
2016/08/03	0	1430	HS
2016/08/04	1	0930	LC
2016/08/05	2	0830	EP
2016/08/06	3	0945	EP
2016/08/07	4	1035	JN

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	7.6	7.9
4	8.2	8.2

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	427	1912
4	465	1664

Dissolved Oxygen (mg/L)

0	8.6	8.8
4	8.7	8.7

Temperature (°C)

0	16	15
4	16	16

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0893-01-TRS
RE-TEST

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	2.5	0.2
2	2.6	0.2
3	3.3	0.5
4	3.4	0.5
5	3.3	0.4
6	3.3	0.4
7	3.1	0.4
8	3.2	0.4
9	2.8	0.3
10	2.4	0.2

Sample	Group Wet Weight (g)
control	3.5
100	3.3

average	3.0	0.4
sd	0.4	0.1
cv(%)	12.7	33.7

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient
of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

The test was set outside of the 5 day hold time, as requested by the client.

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, H₂S 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.



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/07/26
Report Date: 2016/08/03
Version: FINAL

Test Report

Client: TEC164
Reference: 16-0893
Billing: 411634

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



Trout (Single Concentration) Test Report

Result Summary

Client: TEC164
Reference: 16-0893-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160725_N

Collection: collected on 2016/07/25 at 0900 by not given

Receipt: received on 2016/07/26 at 1000 by MC

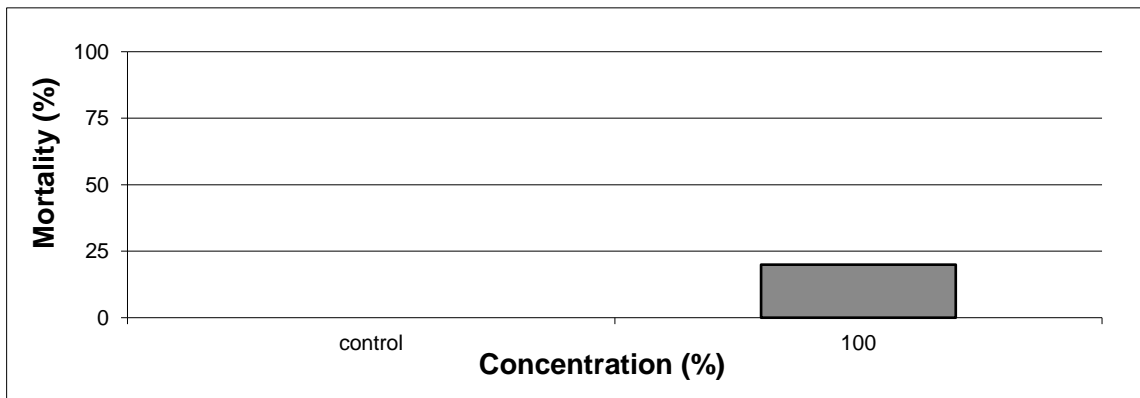
Containers: received 4 x 20 L carboy / 4 x 1 L bottle at 12 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/07/27 ; ended on 2016/07/31

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	WL_BFWB_OUT_S P21_20160725_N	20	none



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0893-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160615TR)

Acclimation: 43 days (must be \geq 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.6; EC: 1825 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.1 (mg/L); temperature: 20 °C
hardness (mg CaCO₃/L): 1077; colour: colourless; odour: -

Sample holding time: 2 days (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel \geq 15cm)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 8.4 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.15 g/Litre (must be \leq 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must \geq 90%)

The control had 0 percent (%) stressed behaviour (must \leq 10%)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated July 3, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.41 (0.34-0.48) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.53 (0.38-0.68) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume

Test Data

Client: TEC164
Reference: 16-0893-01-TRS

Test Log:

Date	Day	Time	Technician
2016/07/27	0	1220	EP
2016/07/28	1	0800	ML
2016/07/29	2	0925	JW
2016/07/30	3	1045	LC
2016/07/31	4	1010	LC

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

pH (units)

0	7.7	7.8
4	7.7	8.1

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	447	1885
4	429	1698

Dissolved Oxygen (mg/L)

0	8.2	8.4
4	8.7	8.7

Temperature (°C)

0	15	15
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	8
4	10	8

Mortality (%)

4	0	20
---	---	----

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Client: TEC164
Reference: 16-0893-01-TRS

Test Data

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	2.8	0.2
2	3.0	0.2
3	3.0	0.3
4	3.3	0.4
5	3.1	0.3
6	2.8	0.2
7	3.0	0.3
8	3.0	0.3
9	3.5	0.4
10	3.2	0.4

Sample	Group Wet Weight (g)
control	3.0
100	3.1

average	3.1	0.3
sd	0.2	0.1
cv(%)	7.0	27.2

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-0893-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160725_N

Collection: collected on 2016/07/25 at 0900 by not given

Receipt: received on 2016/07/26 at 1000 by MC

Containers: received 4 x 20 L carboy / 4 x 1 L bottle at 12 °C,
in good condition with no seals and no initials

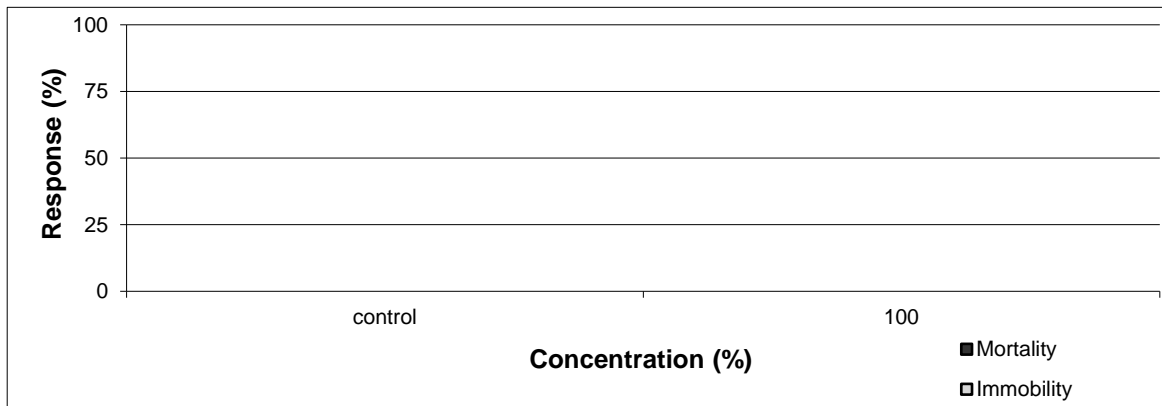
Description: type: water, collection method: grab

Test: started on 2016/07/26 ; ended on 2016/07/28

Result:

Sample	Client Code	Average		Comment
		Mortality (%)	Immortality (%)	
control	lab control	0	0	none
100	WL_BFWB_OUT_SP 21_20160725_N	0	0	

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0893-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
31 neonates per average brood

Sample initial chemistry: pH: 7.6; EC: 1825 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.1 (mg/L); temperature: 20 °C
hardness (mg CaCO₃/L): 1077; colour: colourless; odour: -

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 87 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 20 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0893-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated July 7, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.69 (0.66-0.71) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.66-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Test Data

Client: TEC164
Reference: 16-0893-01-DAS

Test Log:

Date	Day	Time	Technician
2016/07/26	0	1415	EP
2016/07/27	1	1035	JW
2016/07/28	2	0940	LC/HS

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.7	7.7	7.7	7.5	7.5	7.6
2	7.6	7.6	7.6	8.2	8.2	8.2

Day	Conductivity (µS/cm @ 25°C)					
0	311	316	317	1839	1883	1895
2	329	323	322	1775	1801	1801

Day	Dissolved Oxygen (mg/L)					
0	8.1	8.2	8.2	8.2	8.2	8.2
2	8.0	8.0	8.0	7.7	7.7	7.7

Day	Temperature (°C)					
0	18	18	18	18	18	18
2	19	19	19	20	20	20

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(2D)	10(1D)	10(1B,2D)
2	10	10	10	10(1D)	10(1D)	10(2D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0893-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None



Result Summary

Client: TEC164
Reference: 16-0893-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160725_N

Collection: collected on 2016/07/25 at 0900 by not given

Receipt: received on 2016/07/26 at 1000 by MC

Containers: received 4 x 20 L carboy / 4 x 1 L bottle at 12 °C,
in good condition with no seals and no initials

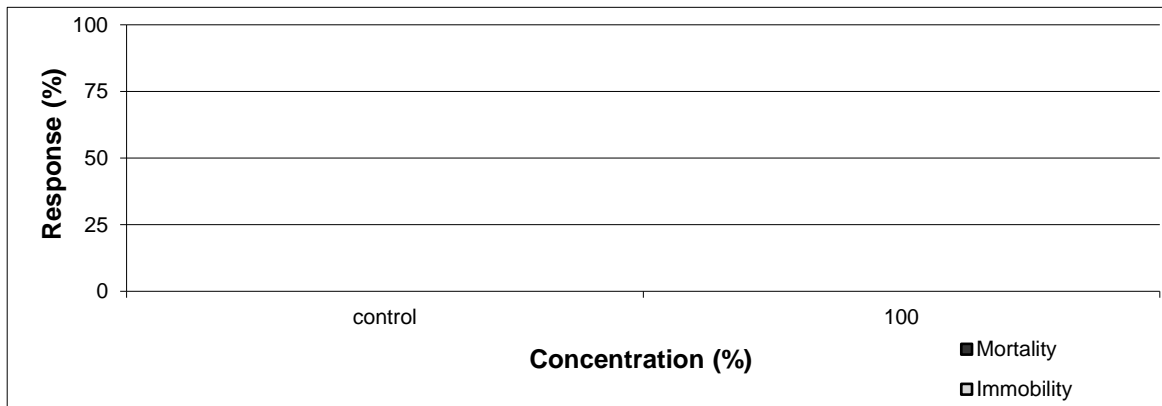
Description: type: water, collection method: grab

Test: started on 2016/07/26 ; ended on 2016/07/28

Result:

Sample	Client Code	Average		Comment
		Mortality (%)	Immobility (%)	
control	lab control	0	0	
100	WL_BFWB_OUT_SP 21_20160725_N	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

**Test Conditions**

Client: TEC164 Reference: 16-0893-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
31 neonates per average brood

Sample initial chemistry: pH: 7.6; EC: 1825 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.1 (mg/L); temperature: 20 °C
hardness (mg CaCO₃/L): 1077; colour: colourless; odour: -

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 87 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 10 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 16-0893-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated July 7, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.69 (0.66-0.71) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.66-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Test Data

Client: TEC164
Reference: 16-0893-01-DAS

Test Log:

Date	Day	Time	Technician
2016/07/26	0	1415	EP
2016/07/27	1	1035	JW
2016/07/28	2	0945	LC/HS

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.7	7.7	7.7	7.6	7.6	7.6
2	7.4	7.4	7.5	8.1	8.2	8.2

Day	Conductivity (µS/cm @ 25°C)					
0	310	323	326	1799	1836	1870
2	331	328	333	1839	1901	1920

Day	Dissolved Oxygen (mg/L)					
0	8.3	8.1	8.3	8.7	8.9	9.0
2	9.4	9.4	9.4	9.5	9.5	9.6

Day	Temperature (°C)					
0	10	11	10	10	10	10
2	10	10	10	10	10	10

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10(1F)	10	10	10(2F)	10(1F,1D)
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0893-01-DAS

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

The test temperature was $10 \pm 2^{\circ}\text{C}$, as requested by the client.

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, H₂S 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 OR 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.

Your P.O. #: 441369
Site Location: WLC AWTF

Attention:CHRIS STROICH

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/08/09
Report #: R2232168
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B664111
Received: 2016/08/03, 09:21

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Daphnia magna Single Concentration-100%	1	N/A	2016/08/05	EENVSOP-00154	EPS 1 RM14 2nd ed

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager
Email: MPiche@maxxam.ca
Phone# (780) 577-7100

=====

This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B664111
Report Date: 2016/08/09

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: AC

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		PE0604	
Sampling Date		2016/08/01 09:00	
	UNITS	WL_BFWB_OUT_SP21_2016 0801_N	QC Batch
Daphnia Magna Bioassay			
Mortality	%	ATTACHED	8352434

Maxxam Job #: B664111
Report Date: 2016/08/09

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: AC

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.0°C
-----------	-------

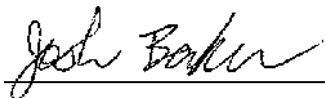
Results relate only to the items tested.

Maxxam Job #: B664111
Report Date: 2016/08/09

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: AC

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Joshua Baker, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/08/01
Report Date: 2016/08/11
Version: FINAL

Test Report

Client: TEC164
Reference: 16-0927
Billing: 411634

A handwritten signature in cursive script that reads "Jacquelyn 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



Trout (Single Concentration) Test Report

Result Summary

Client: TEC164
Reference: 16-0927-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160801_N

Collection: collected on 2016/08/01 at 0900 by not given

Receipt: received on 2016/08/01 at 1500 by MC

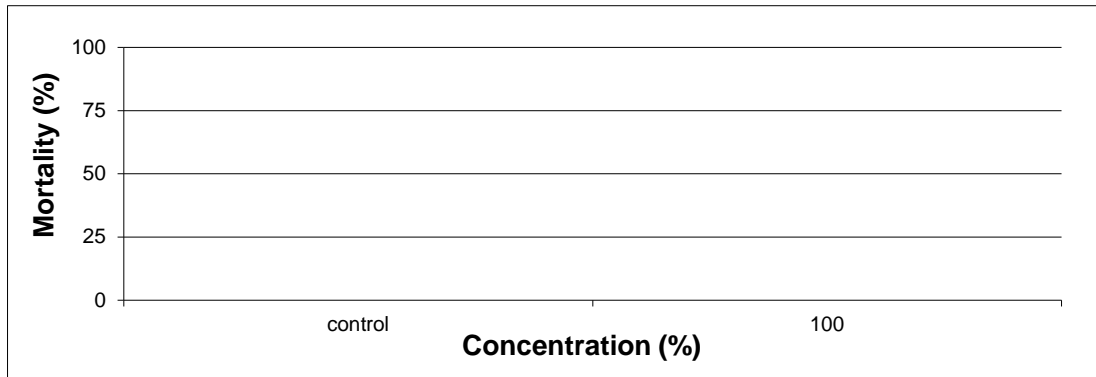
Containers: received 4 x 20 L carboys / 4 x 1 L bottle at 15 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/08/03 ; ended on 2016/08/07

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	WL_BFWB_OUT_S P21_20160801_N	0	none



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0927-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160706TR)

Acclimation: 28 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.5; EC: 1692 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.3 (mg/L); temperature: 10 °C
hardness (mg CaCO₃/L): 1249; colour: colourless; odour: organic

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 8.8 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.165 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated July 20, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.47 (0.38-0.53) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.52 (0.37-0.68) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0927-01-TRS

Test Log:

Date	Day	Time	Technician
2016/08/03	0	1430	HS
2016/08/04	1	0945	LC
2016/08/05	2	0845	EP
2016/08/06	3	0945	EP
2016/08/07	4	1040	JN

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	7.4	7.8
4	8.2	8.1

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	449	1821
4	467	1579

Dissolved Oxygen (mg/L)

0	8.2	8.8
4	8.8	8.3

Temperature (°C)

0	16	15
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0927-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.2	0.3
2	3.1	0.4
3	2.7	0.2
4	3.0	0.3
5	3.1	0.4
6	3.0	0.3
7	3.4	0.5
8	3.2	0.4
9	2.6	0.2
10	2.9	0.3

Sample	Group Wet Weight (g)
control	3.3
100	3.1

average	3.0	0.3
sd	0.2	0.1
cv(%)	7.9	28.7

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-0927-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160801_N

Collection: collected on 2016/08/01 at 0900 by not given

Receipt: received on 2016/08/01 at 1500 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottle at 15 °C, in good condition with no seals and no

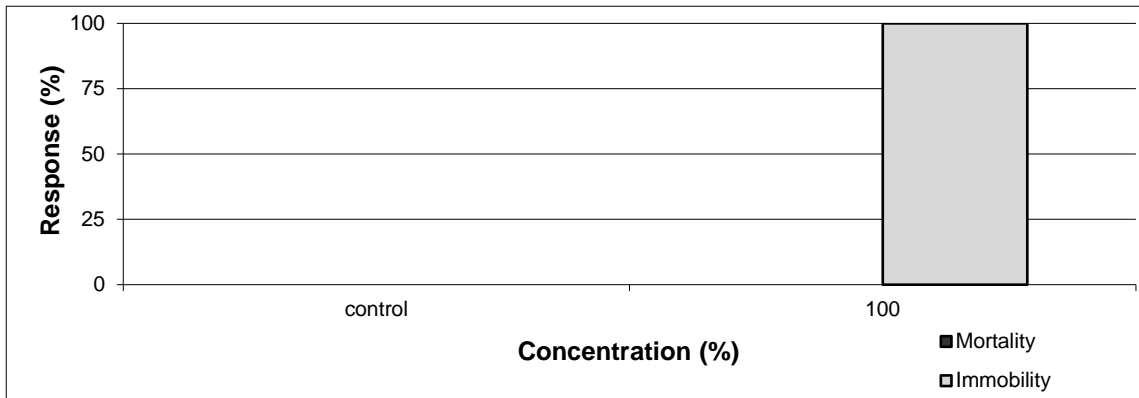
Description: type: water, collection method: grab

Test: started on 2016/08/02 ; ended on 2016/08/04

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160801_	0	100	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0927-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
34 neonates per average brood

Sample initial chemistry: pH: 7.5; EC: 1692 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.3 (mg/L); temperature: 10 °C
hardness (mg CaCO_3/L): 1249; colour: colourless; odour: organic

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 385 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 80 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0927-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated August 4, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.74 (0.70-0.78) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.74 (0.64-0.84) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0927-01-DAS

Test Log:

Date	Day	Time	Technician
2016/08/02	0	1415	HS
2016/08/03	1	0955	JN
2016/08/04	2	0945	HS

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.6	7.6	7.7	8.0	8.1	8.1
2	7.8	7.9	7.9	8.0	8.0	8.0

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	312	314	316	1747	1763	1768
2	312	319	318	1639	1648	1646

Day	Dissolved Oxygen (mg/L)					
0	8.1	8.1	8.1	8.2	8.2	8.2
2	8.1	8.1	8.1	8.2	8.2	8.2

Day	Temperature (°C)					
0	19	19	19	18	18	18
2	19	19	19	19	20	19

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(1I,1D)	10(3I,4D)	10(3I)
2	10	10	10	10(10D,10I)	10(10D,10I)	10(10D,10I)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	100	100	100



Comments/Statistics

Client: TEC164 Reference: 16-0927-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None



Result Summary

Client: TEC164
Reference: 16-0927-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160801_N

Collection: collected on 2016/08/01 at 0900 by not given

Receipt: received on 2016/08/01 at 1500 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottle at 15 °C, in good condition with no seals and no

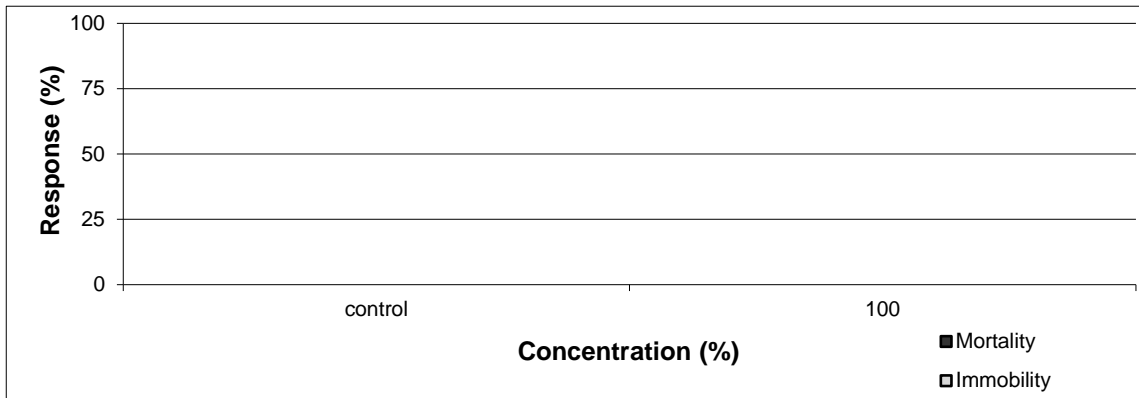
Description: type: water, collection method: grab

Test: started on 2016/08/02 ; ended on 2016/08/04

Result:

Sample	Client Code	Average		Comment
		Mortality (%)	Immortality (%)	
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160801_	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0927-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
34 neonates per average brood

Sample initial chemistry: pH: 7.5; EC: 1692 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.3 (mg/L); temperature: 10 °C
hardness (mg CaCO_3/L): 1249; colour: colourless; odour: organic

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 385 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 80 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $10 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0927-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated August 4, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.74 (0.70-0.78) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.74 (0.64-0.84) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0927-01-DAS

Test Log:

Date	Day	Time	Technician
2016/08/02	0	1400	HS
2016/08/03	1	1000	JN
2016/08/04	2	0950	HS

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.4	7.4	7.4	7.4	7.4	7.4
2	7.3	7.4	7.4	8.0	8.0	8.0

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	314	320	323	1776	1811	1814
2	320	326	328	1760	1806	1807

Day	Dissolved Oxygen (mg/L)					
0	9.3	9.3	9.4	9.3	9.3	9.4
2	9.0	9.0	8.9	9.3	9.4	9.4

Day	Temperature (°C)					
0	11	11	11	10	10	10
2	11	11	11	11	11	11

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0927-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
The test temperature was $10 \pm 2^{\circ}\text{C}$ as requested by the client

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, H₂S 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.

Your P.O. #: 441369
Site Location: WLC AWTF

Attention:Chris Stroich

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/08/18
Report #: R2240540
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B666047

Received: 2016/08/09, 09:13

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Daphnia magna Single Concentration-100%	1	N/A	2016/08/10	EENVSOP-00154	EPS 1 RM14 2nd ed

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====

This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B666047
Report Date: 2016/08/18

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: AK

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		PF1165	
Sampling Date		2016/08/08 09:00	
	UNITS	WL_BFWB_OUT_SP21_2016 0808_N	QC Batch
Daphnia Magna Bioassay			
Mortality	%	ATTACHED	8357911

Maxxam Job #: B666047
Report Date: 2016/08/18

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: AK

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	4.0°C
-----------	-------

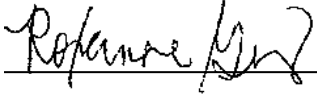
Results relate only to the items tested.

Maxxam Job #: B666047
Report Date: 2016/08/18

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: AK

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Roxanne Gill, Bioassay Supervisor

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.



RESULTS OF DAPHNIA MAGNA SINGLE CONCENTRATION-100%

Success Through Science®

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B666047
Sample Number: PF1165-01

Test Result:

48 hrs Mortality % 0 Statistical Method:

Mean percent mortality:	<u>Sample</u>	0	<u>Control</u>	0
Sample Name :	WL_BFWB_OUT_SP21_20160808_N			Sample Matrix : Water
Description:	clear, colourless			Sample Prior to Analysis:
Sample Collected:	Aug 08, 2016 09:00 AM	Sampling Method :	N/A	pH: 7.6
Sample Collected By:	AK	Site Collection:	N/A	Temperature : 16 °C
Sample Received:	Aug 09, 2016 09:13 AM	Volume Received:	1 L	Dissolved Oxygen: 10.1 mg/L
Analysis Start :	Aug 10, 2016 10:17 AM	Temp.Upon Arrival:	4 °C	Sample Conductance: 1522 µS/cm
End :	Aug 12, 2016 09:52 AM	Storage:	2-6°C	Hardness: 1200 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	21	7.9	356	8.0	0	0	0	0	20	7.7	354	7.6
0	21	7.9	358	8.1	0	0	0	0	20	7.8	357	7.6
0	21	8.0	358	8.1	0	0	0	0	20	7.8	359	7.7
100	21	7.6	1684	8.8	0	0	0	0	20	7.7	1539	7.7
100	21	7.6	1693	8.8	0	0	0	0	20	7.7	1559	7.7
100	21	7.7	1693	8.9	0	0	0	0	20	7.7	1562	7.7

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	0	0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 180 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
 Organisms per Vessel : 10 Pre-aeration Time : 30 min Rate of Pre-aeration : 25-50 mL/min/L
 Total # of Organisms Used : 60 Test Temperature : 20 ± 2 °C Test Hardness Adjusted : No
 Test Volume : 150 mL Vessel Volume : 225 mL Test pH Adjusted: No
 Loading Density : 15.0 mL/Daphnia Photoperiod : 16:8 (light: dark)

Test Organism : *Daphnia magna* Source : In House Culture
 Age at Test Initiation : <24 hrs Average Brood Size : 30.3
 Culture Photoperiod : 16:8 (light: dark) % Mortality within 7 days : 20.6
 Culture Temperature : 20 ± 2 °C Time To First Brood : 8 Days
 Culture Diet Pseudokirchnriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.



RESULTS OF *DAPHNIA MAGNA* SINGLE CONCENTRATION-100%

Success Through Science®

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B666047
Sample Number: PF1165-01

Reference chemical: Sodium Chloride Test Date: Jul 27, 2016
Test Endpoint 48 hrs LC50 (95% confidence interval) : 5.74 (4.70, 7.02)g/L Statistical Method : Untrimmed Spearman-Kärber
Historical Mean LC50 (warning limits) : 6.54 (5.09, 8.41) g/L Concentration : 0,1,25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Chelsea Tessier

Verified By : Roxanne Gill, Bioassay Supervisor

Date: Aug 18, 2016 05:06 PM



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/08/09
Report Date: 2016/08/18
Version: FINAL

Test Report

Client: TEC164
Reference: 16-0976
Billing: PO # 411634

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



Trout (Single Concentration) Test Report

Result Summary

Client: TEC164
Reference: 16-0976-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160808_N

Collection: collected on 2016/08/08 at 0900 by not given

Receipt: received on 2016/08/09 at 0910 by MC

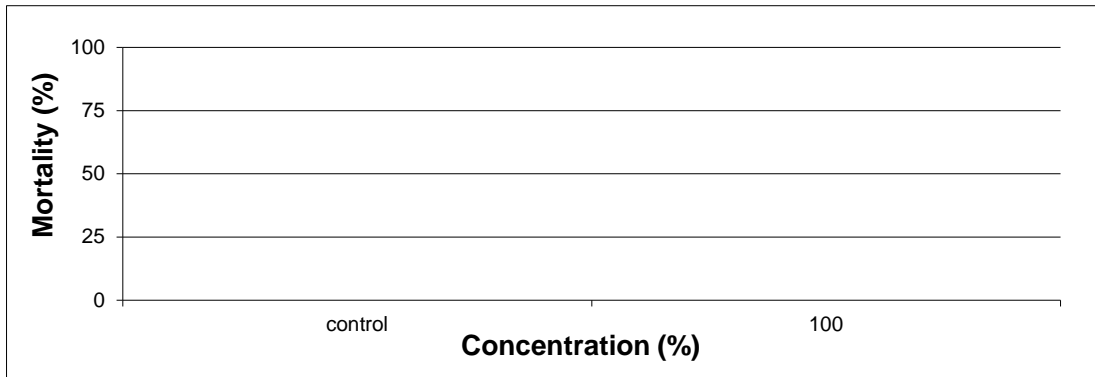
Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 20 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/08/10 ; ended on 2016/08/14

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	WL_BFWB_OUT_S P21_20160808_N	0	none



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0976-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160706TR)

Acclimation: 35 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.7; EC: 1817 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.1 (mg/L); temperature: 19 °C
hardness (mg CaCO₃/L): 1046; colour: colourless; odour: organic

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 8.6 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.16 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated July 20, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.47 (0.38-0.53) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.52 (0.37-0.68) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0976-01-TRS

Test Log:

Date	Day	Time	Technician
2016/08/10	0	1430	ML
2016/08/11	1	0740	LC
2016/08/12	2	0900	EP
2016/08/13	3	0920	LC
2016/08/14	4	1240	LC/JN

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	7.6	7.9
4	8.0	8.0

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	474	1866
4	475	1728

Dissolved Oxygen (mg/L)

0	8.4	8.6
4	8.4	8.6

Temperature (°C)

0	15	15
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0976-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.0	0.3
2	3.1	0.3
3	3.1	0.3
4	3.2	0.4
5	2.7	0.2
6	3.0	0.3
7	3.0	0.3
8	3.1	0.4
9	3.1	0.4
10	3.0	0.3

Sample	Group Wet Weight (g)
control	3.2
100	4.1

average	3.0	0.3
sd	0.1	0.1
cv(%)	4.4	19.8

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-0976-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160808_N

Collection: collected on 2016/08/08 at 0900 by not given

Receipt: received on 2016/08/09 at 0910 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 20 °C, in good condition with no seals and no

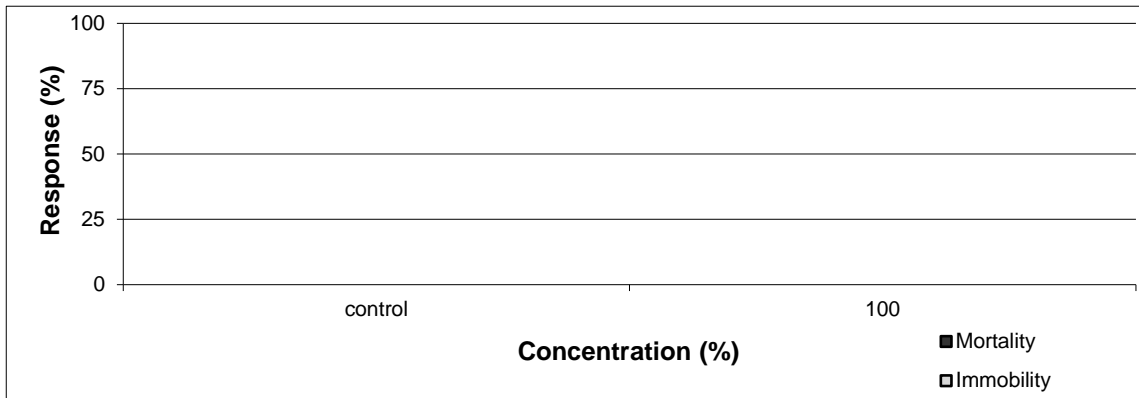
Description: type: water, collection method: grab

Test: started on 2016/08/09 ; ended on 2016/08/11

Result:

Sample	Client Code	Average		Comment
		Mortality (%)	Immortality (%)	
control	lab control	0	0	
100	WL_BFWB_OUT_S P21_20160808_N	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0976-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
31 neonates per average brood

Sample initial chemistry: pH: 7.7; EC: 1817 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.1 (mg/L); temperature: 19 °C
hardness (mg CaCO_3/L): 1046; colour: colourless; odour: organic

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must ≤ 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 85 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0976-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated August 4, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.68 (0.64-0.71) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.74 (0.65-0.84) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 16-0976-01-DAS

Test Log:

Date	Day	Time	Technician
2016/08/09	0	1500	EP
2016/08/10	1	0945	LC
2016/08/11	2	0900	HS

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.9	7.9	7.9	8.1	8.0	8.2
2	7.5	7.5	7.5	7.7	7.7	7.8

Day	Conductivity ($\mu\text{S/cm}$ @ 25°C)					
0	298	305	315	1841	1880	1881
2	340	353	349	1899	1928	1953

Day	Dissolved Oxygen (mg/L)					
0	7.8	7.8	7.8	8.0	8.0	8.0
2	7.8	7.8	7.8	7.9	7.9	7.9

Day	Temperature (°C)					
0	20	20	20	20	20	20
2	20	20	20	20	20	20

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10 (2D)	10	10 (3D)
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0976-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None



Result Summary

Client: TEC164
Reference: 16-0976-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160808_N

Collection: collected on 2016/08/08 at 0900 by not given

Receipt: received on 2016/08/09 at 0910 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 20 °C, in good condition with no seals and no

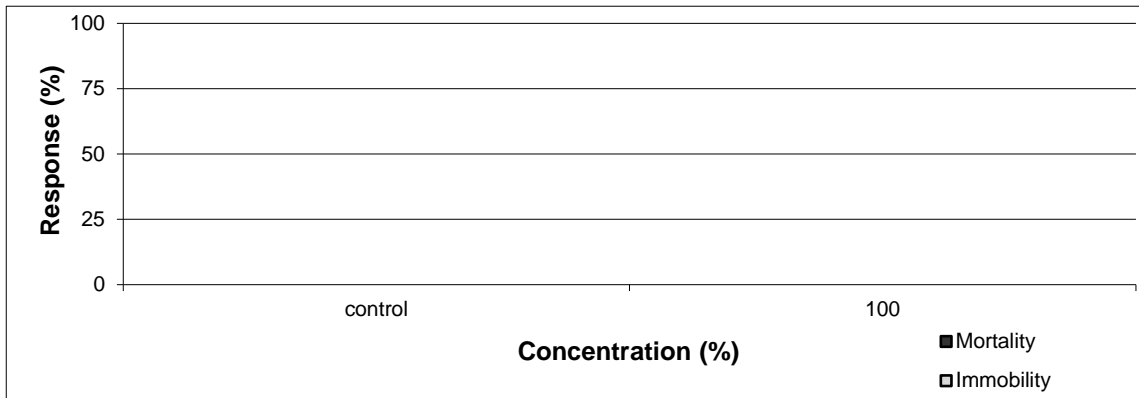
Description: type: water, collection method: grab

Test: started on 2016/08/09 ; ended on 2016/08/11

Result:

Sample	Client Code	Average		Comment
		Mortality (%)	Immortality (%)	
control	lab control	0	0	
100	WL_BFWB_OUT_S P21_20160808_N	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-0976-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
31 neonates per average brood

Sample initial chemistry: pH: 7.7; EC: 1817 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.1 (mg/L); temperature: 19 °C
hardness (mg CaCO_3/L): 1046; colour: colourless; odour: organic

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must ≤ 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 85 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $10 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-0976-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated August 4, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.68 (0.64-0.71) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.74 (0.65-0.84) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-0976-01-DAS

Test Log:

Date	Day	Time	Technician
2016/08/09	0	1500	EP
2016/08/10	1	1010	LC
2016/08/11	2	0900	HS

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	8.0	7.9	8.0	7.7	7.8	7.8
2	7.5	7.6	7.6	7.9	7.9	7.9

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	315	317	318	1892	1957	1953
2	367	360	360	2090	2130	2150

Day	Dissolved Oxygen (mg/L)					
0	8.4	8.2	8.4	8.8	9.1	9.2
2	9.4	9.3	9.4	9.4	9.3	9.3

Day	Temperature (°C)					
0	12	12	12	12	12	12
2	11	11	11	11	11	11

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-0976-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
The test temperature was $10 \pm 2^{\circ}\text{C}$, as requested by the client

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, H₂S 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 OR 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.

Your P.O. #: 441369
Site Location: WLC AWTF

Attention:Chris Stroich

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/08/18
Report #: R2240447
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B668661

Received: 2016/08/16, 09:48

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Daphnia magna Single Concentration-100%	1	N/A	2016/08/16	EENVSOP-00154	EPS 1 RM14 2nd ed

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====

This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B668661
Report Date: 2016/08/18

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: EM

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		PG6473	
Sampling Date		2016/08/15 09:00	
	UNITS	WL_BFWB_OUT_SP21_2016 0815_N	QC Batch
Daphnia Magna Bioassay			
Mortality	%	ATTACHED	8365548

Maxxam Job #: B668661
Report Date: 2016/08/18

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: EM

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.0°C
-----------	-------

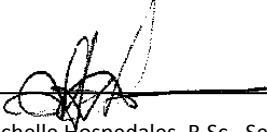
Results relate only to the items tested.

Maxxam Job #: B668661
Report Date: 2016/08/18

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: EM

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Michelle Hospedales, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B668661
Sample Number: PG6473-01

Test Result:

48 hrs Mortality % 0% Statistical Method:

Mean percent mortality:	<u>Sample</u>	0	<u>Control</u>	0	
Sample Name :	WL_BFWB_OUT_SP21_20160815_N		Sample Matrix :	Water	
Description:	clear, colourless		<u>Sample Prior to Analysis:</u>		
Sample Collected:	Aug 15, 2016 09:00 AM	Sampling Method :	N/A	pH:	7.6
Sample Collected By:	EM	Site Collection:	N/A	Temperature :	15 °C
Sample Received:	Aug 16, 2016 09:48 AM	Volume Received:	1 L	Dissolved Oxygen:	10.8 mg/L
Analysis Start :	Aug 16, 2016 01:12 PM	Temp.Upon Arrival:	3 °C	Sample Conductance:	1572 µS/cm
End :	Aug 18, 2016 01:25 PM	Storage:	2-6°C	Hardness:	1600 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	21	7.9	360	8.3	0	0	0	0	20	7.9	353	7.5
0	21	7.9	361	8.3	0	0	0	0	20	8.0	357	7.5
0	21	7.9	362	8.2	0	0	0	0	20	8.0	358	7.5
100	20	7.6	1742	9.4	0	0	0	0	20	7.7	1620	7.5
100	20	7.6	1748	9.4	0	0	0	0	20	7.7	1636	7.5
100	20	7.6	1749	9.3	0	0	0	0	20	7.7	1647	7.5

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	0	0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 160 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
 Organisms per Vessel : 10 Pre-aeration Time : 30 min Rate of Pre-aeration : 25-50 mL/min/L
 Total # of Organisms Used : 60 Test Temperature : 20 ± 2 °C Test Hardness Adjusted : No
 Test Volume : 150 mL Vessel Volume : 225 mL Test pH Adjusted: No
 Loading Density : 15.0 mL/Daphnia Photoperiod : 16:8 (light: dark)

Test Organism : *Daphnia magna* Source : In House Culture
 Age at Test Initiation : <24 hrs Average Brood Size : 27.3
 Culture Photoperiod : 16:8 (light: dark) % Mortality within 7 days : 1.6
 Culture Temperature : 20 ± 2 °C Time To First Brood : 9 Days
 Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B668661
Sample Number: PG6473-01

Reference chemical: Sodium Chloride
Test Date: Aug 12, 2016
Test Endpoint 48 hrs LC50 (95% confidence interval) : 7.07 (5.00, 10.0)g/L
Statistical Method : Binomial
Historical Mean LC50 (warning limits) : 6.48 (5.02, 8.35) g/L
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Arthur Juan Mathias, Chelsea Tessier, Natasha Mouck

Verified By : 
Michelle Hospedales, Senior Analyst

Date: Aug 18, 2016 04:26 PM



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/08/16
Report Date: 2016/08/26
Version: FINAL

Test Report

Client: TEC164
Reference: 16-1018
Billing: PO 411634

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



Trout (Single Concentration) Test Report

Result Summary

Client: TEC164
Reference: 16-1018-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160815_N

Collection: collected on 2016/08/15 at 0900 by not given

Receipt: received on 2016/08/16 at 1245 by MC

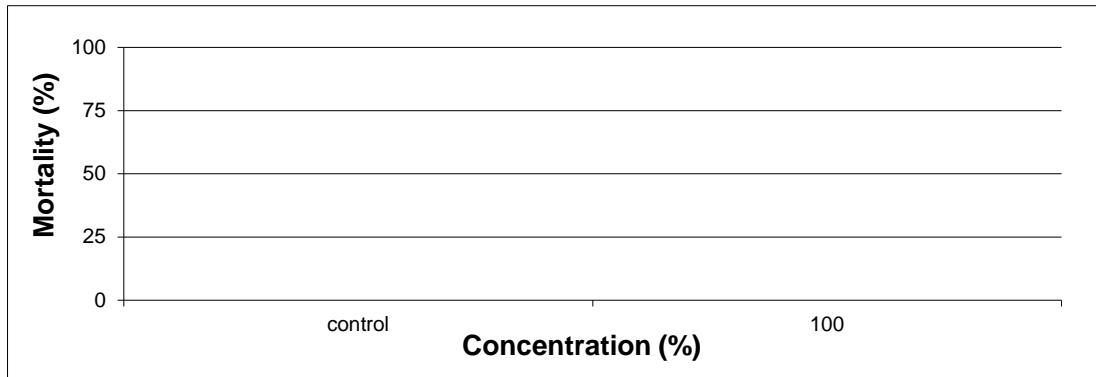
Containers: received 4 x 1 L bottle, 3 x 20 L carboys at 11 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/08/17 ; ended on 2016/08/21

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	WL_BFWB_OUT_S P21_20160815_N	0	none



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-1018-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160706TR)

Acclimation: 42 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.7; EC: 2070 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.9 (mg/L); temperature: 21 °C
hardness (mg CaCO₃/L): 1056; colour: colourless; odour: organic

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 8.8 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.195 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated July 20, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.47 (0.38-0.53) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.52 (0.37-0.68) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-1018-01-TRS

Test Log:

Date	Day	Time	Technician
2016/08/17	0	1430	JW/LC
2016/08/18	1	0750	JW
2016/08/19	2	0800	JW
2016/08/20	3	0840	LC
2016/08/21	4	1040	JW/LC

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	7.8	7.8
4	8.1	8.0

Conductivity ($\mu\text{S/cm}$ @ 25°C)

0	462	1921
4	474	1788

Dissolved Oxygen (mg/L)

0	8.5	8.8
4	8.7	8.7

Temperature (°C)

0	16	15
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-1018-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.5	0.5
2	3.4	0.5
3	3.6	0.6
4	3.6	0.5
5	3.4	0.4
6	3.0	0.3
7	2.5	0.1
8	3.4	0.5
9	2.6	0.2
10	2.8	0.3

Sample	Group Wet Weight (g)
control	3.9

average	3.2	0.4
sd	0.4	0.2
cv(%)	13.2	40.9

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-1018-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160815_N

Collection: collected on 2016/08/15 at 0900 by not given

Receipt: received on 2016/08/16 at 1245 by MC

Containers: received 4 x 1 L bottle, 3 x 20 L carboys at 11 °C, in good condition with no seals and no

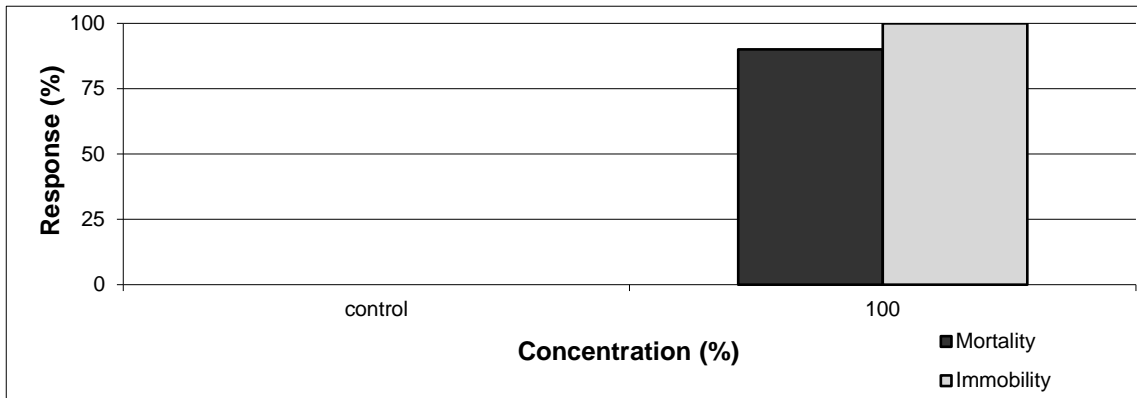
Description: type: water, collection method: grab

Test: started on 2016/08/16 ; ended on 2016/08/18

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160815_	90	100	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-1018-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
29 neonates per average brood

Sample initial chemistry: pH: 7.7; EC: 2070 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.9 (mg/L); temperature: 21 °C
hardness (mg CaCO_3/L): 1056; colour: colourless; odour: organic
salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 89 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-1018-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated August 15, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.67 (0.64-0.69) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.74 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-1018-01-DAS

Test Log:

Date	Day	Time	Technician
2016/08/16	0	1425	JW/EP
2016/08/17	1	0930	HS
2016/08/18	2	1000	EP

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.7	7.8	7.8	7.8	7.9	7.9
2	7.8	7.8	7.8	7.7	7.7	7.7

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	352	355	356	2100	2140	2170
2	327	332	338	1920	1921	1915

Day	Dissolved Oxygen (mg/L)					
0	8.1	8.0	8.0	8.1	8.1	8.1
2	8.0	8.0	7.9	8.0	7.8	7.9

Day	Temperature (°C)					
0	19	19	19	18	18	18
2	20	20	20	20	20	20

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(10F,10I,10D)	10(10F,10I,10D)	10(10F,10I,10D)
2	10	10	10	2(2I)	1(1I)	0

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	80	90	100

Day	Immobility (%)					
2	0	0	0	100	100	100



Comments/Statistics

Client: TEC164 Reference: 16-1018-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None



Result Summary

Client: TEC164
Reference: 16-1018-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160815_N

Collection: collected on 2016/08/15 at 0900 by not given

Receipt: received on 2016/08/16 at 1245 by MC

Containers: received 4 x 1 L bottle, 3 x 20 L carboys at 11 °C, in good condition with no seals and no

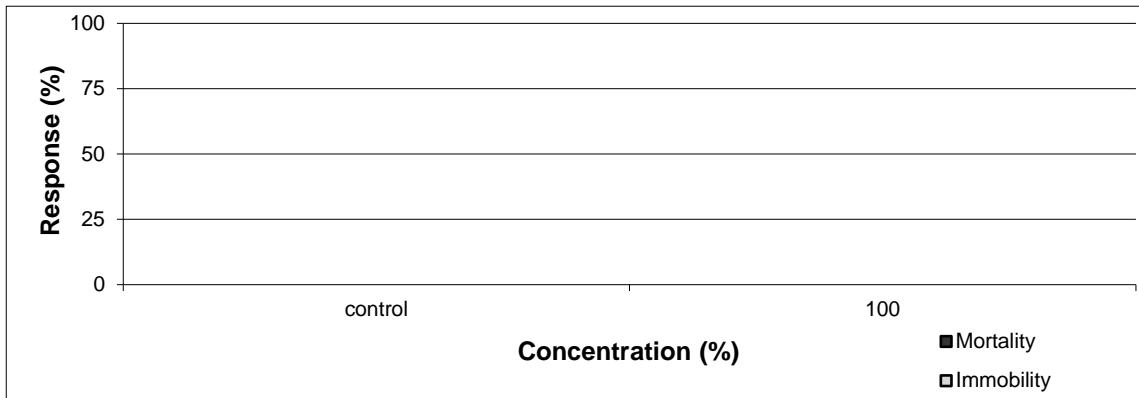
Description: type: water, collection method: grab

Test: started on 2016/08/16 ; ended on 2016/08/18

Result:

Sample	Client Code	Average		Comment
		Mortality (%)	Immortality (%)	
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160815_	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-1018-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
29 neonates per average brood

Sample initial chemistry: pH: 7.7; EC: 2070 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.9 (mg/L); temperature: 21 °C
hardness (mg CaCO_3/L): 1056; colour: colourless; odour: organic
salinity (ppt): 0

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must ≤ 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 89 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $10 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-1018-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated August 15, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.67 (0.64-0.69) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.74 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-1018-01-DAS

Test Log:

Date	Day	Time	Technician
2016/08/16	0	1425	JW/EP
2016/08/17	1	0930	HS
2016/08/18	2	1045	EP

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.9	7.9	7.9	7.7	7.7	7.8
2	7.6	7.8	7.7	7.8	7.7	7.7

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	341	356	359	2060	2190	2230
2	329	340	348	2070	2120	2140

Day	Dissolved Oxygen (mg/L)					
0	9.5	9.4	9.5	9.4	9.4	9.4
2	9.4	9.4	9.4	9.4	9.4	9.4

Day	Temperature (°C)					
0	11	11	11	11	11	11
2	12	12	12	12	12	12

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(2F)	10(2F)	10 (3F)
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-1018-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
The test temperature was set at $10 \pm 2^{\circ}\text{C}$, as requested by the client.



Result Summary

Client: TEC164
Reference: 16-1018-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160815_N

Collection: collected on 2016/08/15 at 0900 by not given

Receipt: received on 2016/08/16 at 1245 by MC

Containers: received 4 x 1 L bottle, 3 x 20 L carboys at 11 °C, in good condition with no seals and no

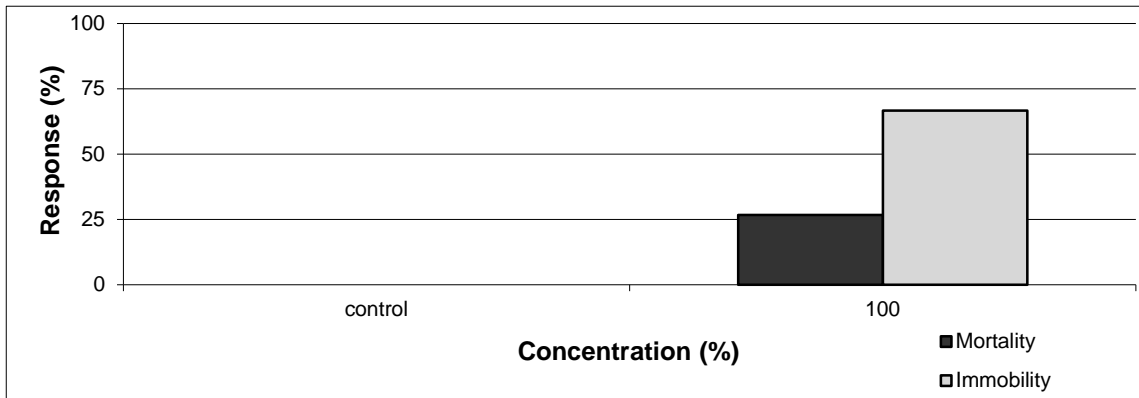
Description: type: water, collection method: grab

Test: started on 2016/08/16 ; ended on 2016/08/18

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160815_	27	67	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

**Test Conditions**

Client: TEC164 Reference: 16-1018-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 7%

Culture brood data: 9 days to first brood
36 neonates per average brood

Sample initial chemistry: pH: 7.7; EC: 2070 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.9 (mg/L); temperature: 21 °C
hardness (mg CaCO_3/L): 1056; colour: colourless; odour: organic
salinity (ppt): 0

Sample holding time: 3 days (must be ≤ 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must ≤ 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 89 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-1018-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated August 15, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.67 (0.64-0.69) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.74 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-1018-01-DAS

Test Log:

Date	Day	Time	Technician
2061/08/18	0	1530	HS/JW
2061/08/19	1	1215	LC
2061/08/20	2	1040	LC

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.8	7.8	7.8	8.0	8.0	8.0
2	7.8	8.0	8.0	8.0	8.0	8.0

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	331	337	337	1955	1977	2000
2	318	338	347	1850	1865	1864

Day	Dissolved Oxygen (mg/L)					
0	7.9	7.9	7.9	8.4	8.4	8.4
2	7.4	7.6	7.7	7.7	7.7	7.7

Day	Temperature (°C)					
0	21	21	21	20	21	21
2	20	20	20	20	20	20

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(8I,4D)	10(10I,7D)	10(8I,6D)
2	10	10	10	9(3I)	8(5I,4D)	5(4I,1D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	10	20	50

Day	Immobility (%)					
2	0	0	0	40	70	90



Comments/Statistics

Client: TEC164 Reference: 16-1018-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None

Result Summary

Client: TEC164
Reference: 16-1018-01 DAD

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160815_N

Collection: collected on 2016/08/15 at 0900 by not given

Receipt: received on 2016/08/16 at 1245 by MC

Containers: received 4 x 1 L bottle, 3 x 20 L carboys at 11 °C, in good condition with no seals and no initials

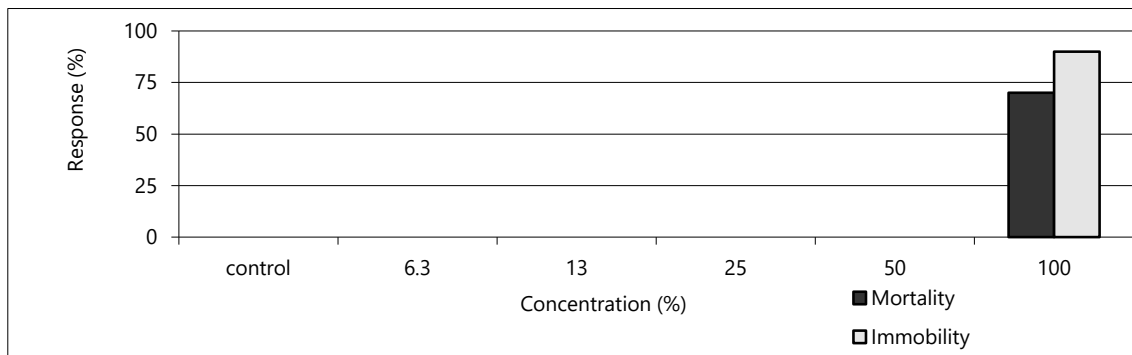
Description: type: water, collection method: grab

Test: started on 2016/08/16 ; ended on 2016/08/18

Result:

	Endpoint (48-hour)	Value (%)	Confidence Limits (95%)		Method Calculated
			lower	upper	
Acute: (mortality)	LC50	82	67	>100	Spearman-Kärber
Acute: (immobility)	EC50	73	68	80	Spearman-Kärber

Notes: LC50 concentrations lethal to 50% of the test population



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164
Reference: 16-1018-01 DAD

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 7%

Culture brood data: 9 days to first brood

36 neonates per average brood

Sample initial chemistry: pH: 7.7; EC: 2070 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.9 (mg/L); temperature: 21 °C
hardness (mg CaCO_3/L): 1056; colour: colourless; salinity (ppt): organic
salinity (ppt): 0

Sample holding time: 3 days (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control/dilution water: Moderately hard water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 89 mg CaCO_3/L

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 16-1018-01 DAD

Endpoint: Mortality, 48-h LC50 (95% confidence limits)
Immobility, 48-h EC50 (95% confidence limits)

Test validity: The control had 100% survival (must \geq 90%)
Control had 0 percent (%) abnormal behaviour (must \leq 10%, immobility)

Reference toxicant: 48-h test with NaCl initiated August 15, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.67 (0.64-0.69) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.74 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 16-1018-01-DAS

Test Log:

Date	Day	Time	Technician
2016/08/16	0	1530	HW/JW
2016/08/17	1	1200	LC
2016/08/18	2	1050	LC

Chemistry:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

pH (units)

0	7.8	8.0	8.1	8.1	8.1	8.0		
2	7.9	8.0	8.1	8.3	8.3	8.0		

Conductivity (µS/cm @ 25°C)

0	325	443	558	785	1191	1922		
2	320	450	560	787	1158	1794		

Dissolved Oxygen (mg/L)

0	7.9	8.4	8.4	8.4	8.4	8.4		
2	7.7	7.7	7.7	7.7	7.7	7.7		

Temperature (°C)

0	20	20	20	20	20	20		
2	20	20	20	20	20	20		

Biology:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

Number Alive and Behavior (behavior is in brackets)

1	10	10 (2F)	10	10	10 (1F)	10 (8I, 6D)		
2	10	10	10	10	10	3(2I)		

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris; nd, not done; na, not applicable;

Mortality (%)

2	0	0	0	0	0	70		
---	---	---	---	---	---	----	--	--

Immobility (%)

2	0	0	0	0	0	90		
---	---	---	---	---	---	----	--	--



***Daphnia* (48-h LC50/EC50) Test Report**

Comments/Statistics

Client: TEC164 Reference: 16-1018-01-DAS

Test Result Comments:

None

Data Analysis:

Regression analysis was attempted on the data, but the assumptions of normality and homoscedasticity of residuals were not met. Therefore, endpoints for survival were calculated using a Spearman-Kärber model using CETIS v. 1.9.0.8

Regression analysis was attempted on the data, but the assumptions of normality and homoscedasticity of residuals were not met. Therefore, endpoints for immobility were calculated using a Spearman-Kärber model using CETIS v. 1.9.0.8

Protocol Deviations:

None

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, H₂S 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 OR 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.

Your P.O. #: 441369
Site Location: WLC AWTF
Your C.O.C. #: 1of1

Attention:Chris Stroich

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/09/06
Report #: R2254441
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B670600

Received: 2016/08/19, 17:05

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Daphnia magna Single Concentration-100% (1)	1	N/A	2016/08/21	EENSOP-00154	EPS 1 RM14 2nd ed
Microcystin - Sublet (1)	1	2016/09/06	2016/09/06		

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Edmonton Environmental

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Customer Service Alberta, Customer Service Alberta

Email: CSAlberta@maxxam.ca

Phone# (403) 291-3077

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B670600
Report Date: 2016/09/06

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		PH7761	
Sampling Date		2016/08/18 15:30	
COC Number		1of1	
	UNITS	WL_BFWB_OUT_SP21 _20160818_N	QC Batch
Parameter			
Subcontract Parameter	N/A	ATTACHMENT	8389112
Daphnia Magna Bioassay			
Mortality	%	ATTACHED	8371203

Maxxam Job #: B670600
Report Date: 2016/09/06

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.0°C
Package 2	6.0°C

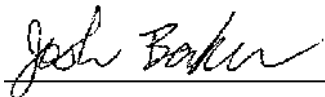
Results relate only to the items tested.

Maxxam Job #: B670600
Report Date: 2016/09/06

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Joshua Baker, B.Sc., Senior Analyst



Kristi Bilodeau, Project Manager

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B670600
Sample Number: PH7761-01

Test Result:

48 hrs Mortality % 0% Statistical Method:

Mean percent mortality:	<u>Sample</u>	0	<u>Control</u>	0
Sample Name :	WL_BFWB_OUT_SP21_20160818_N			Sample Matrix : Water
Description:	colourless			<u>Sample Prior to Analysis:</u>
Sample Collected:	Aug 18, 2016 03:30 PM	Sampling Method :	N/A	pH: 7.6
Sample Collected By:	N/A	Site Collection:	N/A	Temperature : 18 °C
Sample Received:	Aug 19, 2016 05:05 PM	Volume Received:	1 L	Dissolved Oxygen: 9.1 mg/L
Analysis Start :	Aug 21, 2016 10:57 AM	Temp.Upon Arrival:	6 °C	Sample Conductance: 1557 µS/cm
End :	Aug 23, 2016 10:33 AM	Storage:	2-6°C	Hardness: 800 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	21	8.0	357	7.7	0	0	0	0	20	7.9	362	7.7
0	21	8.0	360	7.6	0	0	0	0	20	7.9	353	7.5
0	21	8.0	360	7.6	0	0	0	0	20	7.9	362	7.5
100	19	7.7	1598	8.6	0	0	1	10.0	20	7.7	1493	7.4
100	19	7.7	1611	8.6	0	0	2	20.0	20	7.7	1517	7.3
100	19	7.7	1609	8.6	0	0	0	0	20	7.7	1504	7.4

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	1	10.0
100	0	0	0	0
100	0	0	1	10.0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 180 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
 Organisms per Vessel : 10 Pre-aeration Time : 30 min Rate of Pre-aeration : 25-50 mL/min/L
 Total # of Organisms Used : 60 Test Temperature : 20 ± 2 °C Test Hardness Adjusted : No
 Test Volume : 150 mL Vessel Volume : 225 mL Test pH Adjusted: No
 Loading Density : 15.0 mL/Daphnia Photoperiod : 16:8 (light: dark)

Test Organism : *Daphnia magna* Source : In House Culture
 Age at Test Initiation : <24 hrs Average Brood Size : 24.5
 Culture Photoperiod : 16:8 (light: dark) % Mortality within 7 days : 0
 Culture Temperature : 20 ± 2 °C Time To First Brood : 8 Days
 Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B670600
Sample Number: PH7761-01

Reference chemical: Sodium Chloride
Test Endpoint 48 hrs LC50 (95% confidence interval) : 7.07 (5.00, 10.0)g/L
Historical Mean LC50 (warning limits) : 6.48 (5.02, 8.35) g/L
Test Date: Aug 12, 2016
Statistical Method : Binomial
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Arthur Juan Mathias, Chelsea Tessier, Michelle Hospedales



Verified By : Joshua Baker, Senior Analyst

Date: Aug 24, 2016 04:02 PM



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/08/19
Report Date: 2016/08/29
Version: FINAL

Test Report

Client: TEC164
Reference: 16-1039
Billing: PO # 430571

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



Trout (Single Concentration) Test Report

Result Summary

Client: TEC164
Reference: 16-1039-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160818_N

Collection: collected on 2016/08/18 at 1530 by not given

Receipt: received on 2016/08/19 at 1600 by MC

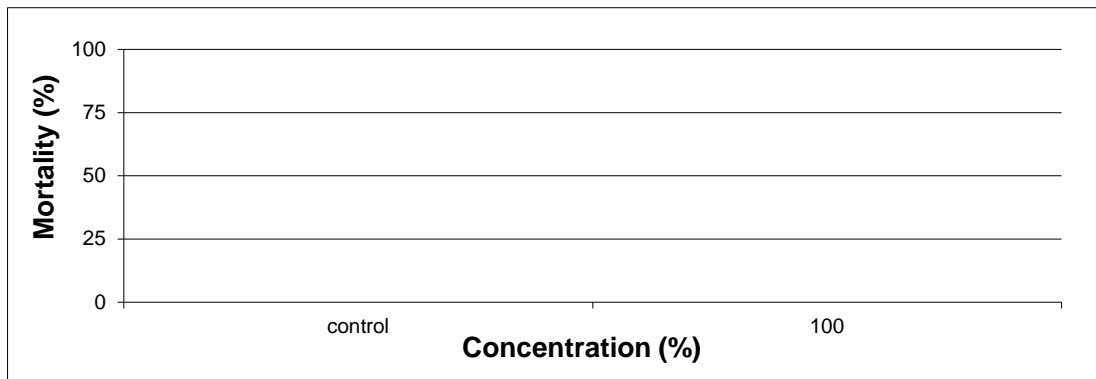
Containers: received 2 x 20 L carboys / 2 x 1 L bottles / 2 x 125 mL tube at 10 °C, in good condition with no seals and

Description: type: water, collection method: grab

Test: started on 2016/08/20 ; ended on 2016/08/24

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	WL_BFWB_OUT_S P21_20160818_N	0	none



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-1039-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160706TR)

Acclimation: 45 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.3; EC: 1919 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.9 (mg/L); temperature: 15 °C
hardness (mg CaCO₃/L): 769; colour: colourless; odour: organic
salinity (ppt): 0

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 8.6 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.155 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated July 20, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.47 (0.38-0.53) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.52 (0.37-0.68) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-1039-01-TRS

Test Log:

Date	Day	Time	Technician
2016/08/20	0	1445	LC
2016/08/21	1	1000	JW
2016/08/22	2	0900	ML
2016/08/23	3	0820	LC
2016/08/24	4	0800	EP

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	7.6	7.7
4	8.1	7.9

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	394	1807
4	329	1685

Dissolved Oxygen (mg/L)

0	8.6	8.6
4	8.8	8.7

Temperature (°C)

0	15	16
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-1039-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	2.5	0.2
2	2.8	0.3
3	3.0	0.3
4	3.2	0.6
5	2.7	0.2
6	3.1	0.4
7	3.4	0.6
8	2.4	0.2
9	2.2	0.1
10	2.3	0.2

Sample	Group Wet Weight (g)
control	3.1
100	-

average	2.8	0.3
sd	0.4	0.2
cv(%)	14.8	55.8

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-1039-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160818_N

Collection: collected on 2016/08/18 at 1530 by not given

Receipt: received on 2016/08/19 at 1600 by MC

Containers: received 2 x 20 L carboys / 2 x 1 L bottles / 2 x 125 mL tube at 10 °C, in good condition with no

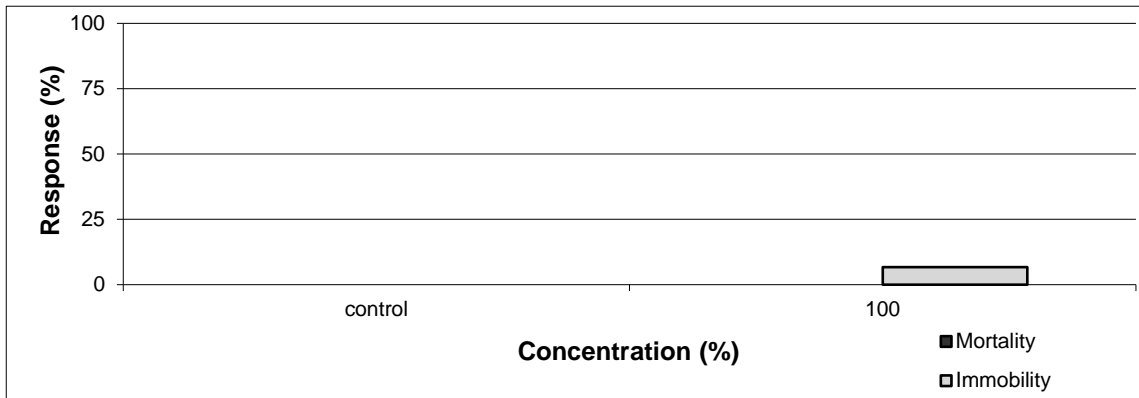
Description: type: water, collection method: grab

Test: started on 2016/08/19 ; ended on 2016/08/21

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160818_	0	7	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-1039-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 9 days to first brood
32 neonates per average brood

Sample initial chemistry: pH: 7.3; EC: 1919 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.9 (mg/L); temperature: 15 °C
hardness (mg CaCO₃/L): 769; colour: colourless; odour: organic
salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 83 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 20 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-1039-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated August 15, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.67 (0.64-0.69) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.74 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-1039-01-DAS

Test Log:

Date	Day	Time	Technician
2016/08/19	0	1615	ML/LC
2016/08/20	1	1125	LC
2016/08/21	2	1110	JW/JN

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	8.1	8.0	8.0	8.1	8.1	8.1
2	7.9	7.9	7.9	7.8	7.8	7.8

Day	Conductivity ($\mu\text{S/cm}$ @ 25°C)					
0	316	324	320	1803	1826	1877
2	316	327	327	1715	1722	1718

Day	Dissolved Oxygen (mg/L)					
0	7.7	7.9	7.9	7.7	7.7	7.7
2	7.6	7.6	7.7	7.3	7.3	7.2

Day	Temperature (°C)					
0	21	20	19	21	21	21
2	21	21	20	20	20	20

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(3D)	10(3D)	10(4D,2I)
2	10	10	10	10(6D,1I)	10(5D)	10(8D,1I)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	10	0	10



Comments/Statistics

Client: TEC164 Reference: 16-1039-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None



Result Summary

Client: TEC164
Reference: 16-1039-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160818_N

Collection: collected on 2016/08/18 at 1530 by not given

Receipt: received on 2016/08/19 at 1600 by MC

Containers: received 2 x 20 L carboys / 2 x 1 L bottles / 2 x 125 mL tube at 10 °C, in good condition with no

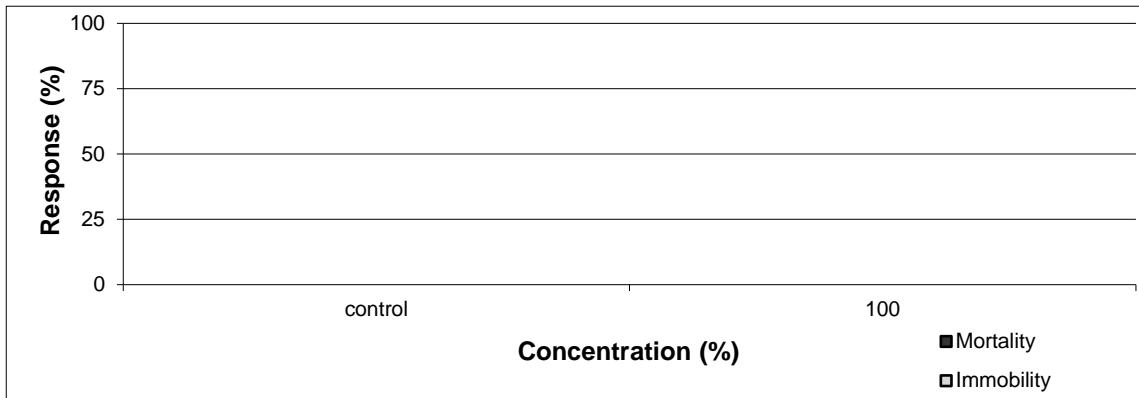
Description: type: water, collection method: grab

Test: started on 2016/08/19 ; ended on 2016/08/21

Result:

Sample	Client Code	Average		Comment
		Mortality (%)	Immortality (%)	
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160818_	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-1039-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 4%

Culture brood data: 8 days to first brood
27 neonates per average brood

Sample initial chemistry: pH: 7.3; EC: 1919 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.9 (mg/L); temperature: 15 °C
hardness (mg CaCO₃/L): 769; colour: colourless; odour: organic
salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 83 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 10 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-1039-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated August 15, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.67 (0.64-0.69) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.74 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-1039-01-DAS

Test Log:

Date	Day	Time	Technician
2016/08/19	0	1615	ML/LC
2016/08/20	1	1115	LC
2016/08/21	2	1145	JN/JW

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.7	7.8	7.8	7.6	7.6	7.6
2	7.8	7.8	7.8	8.2	8.1	8.1

Day	Conductivity ($\mu\text{S/cm}$ @ 25°C)					
0	326	325	332	1874	1870	1892
2	326	334	398	1852	1855	1869

Day	Dissolved Oxygen (mg/L)					
0	8.0	8.0	8.0	9.4	9.4	9.4
2	9.4	9.5	9.5	9.5	9.5	9.5

Day	Temperature (°C)					
0	11	11	11	12	12	12
2	11	11	11	11	11	11

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



***Daphnia* (Single Concentration) Test Report**

Comments/Statistics

Client: TEC164 Reference: 16-1039-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
The test temperature was $10 \pm 2^{\circ}\text{C}$ as per the client's request

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, H₂S 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.

Your P.O. #: 441369
Site Location: WLC AWTF
Your C.O.C. #: 1of1

Attention:Chris Stroich

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/08/24
Report #: R2246093
Version: 1 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

MAXXAM JOB #: B670584

Received: 2016/08/19, 17:05

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Daphnia magna Single Concentration-100% (1)	1	N/A	2016/08/21	EENVSOP-00154	EPS 1 RM14 2nd ed

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

(1) This test was performed by Maxxam Edmonton Environmental

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Customer Service Alberta, Customer Service Alberta

Email: CSAlberta@maxxam.ca

Phone# (403) 291-3077

=====

This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B670584
Report Date: 2016/08/24

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		PH7521	
Sampling Date		2016/08/19 09:00	
COC Number		1of1	
	UNITS	WL_BFWB_OUT_SP21_2016 0819_N	QC Batch
Daphnia Magna Bioassay			
Mortality	%	ATTACHED	8371203

Maxxam Analytics International Corporation - 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Maxxam Job #: B670584
Report Date: 2016/08/24

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369

GENERAL COMMENTS

Results relate only to the items tested.

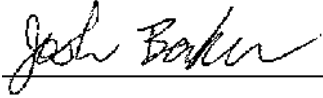
Maxxam Analytics International Corporation - 2021 - 41st Avenue N.E. T2E 6P2 Telephone (403) 291-3077 Fax (403) 291-9468

Maxxam Job #: B670584
Report Date: 2016/08/24

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Joshua Baker, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Analytics International Corporation - 41st Avenue N.E. T2E 6P2 - Calgary, Alberta T2E 6P2 - Canada

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B670584
Sample Number: PH7521-01

Test Result:

48 hrs Mortality % 0% Statistical Method:

Mean percent mortality:	<u>Sample</u>	0	<u>Control</u>	0
Sample Name :	WL_BFWB_OUT_SP21_20160819_N			Sample Matrix : Water
Description:	Colourless			<u>Sample Prior to Analysis:</u>
Sample Collected:	Aug 19, 2016 09:00 AM	Sampling Method :	N/A	pH: 7.5
Sample Collected By:	N/A	Site Collection:	N/A	Temperature : 19 °C
Sample Received:	Aug 19, 2016 05:05 PM	Volume Received:	1 L	Dissolved Oxygen: 9.0 mg/L
Analysis Start :	Aug 21, 2016 10:58 PM	Temp.Upon Arrival:	6 °C	Sample Conductance: 1577 µS/cm
End :	Aug 23, 2016 10:35 AM	Storage:	2-6°C	Hardness: 800 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	21	7.9	355	7.6	0	0	0	0	20	8.0	347	7.6
0	21	7.9	360	7.6	0	0	0	0	20	8.0	354	7.6
0	21	7.9	360	7.6	0	0	0	0	20	8.0	360	7.8
100	19	7.7	1606	8.5	0	0	1	10.0	20	7.7	1490	7.4
100	19	7.7	1619	8.4	0	0	2	20.0	20	7.7	1501	7.4
100	19	7.7	1624	8.4	0	0	1	10.0	20	7.7	1534	7.5

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	1	10.0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 180 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
 Organisms per Vessel : 10 Pre-aeration Time : 30 min Rate of Pre-aeration : 25-50 mL/min/L
 Total # of Organisms Used : 60 Test Temperature : 20 ± 2 °C Test Hardness Adjusted : No
 Test Volume : 150 mL Vessel Volume : 225 mL Test pH Adjusted: No
 Loading Density : 15.0 mL/Daphnia Photoperiod : 16:8 (light: dark)

Test Organism : *Daphnia magna* Source : In House Culture
 Age at Test Initiation : <24 hrs Average Brood Size : 28.5
 Culture Photoperiod : 16:8 (light: dark) % Mortality within 7 days : 3.2
 Culture Temperature : 20 ± 2 °C Time To First Brood : 9 Days
 Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

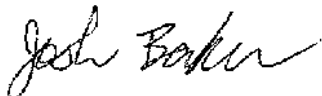
Job Number: B670584
Sample Number: PH7521-01

Reference chemical: Sodium Chloride
Test Endpoint 48 hrs LC50 (95% confidence interval) : 7.07 (5.00, 10.0)g/L
Historical Mean LC50 (warning limits) : 6.48 (5.02, 8.35) g/L
Test Date: Aug 12, 2016
Statistical Method : Binomial
Concentration : 0,1,25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Arthur Juan Mathias, Chelsea Tessier, Michelle Hospedales



Verified By : Joshua Baker, Senior Analyst

Date: Aug 24, 2016 04:07 PM



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/08/19
Report Date: 2016/08/29
Version: FINAL

Test Report

Client: TEC164
Reference: 16-1040
Billing: PO # 430571

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



Trout (Single Concentration) Test Report

Result Summary

Client: TEC164
Reference: 16-1040-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160819_N

Collection: collected on 2016/08/19 at 0900 by not given

Receipt: received on 2016/08/19 at 1600 by MC

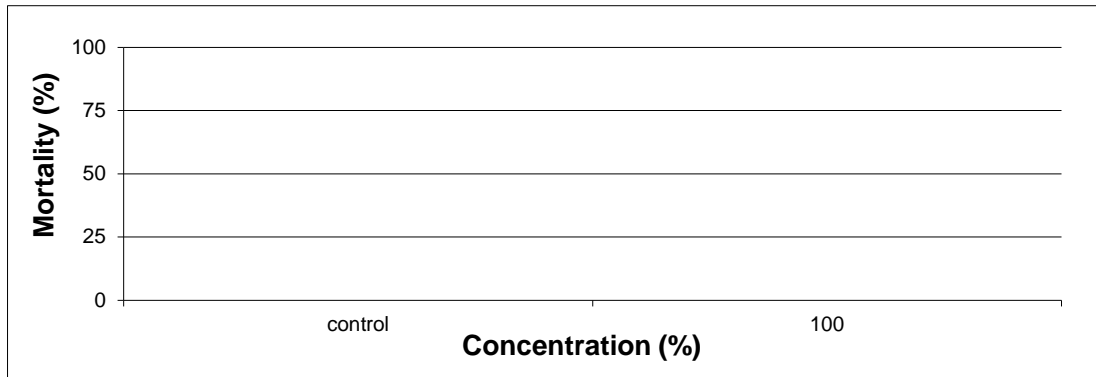
Containers: received 2 x 20 L carboys / 2 x 1 L bottles / 2 x 125 mL tube at 10 °C, in good condition with no seals and

Description: type: water, collection method: grab

Test: started on 2016/08/20 ; ended on 2016/08/24

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	WL_BFWB_OUT_S P21_20160819_N	0	none



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-1040-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160706TR)

Acclimation: 45 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.6; EC: 1929 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.7 (mg/L); temperature: 15 °C
hardness (mg CaCO₃/L): 798; colour: colourless; odour: organic
salinity (ppt): 0

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 8.7 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.15 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated July 20, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.47 (0.38-0.53) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.52 (0.37-0.68) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-1040-01-TRS

Test Log:

Date	Day	Time	Technician
2016/08/20	0	1500	LC
2016/08/21	1	1000	JW
2016/08/22	2	0900	ML
2016/08/23	3	0825	LC
2016/08/24	4	0800	EP

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	7.2	7.5
4	7.9	7.8

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	404	1866
4	289	1750

Dissolved Oxygen (mg/L)

0	8.7	8.7
4	8.8	8.8

Temperature (°C)

0	15	15
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-1040-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	2.6	0.2
2	3.2	0.5
3	2.8	0.3
4	2.7	0.2
5	3.1	0.4
6	2.3	0.2
7	3.0	0.4
8	3.0	0.3
9	2.5	0.3
10	2.4	0.2

Sample	Group Wet Weight (g)
control	3.0
100	-

average	2.8	0.3
sd	0.3	0.1
cv(%)	11.2	35.1

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-1040-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160819_N

Collection: collected on 2016/08/19 at 0900 by not given

Receipt: received on 2016/08/19 at 1600 by MC

Containers: received 2 x 20 L carboys / 2 x 1 L bottles / 2 x 125 mL tube at 10 °C, in good condition with no

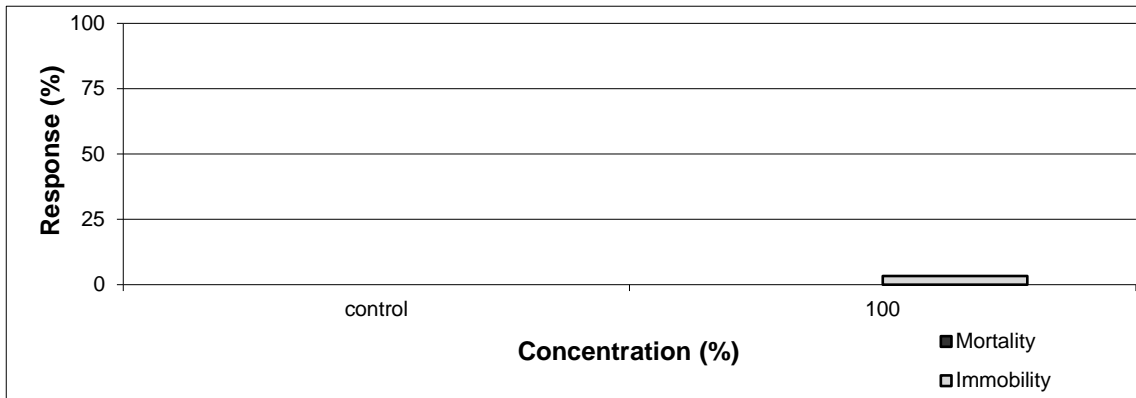
Description: type: water, collection method: grab

Test: started on 2016/08/19 ; ended on 2016/08/21

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160819_	0	3	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-1040-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 9 days to first brood
32 neonates per average brood

Sample initial chemistry: pH: 7.6; EC: 1929 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.7 (mg/L); temperature: 15 °C
hardness (mg CaCO_3/L): 798; colour: colourless; odour: organic
salinity (ppt): 0

Sample holding time: <1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 83 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-1040-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated August 15, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.67 (0.64-0.69) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.74 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-1040-01-DAS

Test Log:

Date	Day	Time	Technician
2016/08/19	0	1615	ML/LC
2016/08/20	1	1120	LC
2016/08/21	2	1110	JW/JN

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.8	7.9	7.9	8.1	8.1	8.2
2	7.9	7.9	7.9	7.8	7.9	7.9

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	313	322	325	1820	1836	1849
2	316	333	340	1715	1736	1757

Day	Dissolved Oxygen (mg/L)					
0	7.9	7.9	7.9	7.6	7.6	7.6
2	7.7	7.7	7.7	7.6	7.5	7.6

Day	Temperature (°C)					
0	20	20	20	22	22	22
2	20	20	20	20	20	20

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(10D)	10(4D)	10(6D,1I)
2	10	10	10	10(10D)	10(10D)	10(10D,1I)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	10



Comments/Statistics

Client: TEC164 Reference: 16-1040-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None



Result Summary

Client: TEC164
Reference: 16-1040-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160819_N

Collection: collected on 2016/08/19 at 0900 by not given

Receipt: received on 2016/08/19 at 1600 by MC

Containers: received 2 x 20 L carboys / 2 x 1 L bottles / 2 x 125 mL tube at 10 °C, in good condition with no

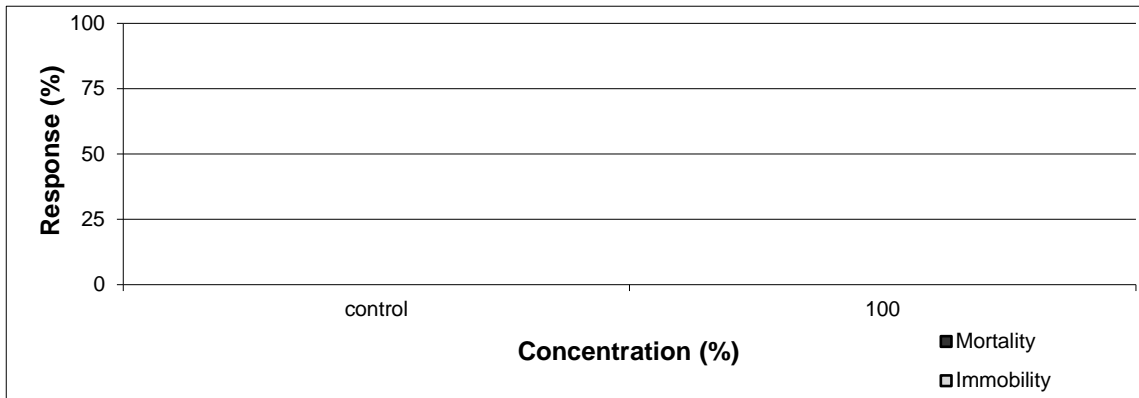
Description: type: water, collection method: grab

Test: started on 2016/08/19 ; ended on 2016/08/21

Result:

Sample	Client Code	Average		Comment
		Mortality (%)	Immortality (%)	
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160819_	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-1040-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 9 days to first brood
32 neonates per average brood

Sample initial chemistry: pH: 7.6; EC: 1929 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.7 (mg/L); temperature: 15 °C
hardness (mg CaCO₃/L): 798; colour: colourless; odour: organic
salinity (ppt): 0

Sample holding time: <1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 83 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 10 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-1040-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated August 15, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.67 (0.64-0.69) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.74 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Test Data

Client: TEC164
Reference: 16-1040-01-DAS

Test Log:

Date	Day	Time	Technician
2016/08/19	0	1615	ML/LC
2016/08/20	1	1110	LC
2016/08/21	2	1145	JN/JW

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.8	7.9	7.9	7.6	7.7	7.7
2	7.8	7.8	7.8	8.0	8.1	8.1

Day	Conductivity (µS/cm @ 25°C)					
0	331	331	331	1850	1898	1903
2	319	331	339	1835	1838	1869

Day	Dissolved Oxygen (mg/L)					
0	8.0	8.0	8.0	9.4	9.4	9.4
2	9.6	9.6	9.6	9.4	9.6	9.4

Day	Temperature (°C)					
0	11	11	11	12	12	12
2	11	11	11	11	11	11

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



Comments/Statistics

Client: TEC164 Reference: 16-1040-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
The test temperature was $10 \pm 2^{\circ}\text{C}$ as per the client's request

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, H₂S 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.

Your P.O. #: 441369
Site Location: WLC AWTF

Attention:Chris Stroich

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/08/26
Report #: R2247494
Version: 3 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B671465
Received: 2016/08/23, 10:06

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Date		Laboratory Method	Analytical Method
		Extracted	Analyzed		
Daphnia magna Single Concentration-100%	1	N/A	2016/08/24	EENSOP-00154	EPS 1 RM14 2nd ed
Elements by ICPMS-Dissolved-Lab Filtered	1	N/A	2016/08/24	AB SOP-00043	EPA 200.8 R5.4 m
Elements by ICPMS - Total	1	2016/08/24	2016/08/24	AB SOP-00014 / AB SOP-00043	EPA 200.8 R5.4 m
Technician Time - Customer Service	1	2016/08/24	2016/08/24		

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Micheline Piche, Project Manager
Email: MPiche@maxxam.ca
Phone# (780) 577-7100

=====
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B671465
Report Date: 2016/08/26

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: KA

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		PI3606		
Sampling Date		2016/08/22 09:00		
	UNITS	WL_BFWB_OUT_SP21_2016 0822_N	RDL	QC Batch
Industrial - Calculated				
Hours of Labour	hr	1.0	0.01	ONSITE
Daphnia Magna Bioassay				
Mortality	%	ATTACHED	N/A	8374699
RDL = Reportable Detection Limit N/A = Not Applicable				

Maxxam Job #: B671465
Report Date: 2016/08/26

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: KA

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		PI3607	PI3608		
Sampling Date		2016/08/22 09:00	2016/08/22 09:00		
	UNITS	WL_BFWB_OUT_SP21_2016 0822_N	WL_BFWB_OUT_SP21_2016 0822_N	RDL	QC Batch
Elements					
Total Aluminum (Al)	mg/L	N/A	0.0042	0.0030	8374456
Total Antimony (Sb)	mg/L	N/A	<0.00060	0.00060	8374456
Total Arsenic (As)	mg/L	N/A	<0.00020	0.00020	8374456
Total Beryllium (Be)	mg/L	N/A	<0.0010	0.0010	8374456
Total Cadmium (Cd)	mg/L	N/A	<0.000020	0.000020	8374456
Total Chromium (Cr)	mg/L	N/A	<0.0010	0.0010	8374456
Total Cobalt (Co)	mg/L	N/A	<0.00030	0.00030	8374456
Total Copper (Cu)	mg/L	N/A	<0.00020	0.00020	8374456
Total Lead (Pb)	mg/L	N/A	<0.00020	0.00020	8374456
Total Molybdenum (Mo)	mg/L	N/A	0.0022	0.00020	8374456
Total Nickel (Ni)	mg/L	N/A	0.0091	0.00050	8374456
Total Selenium (Se)	mg/L	N/A	0.011	0.00020	8374456
Total Silver (Ag)	mg/L	N/A	<0.00010	0.00010	8374456
Total Thallium (Tl)	mg/L	N/A	<0.00020	0.00020	8374456
Total Tin (Sn)	mg/L	N/A	<0.0010	0.0010	8374456
Total Titanium (Ti)	mg/L	N/A	<0.0010	0.0010	8374456
Total Uranium (U)	mg/L	N/A	0.012	0.00010	8374456
Total Vanadium (V)	mg/L	N/A	<0.0010	0.0010	8374456
Total Zinc (Zn)	mg/L	N/A	0.0052	0.0030	8374456
Lab Filtered Elements					
Dissolved Aluminum (Al)	mg/L	<0.0030	N/A	0.0030	8374616
Dissolved Antimony (Sb)	mg/L	<0.00060	N/A	0.00060	8374616
Dissolved Arsenic (As)	mg/L	<0.00020	N/A	0.00020	8374616
Dissolved Beryllium (Be)	mg/L	<0.0010	N/A	0.0010	8374616
Dissolved Cadmium (Cd)	mg/L	<0.000020	N/A	0.000020	8374616
Dissolved Chromium (Cr)	mg/L	<0.0010	N/A	0.0010	8374616
Dissolved Cobalt (Co)	mg/L	<0.00030	N/A	0.00030	8374616
Dissolved Copper (Cu)	mg/L	<0.00020	N/A	0.00020	8374616
Dissolved Lead (Pb)	mg/L	<0.00020	N/A	0.00020	8374616
Dissolved Molybdenum (Mo)	mg/L	0.0021	N/A	0.00020	8374616
Dissolved Nickel (Ni)	mg/L	0.0088	N/A	0.00050	8374616
RDL = Reportable Detection Limit N/A = Not Applicable					

Maxxam Job #: B671465
Report Date: 2016/08/26

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: KA

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Maxxam ID		PI3607	PI3608		
Sampling Date		2016/08/22 09:00	2016/08/22 09:00		
	UNITS	WL_BFWB_OUT_SP21_2016 0822_N	WL_BFWB_OUT_SP21_2016 0822_N	RDL	QC Batch
Dissolved Selenium (Se)	mg/L	0.013	N/A	0.00020	8374616
Dissolved Silver (Ag)	mg/L	<0.00010	N/A	0.00010	8374616
Dissolved Thallium (Tl)	mg/L	<0.00020	N/A	0.00020	8374616
Dissolved Tin (Sn)	mg/L	<0.0010	N/A	0.0010	8374616
Dissolved Titanium (Ti)	mg/L	<0.0010	N/A	0.0010	8374616
Dissolved Uranium (U)	mg/L	0.011	N/A	0.00010	8374616
Dissolved Vanadium (V)	mg/L	<0.0010	N/A	0.0010	8374616
Dissolved Zinc (Zn)	mg/L	0.0056	N/A	0.0030	8374616
RDL = Reportable Detection Limit N/A = Not Applicable					

Maxxam Job #: B671465
Report Date: 2016/08/26

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: KA

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	7.0°C
-----------	-------

Results relate only to the items tested.

Maxxam Job #: B671465
Report Date: 2016/08/26

QUALITY ASSURANCE REPORT

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: KA

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8374456	Total Aluminum (Al)	2016/08/24	NC	80 - 120	100	80 - 120	0.0034, RDL=0.0030	mg/L		
8374456	Total Antimony (Sb)	2016/08/24	105	80 - 120	97	80 - 120	<0.00060	mg/L		
8374456	Total Arsenic (As)	2016/08/24	102	80 - 120	100	80 - 120	<0.00020	mg/L		
8374456	Total Beryllium (Be)	2016/08/24	105	80 - 120	101	80 - 120	<0.0010	mg/L		
8374456	Total Cadmium (Cd)	2016/08/24	105	80 - 120	100	80 - 120	<0.000020	mg/L		
8374456	Total Chromium (Cr)	2016/08/24	102	80 - 120	105	80 - 120	<0.0010	mg/L		
8374456	Total Cobalt (Co)	2016/08/24	101	80 - 120	102	80 - 120	<0.00030	mg/L		
8374456	Total Copper (Cu)	2016/08/24	97	80 - 120	100	80 - 120	<0.00020	mg/L		
8374456	Total Lead (Pb)	2016/08/24	100	80 - 120	103	80 - 120	<0.00020	mg/L		
8374456	Total Molybdenum (Mo)	2016/08/24	NC	80 - 120	106	80 - 120	<0.00020	mg/L		
8374456	Total Nickel (Ni)	2016/08/24	99	80 - 120	100	80 - 120	<0.00050	mg/L		
8374456	Total Selenium (Se)	2016/08/24	103	80 - 120	101	80 - 120	<0.00020	mg/L	3.8	20
8374456	Total Silver (Ag)	2016/08/24	101	80 - 120	100	80 - 120	<0.00010	mg/L		
8374456	Total Thallium (Tl)	2016/08/24	99	80 - 120	101	80 - 120	<0.00020	mg/L		
8374456	Total Tin (Sn)	2016/08/24	112	80 - 120	106	80 - 120	<0.0010	mg/L		
8374456	Total Titanium (Ti)	2016/08/24	95	80 - 120	107	80 - 120	<0.0010	mg/L		
8374456	Total Uranium (U)	2016/08/24	102	80 - 120	100	80 - 120	<0.00010	mg/L		
8374456	Total Vanadium (V)	2016/08/24	107	80 - 120	105	80 - 120	<0.0010	mg/L		
8374456	Total Zinc (Zn)	2016/08/24	95	80 - 120	97	80 - 120	<0.0030	mg/L		
8374616	Dissolved Aluminum (Al)	2016/08/24	95	80 - 120	100	80 - 120	<0.0030	mg/L		
8374616	Dissolved Antimony (Sb)	2016/08/24	98	80 - 120	95	80 - 120	<0.00060	mg/L		
8374616	Dissolved Arsenic (As)	2016/08/24	100	80 - 120	102	80 - 120	<0.00020	mg/L		
8374616	Dissolved Beryllium (Be)	2016/08/24	101	80 - 120	103	80 - 120	<0.0010	mg/L		
8374616	Dissolved Cadmium (Cd)	2016/08/24	102	80 - 120	102	80 - 120	<0.000020	mg/L		
8374616	Dissolved Chromium (Cr)	2016/08/24	100	80 - 120	104	80 - 120	<0.0010	mg/L		
8374616	Dissolved Cobalt (Co)	2016/08/24	97	80 - 120	102	80 - 120	<0.00030	mg/L		
8374616	Dissolved Copper (Cu)	2016/08/24	95	80 - 120	101	80 - 120	<0.00020	mg/L		
8374616	Dissolved Lead (Pb)	2016/08/24	98	80 - 120	103	80 - 120	<0.00020	mg/L		
8374616	Dissolved Molybdenum (Mo)	2016/08/24	108	80 - 120	105	80 - 120	<0.00020	mg/L		
8374616	Dissolved Nickel (Ni)	2016/08/24	95	80 - 120	101	80 - 120	<0.00050	mg/L		

Maxxam Job #: B671465
Report Date: 2016/08/26

QUALITY ASSURANCE REPORT(CONT'D)

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: KA

QC Batch	Parameter	Date	Matrix Spike		Spiked Blank		Method Blank		RPD	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
8374616	Dissolved Selenium (Se)	2016/08/24	96	80 - 120	103	80 - 120	<0.00020	mg/L	7.1	20
8374616	Dissolved Silver (Ag)	2016/08/24	99	80 - 120	100	80 - 120	<0.00010	mg/L		
8374616	Dissolved Thallium (Tl)	2016/08/24	97	80 - 120	101	80 - 120	<0.00020	mg/L		
8374616	Dissolved Tin (Sn)	2016/08/24	107	80 - 120	107	80 - 120	<0.0010	mg/L		
8374616	Dissolved Titanium (Ti)	2016/08/24	106	80 - 120	101	80 - 120	<0.0010	mg/L		
8374616	Dissolved Uranium (U)	2016/08/24	99	80 - 120	100	80 - 120	<0.00010	mg/L		
8374616	Dissolved Vanadium (V)	2016/08/24	103	80 - 120	104	80 - 120	<0.0010	mg/L		
8374616	Dissolved Zinc (Zn)	2016/08/24	97	80 - 120	103	80 - 120	<0.0030	mg/L		

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

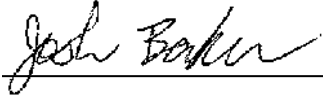
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

Maxxam Job #: B671465
Report Date: 2016/08/26

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: KA

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Joshua Baker, B.Sc., Senior Analyst



Suwan Fock, B.Sc., QP, Inorganics Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B671465
Sample Number: P13606-01

Test Result:

48 hrs Mortality % 0% Statistical Method:

Mean percent mortality:	<u>Sample</u>	0	<u>Control</u>	0
Sample Name :	WL_BFWB_OUT_SP21_20160822_N			Sample Matrix : Water
Description:	Clear			<u>Sample Prior to Analysis:</u>
Sample Collected:	Aug 22, 2016 09:00 AM	Sampling Method :	N/A	pH: 7.6
Sample Collected By:	KA	Site Collection:	N/A	Temperature : 14 °C
Sample Received:	Aug 23, 2016 10:06 AM	Volume Received:	1 L	Dissolved Oxygen: 9.8 mg/L
Analysis Start :	Aug 24, 2016 09:43 AM	Temp.Upon Arrival:	7 °C	Sample Conductance: 1402 µS/cm
End :	Aug 26, 2016 09:11 AM	Storage:	2-6°C	Hardness: 1000 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	21	8.0	357	7.7	0	0	0	0	20	8.0	352	7.7
0	21	8.0	360	7.7	0	0	0	0	20	8.0	359	7.7
0	21	8.1	359	7.7	0	0	0	0	20	8.0	362	7.7
100	21	7.7	1627	8.3	0	0	0	0	19	7.8	1498	7.5
100	21	7.7	1636	8.3	0	0	0	0	20	7.7	1495	7.4
100	21	7.7	1638	8.3	0	0	0	0	20	7.7	1498	7.4

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	0	0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 160 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
 Organisms per Vessel : 10 Pre-aeration Time : 30 min Rate of Pre-aeration : 25-50 mL/min/L
 Total # of Organisms Used : 60 Test Temperature : 20 ± 2 °C Test Hardness Adjusted : No
 Test Volume : 150 mL Vessel Volume : 225 mL Test pH Adjusted: No
 Loading Density : 15.0 mL/Daphnia Photoperiod : 16:8 (light: dark)

Test Organism : *Daphnia magna* Source : In House Culture
 Age at Test Initiation : <24 hrs Average Brood Size : 25.9
 Culture Photoperiod : 16:8 (light: dark) % Mortality within 7 days : 0
 Culture Temperature : 20 ± 2 °C Time To First Brood : 8 Days
 Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

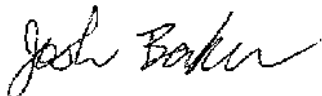
Job Number: B671465
Sample Number: PI3606-01

Reference chemical: Sodium Chloride
Test Endpoint 48 hrs LC50 (95% confidence interval) : 7.07 (5.00, 10.0)g/L
Historical Mean LC50 (warning limits) : 6.48 (5.02, 8.35) g/L
Test Date: Aug 12, 2016
Statistical Method : Binomial
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Chelsea Tessier



Verified By : Joshua Baker, Senior Analyst

Date: Aug 26, 2016 02:30 PM



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/08/23
Report Date: 2016/08/31
Version: FINAL

Test Report

Client: TEC164
Reference: 16-1050
Billing: 411634

A handwritten signature in black ink, appearing to read "A. Put", is positioned above a horizontal line.

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



Trout (Single Concentration) Test Report

Result Summary

Client: TEC164
Reference: 16-1050-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160822_N

Collection: collected on 2016/08/22 at 0900 by not given

Receipt: received on 2016/08/23 at 1050 by MC

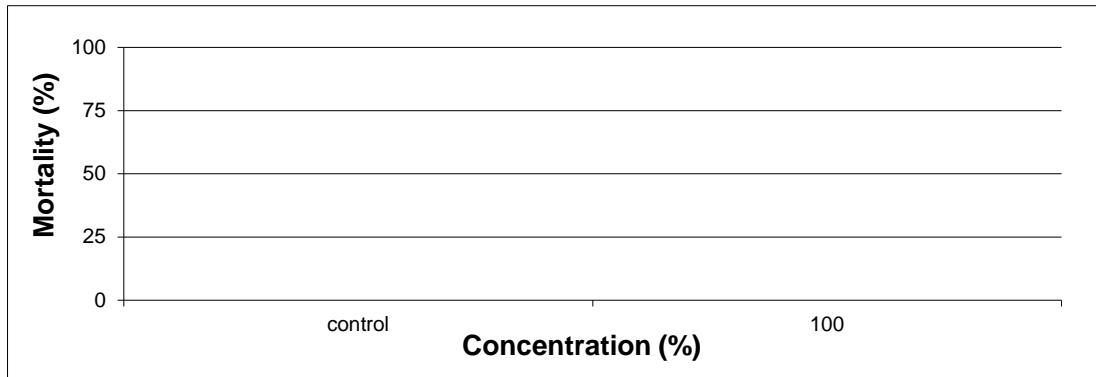
Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 9 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/08/23 ; ended on 2016/08/27

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	WL_BFWB_OUT_S P21_20160822_N	0	none



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-1050-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160729TR)

Acclimation: 25 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.6; EC: 1862 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.5 (mg/L); temperature: 17 °C
hardness (mg CaCO₃/L): 825; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 120 minutes at 6.5 \pm 1 mL/min. Dissolved oxygen in full strength sample was 8.8 mg/L after pre-aeration. The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.245 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated August 16, 2016; current results (96-h LC50 and 95% confidence limits) = 0.51 (0.45-0.57) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.51 (0.36-0.66) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-1050-01-TRS

Test Log:

Date	Day	Time	Technician
2016/08/23	0	1615	EP/LC
2016/08/24	1	0800	EP
2016/08/25	2	0750	LC
2016/08/26	3	0730	HS
2016/08/27	4	0920	LC

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

pH (units)

0	7.5	7.7
4	8.1	8.2

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	474	1848
4	390	1472

Dissolved Oxygen (mg/L)

0	8.2	8.8
4	8.6	8.7

Temperature (°C)

0	16	15
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-1050-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.6	0.6
2	3.6	0.6
3	3.5	0.6
4	3.9	0.6
5	3.6	0.5
6	3.7	0.6
7	3.0	0.4
8	3.2	0.4
9	3.0	0.4
10	2.9	0.2

Sample	Group Wet Weight (g)
control	4.9
100	-

average	3.4	0.5
sd	0.3	0.1
cv(%)	10.2	28.0

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None



Result Summary

Client: TEC164
Reference: 16-1050-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160822_N

Collection: collected on 2016/08/22 at 0900 by not given

Receipt: received on 2016/08/23 at 1050 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 9 °C, in good condition with no seals and no

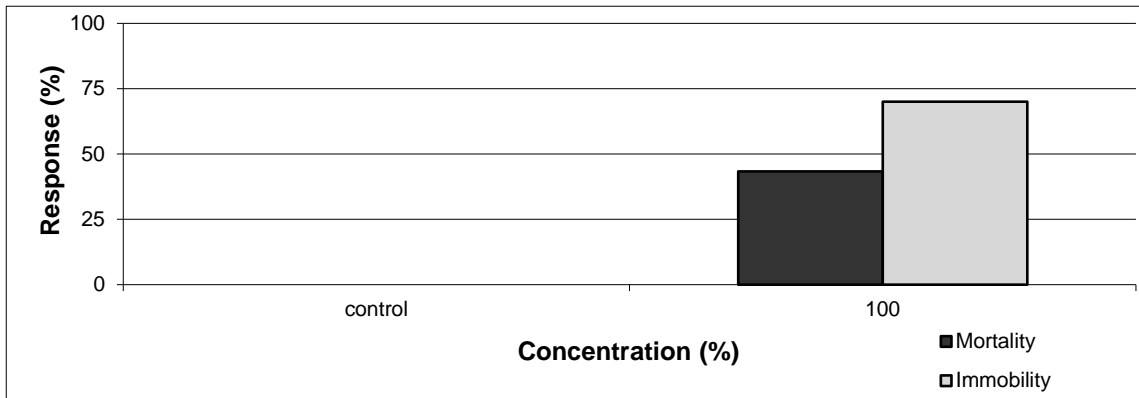
Description: type: water, collection method: grab

Test: started on 2016/08/23 ; ended on 2016/08/25

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_S P21_20160822_N	43	70	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-1050-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
28 neonates per average brood

Sample initial chemistry: pH: 7.6; EC: 1862 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.5 (mg/L); temperature: 17 °C
hardness (mg CaCO₃/L): 825; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 385 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 94 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 20 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-1050-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated August 15, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.67 (0.64-0.69) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.74 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Daphnia (Single Concentration) Test Report

Test Data

Client: TEC164
Reference: 16-1050-01-DAS

Test Log:

Date	Day	Time	Technician
2016/08/23	0	1415	JW/LC
2016/08/24	1	0800	ML
2016/08/25	2	0830	HS

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.9	7.9	7.9	8.1	8.2	8.2
2	7.9	8.0	8.0	7.9	8.0	8.0

Day	Conductivity ($\mu\text{S/cm}$ @ 25°C)					
0	316	332	334	1824	1856	1863
2	276	293	280	1488	1493	1508

Day	Dissolved Oxygen (mg/L)					
0	7.8	7.8	7.9	8.0	8.0	8.0
2	7.9	7.9	7.9	8.1	8.1	8.1

Day	Temperature (°C)					
0	19	19	19	19	19	19
2	19	19	19	19	19	19

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10 (2F)	10	10	10 (3D)	10 (6D,3I)	10 (5D,3I)
2	10	10	10	8 (2I,8D)	3 (3I,3D)	6 (3I,6D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	20	70	40

Day	Immobility (%)					
2	0	0	0	40	100	70



Comments/Statistics

Client: TEC164 Reference: 16-1050-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None



Result Summary

Client: TEC164
Reference: 16-1050-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160822_N

Collection: collected on 2016/08/22 at 0900 by not given

Receipt: received on 2016/08/23 at 1050 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 9 °C, in good condition with no seals and no

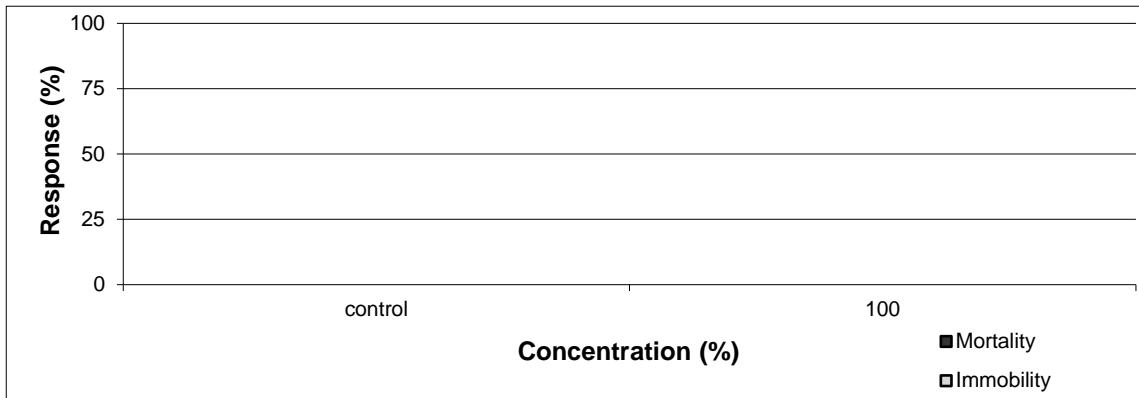
Description: type: water, collection method: grab

Test: started on 2016/08/23 ; ended on 2016/08/25

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_S P21_20160822_N	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-1050-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
28 neonates per average brood

Sample initial chemistry: pH: 7.6; EC: 1862 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.5 (mg/L); temperature: 17 °C
hardness (mg CaCO_3/L): 825; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 385 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must ≤ 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 94 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $10 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page



Test Conditions

Client: TEC164 Reference: 16-1050-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated August 15, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.67 (0.64-0.69) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.74 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page



Test Data

Client: TEC164
Reference: 16-1050-01-DAS

Test Log:

Date	Day	Time	Technician
2016/08/23	0	1420	JW/LC
2016/08/24	1	0800	ML
2016/08/25	2	0830	HS

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.8	7.9	7.9	7.7	7.8	7.7
2	7.8	7.8	7.8	8.2	8.2	8.2

Day	Conductivity (µS/cm @ 25°C)					
0	346	360	361	1771	1882	1918
2	307	313	318	1562	1639	1633

Day	Dissolved Oxygen (mg/L)					
0	9.6	9.6	9.6	9.6	9.6	9.6
2	9.6	9.5	9.5	9.6	9.6	9.5

Day	Temperature (°C)					
0	11	11	11	11	11	11
2	11	11	11	11	11	11

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0



***Daphnia* (Single Concentration) Test Report**

Comments/Statistics

Client: TEC164 Reference: 16-1050-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
The test was set at 10 ± 2 degrees as per client's request.

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, H₂S 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 OR 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.

Your P.O. #: 441369
Site Location: WLC AWTF

Attention:Chris Stroich

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/09/07
Report #: R2254772
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B674005
Received: 2016/08/30, 09:39

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Daphnia magna Single Concentration-100%	1	N/A	2016/08/30	EENVSOP-00154	EPS 1 RM14 2nd ed
Technician Time - Customer Service	1	N/A	2016/08/30		

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Micheline Piche, Project Manager
Email: MPiche@maxxam.ca
Phone# (780) 577-7100

=====
This report has been generated and distributed using a secure automated process.
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B674005
Report Date: 2016/09/07

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: KA

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		PJ8669		
Sampling Date		2016/08/29 09:00		
	UNITS	WL_BFWB_OUT_SP21 _20160829_N	RDL	QC Batch
Industrial - Calculated				
Hours of Labour	hr	1.0	0.01	ONSITE
Daphnia Magna Bioassay				
Mortality	%	ATTACHED	N/A	8383473
RDL = Reportable Detection Limit N/A = Not Applicable				

Maxxam Job #: B674005
Report Date: 2016/09/07

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: KA

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.0°C
-----------	-------

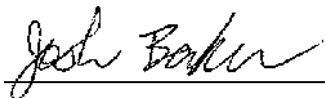
Results relate only to the items tested.

Maxxam Job #: B674005
Report Date: 2016/09/07

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: KA

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Joshua Baker, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B674005
Sample Number: PJ8669-01

Test Result:

48 hrs Mortality % 0 Statistical Method:

Mean percent mortality: Sample 0 Control 0

Sample Name : WL_BFWB_OUT_SP21_20160829_N

Sample Matrix : Water

Description: clear

Sample Prior to Analysis:

Sample Collected: Aug 29, 2016 09:00 AM

Sampling Method : N/A

pH: 7.7

Sample Collected By: KA

Site Collection: N/A

Temperature : 20 °C

Sample Received: Aug 30, 2016 09:39 AM

Volume Received: 1 L

Dissolved Oxygen: 9.0 mg/L

Analysis Start : Aug 30, 2016 02:53 PM

Temp.Upon Arrival: 6 °C

Sample Conductance: 1601 µS/cm

End : Sep 01, 2016 01:58 PM

Storage: 2-6°C

Hardness: 1000 mg CaCO₃/L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	21	7.8	506	7.5	0	0	0	0	20	7.8	488	7.3
0	21	7.9	510	7.5	0	0	0	0	20	7.9	501	7.4
0	21	7.9	510	7.6	0	0	0	0	20	7.9	497	7.3
100	21	7.8	1644	8.2	0	0	2	20.0	20	7.7	1491	7.0
100	21	7.7	1651	8.3	0	0	0	0	20	7.6	1469	7.3
100	21	7.7	1651	8.2	0	0	1	10.0	20	7.8	1472	7.0

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	2	20.0
100	0	0	0	0
100	0	0	1	10.0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water

Hardness: 200 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)

Organisms per Vessel : 10 **Pre-aeration Time :** 30 min **Rate of Pre-aeration :** 25-50 mL/min/L

Total # of Organisms Used : 60 **Test Temperature :** 20 ± 2 °C **Test Hardness Adjusted :** No

Test Volume : 150 mL **Vessel Volume :** 225 mL **Test pH Adjusted:** No

Loading Density : 15.0 mL/Daphnia **Photoperiod :** 16:8 (light: dark)

Test Organism : *Daphnia magna* **Source :** In House Culture

Age at Test Initiation : <24 hrs **Average Brood Size :** 28.5

Culture Photoperiod : 16:8 (light: dark) **% Mortality within 7 days :** 1.6

Culture Temperature : 20 ± 2 °C **Time To First Brood :** 8 Days

Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

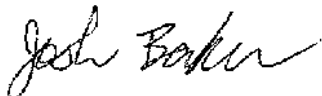
Job Number: B674005
Sample Number: PJ8669-01

Reference chemical: Sodium Chloride
Test Endpoint 48 hrs LC50 (95% confidence interval) : 7.07 (5.00, 10.0)g/L
Historical Mean LC50 (warning limits) : 6.57 (5.16, 8.36) g/L
Test Date: Aug 25, 2016
Statistical Method : Binomial
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Chelsea Tessier, Natasha Mouck



Verified By : Joshua Baker, Senior Analyst

Date: Sep 07, 2016 09:06 AM

ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/08/30
Report Date: 2016/09/12
Version: FINAL

Test Report

Client: TEC164
Reference: 16-1078
Billing: PO # 430571



Senior Verifier

Result Summary

Client: TEC164
Reference: 16-1078-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160829_N

Collection: collected on 2016/08/29 at 0900 by not given

Receipt: received on 2016/08/30 at 1430 by MC

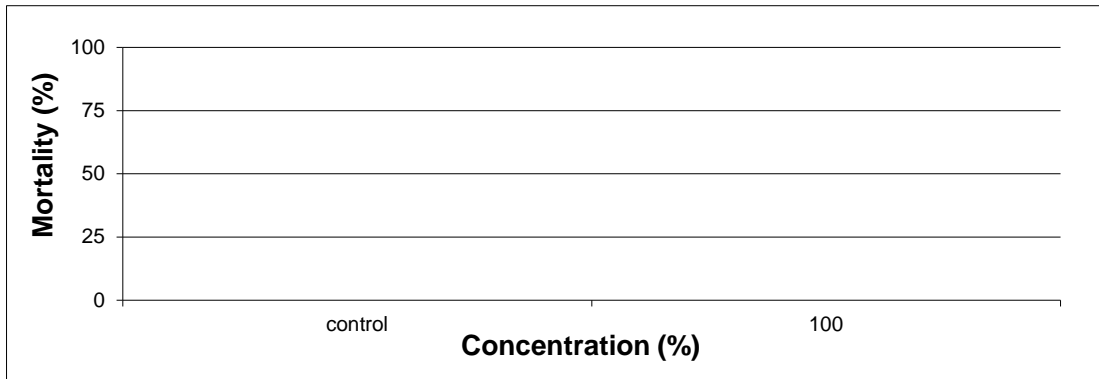
Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 13 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/08/31 ; ended on 2016/09/04

Result:

Sample	Client Code	Mortality (%)	Comment
control 100%	lab control WL_BFWB_OUT_SP2 1_20160829_N	0 0	none



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-1078-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160729TR)

Acclimation: 33 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.7; EC: 1695 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 6.8 (mg/L); temperature: 20 °C
hardness (mg CaCO_3/L): 697; colour: colourless; salinity (ppt): 0

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at $6.5 \pm 1 \text{ mL}/\text{min}/\text{L}$
Dissolved oxygen in full strength sample was 8.9 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.22 g/Litre (must be $\leq 0.5 \text{ g}/\text{Litre}$)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at $6.5 \pm 1 \text{ mL}/\text{min}/\text{L}$ by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $15 \pm 1^\circ\text{C}$

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated August 16, 2016; current results (96-h LC50 and 95% confidence limits) = 0.51 (0.45-0.57) log (g/L KCl)

historical results:

(96-h LC50 and 95% confidence limits) = 0.51 (0.36-0.66) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume

Test Data

 Client: TEC164
 Reference: 16-1078-01-TRS

Test Log:

Date	Day	Time	Technician
2016/08/31	0	1030	EP
2016/09/01	1	0835	LC
2016/09/02	2	0815	EP
2016/09/03	3	1015	LC
2016/09/04	4	1100	ML

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)			
0	7.5	7.8		
4	8.0	8.1		

 Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

	353	1610		
4	359	1423		

Dissolved Oxygen (mg/L)

	8.5	8.9		
4	8.7	8.9		

Temperature (°C)

	15	14		
4	15	14		

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

	10	10		
1	10	10		
2	10	10		
3	10	10		
4	10	10		

Mortality (%)

	0	0		
--	---	---	--	--

Stressed (%)

	0	0		
--	---	---	--	--

Client: TEC164
Reference: 16-1078-01-TRS

Test Data

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	2.9	0.4
2	3.0	0.4
3	3.1	0.5
4	3.0	0.3
5	3.5	0.7
6	3.0	0.4
7	3.5	0.6
8	3.3	0.5
9	2.9	0.3
10	2.7	0.3

Sample	Group Wet Weight (g)
control	4.4

average	3.1	0.4
sd	0.3	0.1
cv(%)	8.6	30.7

Notes: nd, not done; na, not applicable;
 sd, standard deviation; cv(%), coefficient
 of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: TEC164
Reference: 16-1078-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160829_N

Collection: collected on 2016/08/29 at 0900 by not given

Receipt: received on 2016/08/30 at 1430 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 13 °C, in good condition with no seals and no

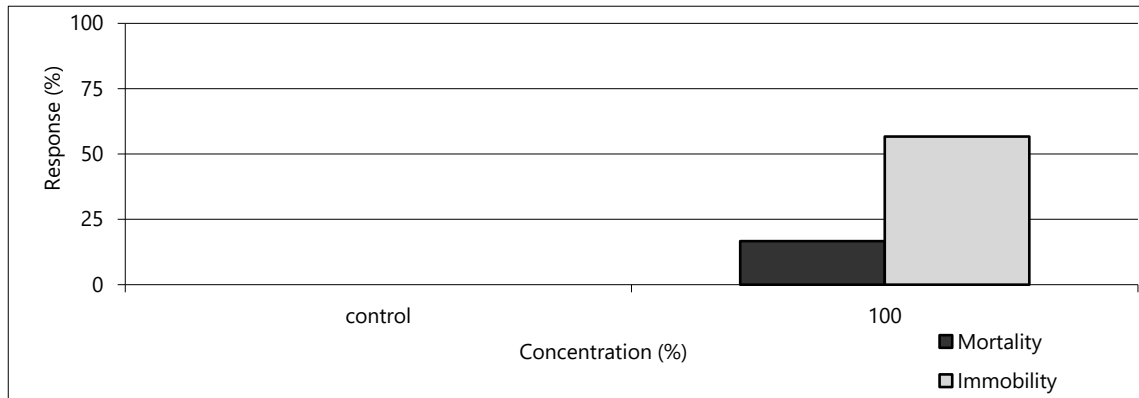
Description: type: water, collection method: grab

Test: started on 2016/08/30 ; ended on 2016/09/01

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP 21_20160829_N	17	57	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-1078-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
28 neonates per average brood

Sample initial chemistry: pH: 7.7; EC: 1695 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 6.8 (mg/L); temperature: 20 °C
hardness (mg CaCO_3/L): 697; colour: colourless; odour: 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 85 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 16-1078-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated August 29, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.68 (0.65-0.70) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.74 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TECT64
Reference: 16-1078-01-DAS

Test Log:

Date	Day	Time	Technician
2016/08/30	0	1520	JW/EP
2016/08/31	1	0930	HS
2016/09/01	2	0930	EP

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.8	8.0	8.0	8.2	8.2	8.2
2	7.7	7.7	7.7	7.8	7.9	7.9

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	286	283	286	1566	1581	1582
2	304	310	309	1587	1598	1599

Day	Dissolved Oxygen (mg/L)					
0	7.9	7.9	7.9	7.7	7.7	7.7
2	7.6	7.7	7.7	7.8	7.8	7.8

Day	Temperature (°C)					
0	20	20	20	22	22	22
2	20	20	20	20	20	20

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10 (10D)	10 (10D)	10 (10D)
2	10	10	10	10 (2I, 2D)	10 (5I, 5D)	5 (5I, 5D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	50

Day	Immobility (%)					
2	0	0	0	20	50	100

Comments/Statistics

Client: TEC164 Reference: 16-1078-01-DAS

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None

Result Summary

Client: TEC164
Reference: 16-1078-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160829_N

Collection: collected on 2016/08/29 at 0900 by not given

Receipt: received on 2016/08/30 at 1430 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 13 °C, in good condition with no seals and no

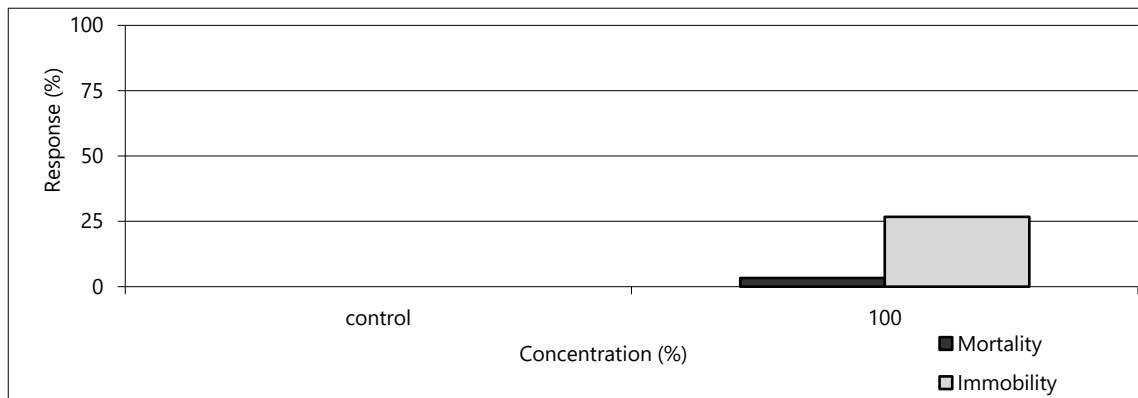
Description: type: water, collection method: grab

Test: started on 2016/08/30 ; ended on 2016/09/01

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP 21_20160829_N	3	27	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164 Reference: 16-1078-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
28 neonates per average brood

Sample initial chemistry: pH: 7.7; EC: 1695 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 6.8 (mg/L); temperature: 20 °C
hardness (mg CaCO_3/L): 697; colour: colourless; odour: 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 85 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $10 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 16-1078-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated August 29, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.68 (0.65-0.70) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.74 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TECT64
Reference: 16-1078-01-DAS

Test Log:

Date	Day	Time	Technician
2016/08/30	0	1510	JW/EP
2016/08/31	1	0930	HS
2016/09/01	2	0930	EP

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.7	7.8	7.9	7.8	7.8	7.8
2	7.6	7.7	7.7	8.0	8.0	8.0

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	264	286	287	1628	1617	1641
2	305	315	320	1644	1655	1660

Day	Dissolved Oxygen (mg/L)					
0	9.6	9.6	9.6	9.6	9.6	9.7
2	9.1	9.2	9.1	9.1	9.2	9.3

Day	Temperature (°C)					
0	11	11	11	11	11	10
2	11	11	11	11	11	11

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10	10 (5I, 5D)	9 (2I, 2D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	10

Day	Immobility (%)					
2	0	0	0	0	50	30

Comments/Statistics

Client: TEC164 Reference: 16-1078-01-DAS

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

The test was run at $10 \pm 2^{\circ}\text{C}$, at the request of the client

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, H₂S 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 OR 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.

Your P.O. #: 441369
Site Location: WLC AWTF

Attention:Chris Stroich

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/09/12
Report #: R2258373
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B676671

Received: 2016/09/07, 09:40

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Daphnia magna Single Concentration-100%	2	N/A	2016/09/08	EENVSOP-00154	EPS 1 RM14 2nd ed

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====

This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B676671
Report Date: 2016/09/12

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: LH

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		PL3212	PL3213	
Sampling Date		2016/09/06 09:00	2016/09/06 09:00	
	UNITS	WL_BFWB_OUT_SP21 _20160906_NP	WL_WLCI_SP01_2016 0906_N	QC Batch
Daphnia Magna Bioassay				
Mortality	%	ATTACHED	ATTACHED	8391345

Maxxam Job #: B676671
Report Date: 2016/09/12

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: LH

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.3°C
-----------	-------

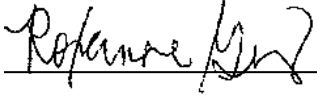
Results relate only to the items tested.

Maxxam Job #: B676671
Report Date: 2016/09/12

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: LH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Roxanne Gill, Bioassay Supervisor

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B676671
Sample Number: PL3212-01

Test Result:

48 hrs Mortality % 0 Statistical Method:

Mean percent mortality:	<u>Sample</u>	0	<u>Control</u>	0
Sample Name :	WL_BFWB_OUT_SP21_20160906_NP			Sample Matrix : Water
Description:	clear			Sample Prior to Analysis:
Sample Collected:	Sep 06, 2016 09:00 AM	Sampling Method :	N/A	pH: 7.5
Sample Collected By:	LH	Site Collection:	N/A	Temperature : 19 °C
Sample Received:	Sep 07, 2016 09:40 AM	Volume Received:	1 L	Dissolved Oxygen: 9.0 mg/L
Analysis Start :	Sep 08, 2016 11:36 AM	Temp.Upon Arrival:	6 °C	Sample Conductance: 1569 µS/cm
End :	Sep 10, 2016 10:56 AM	Storage:	2-6°C	Hardness: 800 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	20	7.9	406	7.7	0	0	0	0	20	7.9	399	8.0
0	20	7.9	408	7.7	0	0	0	0	20	7.9	403	7.9
0	20	8.0	409	7.7	0	0	0	0	20	8.0	403	7.9
100	20	7.7	1604	8.2	0	0	0	0	20	7.7	1480	7.6
100	20	7.7	1610	8.2	0	0	0	0	20	7.7	1488	7.7
100	20	7.7	1609	8.2	0	0	0	0	20	7.6	1495	7.8

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	0	0
100	0	0	1	10.0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 200 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
Organisms per Vessel : 10 **Pre-aeration Time :** 30 min **Rate of Pre-aeration :** 25-50 mL/min/L
Total # of Organisms Used : 60 **Test Temperature :** 20 ± 2 °C **Test Hardness Adjusted :** No
Test Volume : 150 mL **Vessel Volume :** 225 mL **Test pH Adjusted:** No
Loading Density : 15.0 mL/Daphnia **Photoperiod :** 16:8 (light: dark)

Test Organism : *Daphnia magna* **Source :** In House Culture
Age at Test Initiation : <24 hrs **Average Brood Size :** 23.1
Culture Photoperiod : 16:8 (light: dark) **% Mortality within 7 days :** 0
Culture Temperature : 20 ± 2 °C **Time To First Brood :** 9 Days
Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

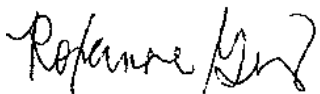
Job Number: B676671
Sample Number: PL3212-01

Reference chemical: Sodium Chloride
Test Endpoint 48 hrs LC50 (95% confidence interval) : 7.07 (5.00, 10.0)g/L
Historical Mean LC50 (warning limits) : 6.57 (5.16, 8.36) g/L
Test Date: Aug 25, 2016
Statistical Method : Binomial
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Aynura Rakhmangulova, Chelsea Tessier, Michelle Hospedales



Verified By : Roxanne Gill, Bioassay Supervisor

Date: Sep 12, 2016 01:04 PM

ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/09/07
Report Date: 2016/09/19
Version: FINAL

Test Report

Client: TEC164
Reference: 1617-0022
Billing: 411634



Senior Verifier

Result Summary

Client: TEC164
Reference: 1617-0022-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160906_N

Collection: collected on 2016/09/06 at 0900 by not given

Receipt: received on 2016/09/07 at 1000 by MC

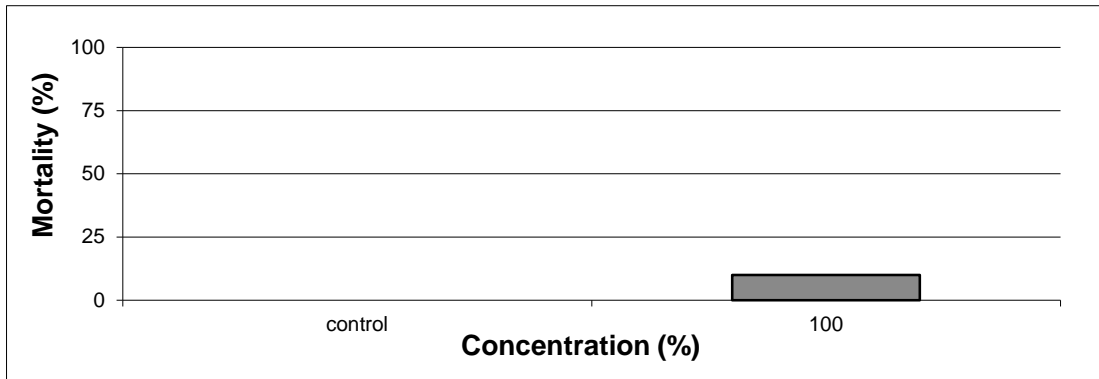
Containers: received 4 x 20 L carboys / 4 x 1 L bottle at 6 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/09/08 ; ended on 2016/09/12

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	WL_BFWB_OUT_SP21_20160906_N	10	none



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0022-TRS
--

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160729TR)

Acclimation: 41 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.8; EC: 1850 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.2 (mg/L); temperature: 17 °C
hardness (mg CaCO_3/L): 826; colour: colourless; salinity (ppt): 0

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 8.9 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.205 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated August 16, 2016; current results (96-h LC50 and 95% confidence limits) = 0.51 (0.45-0.57) log (g/L KCl)

historical results:

(96-h LC50 and 95% confidence limits) = 0.51 (0.36-0.66) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume

Test Data

 Client: TEC164
 Reference: 1617-0022-TRS

Test Log:

Date	Day	Time	Technician
2016/09/08	0	1530	CQ
2016/09/09	1	1340	JN
2016/09/10	2	1110	JW
2016/09/11	3	0945	ML
2016/09/12	4	0920	LC/EP

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	7.7	7.8
4	8.0	8.1

 Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

	419	1849
4	410	1709

Dissolved Oxygen (mg/L)

	8.4	8.9
4	8.8	8.8

Temperature (°C)

	16	15
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

	10	10
1	10	10
2	10	9
3	10	9
4	10	9

Mortality (%)

	0	10
4		

Stressed (%)

	0	0
4		

Client: TEC164
Reference: 1617-0022-TRS

Test Data

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	2.5	0.2
2	3.3	0.3
3	3.1	0.3
4	3.5	0.5
5	3.2	0.3
6	3.3	0.4
7	4.0	0.8
8	3.6	0.5
9	3.2	0.4
10	3.0	0.4

Sample	Group Wet Weight (g)
control	4.1

average	3.3	0.4
sd	0.4	0.2
cv(%)	12.1	40.6

Notes: nd, not done; na, not applicable;
 sd, standard deviation; cv(%), coefficient
 of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: TEC164
Reference: 1617-0022-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160906_N

Collection: collected on 2016/09/06 at 0900 by not given

Receipt: received on 2016/09/07 at 1000 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottle at 6 °C,
in good condition with no seals and no initials

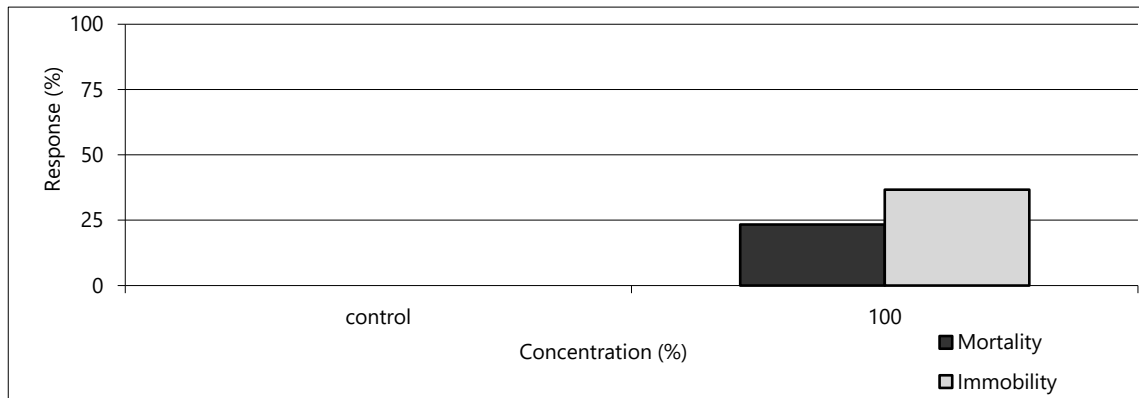
Description: type: water, collection method: grab

Test: started on 2016/09/07 ; ended on 2016/09/09

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP 21_20160906_N	23	37	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0022-DAS
--

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 9 days to first brood
23 neonates per average brood

Sample initial chemistry: pH: 7.8; EC: 1850 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.2 (mg/L); temperature: 17 °C
hardness (mg CaCO_3/L): 826; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 86 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0022-DAS
--

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated August 29, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.68 (0.65-0.70) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.74 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0022-DAS

Test Log:

Date	Day	Time	Technician
2016/09/07	0	1215	HS
2016/09/08	1	1110	JW
2016/09/09	2	1020	JW

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.5	7.6	7.6	8.2	8.2	8.2
2	7.9	7.9	7.9	7.9	7.9	7.8

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	324	327	328	1743	1789	1814
2	351	352	351	1720	1741	1748

Day	Dissolved Oxygen (mg/L)					
0	8.1	8.1	8.1	8.1	8.1	8.1
2	8.0	7.9	8.1	8.1	8.1	8.1

Day	Temperature (°C)					
0	19	19	19	19	19	19
2	19	19	19	19	19	19

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(4D)	10(1D)	10(7D)
2	10	10	10	7	9(1D)	7(4I,4D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	30	10	30

Day	Immobility (%)					
2	0	0	0	30	10	70

Comments/Statistics

Client: TEC164 Reference: 1617-0022-DAS
--

Test Result Comments:
None

Data Analysis:
None

Protocol Deviations:
None

Result Summary

Client: TEC164
Reference: 1617-0022-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160906_N

Collection: collected on 2016/09/06 at 0900 by not given

Receipt: received on 2016/09/07 at 1000 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottle at 6 °C,
in good condition with no seals and no initials

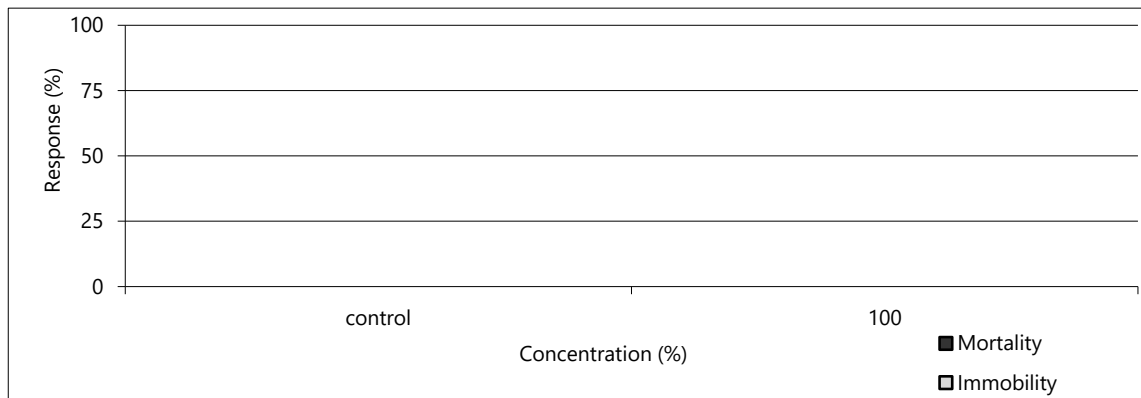
Description: type: water, collection method: grab

Test: started on 2016/09/07 ; ended on 2016/09/09

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control 100	lab control WL_BFWB_OUT_SP 21_20160906_N	0 0	0 0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0022-DAS
--

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 9 days to first brood
23 neonates per average brood

Sample initial chemistry: pH: 7.8; EC: 1850 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.2 (mg/L); temperature: 17 °C
hardness (mg CaCO_3/L): 826; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 86 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature:

$10 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0022-DAS
--

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated August 29, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.68 (0.65-0.70) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.74 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0022-DAS

Test Log:

Date	Day	Time	Technician
2016/09/07	0	1445	HS
2016/09/08	1	1110	JW
2016/09/09	2	1040	JW

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.7	7.8	7.8	8.0	8.0	8.0
2	7.7	7.7	7.7	8.0	8.0	8.0

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	336	339	338	1910	1855	1871
2	339	345	346	1831	1827	1866

Day	Dissolved Oxygen (mg/L)					
0	8.2	8.1	8.1	9.1	9.0	9.1
2	9.2	9.2	9.2	9.1	9.1	9.2

Day	Temperature (°C)					
0	11	11	11	10	10	10
2	11	11	11	11	11	11

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10(2D)	10(4D)	10(4D)
2	10	10	10	10	10(1D)	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0

Comments/Statistics

Client: TEC164 Reference: 1617-0022-DAS
--

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:The test was run at $10 \pm 2^{\circ}\text{C}$, at the request of the client

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, H₂S 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.

ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/09/13
Report Date: 2016/09/23
Version: FINAL

Test Report

Client: TEC164
Reference: 1617-0052
Billing: PO 411634



Senior Verifier

Result Summary

Client: TEC164
Reference: 1617-0052-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160912_N

Collection: collected on 2016/09/12 at 0900 by not given

Receipt: received on 2016/09/13 at 0930 by MC

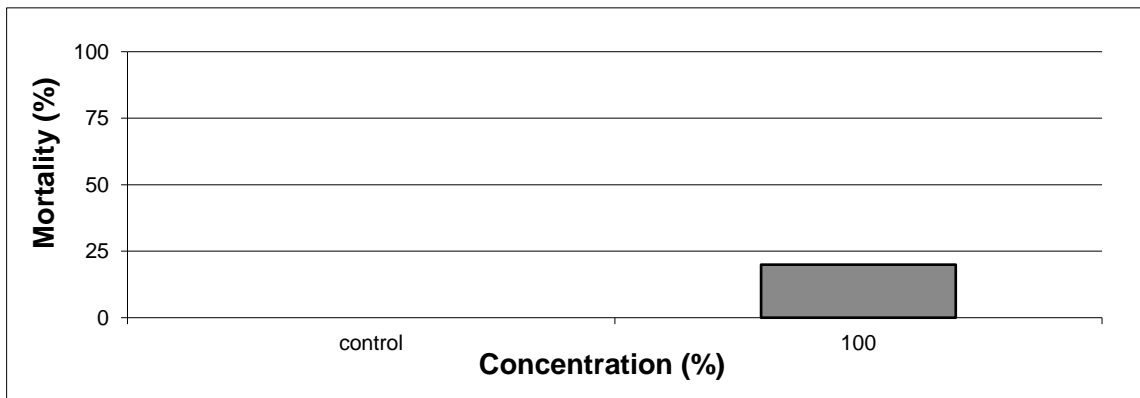
Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 6 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/09/14 ; ended on 2016/09/18

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	WL_BFWB_OUT_SP2 1_20160912_N	20	none



The test data and results are authorized and verified correct.

Jaclyn Rose

Senior Verifier

Test Conditions

Client: TEC164
Reference: 1617-0052-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160729TR)

Acclimation: 47 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.8; EC: 1724 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.5 (mg/L); temperature: 18 °C
hardness (mg CaCO₃/L): 886; colour: colourless; salinity (ppt): 0

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel ≥ 15 cm)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 8.7 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.2 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated August 16, 2016; current results (96-h LC50 and 95% confidence limits) = 0.51 (0.45-0.57) log (g/L KCl)

historical results:

(96-h LC50 and 95% confidence limits) = 0.51 (0.36-0.66) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume

Test Data

Client: TEC164
Reference: 1617-0052-01-TRS

Test Log:

Date	Day	Time	Technician
2016/09/14	0	1130	LC
2016/09/15	1	0835	LC
2016/09/16	2	0845	LC
2016/09/17	3	1020	JW
2016/09/18	4	0900	EP

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

pH (units)

0	7.5	7.7
4	8.3	8.2

Conductivity (µS/cm @ 25°C)

0	470	1800
4	469	1745

Dissolved Oxygen (mg/L)

0	8.7	8.7
4	8.7	8.7

Temperature (°C)

0	15	15
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	9
2	10	9
3	10	8
4	10	8

Mortality (%)

4	0	20
---	---	----

Stressed (%)

4	0	0
---	---	---

Client: TEC164
Reference: 1617-0052-01-TRS

Test Data

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.1	0.4
2	3.5	0.6
3	3.2	0.4
4	2.9	0.2
5	3.2	0.4
6	3.5	0.6
7	3.3	0.5
8	3.0	0.3
9	3.0	0.3
10	3.0	0.3

Sample	Group Wet Weight (g)
control	4.0

average	3.2	0.4
sd	0.2	0.1
cv(%)	6.7	33.3

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: TEC164
Reference: 1617-0052-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160912_N

Collection: collected on 2016/09/12 at 0900 by not given

Receipt: received on 2016/09/13 at 0930 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 6 °C, in good condition with no seals and no initials

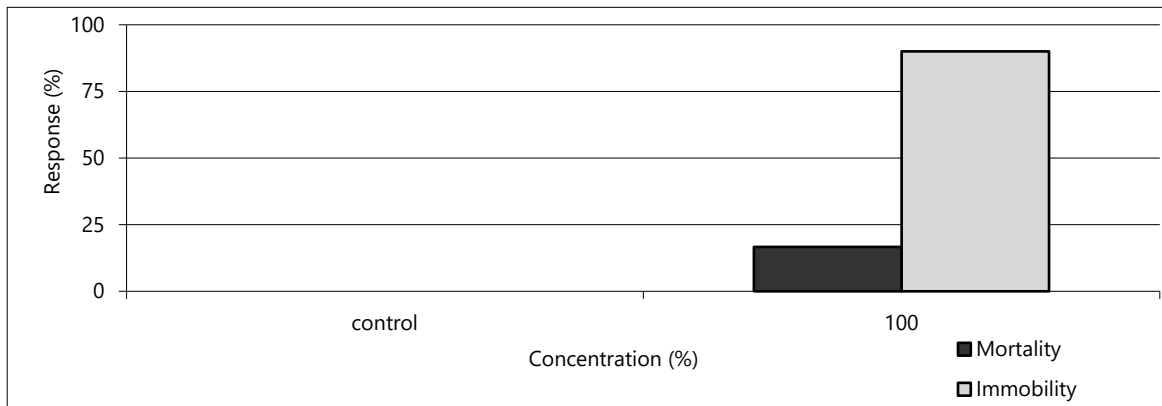
Description: type: water, collection method: grab

Test: started on 2016/09/13 ; ended on 2016/09/15

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160912_N	17	90	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Jaclyn Poole

Senior Verifier

Client: TEC164 Reference: 1617-0052-01-DAS

Test Conditions

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 9 days to first brood
24 neonates per average brood

Sample initial chemistry: pH: 7.8; EC: 1724 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.5 (mg/L); temperature: 18 °C
hardness (mg CaCO_3/L): 886; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 85 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0052-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated September 12, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.73 (0.68-0.78) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.73 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0052-01-DAS

Test Log:

Date	Day	Time	Technician
2016/09/13	0	1445	EP/JW
2016/09/14	1	0840	LC
2016/09/15	2	1010	JW

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.9	7.9	7.9	8.0	8.0	8.0
2	7.8	7.9	7.9	7.9	8.0	8.0

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	329	340	339	1786	1796	1816
2	346	351	359	1749	1759	1778

Day	Dissolved Oxygen (mg/L)					
0	8.0	8.0	8.0	8.1	8.2	8.2
2	7.9	7.9	8.0	7.9	7.9	7.8

Day	Temperature (°C)					
0	19	19	19	19	18	18
2	19	19	19	20	20	20

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10 (4I,10D)	10 (5I,10D)	10 (6I,10D)
2	10	10	10	9 (7I,9D)	8 (7I,8D)	8 (8I,8D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	10	20	20

Day	Immobility (%)					
2	0	0	0	80	90	100

Comments/Statistics

Client: TEC164 Reference: 1617-0052-01-DAS

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: TEC164
Reference: 1617-0052-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160912_N

Collection: collected on 2016/09/12 at 0900 by not given

Receipt: received on 2016/09/13 at 0930 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 6 °C, in good condition with no seals and no initials

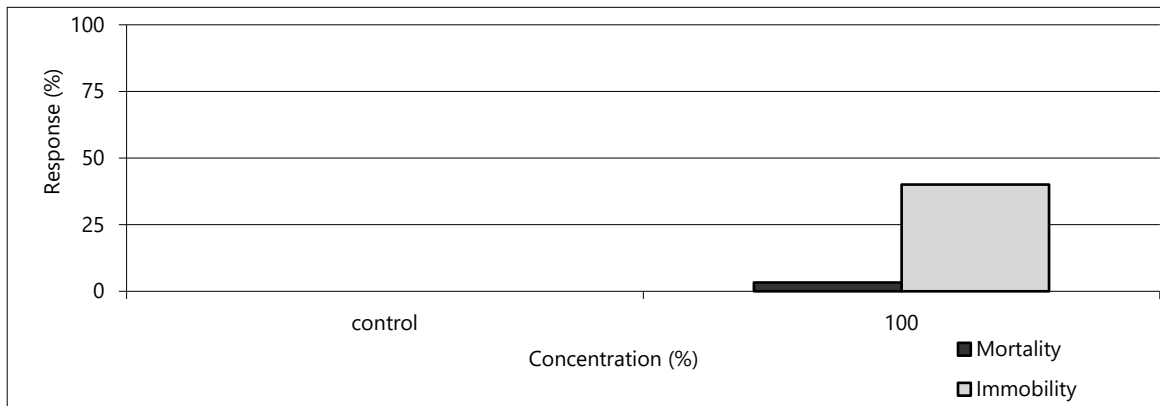
Description: type: water, collection method: grab

Test: started on 2016/09/13 ; ended on 2016/09/15

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20160912_N	3	40	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Jacklyn Rose

Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0052-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 9 days to first brood
24 neonates per average brood

Sample initial chemistry: pH: 7.8; EC: 1724 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.5 (mg/L); temperature: 18 °C
hardness (mg CaCO₃/L): 886; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 375 mL glass jars

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 85 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 10 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0052-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated September 12, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.73 (0.68-0.78) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.73 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0052-01-DAS

Test Log:

Date	Day	Time	Technician
2016/09/13	0	1400	JW/EP
2016/09/14	1	0840	LC
2016/09/15	2	1020	JW/HS

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	8.0	8.0	8.0	7.7	7.7	7.7
2	7.7	7.7	7.7	8.1	8.1	8.1

Day	Conductivity (µS/cm @ 25°C)					
0	368	351	356	1895	1810	1842
2	348	355	364	1843	1863	1889

Day	Dissolved Oxygen (mg/L)					
0	9.4	9.3	9.4	9.6	9.6	9.6
2	9.4	9.4	9.4	9.4	9.4	9.4

Day	Temperature (°C)					
0	12	12	12	11	11	11
2	12	11	11	11	11	11

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10 (10D)	10 (5I,10D)	10 (2I,10D)
2	10	10	10	10 (3D, 3I)	10 (6D,3I)	9 (5D,5I)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	10

Day	Immobility (%)					
2	0	0	0	30	30	60

Comments/Statistics

Client: TEC164 Reference: 1617-0052-01-DAS

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:The test was set at $10 \pm 2^{\circ}\text{C}$, as per the client's request.

ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/09/18
Report Date: 2016/09/29
Version: FINAL

Test Report

Client: TEC164
Reference: 1617-0091
Billing: PO 411634



Senior Verifier

Result Summary

Client: TEC164
Reference: 1617-0091-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160917_N

Collection: collected on 2016/09/17 at not given by

Receipt: received on 2016/09/18 at 0905 by ML

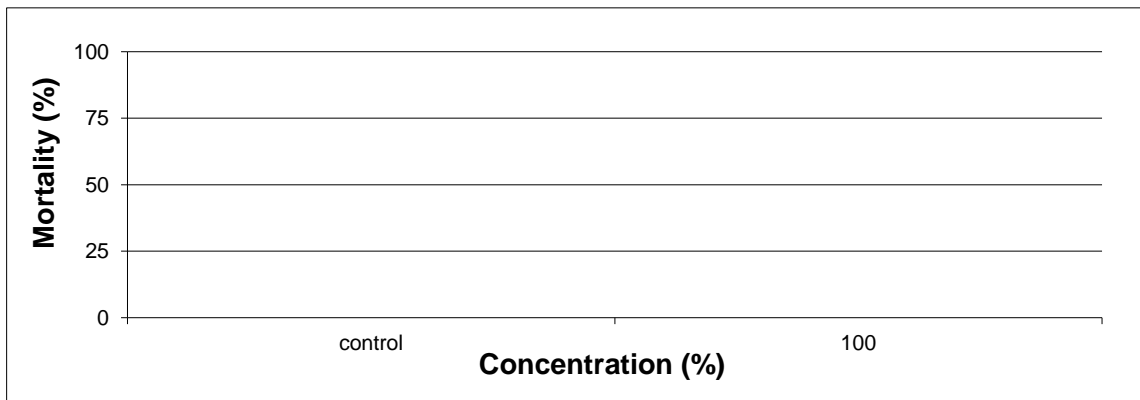
Containers: received 4 x 20L carboys, 4 x 1L bottles at 9 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/09/19 ; ended on 2016/09/23

Result:

Sample	Client Code	Mortality (%)	Comment
control 100%	lab control WL_BFWB_OUT_SP21_2 0160917_N	0 0	none



The test data and results are authorized and verified correct.

Jacqueline Pace

Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0091-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160824TR)

Acclimation: 26 days (must be ≥ 2 weeks)

Stock mortality: 0.15% (seven days preceding testing)

Sample initial chemistry: pH: 7.6; EC: 1742 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.3 (mg/L); temperature: 18 °C
hardness (mg CaCO_3/L): 797; colour: colourless; salinity (ppt): 0

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 8.8 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.165 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated September 16, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.51 (0.45-0.57) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.51 (0.36-0.66) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume

Test Data

Client: TEC164
Reference: 1617-0091-01-TRS

Test Log:

Date	Day	Time	Technician
2016/09/19	0	1145	CQ
2016/09/20	1	0945	EP
2016/09/21	2	0915	LC
2016/09/22	3	0740	JW
2016/09/23	4	0830	LC/JW

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

pH (units)

0	7.4	7.8
4	8.2	8.1

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	405	1765
4	376	1655

Dissolved Oxygen (mg/L)

0	8.3	8.8
4	8.6	8.7

Temperature (°C)

0	16	15
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---

Client: TEC164
Reference: 1617-0091-01-TRS

Test Data

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	2.9	0.2
2	2.7	0.2
3	3.9	0.7
4	2.8	0.2
5	3.2	0.3
6	3.2	0.4
7	3.2	0.3
8	3.2	0.3
9	3.2	0.3
10	3.3	0.4

Sample	Group Wet Weight (g)
control	3.3

average	3.2	0.3
sd	0.3	0.1
cv(%)	10.5	45.3

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: TEC164
Reference: 1617-0091-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160917_N

Collection: collected on 2016/09/17 at not given by

Receipt: received on 2016/09/18 at 0905 by ML

Containers: received 4 x 20L carboys, 4 x 1L bottles at 9 °C, in good condition with no seals and no initials

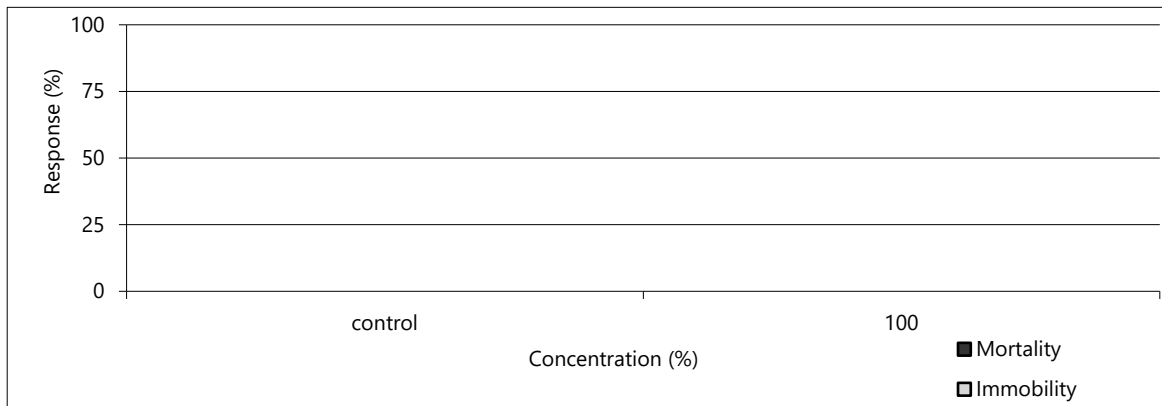
Description: type: water, collection method: grab

Test: started on 2016/09/19 ; ended on 2016/09/21

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control 100	lab control WL_BFWB_OUT_SP21 _20160917_N	0 0	0 0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Jacklyn Poole

Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0091-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 9 days to first brood
23.2 neonates per average brood

Sample initial chemistry: pH: 7.6; EC: 1742 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.3 (mg/L); temperature: 18 °C
hardness (mg CaCO₃/L): 797; colour: colourless; salinity (ppt): 0

Sample holding time: 2 days (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 82 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 20 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0091-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated September 12 2016 current results
(48-h LC50 and 95% confidence limits) = 0.73 (0.68-0.78) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.73 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0091-01-DAS

Test Log:

Date	Day	Time	Technician
2016/09/19	0	1530	EP
2016/09/20	1	1040	JW
2016/09/21	2	0910	JW/EP

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.9	7.9	7.9	8.1	8.1	8.1
2	8.0	8.0	8.0	8.1	8.1	8.0

Day	Conductivity (µS/cm @ 25°C)					
0	316	328	329	1787	1789	1810
2	331	346	350	1606	1675	1698

Day	Dissolved Oxygen (mg/L)					
0	8.0	8.0	8.0	8.1	8.1	8.1
2	7.9	8.0	8.0	8.0	8.0	8.0

Day	Temperature (°C)					
0	19	19	19	19	19	19
2	20	20	19	20	19	19

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10(1D)	10	10(1D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0

Comments/Statistics

Client: TEC164 Reference: 1617-0091-01-DAS

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: TEC164
Reference: 1617-0091-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160917_N

Collection: collected on 2016/09/17 at not given by

Receipt: received on 2016/09/18 at 0905 by ML

Containers: received 4 x 20L carboys, 4 x 1L bottles at 9 °C, in good condition with no seals and no initials

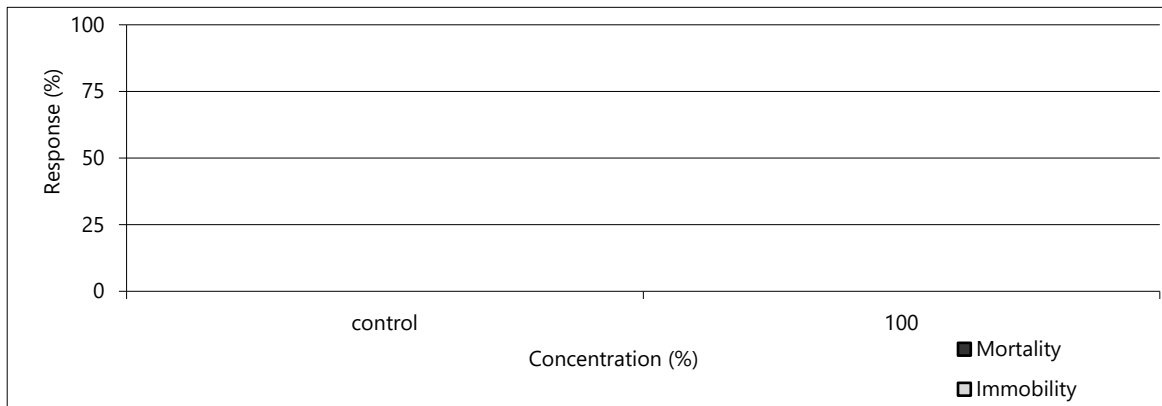
Description: type: water, collection method: grab

Test: started on 2016/09/19 ; ended on 2016/09/21

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control 100	lab control WL_BFWB_OUT_SP21 _20160917_N	0 0	0 0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Jaclyn Poole

Senior Verifier

Client: TEC164
Reference: 1617-0091-01-DAS

Test Conditions

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 9 days to first brood
23.2 neonates per average brood

Sample initial chemistry: pH: 7.6; EC: 1742 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.3 (mg/L); temperature: 18 °C
hardness (mg CaCO₃/L): 797; colour: colourless; salinity (ppt): 0

Sample holding time: 2 days (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 82 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 10 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0091-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated September 12 2016 current results
(48-h LC50 and 95% confidence limits) = 0.73 (0.68-0.78) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.73 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0091-01-DAS

Test Log:

Date	Day	Time	Technician
2016/09/19	0	1530	EP
2016/09/20	1	1045	JW
2016/09/21	2	0920	JW/EP

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	8.0	8.0	8.0	7.7	7.7	7.7
2	7.7	7.8	7.8	8.1	8.2	8.2

Day	Conductivity (µS/cm @ 25°C)					
0	338	339	342	1732	1738	1748
2	322	325	329	1712	1733	1741

Day	Dissolved Oxygen (mg/L)					
0	9.3	9.2	9.2	9.4	9.5	9.4
2	9.0	9.1	9.1	9.2	9.2	9.3

Day	Temperature (°C)					
0	12	12	12	11	11	11
2	12	12	12	12	12	12

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10(1D)	10	10(4D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0

Comments/Statistics

Client: TEC164 Reference: 1617-0091-01-DAS

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:The test temperature was $10 \pm 2^{\circ}\text{C}$, as requested by the client

Your P.O. #: 441369
Site Location: WLC AWTF

Attention:Chris Stroich

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/09/30
Report #: R2272928
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B681622

Received: 2016/09/20, 09:53

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Daphnia magna Single Concentration-100%	2	N/A	2016/09/21	EENVSOP-00154	EPS 1 RM14 2nd ed
Technician Time - Customer Service	2	N/A	2016/09/21		

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====
This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B681622
Report Date: 2016/09/30

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: GF

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		PO0617	PO0618		
Sampling Date		2016/09/19 09:00	2016/09/19 08:00		
	UNITS	WL_BFWB_OUT_SP21 _20160919_N	WL_WLCI_SP01_2016 0919_N	RDL	QC Batch
Industrial - Calculated					
Hours of Labour	hr	1.0	1.0	0.01	ONSITE
Daphnia Magna Bioassay					
Mortality	%	ATTACHED	ATTACHED	N/A	8405411
RDL = Reportable Detection Limit N/A = Not Applicable					

Maxxam Job #: B681622
Report Date: 2016/09/30

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: GF

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.3°C
-----------	-------

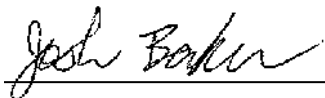
Results relate only to the items tested.

Maxxam Job #: B681622
Report Date: 2016/09/30

TECK COAL LIMITED
Site Location: WLC AWTF
Your P.O. #: 441369
Sampler Initials: GF

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Joshua Baker, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B681622
Sample Number: PO0617-01

Test Result:

48 hrs Mortality % 0 Statistical Method:

Mean percent mortality:	<u>Sample</u>	0	<u>Control</u>	0
Sample Name :	WL_BFWB_OUT_SP21_20160919_N			Sample Matrix : Water
Description:	Clear			<u>Sample Prior to Analysis:</u>
Sample Collected:	Sep 19, 2016 09:00 AM	Sampling Method :	N/A	pH: 7.6
Sample Collected By:	GF	Site Collection:	N/A	Temperature : 15 °C
Sample Received:	Sep 20, 2016 09:53 AM	Volume Received:	1 L	Dissolved Oxygen: 10.3 mg/L
Analysis Start :	Sep 21, 2016 09:06 AM	Temp.Upon Arrival:	2 °C	Sample Conductance: 1453 µS/cm
End :	Sep 23, 2016 08:26 AM	Storage:	2-6°C	Hardness: 800 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	20	7.8	372	7.8	0	0	0	0	19	8.1	376	7.8
0	20	7.9	373	7.8	0	0	0	0	20	7.8	384	7.5
0	20	7.9	374	7.8	0	0	0	0	20	8.0	379	7.5
100	20	8.1	1647	8.4	0	0	0	0	20	8.0	1534	7.5
100	20	8.2	1651	8.4	0	0	0	0	20	7.9	1565	7.4
100	20	7.7	1654	8.4	0	0	0	0	19	7.9	1614	7.2

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	0	0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 160 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
 Organisms per Vessel : 10 Pre-aeration Time : 30 min Rate of Pre-aeration : 25-50 mL/min/L
 Total # of Organisms Used : 60 Test Temperature : 20 ± 2 °C Test Hardness Adjusted : No
 Test Volume : 150 mL Vessel Volume : 225 mL Test pH Adjusted: No
 Loading Density : 15.0 mL/Daphnia Photoperiod : 16:8 (light: dark)

Test Organism : *Daphnia magna* Source : In House Culture
 Age at Test Initiation : <24 hrs Average Brood Size : 23.9
 Culture Photoperiod : 16:8 (light: dark) % Mortality within 7 days : 3.2
 Culture Temperature : 20 ± 2 °C Time To First Brood : 8 Days
 Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

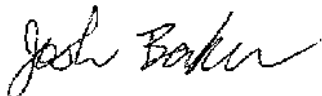
Job Number: B681622
Sample Number: PO0617-01

Reference chemical: Sodium Chloride
Test Endpoint 48 hrs LC50 (95% confidence interval) : 7.07 (5.00, 10.0)g/L
Historical Mean LC50 (warning limits) : 6.59 (5.17, 8.40) g/L
Test Date: Sep 12, 2016
Statistical Method : Binomial
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Aynura Rakhmangulova, Chelsea Tessier, Natasha Mouck



Verified By : Joshua Baker, Senior Analyst

Date: Sep 30, 2016 06:18 PM



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/09/20
Report Date: 2016/09/29
Version: FINAL

Test Report

Client: TEC164
Reference: 1617-0102
Billing: PO 411634

A handwritten signature in cursive script that reads 'Jacquyn Rose'.

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

Result Summary

Client: TEC164
Reference: 1617-0102-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160919_N

Collection: collected on 2016/09/19 at 0900 by not given

Receipt: received on 2016/09/20 at 1030 by MC

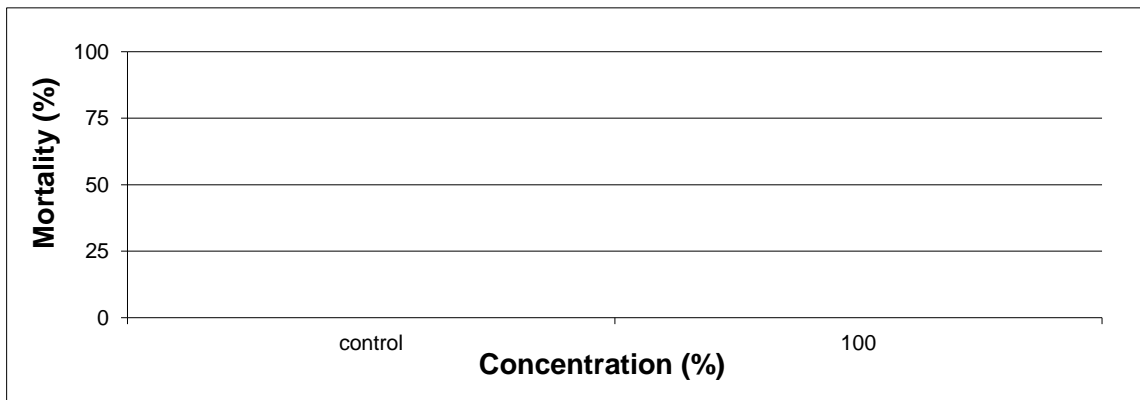
Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 7 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/09/21 ; ended on 2016/09/25

Result:

Sample	Client Code	Mortality (%)	Comment
control 100%	lab control WL_BFWB_OUT_SP21_2 0160919_N	0 0	none



The test data and results are authorized and verified correct.

Jaclyn Poole

Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0102-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160824TR)

Acclimation: 28 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.6; EC: 1894 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.5 (mg/L); temperature: 19 °C
hardness (mg CaCO₃/L): 885; colour: colourless; salinity (ppt): 0

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 9 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.16 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated September 16, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.51 (0.45-0.57) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.51 (0.36-0.66) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume

Test Data

Client: TEC164
Reference: 1617-0102-01-TRS

Test Log:

Date	Day	Time	Technician
2016/09/21	0	1455	JN
2016/09/22	1	0740	JW
2016/09/23	2	0805	LC
2016/09/24	3	1020	JW
2016/09/25	4	1100	ML/EP

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

pH (units)

0	7.6	7.8
4	8.1	8.2

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	341	1755
4	366	1645

Dissolved Oxygen (mg/L)

0	9.1	9.0
4	8.6	8.7

Temperature (°C)

0	15	15
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---

Client: TEC164
Reference: 1617-0102-01-TRS

Test Data

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.3	0.4
2	3.1	0.4
3	2.9	0.3
4	3.0	0.3
5	2.8	0.3
6	2.8	0.3
7	3.0	0.3
8	3.0	0.4
9	2.8	0.3
10	2.7	0.2

Sample	Group Wet Weight (g)
control	3.2

average	2.9	0.3
sd	0.2	0.1
cv(%)	6.0	19.8

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient
of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: TEC164
Reference: 1617-0102-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160919_N

Collection: collected on 2016/09/19 at 0900 by not given

Receipt: received on 2016/09/20 at 1030 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 7 °C, in good condition with no seals and no initials

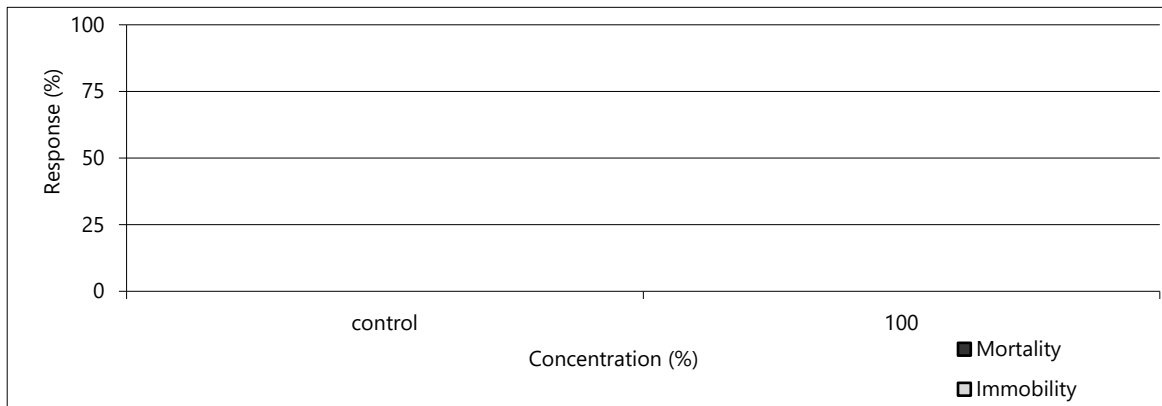
Description: type: water, collection method: grab

Test: started on 2016/09/20 ; ended on 2016/09/22

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control 100	lab control WL_BFWB_OUT_SP21 _20160919_N	0 0	0 0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Jaclyn Rose

Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0102-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 9 days to first brood
23 neonates per average brood

Sample initial chemistry: pH: 7.6; EC: 1894 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.5 (mg/L); temperature: 19 °C
hardness (mg CaCO₃/L): 885; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 84 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 20 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0102-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated September 12 2016 current results
(48-h LC50 and 95% confidence limits) = 0.73 (0.68-0.78) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.73 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0102-01-DAS

Test Log:

Date	Day	Time	Technician
2016/09/20	0	1420	HS/JW
2016/09/21	1	0915	EP/JW
2016/09/22	2	0900	JW

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.8	7.8	7.8	7.8	7.9	7.9
2	7.8	7.9	7.9	8.0	8.0	8.0

Day	Conductivity (µS/cm @ 25°C)					
0	332	339	344	1905	1932	1940
2	315	324	332	1751	1722	1699

Day	Dissolved Oxygen (mg/L)					
0	8.1	8.1	8.1	8.3	8.3	8.3
2	7.8	7.8	7.9	7.9	7.9	7.9

Day	Temperature (°C)					
0	19	19	19	19	19	19
2	20	20	20	20	20	20

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10	10	10(1D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0

Comments/Statistics

Client: TEC164 Reference: 1617-0102-01-DAS

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: TEC164
Reference: 1617-0102-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160919_N

Collection: collected on 2016/09/19 at 0900 by not given

Receipt: received on 2016/09/20 at 1030 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottles at 7 °C, in good condition with no seals and no initials

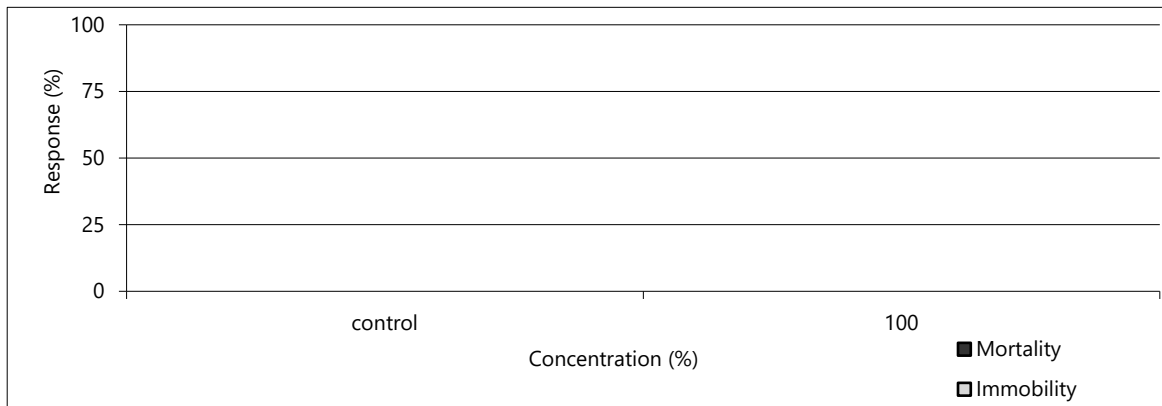
Description: type: water, collection method: grab

Test: started on 2016/09/20 ; ended on 2016/09/22

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control 100	lab control WL_BFWB_OUT_SP21 _20160919_N	0 0	0 0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Jacklyn Poole

Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0102-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 10 days to first brood
23 neonates per average brood

Sample initial chemistry: pH: 7.6; EC: 1894 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 7.5 (mg/L); temperature: 19 °C
hardness (mg CaCO₃/L): 885; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 84 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 10 \pm 3°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0102-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated September 12 2016 current results
(48-h LC50 and 95% confidence limits) = 0.73 (0.68-0.78) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.73 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0102-01-DAS

Test Log:

Date	Day	Time	Technician
2016/09/20	0	1430	HS/JW
2016/09/21	1	0915	EP/JW
2016/09/22	2	0920	JW

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.8	7.8	7.8	7.8	7.8	7.8
2	7.8	7.9	7.9	8.1	8.2	8.2

Day	Conductivity (µS/cm @ 25°C)					
0	338	343	343	1916	1936	1954
2	313	339	339	1810	1808	1828

Day	Dissolved Oxygen (mg/L)					
0	9.3	9.3	9.3	9.4	9.5	9.5
2	9.1	9.2	9.1	9.1	9.2	9.0

Day	Temperature (°C)					
0	11	11	11	11	11	11
2	13	12	13	13	12	13

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10	10	10(1D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0

Comments/Statistics

Client: TEC164 Reference: 1617-0102-01-DAS

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:The test temperature was $10 \pm 3^{\circ}\text{C}$, as requested by the client

Your Project #: WLC AWTF
Your C.O.C. #: 20160926-ACUTETOXICI

Attention:Chris Stroich

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/10/04
Report #: R2274818
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B684204

Received: 2016/09/27, 09:27

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Daphnia magna Single Concentration-100%	2	N/A	2016/09/28	EENVSOP-00154	EPS 1 RM14 2nd ed
Technician Time - Customer Service	2	N/A	2016/09/28		

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====
This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B684204
Report Date: 2016/10/04

TECK COAL LIMITED
Client Project #: WLC AWTF

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		PP5577	PP5578		
Sampling Date		2016/09/26 08:00	2016/09/26 09:00		
COC Number		20160926-ACUTETOXI	20160926-ACUTETOXI		
	UNITS	WL_WLC1_SPO1_2016 091926_N	WL_BFWB_OUT_SP21 _20160926_N	RDL	QC Batch
Industrial - Calculated					
Hours of Labour	hr	1.0	1.0	0.01	ONSITE
Daphnia Magna Bioassay					
Mortality	%	ATTACHED	ATTACHED	N/A	8413990
RDL = Reportable Detection Limit N/A = Not Applicable					

Maxxam Job #: B684204
Report Date: 2016/10/04

TECK COAL LIMITED
Client Project #: WLC AWTF

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.0°C
-----------	-------

Results relate only to the items tested.

Maxxam Job #: B684204
Report Date: 2016/10/04

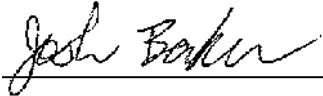
TECK COAL LIMITED
Client Project #: WLC AWTF

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Amanda Dwyer, Project Manager Assistant



Joshua Baker, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number : - WLC AWTF

Job Number: B684204
Sample Number: PP5578-01

Test Result:

48 hrs Mortality % 0% Statistical Method:

Mean percent mortality:	<u>Sample</u>	0	<u>Control</u>	0
Sample Name :	WL_BFWB_OUT_SP21_20160926_N			Sample Matrix : Water
Description:	Clear			<u>Sample Prior to Analysis:</u>
Sample Collected:	Sep 26, 2016 09:00 AM	Sampling Method :	N/A	pH: 7.6
Sample Collected By:	N/A	Site Collection:	N/A	Temperature : 19 °C
Sample Received:	Sep 27, 2016 09:27 AM	Volume Received:	1 L	Dissolved Oxygen: 9.2 mg/L
Analysis Start :	Sep 28, 2016 10:36 AM	Temp.Upon Arrival:	5 °C	Sample Conductance: 1642 µS/cm
End :	Sep 30, 2016 10:32 AM	Storage:	2-6°C	Hardness: 400 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	20	8.0	368	7.7	0	0	0	0	20	8.0	374	7.5
0	20	8.1	372	7.7	0	0	0	0	20	8.3	390	7.5
0	20	8.1	372	7.7	0	0	0	0	20	8.1	376	7.4
100	20	7.7	1674	8.4	0	0	0	0	20	7.8	1607	7.4
100	20	7.7	1682	8.4	0	0	0	0	20	7.7	1649	7.2
100	20	7.7	1681	8.4	0	0	0	0	20	7.8	1626	7.4

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	3	30.0
100	0	0	1	10.0
100	0	0	6	60.0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 160 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
 Organisms per Vessel : 10 Pre-aeration Time : 30 min Rate of Pre-aeration : 25-50 mL/min/L
 Total # of Organisms Used : 60 Test Temperature : 20 ± 2 °C Test Hardness Adjusted : No
 Test Volume : 150 mL Vessel Volume : 225 mL Test pH Adjusted: No
 Loading Density : 15.0 mL/Daphnia Photoperiod : 16:8 (light: dark)

Test Organism : *Daphnia magna* Source : In House Culture
 Age at Test Initiation : <24 hrs Average Brood Size : 20.7
 Culture Photoperiod : 16:8 (light: dark) % Mortality within 7 days : 0
 Culture Temperature : 20 ± 2 °C Time To First Brood : 8 Days
 Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: - WLC AWTF

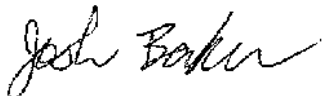
Job Number: B684204
Sample Number: PP5578-01

Reference chemical: Sodium Chloride
Test Endpoint 48 hrs LC50 (95% confidence interval) : 7.07 (5.00, 10.0)g/L
Historical Mean LC50 (warning limits) : 6.59 (5.17, 8.40) g/L
Test Date: Sep 23, 2016
Statistical Method : Binomial
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Aynura Rakhmangulova



Verified By : Joshua Baker, Senior Analyst

Date: Oct 04, 2016 11:24 AM

ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/09/27
Report Date: 2016/10/05
Version: FINAL

Test Report

Client: TEC164
Reference: 1617-0144
Billing: PO 411634



Senior Verifier

Result Summary

Client: TEC164
Reference: 1617-0144-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160926_N

Collection: collected on 2016/09/26 at 0900 by not given

Receipt: received on 2016/09/27 at 1410 by MC

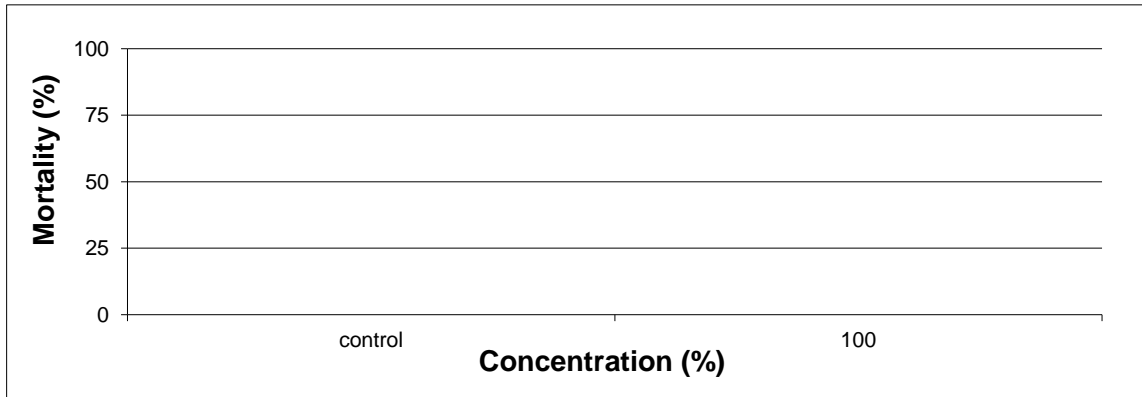
Containers: received 4 x 20 L carboys / 4 x 1 L bottle at 13 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/09/28 ; ended on 2016/10/02

Result:

Sample	Client Code	Mortality (%)	Comment
control 100%	lab control WL_BFWB_OUT_SP21_2 0160926_N	0 0	none



The test data and results are authorized and verified correct.

Jacques Poole

Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0144-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160824TR)

Acclimation: 35 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.7; EC: 1875 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.4 (mg/L); temperature: 16 °C
hardness (mg CaCO_3/L): 654; colour: colourless; salinity (ppt): 0

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 9 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.19 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated September 16, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.51 (0.45-0.57) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.51 (0.36-0.66) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume

Test Data

Client: TEC164
Reference: 1617-0144-01-TRS

Test Log:

Date	Day	Time	Technician
2016/09/28	0	1200	JN
2016/09/29	1	0900	LC
2016/09/30	2	1040	JN
2016/10/01	3	1210	JN
2016/10/02	4	0900	HS

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

pH (units)

0	7.9	7.9
4	7.9	8.1

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	463	1834
4	464	1699

Dissolved Oxygen (mg/L)

0	8.9	9.0
4	8.7	8.8

Temperature (°C)

0	15	15
4	15	14

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---

Client: TEC164
Reference: 1617-0144-01-TRS

Test Data

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.2	0.3
2	3.1	0.4
3	3.2	0.3
4	3.2	0.3
5	3.2	0.4
6	3.2	0.5
7	3.1	0.4
8	3.5	0.4
9	3.2	0.4
10	3.1	0.4

Sample	Group Wet Weight (g)
control	3.8

average	3.2	0.4
sd	0.1	0.1
cv(%)	3.6	16.6

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient
of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: TEC164
Reference: 1617-0144-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160926_N

Collection: collected on 2016/09/26 at 0900 by not given

Receipt: received on 2016/09/27 at 1410 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottle at 13 °C, in good condition with no seals and no initials

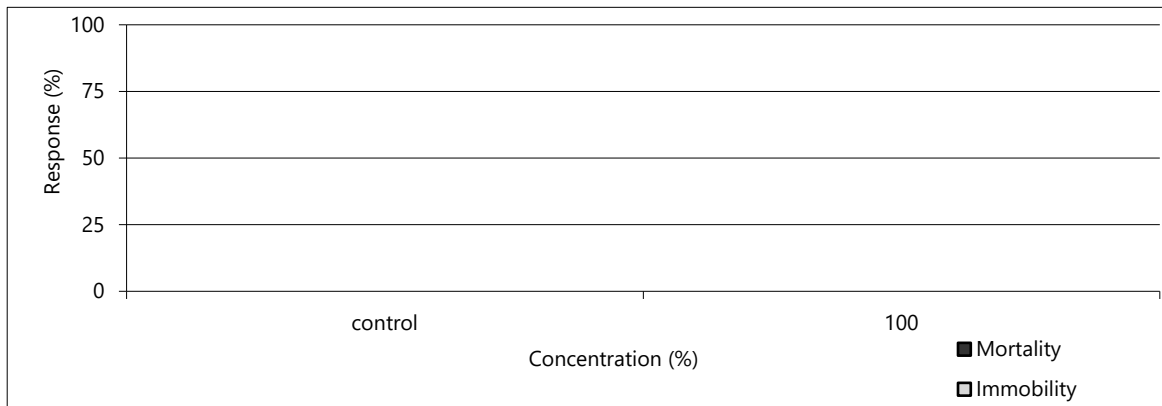
Description: type: water, collection method: grab

Test: started on 2016/09/27 ; ended on 2016/09/29

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control 100	lab control WL_BFWB_OUT_SP21 _20160926_N	0 0	0 0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Jacklyn Rose

Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0144-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
24 neonates per average brood

Sample initial chemistry: pH: 7.7; EC: 1875 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.4 (mg/L); temperature: 16 °C
hardness (mg CaCO_3/L): 654; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 83 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0144-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated September 26, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.70 (0.68-0.73) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.73 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0144-01-DAS

Test Log:

Date	Day	Time	Technician
2016/09/27	0	1500	EP
2016/09/28	1	1130	HS/JW
2016/09/29	2	1100	JW

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.8	7.8	7.9	8.1	8.2	8.2
2	7.8	7.8	7.8	7.9	7.9	7.9

Day	Conductivity (µS/cm @ 25°C)					
0	318	321	321	1853	1870	1885
2	316	333	334	1783	1803	1834

Day	Dissolved Oxygen (mg/L)					
0	7.8	7.8	8.0	8.1	8.2	8.2
2	7.8	7.9	8.0	8.0	8.0	8.0

Day	Temperature (°C)					
0	18	18	18	18	18	18
2	19	19	19	19	19	19

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10 (3D)	10 (4D)	10 (3D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0

Comments/Statistics

Client: TEC164 Reference: 1617-0144-01-DAS

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: TEC164
Reference: 1617-0144-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20160926_N

Collection: collected on 2016/09/26 at 0900 by not given

Receipt: received on 2016/09/27 at 1410 by MC

Containers: received 4 x 20 L carboys / 4 x 1 L bottle at 13 °C, in good condition with no seals and no initials

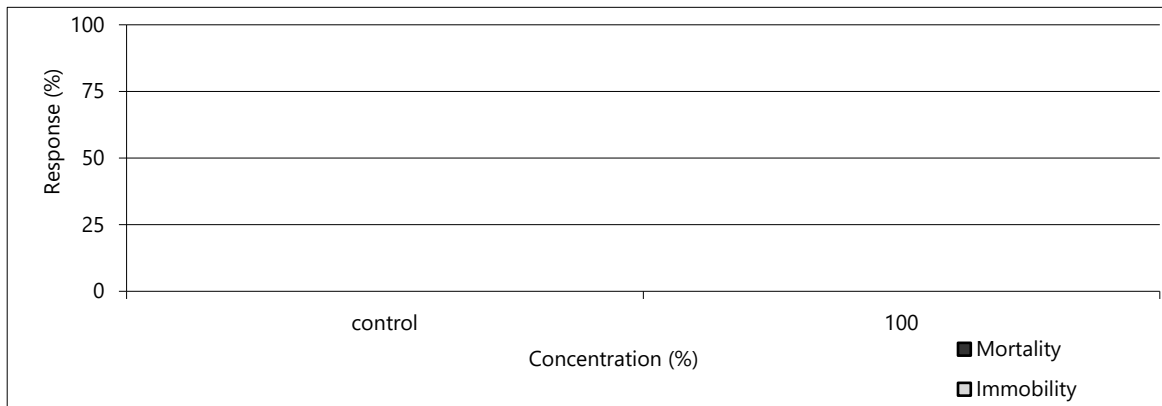
Description: type: water, collection method: grab

Test: started on 2016/09/27 ; ended on 2016/09/29

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control 100	lab control WL_BFWB_OUT_SP21 _20160926_N	0 0	0 0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Jaclyn Rose

Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0144-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 10 days to first brood
25 neonates per average brood

Sample initial chemistry: pH: 7.7; EC: 1875 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.4 (mg/L); temperature: 16 °C
hardness (mg CaCO₃/L): 654; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 83 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 10 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0144-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated September 26, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.70 (0.68-0.73) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.73 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0144-01-DAS

Test Log:

Date	Day	Time	Technician
2016/09/27	0	1500	EP
2016/09/28	1	1130	HS/JW
2016/09/29	2	1100	JW

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.8	7.8	7.9	7.5	7.5	7.6
2	7.7	7.7	7.7	8.1	8.1	8.1

Day	Conductivity (µS/cm @ 25°C)					
0	320	320	328	1922	1939	1932
2	336	328	330	1862	1883	1896

Day	Dissolved Oxygen (mg/L)					
0	8.3	8.3	8.4	9.5	9.5	9.5
2	9.2	9.2	9.0	9.1	8.9	9.2

Day	Temperature (°C)					
0	11	11	11	11	11	11
2	12	12	12	12	12	12

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0

Comments/Statistics

Client: TEC164

Reference: 1617-0144-01-DAS

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:The test temperature was $10 \pm 2^{\circ}\text{C}$, as requested by the client

Your P.O. #: 441369
Your Project #: WLC AWTF
Your C.O.C. #: 20161003-ACUTETOXICI

Attention:Chris Stroich

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/10/07
Report #: R2278036
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B687115

Received: 2016/10/04, 09:57

Sample Matrix: SURFACE WATER
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Daphnia magna Single Concentration-100%	2	N/A	2016/10/05	EENVSOP-00154	EPS 1 RM14 2nd ed
Technician Time - Customer Service	2	N/A	2016/10/05		

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====

This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B687115
Report Date: 2016/10/07

TECK COAL LIMITED
Client Project #: WLC AWTF
Your P.O. #: 441369

RESULTS OF CHEMICAL ANALYSES OF SURFACE WATER

Maxxam ID		PR4492	PR4493		
Sampling Date		2016/10/03 08:00	2016/10/03 09:00		
COC Number		20161003-ACUTETOXI	20161003-ACUTETOXI		
	UNITS	WL_WLCL_SP01_2016 1003_N	WL_BFWB_OUT_SP21 _20161003_N	RDL	QC Batch
Industrial - Calculated					
Hours of Labour	hr	1.0	1.0	0.01	ONSITE
Daphnia Magna Bioassay					
Mortality	%	ATTACHED	ATTACHED	N/A	8423218
RDL = Reportable Detection Limit N/A = Not Applicable					

Maxxam Job #: B687115
Report Date: 2016/10/07

TECK COAL LIMITED
Client Project #: WLC AWTF
Your P.O. #: 441369

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.3°C
-----------	-------

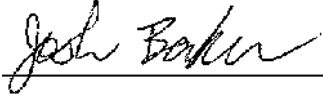
Results relate only to the items tested.

Maxxam Job #: B687115
Report Date: 2016/10/07

TECK COAL LIMITED
Client Project #: WLC AWTF
Your P.O. #: 441369

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Joshua Baker, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number : - WLC AWTF

Job Number: B687115
Sample Number: PR4493-01

Test Result:

48 hrs Mortality % 0 Statistical Method:

Mean percent mortality:	<u>Sample</u>	0	<u>Control</u>	0
Sample Name :	WL_BFWB_OUT_SP21_20161003_N			Sample Matrix : SURFACE WATER
Description:	clear			<u>Sample Prior to Analysis:</u>
Sample Collected:	Oct 03, 2016 09:00 AM	Sampling Method :	Grab	pH: 7.5
Sample Collected By:	N/A	Site Collection:	N/A	Temperature : 15 °C
Sample Received:	Oct 04, 2016 09:57 AM	Volume Received:	1 L	Dissolved Oxygen: 10.1 mg/L
Analysis Start :	Oct 05, 2016 10:55 AM	Temp.Upon Arrival:	2 °C	Sample Conductance: 1486 µS/cm
End :	Oct 07, 2016 10:10 AM	Storage:	2-6°C	Hardness: 800 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	21	8.0	377	7.7	0	0	0	0	20	8.0	378	8.1
0	21	8.0	377	7.7	0	0	0	0	19	8.1	388	8.2
0	21	7.9	377	7.7	0	0	0	0	20	8.0	378	8.0
100	21	7.7	1699	8.0	0	0	0	0	20	7.8	1570	8.0
100	21	7.6	1708	8.1	0	0	0	0	20	7.7	1589	8.0
100	21	7.7	1708	8.1	0	0	2	20.0	20	7.6	1608	8.0

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	1	10.0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 180 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
 Organisms per Vessel : 10 Pre-aeration Time : 30 min Rate of Pre-aeration : 25-50 mL/min/L
 Total # of Organisms Used : 60 Test Temperature : 20 ± 2 °C Test Hardness Adjusted : No
 Test Volume : 150 mL Vessel Volume : 225 mL Test pH Adjusted: No
 Loading Density : 15.0 mL/Daphnia Photoperiod : 16:8 (light: dark)

Test Organism : *Daphnia magna* Source : In House Culture
 Age at Test Initiation : <24 hrs Average Brood Size : 25.1
 Culture Photoperiod : 16:8 (light: dark) % Mortality within 7 days : 1.6
 Culture Temperature : 20 ± 2 °C Time To First Brood : 8 Days
 Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: - WLC AWTF

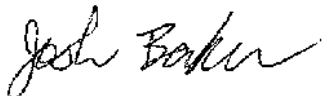
Job Number: B687115
Sample Number: PR4493-01

Reference chemical: Sodium Chloride
Test Endpoint 48 hrs LC50 (95% confidence interval) : 7.07 (5.00, 10.0)g/L
Historical Mean LC50 (warning limits) : 6.59 (5.17, 8.40) g/L
Test Date: Sep 23, 2016
Statistical Method : Binomial
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Aynura Rakhmangulova, Chelsea Tessier, Natasha Mouck



Verified By : Joshua Baker, Senior Analyst

Date: Oct 07, 2016 03:13 PM

ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/10/04
Report Date: 2016/10/17
Version: FINAL

Test Report

Client: TEC164
Reference: 1617-0166
Billing: 411634



Senior Verifier

Result Summary

Client: TEC164
Reference: 1617-0166-01-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20161003_N

Collection: collected on 2016/10/03 at 0900 by not given

Receipt: received on 2016/10/04 at 1200 by MC

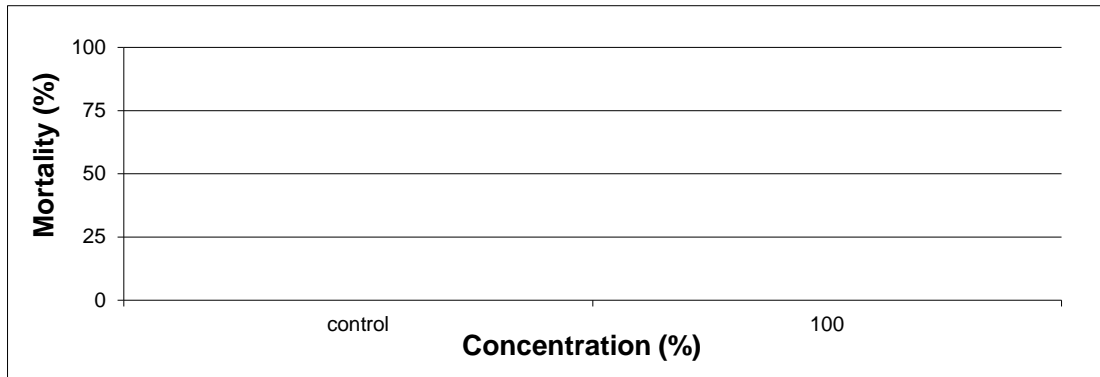
Containers: received 4 x 20 L carboy / 4 x 1 L bottle at 12 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/10/05 ; ended on 2016/10/09

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	WL_BFWB_OUT_SP21_20161003_N	0	none



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164
Reference: 1617-0166-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160824TR)

Acclimation: 42 days (must be ≥ 2 weeks)

Stock mortality: 0.5% (seven days preceding testing)

Sample initial chemistry: pH: 7.8; EC: 1828 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.9 (mg/L); temperature: 19 °C
hardness (mg CaCO₃/L): 965; colour: colourless; salinity (ppt): 0

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 9 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.155 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated September 16, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.51 (0.45-0.57) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.51 (0.36-0.66) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume

Test Data

Client: TEC164
Reference: 1617-0166-01-TRS

Test Log:

Date	Day	Time	Technician
2016/10/05	0	1030	EP
2016/10/06	1	0800	ML
2016/10/07	2	1000	EP
2016/10/08	3	1115	EP
2016/10/09	4	1200	LC

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	7.5	7.8
4	8.2	8.2

	Conductivity (µS/cm @ 25°C)	
--	-----------------------------	--

0	476	1837
4	470	1701

	Dissolved Oxygen (mg/L)	
--	-------------------------	--

0	8.9	9.0
4	8.5	8.7

	Temperature (°C)	
--	------------------	--

0	14	14
4	14	14

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

	Mortality (%)	
--	---------------	--

4	0	0
---	---	---

	Stressed (%)	
--	--------------	--

4	0	0
---	---	---

Test Data

Client: TEC164
Reference: 1617-0166-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	2.7	0.2
2	2.8	0.2
3	3.5	0.4
4	2.9	0.2
5	3.1	0.3
6	3.2	0.3
7	3.1	0.3
8	3.1	0.3
9	3.4	0.5
10	3.2	0.4

Sample	Group Wet Weight (g)
control	3.1

average	3.1	0.3
sd	0.2	0.1
cv(%)	8.0	32.1

Notes: nd, not done; na, not applicable;
 sd, standard deviation; cv(%), coefficient of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: TEC164
Reference: 1617-0166-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20161003_N

Collection: collected on 2016/10/03 at 0900 by not given

Receipt: received on 2016/10/04 at 1200 by MC

Containers: received 4 x 20 L carboy / 4 x 1 L bottle at 12 °C, in good condition with no seals and no initials

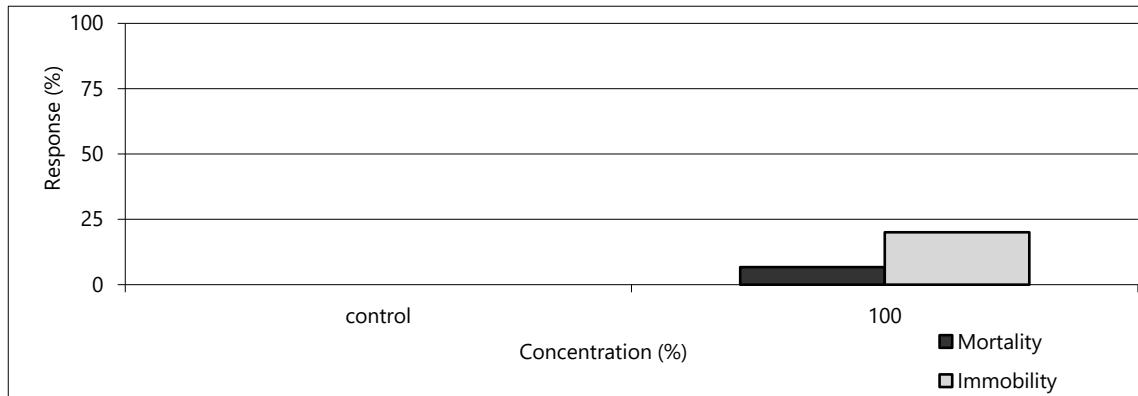
Description: type: water, collection method: grab

Test: started on 2016/10/04 ; ended on 2016/10/06

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20161003_N	7	20	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0166-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
26 neonates per average brood

Sample initial chemistry: pH: 7.8; EC: 1828 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.9 (mg/L); temperature: 19 °C
hardness (mg CaCO_3/L): 965; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 84 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 20 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0166-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated September 26, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.70 (0.68-0.73) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.73 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0166-01-DAS

Test Log:

Date	Day	Time	Technician
2016/10/04	0	1415	ML/JW
2016/10/05	1	0915	ML
2016/10/06	2	0900	ML

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.8	7.8	7.8	8.1	8.2	8.1
2	7.9	7.8	7.8	7.8	7.8	7.8

Day	Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)					
0	312	320	320	1815	1840	1851
2	317	315	315	1696	1768	1721

Day	Dissolved Oxygen (mg/L)					
0	8.2	8.2	8.2	8.3	8.3	8.3
2	8.2	8.1	8.2	8.2	8.2	8.2

Day	Temperature (°C)					
0	18	18	18	18	18	18
2	18	19	18	18	18	18

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10 (3I, 3D)	10 (1D)	8 (1I)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	20

Day	Immobility (%)					
2	0	0	0	30	0	30

Comments/Statistics

Client: TEC164 Reference: 1617-0166-01-DAS

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: TEC164
Reference: 1617-0166-01-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20161003_N

Collection: collected on 2016/10/03 at 0900 by not given

Receipt: received on 2016/10/04 at 1200 by MC

Containers: received 4 x 20 L carboy / 4 x 1 L bottle at 12 °C, in good condition with no seals and no initials

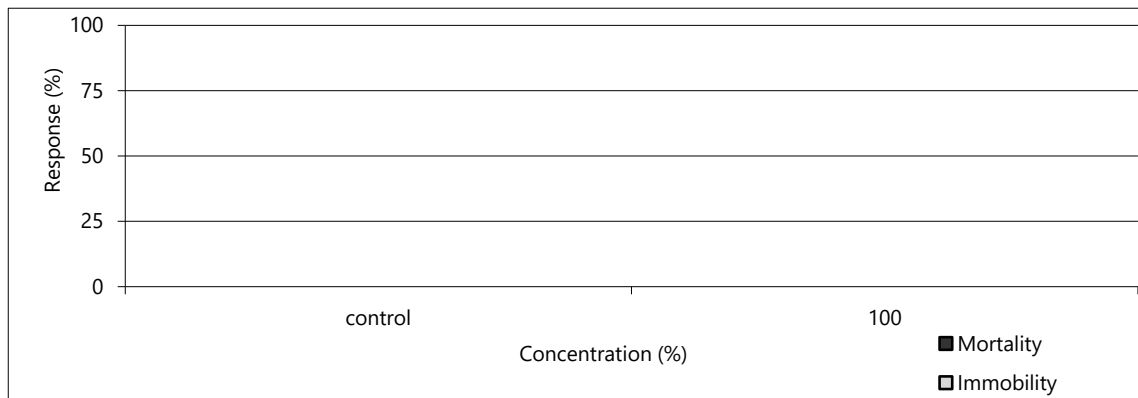
Description: type: water, collection method: grab

Test: started on 2016/10/04 ; ended on 2016/10/06

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control 100	lab control WL_BFWB_OUT_SP21 _20161003_N	0 0	0 0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0166-01-DAS

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
26 neonates per average brood

Sample initial chemistry: pH: 7.8; EC: 1828 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.9 (mg/L); temperature: 19 °C
hardness (mg CaCO_3/L): 965; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 84 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 10 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0166-01-DAS

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated September 26, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.70 (0.68-0.73) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.73 (0.64-0.83) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0166-01-DAS

Test Log:

Date	Day	Time	Technician
2016/10/04	0	1415	ML/JW
2016/10/05	1	0915	ML
2016/10/06	2	0900	ML

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.8	7.8	7.8	7.6	7.6	7.6
2	7.5	7.5	7.5	7.9	8.0	8.0

Day	Conductivity (µS/cm @ 25°C)					
0	310	317	319	1832	1866	1870
2	314	320	323	1782	1818	1830

Day	Dissolved Oxygen (mg/L)					
0	8.4	8.4	8.4	9.6	9.6	9.6
2	9.2	9.2	9.2	9.2	9.4	9.4

Day	Temperature (°C)					
0	12	12	12	11	11	11
2	12	12	12	12	12	12

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0

Comments/Statistics

Client: TEC164 Reference: 1617-0166-01-DAS

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

The test was set at $10 \pm 2^{\circ}\text{C}$ as per the client's requests

Your P.O. #: 441369
Your Project #: WLC AWTF
Your C.O.C. #: 20161011-ACUTE TOXIC

Attention: Thomas Davidson

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/10/24
Report #: R2287962
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B689625

Received: 2016/10/12, 09:32

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Daphnia magna Single Concentration-100%	2	N/A	2016/10/13	EENVSOP-00154	EPS 1 RM14 2nd ed
Technician Time - Customer Service	2	N/A	2016/10/13		

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====

This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B689625
Report Date: 2016/10/24

TECK COAL LIMITED
Client Project #: WLC AWTF
Your P.O. #: 441369
Sampler Initials: .

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		PS9919	PS9920		
Sampling Date		2016/10/11 08:00	2016/10/11 09:00		
COC Number		20161011-ACUTE TOXI	20161011-ACUTE TOXI		
	UNITS	WL_WLCI_SP01_2016 1011_N	WL_BFWB_OUT_SP21 _20161011_N	RDL	QC Batch
Industrial - Calculated					
Hours of Labour	hr	1.0	1.0	0.01	ONSITE
Daphnia Magna Bioassay					
Mortality	%	ATTACHED	ATTACHED	N/A	8431968
RDL = Reportable Detection Limit N/A = Not Applicable					

Maxxam Job #: B689625
Report Date: 2016/10/24

TECK COAL LIMITED
Client Project #: WLC AWTF
Your P.O. #: 441369
Sampler Initials: .

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	0.3°C
-----------	-------

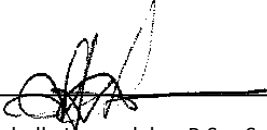
Results relate only to the items tested.

Maxxam Job #: B689625
Report Date: 2016/10/24

TECK COAL LIMITED
Client Project #: WLC AWTF
Your P.O. #: 441369
Sampler Initials: .

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Michelle Hospedales, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number : - WLC AWTF

Job Number: B689625
Sample Number: PS9920-01

Test Result:

48 hrs Mortality % 0 Statistical Method:

Mean percent mortality: Sample 0 Control 0

Sample Name : WL_BFWB_OUT_SP21_20161011_N
Description: colourless
Sample Collected: Oct 11, 2016 09:00 AM **Sampling Method :** N/A
Sample Collected By: N/A **Site Collection:** N/A
Sample Received: Oct 12, 2016 09:32 AM **Volume Received:** 1 L
Analysis Start : Oct 13, 2016 11:05 AM **Temp.Upon Arrival:** 0 °C
End : Oct 15, 2016 10:08 AM **Storage:** 2-6°C

Sample Matrix : Water
Sample Prior to Analysis:
pH: 7.7
Temperature : 19 °C
Dissolved Oxygen: 10.2 mg/L
Sample Conductance: 1592 µS/cm
Hardness: 400 mg CaCO₃/L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	20	8.3	385	8.0	0	0	0	0	20	8.2	391	8.1
0	20	8.3	387	8.0	0	0	0	0	20	8.2	403	8.1
0	20	8.3	387	8.0	0	0	0	0	20	8.2	393	8.0
100	19	7.8	1571	9.0	0	0	0	0	20	8.0	1542	8.0
100	19	7.9	1580	9.1	0	0	0	0	20	8.0	1559	8.0
100	19	7.9	1589	9.0	0	0	0	0	19	8.0	1581	8.0

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	0	0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 160 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
Organisms per Vessel : 10 **Pre-aeration Time :** 30 min **Rate of Pre-aeration :** 25-50 mL/min/L
Total # of Organisms Used : 60 **Test Temperature :** 20 ± 2 °C **Test Hardness Adjusted :** No
Test Volume : 150 mL **Vessel Volume :** 225 mL **Test pH Adjusted:** No
Loading Density : 15.0 mL/Daphnia **Photoperiod :** 16:8 (light: dark)

Test Organism : *Daphnia magna* **Source :** In House Culture
Age at Test Initiation : <24 hrs **Average Brood Size :** 24.2
Culture Photoperiod : 16:8 (light: dark) **% Mortality within 7 days :** 3.2
Culture Temperature : 20 ± 2 °C **Time To First Brood :** 8 Days
Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: - WLC AWTF

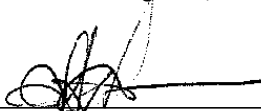
Job Number: B689625
Sample Number: PS9920-01

Reference chemical:	Sodium Chloride	Test Date:	Oct 09, 2016
Test Endpoint 48 hrs LC50 (95% confidence interval) :	7.07 (5.00, 10.0)g/L	Statistical Method :	Binomial
Historical Mean LC50 (warning limits) :	6.59 (5.17, 8.40) g/L	Concentration :	0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Aynura Rakhmangulova, Chelsea Tessier



Verified By : Michelle Hospedales, Senior Analyst

Date: Oct 24, 2016 11:12 AM

ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/10/12
Report Date: 2016/10/24
Version: FINAL

Test Report

Client: TEC164
Reference: 1617-0228
Billing: PO 411634



Senior Verifier

Result Summary

Client: TEC164
Reference: 1617-0228-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20161011_N

Collection: collected on 2016/10/11 at 0900 by AC

Receipt: received on 2016/10/12 at 1100 by MC

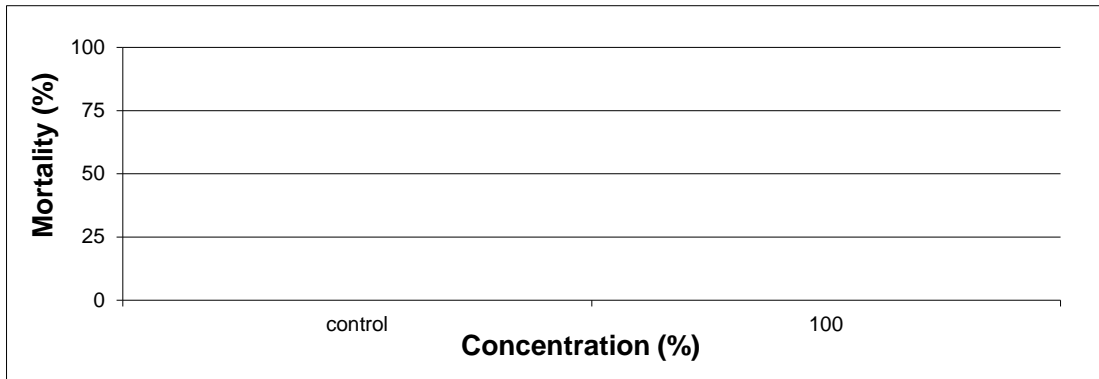
Containers: received 3 x 20 L carboy / 4 x 1 L bottles at 14 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/10/13 ; ended on 2016/10/17

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	WL_BFWB_OUT_SP21_20161011_N	0	none



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0228-TRS
--

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160824TR)

Acclimation: 50 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 8.1; EC: 1825 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.3 (mg/L); temperature: 15 °C
hardness (mg CaCO₃/L): 1036; colour: colourless; salinity (ppt): 0

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 8.6 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.195 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated September 16, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.51 (0.45-0.57) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.51 (0.36-0.66) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume

Test Data

Client: TEC164
Reference: 1617-0228-TRS

Test Log:

Date	Day	Time	Technician
2016/10/13	0	1555	LC/JW
2016/10/14	1	0930	EP
2016/10/15	2	1215	JW
2016/10/16	3	1030	ML
2016/10/17	4	1140	ML/JN

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	7.5	8.0
4	8.2	8.2

	Conductivity (µS/cm @ 25°C)	
--	-----------------------------	--

0	393	1744
4	413	1637

	Dissolved Oxygen (mg/L)	
--	-------------------------	--

0	8.7	8.6
4	8.7	8.8

	Temperature (°C)	
--	------------------	--

0	14	14
4	14	14

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

	Mortality (%)	
--	---------------	--

4	0	0
---	---	---

	Stressed (%)	
--	--------------	--

4	0	0
---	---	---

Test Data

Client: TEC164
Reference: 1617-0228-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.2	0.5
2	3.2	0.4
3	3.4	0.5
4	2.9	0.3
5	3.4	0.4
6	3.0	0.4
7	2.8	0.2
8	3.2	0.4
9	3.0	0.4
10	3.0	0.4

Sample	Group Wet Weight (g)
control	3.9

average	3.1	0.4
sd	0.2	0.1
cv(%)	6.5	22.5

Notes: nd, not done; na, not applicable;
 sd, standard deviation; cv(%), coefficient of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: TEC164
Reference: 1617-0228-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20161011_N

Collection: collected on 2016/10/11 at 0900 by AC

Receipt: received on 2016/10/12 at 1100 by MC

Containers: received 3 x 20 L carboy / 4 x 1 L bottles at 14 °C, in good condition with no seals and no initials

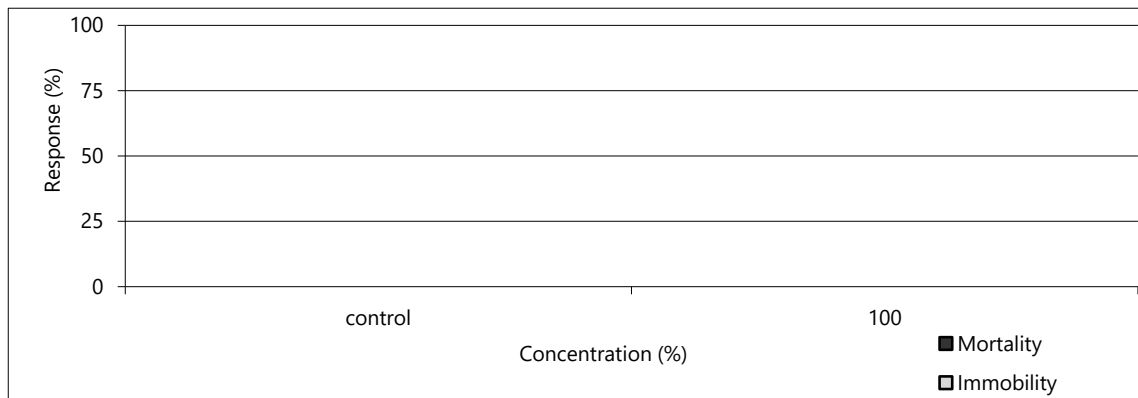
Description: type: water, collection method: grab

Test: started on 2016/10/12 ; ended on 2016/10/14

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control 100	lab control WL_BFWB_OUT_SP21 _20161011_N	0 0	0 0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0228-DAS
--

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 9 days to first brood
19 neonates per average brood

Sample initial chemistry: pH: 8.1; EC: 1825 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.3 (mg/L); temperature: 15 °C
hardness (mg CaCO_3/L): 1036; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 83 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 20 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0228-DAS
--

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated October 13, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.65 (0.60-0.69) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.73 (0.63-0.82) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0228-DAS

Test Log:

Date	Day	Time	Technician
2016/10/12	0	1545	HS/EP
2016/10/13	1	0915	EP
2016/10/14	2	0930	JW

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.9	7.9	7.9	8.1	8.1	8.1
2	7.8	7.8	7.8	7.8	7.9	7.9

Day	Conductivity (µS/cm @ 25°C)					
0	308	319	319	1770	1797	1810
2	303	321	321	1621	1696	1751

Day	Dissolved Oxygen (mg/L)					
0	8.1	8.1	8.1	8.4	8.5	8.5
2	7.9	7.9	7.9	8.0	7.9	7.9

Day	Temperature (°C)					
0	18	18	18	18	18	18
2	19	19	19	19	19	19

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10 (10D)	10 (10D)	10 (10D)
2	10	10	10	10 (4D)	10 (2D)	10 (3D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0

Comments/Statistics

Client: TEC164 Reference: 1617-0228-DAS
--

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: TEC164
Reference: 1617-0228-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20161011_N

Collection: collected on 2016/10/11 at 0900 by AC

Receipt: received on 2016/10/12 at 1100 by MC

Containers: received 3 x 20 L carboy / 4 x 1 L bottles at 14 °C, in good condition with no seals and no initials

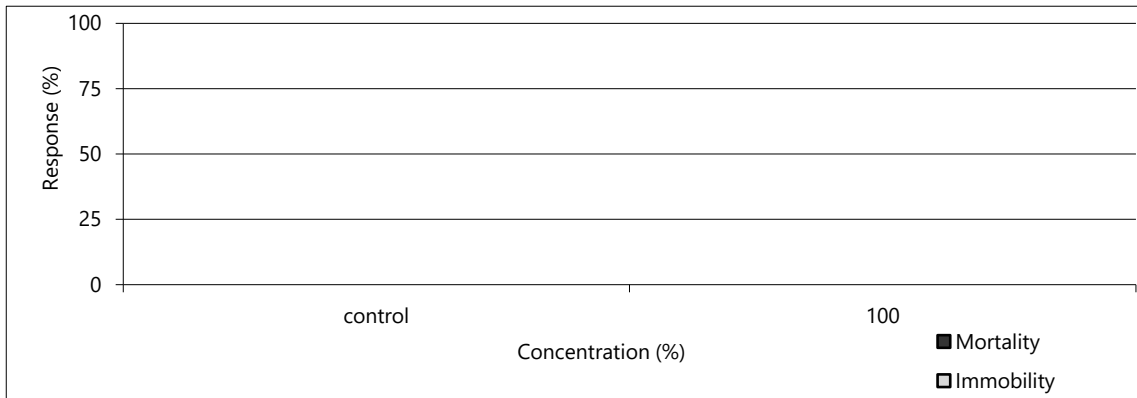
Description: type: water, collection method: grab

Test: started on 2016/10/12 ; ended on 2016/10/14

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control 100	lab control WL_BFWB_OUT_SP21 _20161011_N	0 0	0 0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0228-DAS
--

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 9 days to first brood
19 neonates per average brood

Sample initial chemistry: pH: 8.1; EC: 1825 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.3 (mg/L); temperature: 15 °C
hardness (mg CaCO_3/L): 1036; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 83 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 10 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0228-DAS
--

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated October 13, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.65 (0.60-0.69) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.73 (0.63-0.82) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0228-DAS

Test Log:

Date	Day	Time	Technician
2016/10/12	0	1545	HS/EP
2016/10/13	1	0915	EP
2016/10/14	2	0930	JW

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.9	7.9	7.9	8.0	8.0	8.0
2	7.7	7.7	7.7	8.0	8.0	8.0

Day	Conductivity (µS/cm @ 25°C)					
0	304	315	318	1786	1819	1831
2	320	341	331	1790	1799	1830

Day	Dissolved Oxygen (mg/L)					
0	9.7	9.7	9.7	9.8	9.8	9.8
2	9.5	9.5	9.5	8.5	9.5	9.6

Day	Temperature (°C)					
0	10	10	10	10	10	11
2	11	11	11	11	11	11

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10 (5D)	10 (4D)	10 (5D)

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0

Comments/Statistics

Client: TEC164 Reference: 1617-0228-DAS
--

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:Testing was conducted at $10 \pm 2^{\circ}\text{C}$, as requested by the client.

Your P.O. #: 441369
Your Project #: WLC AWTF
Your C.O.C. #: 20161017-AcuteToxici

Attention: Thomas Davidson

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/10/24
Report #: R2287963
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B691663

Received: 2016/10/18, 09:16

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Daphnia magna Single Concentration-100%	2	N/A	2016/10/18	EENVSOP-00154	EPS 1 RM14 2nd ed
Technician Time - Customer Service	2	N/A	2016/10/18		

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B691663
Report Date: 2016/10/24

TECK COAL LIMITED
Client Project #: WLC AWTF
Your P.O. #: 441369
Sampler Initials: .

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		PU2001	PU2002		
Sampling Date		2016/10/17 08:00	2016/10/17 09:00		
COC Number		20161017-AcuteToxici	20161017-AcuteToxici		
	UNITS	LC_WTF_IN_20161017_NP	WL_BFWB_OUT_SP21_20161017_N	RDL	QC Batch
Industrial - Calculated					
Hours of Labour	hr	1.0	1.0	0.01	ONSITE
Daphnia Magna Bioassay					
Mortality	%	ATTACHED	ATTACHED	N/A	8437590
RDL = Reportable Detection Limit N/A = Not Applicable					

Maxxam Job #: B691663
Report Date: 2016/10/24

TECK COAL LIMITED
Client Project #: WLC AWTF
Your P.O. #: 441369
Sampler Initials: .

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.0°C
-----------	-------

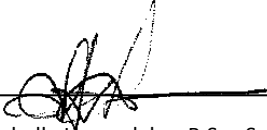
Results relate only to the items tested.

Maxxam Job #: B691663
Report Date: 2016/10/24

TECK COAL LIMITED
Client Project #: WLC AWTF
Your P.O. #: 441369
Sampler Initials: .

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Michelle Hospedales, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number : - WLC AWTF

Job Number: B691663
Sample Number: PU2002-01

Test Result:

48 hrs Mortality % 0 Statistical Method:

Mean percent mortality: Sample 0 Control 0

Sample Name : WL_BFWB_OUT_SP21_20161017_N

Sample Matrix : Water

Description: clear

Sample Prior to Analysis:

Sample Collected: Oct 17, 2016 09:00 AM

Sampling Method : N/A

pH: 7.6

Sample Collected By: TW

Site Collection: N/A

Temperature : 14 °C

Sample Received: Oct 18, 2016 09:16 AM

Volume Received: 1 L

Dissolved Oxygen: 10.6 mg/L

Analysis Start : Oct 18, 2016 01:58 PM

Temp.Upon Arrival: 3 °C

Sample Conductance: 1435 µS/cm

End : Oct 20, 2016 01:32 PM

Storage: 2-6°C

Hardness: 800 mg CaCO₃/L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	20	8.0	366	7.7	0	0	0	0	20	7.9	363	7.7
0	20	8.0	368	7.8	0	0	0	0	20	7.9	369	7.7
0	20	8.0	368	7.8	0	0	0	0	20	7.9	375	7.6
100	20	7.8	1614	8.5	0	0	0	0	20	7.9	1569	7.6
100	20	7.8	1622	8.6	0	0	0	0	20	7.9	1567	7.6
100	20	7.8	1621	8.5	0	0	0	0	20	7.9	1562	7.7

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	0	0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water:

City of Edmonton dechlorinated tap water

Hardness: 180 mg/L CaCO₃

Other parameters available on request.

Test Conditions

Test concentration : 0,0,0,100,100,100 (% vol/vol)

Organisms per Vessel : 10

Pre-aeration Time : 30 min

Rate of Pre-aeration : 25-50 mL/min/L

Total # of Organisms Used : 60

Test Temperature : 20 ± 2 °C

Test Hardness Adjusted : No

Test Volume : 150 mL

Vessel Volume : 225 mL

Test pH Adjusted: No

Loading Density : 15.0 mL/Daphnia

Photoperiod : 16:8 (light: dark)

Test Organism :

Daphnia magna

Source : In House Culture

Age at Test Initiation : <24 hrs

Average Brood Size : 25.0

Culture Photoperiod : 16:8 (light: dark)

% Mortality within 7 days : 0

Culture Temperature : 20 ± 2 °C

Time To First Brood : 8 Days

Culture Diet

Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: - WLC AWTF

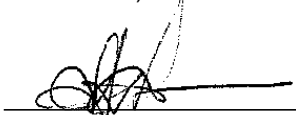
Job Number: B691663
Sample Number: PU2002-01

Reference chemical:	Sodium Chloride	Test Date:	Oct 09, 2016
Test Endpoint 48 hrs LC50 (95% confidence interval) :	7.07 (5.00, 10.0)g/L	Statistical Method :	Binomial
Historical Mean LC50 (warning limits) :	6.59 (5.17, 8.40) g/L	Concentration :	0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Arthur Juan Mathias, Aynura Rakhmangulova, Chelsea Tessier

Verified By : 
Michelle Hospedales, Senior Analyst

Date: Oct 24, 2016 11:31 AM



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/10/18
Report Date: 2016/10/27
Version: FINAL

Test Report

Client: TEC164
Reference: 1617-0266
Billing: PO 411634

A handwritten signature in black ink, appearing to read 'C. R. R.', positioned above a horizontal line.

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

Result Summary

Client: TEC164
Reference: 1617-0266-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20161017_N

Collection: collected on 2016/10/17 at 0900 by TW

Receipt: received on 2016/10/18 at 1300 by MC

Containers: received 4 x 1 L bottle at 13 °C, in good condition
with no seals and no initials

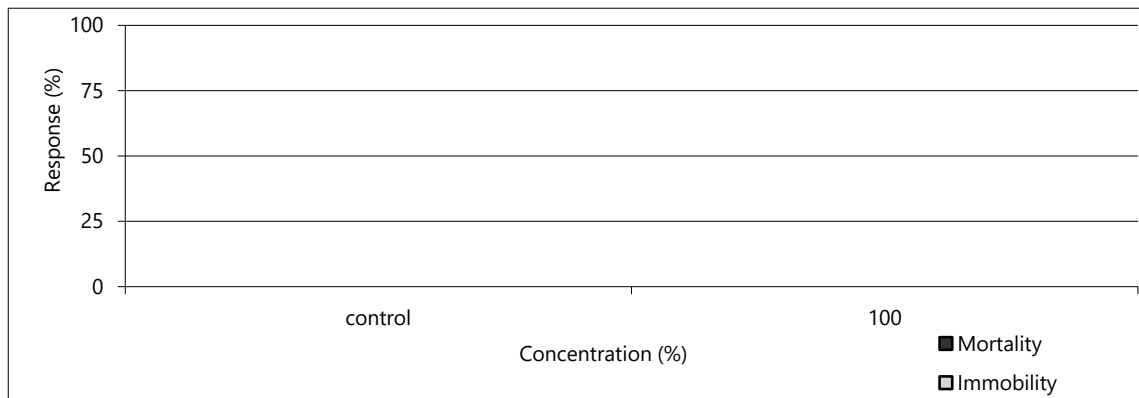
Description: type: water, collection method: grab

Test: started on 2016/10/18 ; ended on 2016/10/20

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control	lab control	0	0	
100	WL_BFWB_OUT_SP21_20161017_N	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0266-DAS
--

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 11 days to first brood
16 neonates per average brood

Sample initial chemistry: pH: 7.6; EC: 1809 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 10.2 (mg/L); temperature: 16 °C
hardness (mg CaCO_3/L): 944; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 80 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 20 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0266-DAS
--

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated October 13, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.65 (0.60-0.69) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.73 (0.63-0.82) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0266-DAS

Test Log:

Date	Day	Time	Technician
2016/10/18	0	1415	JW/LC
2016/10/19	1	0850	JW/LC
2016/10/20	2	1125	LC

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.7	7.7	7.7	7.8	7.8	7.8
2	7.7	7.9	7.9	7.9	8.0	8.0

Day	Conductivity (µS/cm @ 25°C)					
0	319	325	326	1835	1854	1852
2	297	309	310	1622	1654	1669

Day	Dissolved Oxygen (mg/L)					
0	8.1	8.1	8.1	8.2	8.2	8.2
2	7.7	7.8	7.9	7.9	8.0	8.0

Day	Temperature (°C)					
0	19	19	19	18	18	18
2	20	20	20	20	19	19

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10(1F)	10	10	10	10
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0

Comments/Statistics

Client: TEC164 Reference: 1617-0266-DAS
--

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: TEC164
Reference: 1617-0266-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20161017_N

Collection: collected on 2016/10/17 at 0900 by TW

Receipt: received on 2016/10/18 at 1300 by MC

Containers: received 4 x 1 L bottle at 13 °C, in good condition
with no seals and no initials

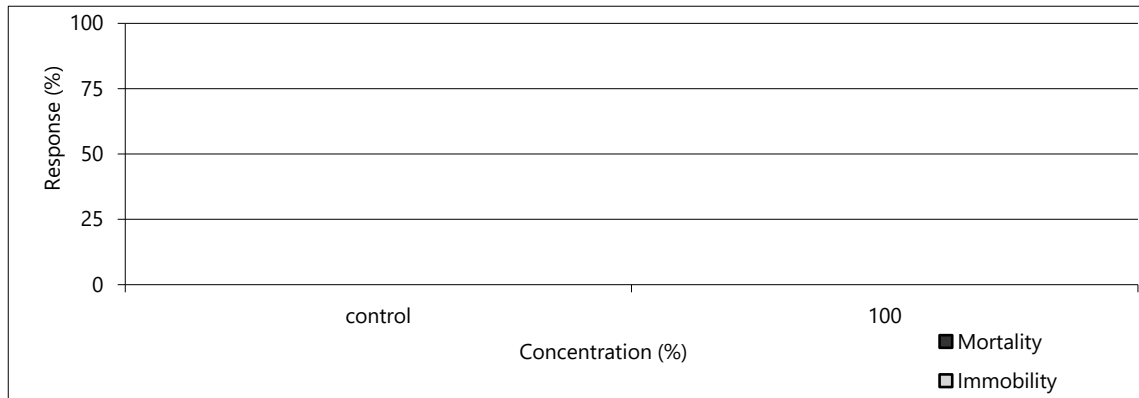
Description: type: water, collection method: grab

Test: started on 2016/10/18 ; ended on 2016/10/20

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control 100	lab control WL_BFWB_OUT_SP21 _20161017_N	0 0	0 0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0266-DAS
--

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 11 days to first brood
16 neonates per average brood

Sample initial chemistry: pH: 7.6; EC: 1809 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 10.2 (mg/L); temperature: 16 °C
hardness (mg CaCO_3/L): 944; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 80 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 10 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0266-DAS
--

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated October 13, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.65 (0.60-0.69) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.73 (0.63-0.82) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0266-DAS

Test Log:

Date	Day	Time	Technician
2016/10/18	0	1415	JW/LC
2016/10/19	1	0850	JW
2016/10/20	2	1120	LC

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.6	7.7	7.7	7.5	7.5	7.5
2	7.6	7.7	7.6	8.0	8.0	8.0

Day	Conductivity (µS/cm @ 25°C)					
0	315	326	327	1874	1857	1875
2	305	312	315	1729	1743	1749

Day	Dissolved Oxygen (mg/L)					
0	9.2	9.2	9.2	9.5	9.5	9.5
2	9.2	9.2	9.3	9.2	9.3	9.4

Day	Temperature (°C)					
0	12	12	12	11	11	11
2	12	12	12	12	12	12

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0

Comments/Statistics

Client: TEC164 Reference: 1617-0266-DAS
--

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

The test was ran at $10 \pm 2^{\circ}\text{C}$, as per the client's request.

Your P.O. #: 441369
Your C.O.C. #: 20161024-AcuteToxici

Attention:Chris Stroich

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/11/08
Report #: R2296989
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B694467

Received: 2016/10/25, 09:33

Sample Matrix: SURFACE WATER
Samples Received: 2

Analyses	Date		Laboratory Method	Analytical Method
	Quantity	Extracted		
Daphnia magna Single Concentration-100%	2	N/A	2016/10/25 EENVSOP-00154	EPS 1 RM14 2nd ed
Technician Time - Customer Service	2	N/A	2016/10/25	

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods. Results relate to samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your P.O. #: 441369
Your C.O.C. #: 20161024-AcuteToxici

Attention:Chris Stroich

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/11/08
Report #: R2296989
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B694467
Received: 2016/10/25, 09:33

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====
This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B694467
Report Date: 2016/11/08

TECK COAL LIMITED
Your P.O. #: 441369
Sampler Initials: KC

RESULTS OF CHEMICAL ANALYSES OF SURFACE WATER

Maxxam ID		PV9369	PV9370		
Sampling Date		2016/10/24 08:00	2016/10/24 09:01		
COC Number		20161024-AcuteToxici	20161024-AcuteToxici		
	UNITS	LC_WTF_IN_20161024_NP	WL_BFWB_OUT_SP21_20161024_N	RDL	QC Batch
Industrial - Calculated					
Hours of Labour	hr	1.0	1.0	0.01	ONSITE
Daphnia Magna Bioassay					
Mortality	%	ATTACHED	ATTACHED	N/A	8446806
RDL = Reportable Detection Limit N/A = Not Applicable					

Maxxam Job #: B694467
Report Date: 2016/11/08

TECK COAL LIMITED
Your P.O. #: 441369
Sampler Initials: KC

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.0°C
-----------	-------

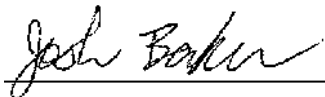
Results relate only to the items tested.

Maxxam Job #: B694467
Report Date: 2016/11/08

TECK COAL LIMITED
Your P.O. #: 441369
Sampler Initials: KC

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Joshua Baker, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number : -

Job Number: B694467
Sample Number: PV9370-01

Test Result:

48 hrs Mortality % 0 Statistical Method:

Mean percent mortality:	<u>Sample</u>	0	<u>Control</u>	0	
Sample Name :	WL_BFWB_OUT_SP21_20161024_N		Sample Matrix :	SURFACE WATER	
Description:	clear		<u>Sample Prior to Analysis:</u>		
Sample Collected:	Oct 24, 2016 09:01 AM	Sampling Method :	Grab	pH:	7.5
Sample Collected By:	KC	Site Collection:	N/A	Temperature :	11 °C
Sample Received:	Oct 25, 2016 09:33 AM	Volume Received:	1 L	Dissolved Oxygen:	10.8 mg/L
Analysis Start :	Oct 25, 2016 02:06 PM	Temp.Upon Arrival:	3 °C	Sample Conductance:	1319 µS/cm
End :	Oct 27, 2016 01:12 PM	Storage:	2-6°C	Hardness:	1000 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	20	8.0	368	7.9	0	0	0	0	20	7.8	373	7.7
0	20	8.0	370	7.9	0	0	0	0	20	7.9	371	7.8
0	20	7.9	370	7.8	0	0	0	0	20	7.9	372	7.7
100	21	7.6	1662	8.8	0	0	0	0	20	7.9	1568	7.7
100	21	7.6	1673	8.8	0	0	0	0	20	7.9	1592	7.5
100	21	7.6	1671	8.8	0	0	0	0	20	7.9	1579	7.6

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	0	0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 180 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
 Organisms per Vessel : 10 Pre-aeration Time : 30 min Rate of Pre-aeration : 25-50 mL/min/L
 Total # of Organisms Used : 60 Test Temperature : 20 ± 2 °C Test Hardness Adjusted : No
 Test Volume : 150 mL Vessel Volume : 225 mL Test pH Adjusted: No
 Loading Density : 15.0 mL/Daphnia Photoperiod : 16:8 (light: dark)

Test Organism : *Daphnia magna* Source : In House Culture
 Age at Test Initiation : <24 hrs Average Brood Size : 24.8
 Culture Photoperiod : 16:8 (light: dark) % Mortality within 7 days : 0
 Culture Temperature : 20 ± 2 °C Time To First Brood : 8 Days
 Culture Diet Pseudokirchnriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: -

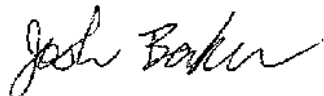
Job Number: B694467
Sample Number: PV9370-01

Reference chemical: Sodium Chloride
Test Endpoint 48 hrs LC50 (95% confidence interval) : 7.07 (N/A, 10.0)g/L
Historical Mean LC50 (warning limits) : 6.59 (5.17, 8.40) g/L
Test Date: Oct 25, 2016
Statistical Method : Binomial
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Arthur Juan Mathias, Chelsea Tessier, Natasha Mouck



Verified By : Joshua Baker, Senior Analyst

Date: Nov 08, 2016 11:13 AM



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/10/25
Report Date: 2016/11/07
Version: FINAL

Test Report

Client: TEC164
Reference: 1617-0306
Billing: PO#: 430571

A handwritten signature in cursive script that reads 'Jacquelyn Rose'.

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

Result Summary

Client: TEC164
Reference: 1617-0306-TRS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_2016024_N

Collection: collected on 2016/10/24 at 0900 by not given

Receipt: received on 2016/10/25 at 1100 by MC

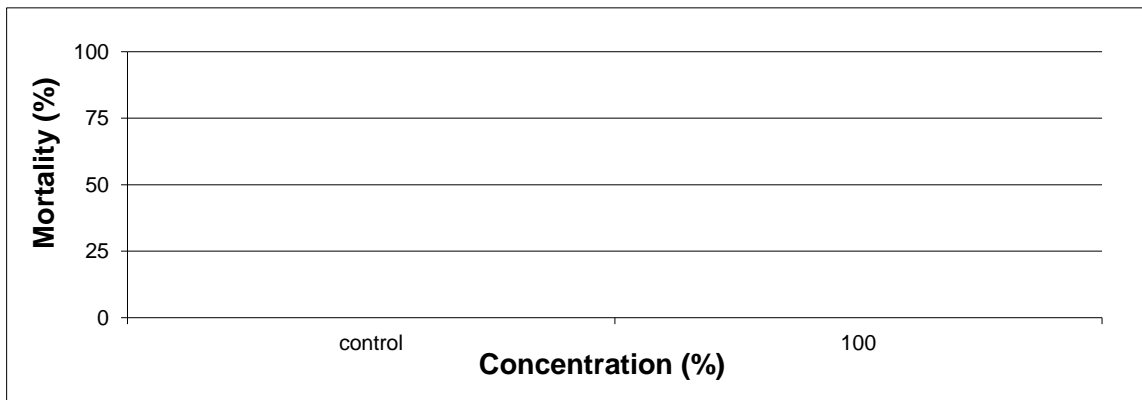
Containers: received 4 x 20 L carboy / 4 x 1 L bottles at 11 °C, in good condition with no seals and no initials

Description: type: water, collection method: grab

Test: started on 2016/10/26 ; ended on 2016/10/30

Result:

Sample	Client Code	Mortality (%)	Comment
control 100%	lab control WL_BFWB_OUT_SP21_2 016024_N	0 0	none



The test data and results are authorized and verified correct.

Jacklyn Rose

Senior Verifier

Test Conditions

Client: TEC164
Reference: 1617-0306-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (2000; amended May 2007 and February 2016).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20161012TR)

Acclimation: 14 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.7; EC: 1724 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.1 (mg/L); temperature: 18 °C
hardness (mg CaCO₃/L): 1056; colour: colourless; salinity (ppt): 1

Sample holding time: 2 days (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 8.7 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.28 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated October 26, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.50 (0.42-0.56) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.51 (0.36-0.66) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume

Test Data

Client: TEC164
Reference: 1617-0306-TRS

Test Log:

Date	Day	Time	Technician
2016/10/26	0	1245	ML
2016/10/27	1	0815	EP
2016/10/28	2	0830	ML
2016/10/29	3	0940	ML
2016/10/30	4	0910	JN/JW

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

pH (units)

0	7.7	7.9
4	8.1	8.0

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	448	1722
4	451	1696

Dissolved Oxygen (mg/L)

0	8.7	8.7
4	8.8	8.8

Temperature (°C)

0	15	15
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	10

Mortality (%)

4	0	0
---	---	---

Stressed (%)

4	0	0
---	---	---

Client: TEC164
Reference: 1617-0306-TRS

Test Data

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	3.0	0.3
2	3.0	3.0
3	2.9	0.2
4	2.9	0.3
5	3.0	0.3
6	3.1	0.4
7	3.0	0.3
8	3.0	0.3
9	2.8	0.2
10	3.0	0.3

Sample	Group Wet Weight (g)
control	5.6

average	3.0	0.6
sd	0.1	0.9
cv(%)	2.8	153.4

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: TEC164
Reference: 1617-0306-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_2016024_N

Collection: collected on 2016/10/24 at 0900 by not given

Receipt: received on 2016/10/25 at 1100 by MC

Containers: received 4 x 20 L carboy / 4 x 1 L bottles at 11 °C, in good condition with no seals and no initials

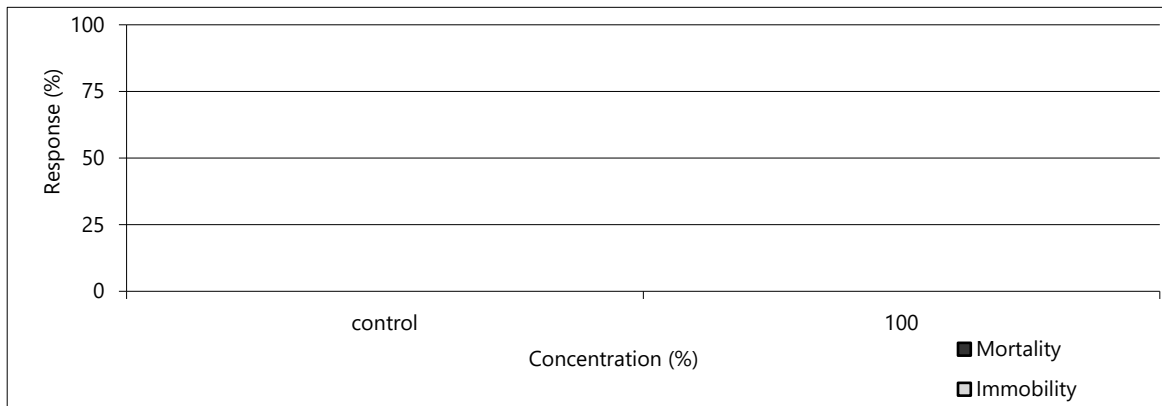
Description: type: water, collection method: grab

Test: started on 2016/10/25 ; ended on 2016/10/27

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control 100	lab control WL_BFWB_OUT_SP21 _2016024_N	0 0	0 0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Jaclyn Poole

Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0306-DAS
--

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 7%

Culture brood data: 11 days to first brood
15 neonates per average brood

Sample initial chemistry: pH: 7.7; EC: 1724 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.1 (mg/L); temperature: 18 °C
hardness (mg CaCO₃/L): 1056; colour: colourless; salinity (ppt): 1

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 87 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 20 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0306-DAS
--

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated October 24, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.65 (0.60-0.69) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.72 (0.63-0.81) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0306-DAS

Test Log:

Date	Day	Time	Technician
2016/10/25	0	1400	JW/EP
2016/10/26	1	0900	JW
2016/10/27	2	0800	HS

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.8	7.8	7.8	7.6	7.6	7.6
2	7.7	7.7	7.7	7.9	7.9	7.9

Day	Conductivity (µS/cm @ 25°C)					
0	286	296	299	1700	1723	1747
2	340	341	332	1740	1749	1817

Day	Dissolved Oxygen (mg/L)					
0	8.0	8.0	8.0	8.0	8.1	8.1
2	8.0	8.0	8.0	7.9	8.0	7.9

Day	Temperature (°C)					
0	19	20	20	19	19	19
2	19	19	19	19	19	19

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10 (1B)
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0

Comments/Statistics

Client: TEC164 Reference: 1617-0306-DAS
--

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: TEC164
Reference: 1617-0306-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_2016024_N

Collection: collected on 2016/10/24 at 0900 by not given

Receipt: received on 2016/10/25 at 1100 by MC

Containers: received 4 x 20 L carboy / 4 x 1 L bottles at 11 °C, in good condition with no seals and no initials

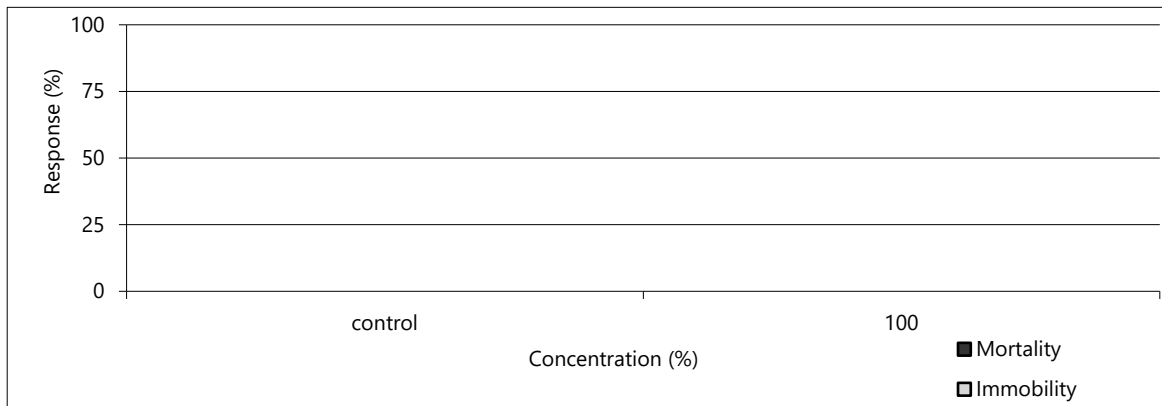
Description: type: water, collection method: grab

Test: started on 2016/10/25 ; ended on 2016/10/27

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control 100	lab control WL_BFWB_OUT_SP21 _2016024_N	0 0	0 0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Jacklyn Poole

Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0306-DAS
--

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 14%

Culture brood data: 11 days to first brood
15 neonates per average brood

Sample initial chemistry: pH: 7.7; EC: 1724 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.1 (mg/L); temperature: 18 °C
hardness (mg CaCO₃/L): 1056; colour: colourless; salinity (ppt): 1

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 87 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 10 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0306-DAS
--

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated October 24, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.65 (0.60-0.69) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.72 (0.63-0.81) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0306-DAS

Test Log:

Date	Day	Time	Technician
2016/10/25	0	1400	EP/JW
2016/10/26	1	0900	JW
2016/10/27	2	0800	HS

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.9	7.9	7.9	7.6	7.6	7.6
2	7.7	7.7	7.7	8.0	8.0	8.0

Day	Conductivity (µS/cm @ 25°C)					
0	289	298	298	1645	1699	1715
2	324	329	323	1726	1806	1827

Day	Dissolved Oxygen (mg/L)					
0	9.0	8.9	9.1	9.2	9.3	9.3
2	9.4	9.4	9.5	9.5	9.5	9.5

Day	Temperature (°C)					
0	11	11	11	12	12	12
2	11	11	11	11	11	11

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10 (1B)	10
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0

Comments/Statistics

Client: TEC164 Reference: 1617-0306-DAS
--

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:The test temperature was $10 \pm 2^{\circ}\text{C}$, as per the client's request

Your P.O. #: 441369
Your C.O.C. #: 20161031-AcuteToxici

Attention:Chris Stroich

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/11/09
Report #: R2297805
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B697101

Received: 2016/11/01, 09:27

Sample Matrix: Water
Samples Received: 2

Analyses	Date		Laboratory Method	Analytical Method
	Quantity	Extracted		
Daphnia magna Single Concentration-100%	2	N/A	2016/11/03 EENVSOP-00154	EPS 1 RM14 2nd ed
Technician Time - Customer Service	2	N/A	2016/11/03	

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods. Results relate to samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your P.O. #: 441369
Your C.O.C. #: 20161031-AcuteToxici

Attention:Chris Stroich

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/11/09
Report #: R2297805
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B697101
Received: 2016/11/01, 09:27

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====

This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B697101
Report Date: 2016/11/09

TECK COAL LIMITED
Your P.O. #: 441369
Sampler Initials: JT

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		PX6360	PX6361		
Sampling Date		2016/10/31 08:00	2016/10/31 09:00		
COC Number		20161031-AcuteToxici	20161031-AcuteToxici		
	UNITS	LC_WTF_IN_20161031_NP	WL_BFWB_OUT_SP21_20161031_N	RDL	QC Batch
Industrial - Calculated					
Hours of Labour	hr	1.0	1.0	0.01	ONSITE
Daphnia Magna Bioassay					
Mortality	%	ATTACHED	ATTACHED	N/A	8458313
RDL = Reportable Detection Limit N/A = Not Applicable					

Maxxam Job #: B697101
Report Date: 2016/11/09

TECK COAL LIMITED
Your P.O. #: 441369
Sampler Initials: JT

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.3°C
-----------	-------

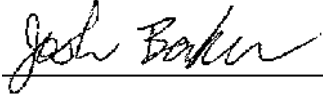
Results relate only to the items tested.

Maxxam Job #: B697101
Report Date: 2016/11/09

TECK COAL LIMITED
Your P.O. #: 441369
Sampler Initials: JT

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Joshua Baker, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood

Job Number: B697101

Client Project Name & Number: -

Sample Number: PX6361-01

Test Result:

48 hrs Mortality % 0 Statistical Method:

Mean percent mortality: Sample 0 Control 0

Sample Name : WL_BFWB_OUT_SP21_20161031_N

Sample Matrix : Water

Description: clear

Sample Prior to Analysis:

Sample Collected: Oct 31, 2016 09:00 AM

Sampling Method : Grab

pH: 7.5

Sample Collected By: JT

Site Collection: N/A

Temperature : 8 °C

Sample Received: Nov 01, 2016 09:27 AM

Volume Received: 1 L

Dissolved Oxygen: 9.9 mg/L

Analysis Start : Nov 03, 2016 10:04 AM

Temp.Upon Arrival: 5 °C

Sample Conductance: 1247 µS/cm

End : Nov 05, 2016 10:03 AM

Storage: 2-6°C

Hardness: 800 mg CaCO₃/L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	20	7.9	406	7.7	0	0	0	0	19	8.0	407	7.7
0	20	7.9	408	7.7	0	0	0	0	20	8.0	408	7.6
0	20	8.0	408	7.7	0	0	0	0	19	8.0	414	7.7
100	20	7.6	1673	8.2	0	0	0	0	19	7.8	1593	7.5
100	20	7.6	1682	8.3	0	0	0	0	20	7.9	1575	7.5
100	20	7.7	1681	8.3	0	0	0	0	20	7.9	1573	7.5

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	0	0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water

Hardness: 180 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)

Organisms per Vessel : 10 **Pre-aeration Time :** 30 min **Rate of Pre-aeration :** 25-50 mL/min/L

Total # of Organisms Used : 60 **Test Temperature :** 20 ± 2 °C **Test Hardness Adjusted :** No

Test Volume : 150 mL **Vessel Volume :** 225 mL **Test pH Adjusted:** No

Loading Density : 15.0 mL/Daphnia **Photoperiod :** 16:8 (light: dark)

Test Organism : *Daphnia magna* **Source :** In House Culture

Age at Test Initiation : <24 hrs **Average Brood Size :** 24.4

Culture Photoperiod : 16:8 (light: dark) **% Mortality within 7 days :** 1.6

Culture Temperature : 20 ± 2 °C **Time To First Brood :** 8 Days

Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number : -

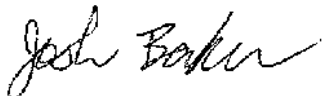
Job Number: B697101
Sample Number: PX6361-01

Reference chemical: Sodium Chloride
Test Endpoint 48 hrs LC50 (95% confidence interval) : 7.07 (N/A, 10.0)g/L
Historical Mean LC50 (warning limits) : 6.59 (5.17, 8.40) g/L
Test Date: Oct 25, 2016
Statistical Method : Binomial
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Aynura Rakhmangulova, Chelsea Tessier, Natasha Mouck



Verified By : Joshua Baker, Senior Analyst

Date: Nov 09, 2016 12:00 PM

ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/11/01
Report Date: 2016/11/17
Version: FINAL

Test Report

Client: TEC164
Reference: 1617-0346
Billing: -



Senior Verifier

November 17, 2016

Memo: Sublet of Rainbow Trout Testing for 1617-0345; 1617-0346

<i>To</i>	Thomas Davidson	<i>From</i>	Claudio Quinteros
<i>Affiliation</i>	Teck Coal Ltd. WLC AWTF	<i>Tel</i>	403 253 7121
<i>e-mail</i>	thomas.davidson@teck.com	<i>e-mail</i>	claudio@nautilusenvironmental.ca

Toxicity samples were collected October 31, 2016 and given the names LC_WTF_IN_20161031_NP and WL_BFWB_OUT_SP21_20161031_N. The samples were then submitted to Nautilus Environmental (Calgary) for analysis and was assigned the laboratory reference 1617-0345 and 1617-0346 respectively. The required tests included rainbow trout testing.

Due to testing capacity, the rainbow trout test was subcontracted to an alternate CALA-Accredited laboratory, Pollutech EnviroQuatics Limited (Pollutech).

Detailed results from Pollutech have been provided here for your consideration. I have verified that these results meet all necessary method requirements.

Please let me know if you have any questions or if you require any additional information.

Thank you,



Laboratory Supervisor



November 15, 2016

Jacklyn Poole,
Nautilus Environmental Company Inc,
#4, 6125 12th Street SE,
Calgary, AB T2H 2K1

Dear Jacklyn:

On November 4, 2016, Pollutech EnviroQuatics Limited personnel received a water sample from Nautilus Environmental Company Inc. Calgary, AB. The following toxicity test was performed on this sample observing Environment Canada methods:

- Rainbow trout 96-hour single-concentration toxicity test according to the criteria outlined in the "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout", Second Edition, Method Development and Applications Centre, Ottawa, ON., Report EPS 1/RM/13, 2000 (with May 2007 and February 2016 amendments).

The result for the rainbow trout toxicity test is summarized as follows.

Sample Name & Sample #	Date Collected	Rainbow Trout (Percent Mortality) ^{1,2}
1617-0346 1510-0011603	10/31/16	0% Mortality

1 - Results relate only to the sample tested.

2 - Most regulations regard $\leq 50\%$ mortality to be a "pass". Check your applicable regulatory requirements.

The following pages contain the required details for reporting of the acute lethality toxicity test. If there are any further details which you require, please do not hesitate to contact us.

Sincerely,

Pollutech EnviroQuatics Limited

R. Clay Ferguson, B.Sc. (Hon.)
Laboratory Manager

File ID:\bioassay\2016\1000\1510-001\1510-001oc2 T

bringing clarity to your environment

704 Mara Street, Suite 122, Point Edward, Ontario, Canada N7V 1X4 • T: 519.339.8787 • F: 519.336.6965
Email: info@pollutechgroup.com • www.pollutechgroup.com

Rainbow Trout 96-Hour Single-Concentration Toxicity Test

METHOD: Environment Canada, "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout", Second Edition, Method Development and Applications Section, Ottawa, ON. Report EPS 1/RM/13, 2000 (with May 2007 and February 2016 amendments). Pollutech Test Method RT-SC-R1.4.

Test Material

Client Name/Location: Nautilus Environmental Company Inc. Calgary, AB

Sample #: 1510-0011603 **Sample Name:** 1617-0346

Sample Method: Grab **Collected by:** N/A

Date/Time Collected: October 31, 2016; N/A **Arrival Temp.:** 14.7°C

Date/Time Received: November 4, 2016; 11:45 **Sample Description:** Clear, colourless

Sample Point Description: Other **Sample Type:** N/A

Transportation: Road/Air

Storage: None

N/A – not available

Test Organisms

Species: Rainbow Trout (*Oncorhynchus mykiss*)

Source: Rainbow Springs Hatchery

Culture Temp.: 15 ± 2°C **Batch Number:** RS092116-2

Water Source: Dechlorinated municipal drinking water

Mean Weight: 0.76 g **Min:** 0.46 g **Max:** 1.42 g

Mean Fork Length: 43.7 mm **Min:** 34 mm **Max:** 54 mm

Loading Density: 0.38 g/L **Sample Size:** 10 fish

Life Stage: Fry

Number Dead Daily In Previous 7 Days For Fish Culture: 0+0+0+0+0+0+0=0

Previous 7-Day Holding Mortalities For Fish Culture: 0%

Rainbow Trout 96-Hour Single-Concentration Toxicity Test - Continued

Sample Number: 1510-0011603

Sample Name: 1617-0346

Test Conditions

Date/Time Started:	November 4, 2016; 16:30		
Test Volume:	20 L/Vessel	Number of Fish Per Vessel:	10
# of Vessels Per Conc.:	1	Test Temperature:	15 ± 1°C
Pre-aeration:	Yes	Duration of Pre-aeration:	30 minutes
Pre-aeration Rate:	6.5 ± 0.26 ml/min·L ⁻¹	Aeration Rate During Test:	6.5 ± 0.26 ml/min·L ⁻¹
Sample Adjustment:	No	Sample pH Adjustment:	No
Test Method Deviations:	None		

Test Facilities



CALA
Testing
Accreditation No. A1225

Testing Laboratory:

Pollutech EnviroQuatics Limited, 704 Mara St., Suite 122, Point Edward, Ontario, N7V 1X4

This laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). The test included in this report is within the scope of this laboratory.

Test Performed By:

J. Marcoux / E. Pasiak / F. Kirkey / R. Giacomini / R. C. Ferguson / K. Ferguson

Initial Measurement of Variables in Unadjusted Sample

Cond: 1375 µmhos **DO:** 9.7 mg/L **pH:** 8.3 **Temp:** 15.1 °C

Test Results

NUMBER OF MORTALITIES

Conc'n (% Volume)	Rep. No.	Time (hours)			
		24	48	72	96
Control	1	0	0	0	0
100%	1	0	0	0	0

Number of Control Fish Showing Atypical/Stressed Behaviour: 0

Rainbow Trout 96-Hour Single-Concentration Toxicity Test - Continued

Sample Number: 1510-0011603

Sample Name: 1617-0346

Test Results

TOXICITY TEST VARIABLES

Conc'n	Rep. No.	Variables	Time (hours)				
			0	24	48	72	96
Control	1	Cond. (μ mhos)	202				n/r
		DO (mg/L)	10.2				9.2
		pH (units)	7.9				8.0
		Temp. ($^{\circ}$ C)	14.5				15.0
100%	1	Cond. (μ mhos)	1,382				n/r
		DO (mg/L)	9.9				9.6
		pH (units)	8.2				8.5
		Temp. ($^{\circ}$ C)	14.7				14.5

n/r = not required

Summary of Test Results

Mean Mortality Rate: 0%¹ **Test Results Verified By:** R. C. Ferguson

¹ - Most regulations regard \leq 50% mortality to be a "pass". Check your applicable regulatory requirements.

Reference Toxicant Results

Reference Chemical: Zinc **Date Test Initiated:** 10/13/16

Fish Lot #: RS092116 **Method:** Trimmed Spearman-Kärber ($\alpha = 10\%$)

96-Hour LC50 (95% Confidence Limits): 0.32 mg/L (0.24 mg/L; 0.42 mg/L)

95% Historic Geometric Mean LC50: 0.32 mg/L (0.19 mg/L; 0.55 mg/L)
(Historic Warning Limits) (\pm 2 Standard Deviations)

Result Summary

Client: TEC164
Reference: 1617-0346-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20161031_N

Collection: collected on 2016/10/31 at 0800 by not given

Receipt: received on 2016/11/01 at 1000 by MC

Containers: received 1 x 20 L carboy / 2 x 1 L bottles at 13 °C, in good condition with no seals and no initials

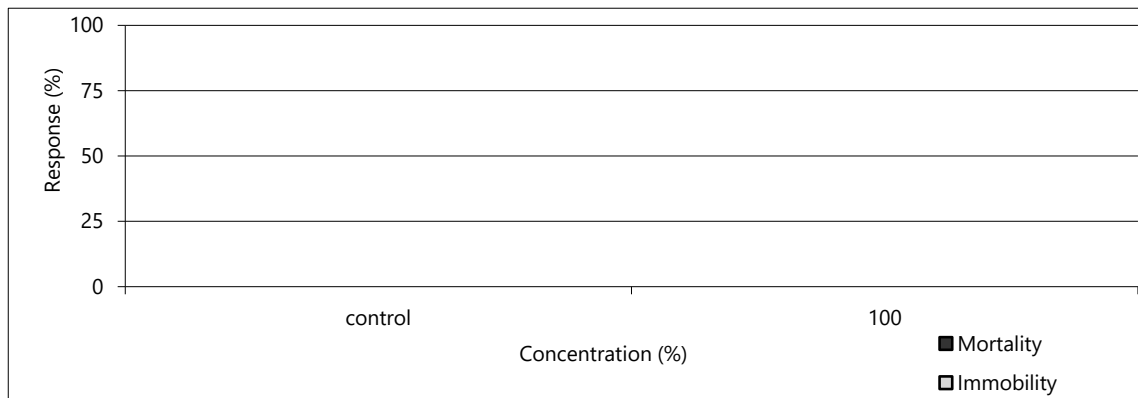
Description: type: water, collection method: grab

Test: started on 2016/11/01 ; ended on 2016/11/03

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control 100	lab control WL_BFWB_OUT_SP21 _20161031_N	0 0	0 0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0346-DAS
--

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 10 days to first brood
16 neonates per average brood

Sample initial chemistry: pH: 7.8; EC: 2470 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.6 (mg/L); temperature: 17 °C
hardness (mg CaCO_3/L): 765; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 86 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 10 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0346-DAS
--

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated October 24, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.65 (0.60-0.69) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.72 (0.63-0.81) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0346-DAS

Test Log:

Date	Day	Time	Technician
2016/11/01	0	1520	HS
2016/11/02	1	1100	HS
2016/11/03	2	0945	EP

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.8	7.8	7.9	7.9	7.9	7.9
2	7.8	7.8	7.8	7.8	7.8	7.8

Day	Conductivity (µS/cm @ 25°C)					
0	340	340	351	1780	1820	1800
2	309	310	315	1665	1670	1679

Day	Dissolved Oxygen (mg/L)					
0	9.5	9.5	9.5	9.6	9.6	9.6
2	8.5	8.5	8.4	8.5	8.5	8.6

Day	Temperature (°C)					
0	11	11	11	11	11	11
2	12	12	12	12	12	12

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0

Comments/Statistics

Client: TEC164 Reference: 1617-0346-DAS
--

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

The test was performed at $10 \pm 2^{\circ}\text{C}$ as per the client's request.

Result Summary

Client: TEC164
Reference: 1617-0346-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20161031_N

Collection: collected on 2016/10/31 at 0800 by not given

Receipt: received on 2016/11/01 at 1000 by MC

Containers: received 1 x 20 L carboy / 2 x 1 L bottles at 13 °C, in good condition with no seals and no initials

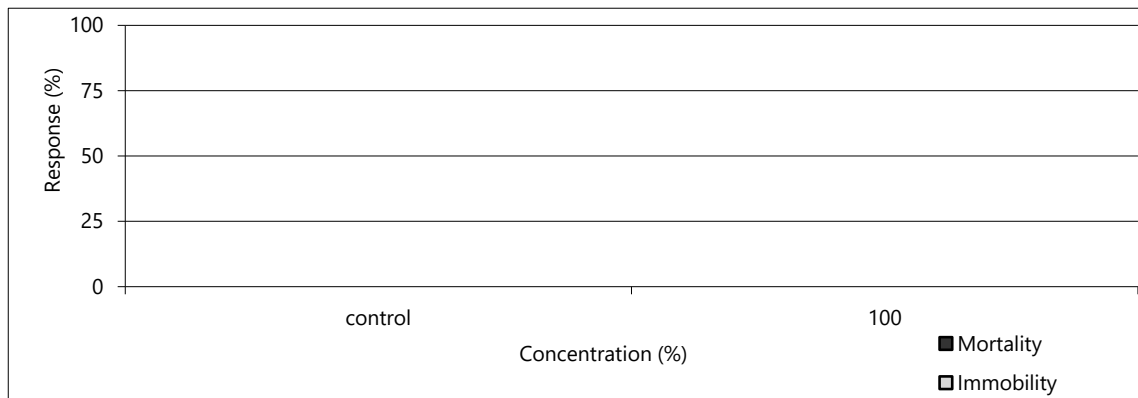
Description: type: water, collection method: grab

Test: started on 2016/11/01 ; ended on 2016/11/03

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control 100	lab control WL_BFWB_OUT_SP21 _20161031_N	0 0	0 0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0346-DAS
--

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 10 days to first brood
17 neonates per average brood

Sample initial chemistry: pH: 7.8; EC: 2470 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.6 (mg/L); temperature: 17 °C
hardness (mg CaCO_3/L): 765; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 86 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 20 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0346-DAS
--

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated October 24, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.65 (0.60-0.69) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.72 (0.63-0.81) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0346-DAS

Test Log:

Date	Day	Time	Technician
2016/11/01	0	1500	HS
2016/11/02	1	1100	HS
2016/11/03	2	0930	EP

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.8	7.8	7.8	8.0	8.0	8.0
2	7.8	7.8	7.8	7.8	8.0	8.0

Day	Conductivity (µS/cm @ 25°C)					
0	330	324	331	1769	1794	1798
2	301	310	316	1645	1658	1659

Day	Dissolved Oxygen (mg/L)					
0	8.0	8.0	8.0	8.4	8.4	8.5
2	7.9	8.0	8.0	8.1	8.1	8.1

Day	Temperature (°C)					
0	19	19	19	18	18	18
2	20	19	19	19	19	19

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0

Comments/Statistics

Client: TEC164 Reference: 1617-0346-DAS
--

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Your P.O. #: 441369
Your C.O.C. #: 20161107-ACUTETOXICI

Attention: Thomas Davidson

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/11/22
Report #: R2304911
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B699770

Received: 2016/11/08, 09:08

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Daphnia magna Single Concentration-100%	2	N/A	2016/11/09	EENVSOP-00154	EPS 1 RM14 2nd ed
Technician Time - Customer Service	2	N/A	2016/11/09		

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods. Results relate to samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your P.O. #: 441369
Your C.O.C. #: 20161107-ACUTETOXICI

Attention:Thomas Davidson

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/11/22
Report #: R2304911
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B699770
Received: 2016/11/08, 09:08

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====
This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B699770
Report Date: 2016/11/22

TECK COAL LIMITED
Your P.O. #: 441369

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		PZ2840	PZ2841		
Sampling Date		2016/11/07 08:00	2016/11/07 09:00		
COC Number		20161107-ACUTETOXICI	20161107-ACUTETOXI		
	UNITS	LC_WTF_IN_20161107_NP	WL_BFWB_OUT_SP21_20161107_N	RDL	QC Batch
Industrial - Calculated					
Hours of Labour	hr	1.0	1.0	0.01	ONSITE
Daphnia Magna Bioassay					
Mortality	%	ATTACHED	ATTACHED	N/A	8465865
RDL = Reportable Detection Limit N/A = Not Applicable					

Maxxam Job #: B699770
Report Date: 2016/11/22

TECK COAL LIMITED
Your P.O. #: 441369

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	6.7°C
-----------	-------

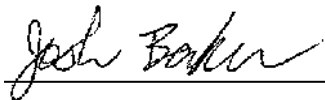
Results relate only to the items tested.

Maxxam Job #: B699770
Report Date: 2016/11/22

TECK COAL LIMITED
Your P.O. #: 441369

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Joshua Baker, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number : -

Job Number: B699770
Sample Number: PZ2841-01

Test Result:

48 hrs Mortality % 0% Statistical Method:

Mean percent mortality:	<u>Sample</u>	0	<u>Control</u>	0
Sample Name :	WL_BFWB_OUT_SP21_20161107_N			Sample Matrix : Water
Description:	Clear			<u>Sample Prior to Analysis:</u>
Sample Collected:	Nov 07, 2016 09:00 AM	Sampling Method :	N/A	pH: 7.8
Sample Collected By:	N/A	Site Collection:	N/A	Temperature : 18 °C
Sample Received:	Nov 08, 2016 09:08 AM	Volume Received:	1 L	Dissolved Oxygen: 10.1 mg/L
Analysis Start :	Nov 09, 2016 10:41 AM	Temp.Upon Arrival:	7 °C	Sample Conductance: 1645 µS/cm
End :	Nov 11, 2016 10:22 AM	Storage:	2-6°C	Hardness: 1200 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	21	8.3	404	8.2	0	0	0	0	19	7.9	439	7.9
0	21	8.4	406	8.2	0	0	0	0	20	7.9	414	7.6
0	21	8.5	406	8.2	0	0	0	0	19	8.1	450	8.0
100	19	8.0	1678	9.3	0	0	0	0	20	7.8	1644	7.7
100	19	7.9	1685	9.3	0	0	0	0	19	7.7	1696	7.5
100	19	7.8	1684	9.3	0	0	0	0	20	7.8	1665	7.7

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	1	10.0
100	0	0	0	0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 180 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
 Organisms per Vessel : 10 Pre-aeration Time : 30 min Rate of Pre-aeration : 25-50 mL/min/L
 Total # of Organisms Used : 60 Test Temperature : 20 ± 2 °C Test Hardness Adjusted : No
 Test Volume : 150 mL Vessel Volume : 225 mL Test pH Adjusted: No
 Loading Density : 15.0 mL/Daphnia Photoperiod : 16:8 (light: dark)

Test Organism : *Daphnia magna* Source : In House Culture
 Age at Test Initiation : <24 hrs Average Brood Size : 23.0
 Culture Photoperiod : 16:8 (light: dark) % Mortality within 7 days : 0
 Culture Temperature : 20 ± 2 °C Time To First Brood : 9 Days
 Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number : -

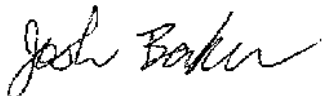
Job Number: B699770
Sample Number: PZ2841-01

Reference chemical: Sodium Chloride
Test Endpoint 48 hrs LC50 (95% confidence interval) : 7.07 (5.00, 10.0)g/L
Historical Mean LC50 (warning limits) : 6.59 (5.17, 8.40) g/L
Test Date: Nov 12, 2016
Statistical Method : Binomial
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Aynura Rakhmangulova, Michelle Hospedales, Natasha Mouck



Verified By : Joshua Baker, Senior Analyst

Date: Nov 22, 2016 03:42 PM



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/11/08
Report Date: 2016/11/25
Version: FINAL

Test Report

Client: TEC164
Reference: 1617-0391
Billing: PO#: 430571

A handwritten signature in black ink that reads "Jacklyn Poole". The signature is written in a cursive, flowing style.

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

Result Summary

Client: TEC164
Reference: 1617-0391-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20161107_N

Collection: collected on 2016/11/07 at 0900 by not given

Receipt: received on 2016/11/08 at 1000 by MC

Containers: received 4 x 20 L carboy / 4 x 1 L bottles at 12 °C, in good condition with no seals and no initials

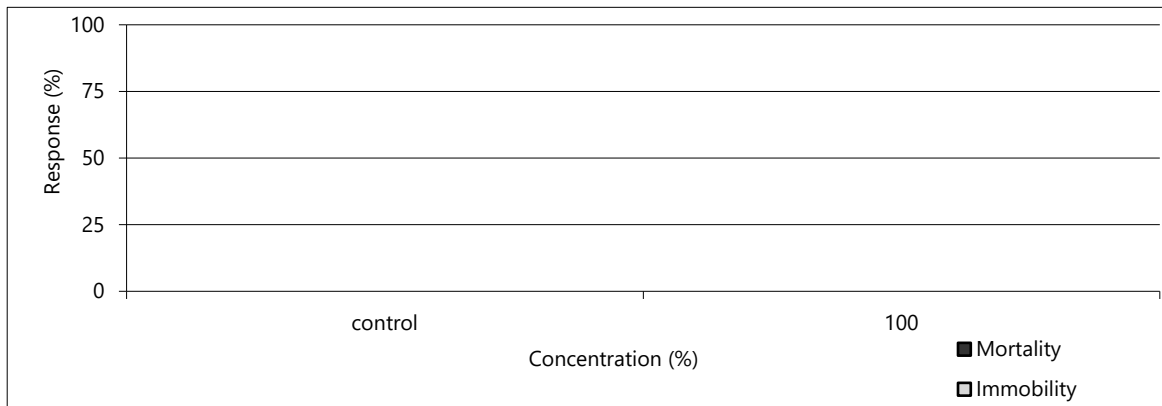
Description: type: water, collection method: grab

Test: started on 2016/11/08 ; ended on 2016/11/10

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control 100	lab control WL_BFWB_OUT_SP21_20161107_N	0	0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Jaclyn Poole

Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0391-DAS
--

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 7%

Culture brood data: 10 days to first brood
24 neonates per average brood

Sample initial chemistry: pH: 7.8; EC: 2550 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.7 (mg/L); temperature: 18 °C
hardness (mg CaCO_3/L): 775; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 85 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0391-DAS
--

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated November 7, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.67 (0.62-0.71) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.71 (0.62-0.81) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0391-DAS

Test Log:

Date	Day	Time	Technician
2016/11/08	0	1420	JW
2016/11/09	1	0930	JW
2016/11/10	2	0845	HS

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.5	7.5	7.5	7.9	7.9	8.0
2	7.6	7.6	7.6	8.0	8.0	8.0

Day	Conductivity (µS/cm @ 25°C)					
0	263	267	270	1731	1774	1765
2	302	306	305	1838	1886	1885

Day	Dissolved Oxygen (mg/L)					
0	8.0	8.0	8.1	8.1	8.1	8.1
2	7.9	7.9	7.9	7.9	7.9	7.9

Day	Temperature (°C)					
0	19	19	19	19	19	19
2	20	20	20	20	20	20

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10 (1F)	10	10	10	10
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0

Comments/Statistics

Client: TEC164 Reference: 1617-0391-DAS
--

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: TEC164
Reference: 1617-0391-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20161107_N

Collection: collected on 2016/11/07 at 0900 by not given

Receipt: received on 2016/11/08 at 1000 by MC

Containers: received 4 x 20 L carboy / 4 x 1 L bottles at 12 °C, in good condition with no seals and no initials

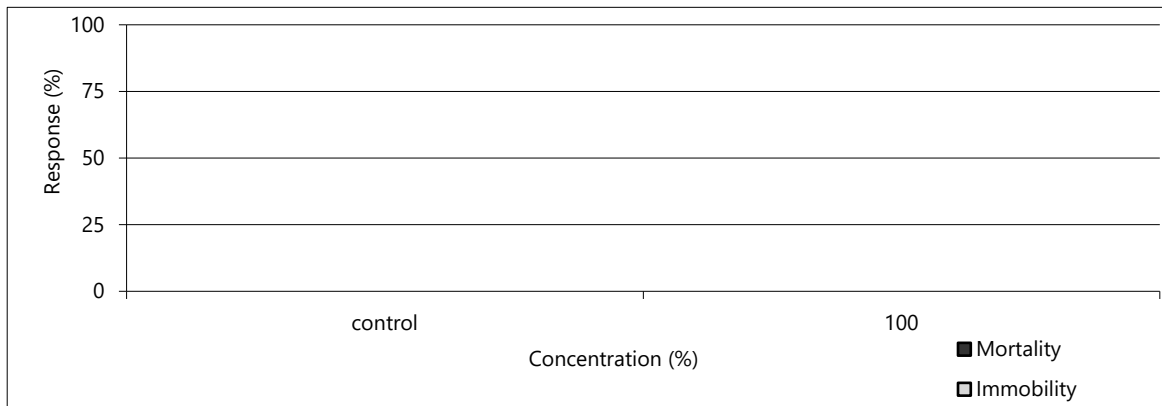
Description: type: water, collection method: grab

Test: started on 2016/11/08 ; ended on 2016/11/10

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control 100	lab control WL_BFWB_OUT_SP21 _20161107_N	0 0	0 0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Jacklyn Poole

Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0391-DAS
--

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 10 days to first brood
24 neonates per average brood

Sample initial chemistry: pH: 7.8; EC: 2550 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.7 (mg/L); temperature: 18 °C
hardness (mg CaCO_3/L): 775; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 85 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $10 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0391-DAS
--

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated November 7, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.67 (0.62-0.71) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.71 (0.62-0.81) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0391-DAS

Test Log:

Date	Day	Time	Technician
2016/11/08	0	1400	JW
2016/11/09	1	0930	JW
2016/11/10	2	0845	HS

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.5	7.5	7.5	7.6	7.6	7.6
2	7.6	7.6	7.5	8.0	8.0	8.1

Day	Conductivity (µS/cm @ 25°C)					
0	266	267	273	1776	1789	1793
2	312	311	316	1908	1986	2090

Day	Dissolved Oxygen (mg/L)					
0	9.4	9.4	9.4	9.6	9.6	9.6
2	9.5	9.5	9.5	9.6	9.6	9.6

Day	Temperature (°C)					
0	11	11	11	11	11	11
2	11	11	11	11	11	11

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0

Comments/Statistics

Client: TEC164 Reference: 1617-0391-DAS
--

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:The test temperature was $10 \pm 2^{\circ}\text{C}$, as per the clients request

November 25, 2016

Memo: Sublet of Rainbow Trout Testing for 1617-0391

<i>To</i>	Thomas Davidson, Chris Stroich	<i>From</i>	Jacklyn Poole
<i>Affiliation</i>	Teck Coal Ltd.	<i>Tel</i>	403 253 7121
<i>e-mail</i>	Thomas.davidson@teck.com ; chris.stroich@teck.com	<i>e-mail</i>	jacklyn@nautilusenvironmental.ca

A toxicity sample was collected November 7, 2016 and given the name WL_BFWB_OUT_SP21_20161107_N. This sample was then submitted to Nautilus Environmental (Calgary) for analysis and was assigned the laboratory reference 1617-0391. The required tests included *Daphnia magna* and rainbow trout testing.

Due to an unhealthy batch of rainbow trout received from a supplier, the rainbow trout test was subcontracted to an alternate CALA-Accredited laboratory, Pollutech Enviroquatics (Pollutech)

Detailed results from Pollutech have been provided here for your consideration. I have verified that these results meet all necessary method requirements.

Please let me know if you have any questions or if you require any additional information.

Thank you,



Laboratory Supervisor



November 23, 2016

Jacklyn Poole,
Nautilus Environmental Company Inc,
#4, 6125 12th Street SE,
Calgary, AB T2H 2K1

Dear Jacklyn:

On November 9, 2016, Pollutech EnviroQuatics Limited personnel received a water sample from Nautilus Environmental Company Inc. Calgary, AB. The following toxicity test was performed on this sample observing Environment Canada methods:

- Rainbow trout 96-hour single-concentration toxicity test according to the criteria outlined in the "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout", Second Edition, Method Development and Applications Centre, Ottawa, ON., Report EPS 1/RM/13, 2000 (with May 2007 and February 2016 amendments).

The result for the rainbow trout toxicity test is summarized as follows.

Sample Name & Sample #	Date Collected	Rainbow Trout (Percent Mortality) ^{1,2}
1617-0391 1510-0011616	11/07/16	0% Mortality

1 - Results relate only to the sample tested.

2 - Most regulations regard $\leq 50\%$ mortality to be a "pass". Check your applicable regulatory requirements.

The following pages contain the required details for reporting of the acute lethality toxicity test. If there are any further details which you require, please do not hesitate to contact us.

Sincerely,
Pollutech EnviroQuatics Limited

R. Clay Ferguson, B.Sc. (Hon.)
Laboratory Manager

File ID:\bioassay\2016\1000\1510-001\1510-001nv3 T

bringing clarity to your environment

Rainbow Trout 96-Hour Single-Concentration Toxicity Test

METHOD: Environment Canada, "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout", Second Edition, Method Development and Applications Section, Ottawa, ON. Report EPS 1/RM/13, 2000 (with May 2007 and February 2016 amendments). Pollutech Test Method RT-SC-R1.4.

Test Material

Client Name/Location: Nautilus Environmental Company Inc. Calgary, AB

Sample #: 1510-0011616 **Sample Name:** 1617-0391

Sample Method: Grab **Collected by:** N/A

Date/Time Collected: November 7, 2016; N/A **Arrival Temp.:** 12.1°C

Date/Time Received: November 9, 2016; 11:50 **Sample Description:** Clear, colourless

Sample Point Description: Other **Sample Type:** N/A

Transportation: Road/Air

Storage: Overnight at 15 ± 1°C

N/A – not available

Test Organisms

Species: Rainbow Trout (*Oncorhynchus mykiss*)

Source: Rainbow Springs Hatchery

Culture Temp.: 15 ± 2°C **Batch Number:** RS101916

Water Source: Dechlorinated municipal drinking water

Mean Weight: 0.41 g **Min:** 0.31 g **Max:** 0.53 g

Mean Fork Length: 36.3 mm **Min:** 34 mm **Max:** 40 mm

Loading Density: 0.21 g/L **Sample Size:** 10 fish

Life Stage: Fry

Number Dead Daily In Previous 7 Days For Fish Culture: 1+0+0+0+1+2+2=6

Previous 7-Day Holding Mortalities For Fish Culture: 0.3%

Rainbow Trout 96-Hour Single-Concentration Toxicity Test - Continued

Sample Number: 1510-0011616

Sample Name: 1617-0391

Test Conditions

Date/Time Started:	November 10, 2016; 13:56		
Test Volume:	20 L/Vessel	Number of Fish Per Vessel:	10
# of Vessels Per Conc.:	1	Test Temperature:	15 ± 1°C
Pre-aeration:	Yes	Duration of Pre-aeration:	30 minutes
Pre-aeration Rate:	6.5 ± 0.26 ml/min·L ⁻¹	Aeration Rate During Test:	6.5 ± 0.26 ml/min·L ⁻¹
Sample Adjustment:	No	Sample pH Adjustment:	No
Test Method Deviations:	None		

Test Facilities

Testing Laboratory:

Pollutech EnviroQuatics Limited, 704 Mara St., Suite 122, Point Edward, Ontario, N7V 1X4



CALA

Testing
Accreditation No. A1225

This laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). The test included in this report is within the scope of this laboratory.

Test Performed By:

K. Ferguson / E. Baker / F. Kirkey / A. Baetsen

Initial Measurement of Variables in Unadjusted Sample

Cond: 1511 µmhos **DO:** 10.1 mg/L **pH:** 8.0 **Temp:** 15.1 °C

Test Results

NUMBER OF MORTALITIES

Conc'n (% Volume)	Rep. No.	Time (hours)			
		24	48	72	96
Control	1	0	0	0	0
100%	1	0	0	0	0

Number of Control Fish Showing Atypical/Stressed Behaviour: 0

Rainbow Trout 96-Hour Single-Concentration Toxicity Test - Continued

Sample Number: 1510-0011616

Sample Name: 1617-0391

Test Results

TOXICITY TEST VARIABLES

Conc'n	Rep. No.	Variables	Time (hours)				
			0	24	48	72	96
Control	1	Cond. (μ mhos)	218				n/r
		DO (mg/L)	9.9				9.8
		pH (units)	8.2				8.1
		Temp. ($^{\circ}$ C)	15.1				14.8
100%	1	Cond. (μ mhos)	1,488				n/r
		DO (mg/L)	10.0				9.8
		pH (units)	8.0				8.3
		Temp. ($^{\circ}$ C)	14.9				14.5

n/r = not required

Summary of Test Results

Mean Mortality Rate: 0%¹ **Test Results Verified By:** R. C. Ferguson

¹ Most regulations regard \leq 50% mortality to be a "pass". Check your applicable regulatory requirements.

Reference Toxicant Results

Reference Chemical: Phenol **Date Test Initiated:** 11/09/16
Fish Lot #: RS101916 **Method:** Probit Analysis
48-Hour LC50 (95% Confidence Limits): 10.23 mg/L (7.63 mg/L; 13.72 mg/L)
Historic Geometric Mean LC50: 8.85 mg/L (5.93 mg/L; 13.20 mg/L)
(Historic Warning Limits) (\pm 2 Standard Deviations)

Your C.O.C. #: 20161114-acute toxic

Attention:Chris Stroich

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/11/23

Report #: R2305442

Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6A2419

Received: 2016/11/16, 09:44

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date		Laboratory Method	Analytical Method
		Extracted	Analyzed		
Daphnia magna Single Concentration-100%	1	N/A	2016/11/17	EENVSOP-00154	EPS 1 RM14 2nd ed
Daphnia magna Single Concentration-100%	1	N/A	2016/11/18	EENVSOP-00154	EPS 1 RM14 2nd ed
Technician Time - Customer Service	2	N/A	2016/11/18		

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods. Results relate to samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your C.O.C. #: 20161114-acute toxic

Attention:Chris Stroich

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/11/23
Report #: R2305442
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6A2419
Received: 2016/11/16, 09:44

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====
This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B6A2419
Report Date: 2016/11/23

TECK COAL LIMITED

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		QB0026		QB0027		
Sampling Date		2016/11/14 08:00		2016/11/14 09:00		
COC Number		20161114-acute toxic		20161114-acute toxic		
	UNITS	LC_WTF_IN_20161114_NP	QC Batch	WL_BFWB_OUT_SP21_20161114_N	RDL	QC Batch
Industrial - Calculated						
Hours of Labour	hr	1.0	ONSITE	1.0	0.01	ONSITE
Daphnia Magna Bioassay						
Mortality	%	ATTACHED	8474231	ATTACHED	N/A	8476072
RDL = Reportable Detection Limit N/A = Not Applicable						

Maxxam Job #: B6A2419
Report Date: 2016/11/23

TECK COAL LIMITED

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	12.0°C
-----------	--------

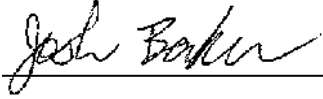
Results relate only to the items tested.

Maxxam Job #: B6A2419
Report Date: 2016/11/23

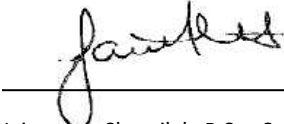
TECK COAL LIMITED

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Joshua Baker, B.Sc., Senior Analyst



Jaime-Lee Shumilak, B.Sc., Supervisor-Sample Logistics

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number : -

Job Number: B6A2419
Sample Number: QB0027-01

Test Result:

48 hrs Mortality % 0 Statistical Method:

Mean percent mortality:	<u>Sample</u>	0	<u>Control</u>	0	
Sample Name :	WL_BFWB_OUT_SP21_20161114_N		Sample Matrix :	Water	
Description:	Clear		Sample Prior to Analysis:		
Sample Collected:	Nov 14, 2016 09:00 AM	Sampling Method :	N/A	pH:	7.6
Sample Collected By:	N/A	Site Collection:	N/A	Temperature :	20 °C
Sample Received:	Nov 16, 2016 09:44 AM	Volume Received:	1 L	Dissolved Oxygen:	8.8 mg/L
Analysis Start :	Nov 18, 2016 10:58 AM	Temp.Upon Arrival:	12 °C	Sample Conductance:	1746 µS/cm
End :	Nov 20, 2016 10:58 AM	Storage:	2-6°C	Hardness:	1400 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	20	7.8	378	7.8	0	0	0	0	19	7.9	376	7.5
0	20	7.9	381	7.8	0	0	0	0	19	8.0	380	7.6
0	20	7.9	381	7.8	0	0	0	0	20	8.0	386	7.6
100	20	7.7	1765	8.1	0	0	0	0	19	7.9	1641	7.3
100	20	7.7	1776	8.1	0	0	0	0	20	7.9	1674	7.3
100	20	7.8	1778	8.1	0	0	0	0	19	8.0	1687	7.3

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	2	20.0
100	0	0	1	10.0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 160 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
Organisms per Vessel : 10 **Pre-aeration Time :** 30 min **Rate of Pre-aeration :** 25-50 mL/min/L
Total # of Organisms Used : 60 **Test Temperature :** 20 ± 2 °C **Test Hardness Adjusted :** No
Test Volume : 150 mL **Vessel Volume :** 225 mL **Test pH Adjusted:** No
Loading Density : 15.0 mL/Daphnia **Photoperiod :** 16:8 (light: dark)

Test Organism : *Daphnia magna* **Source :** In House Culture
Age at Test Initiation : <24 hrs **Average Brood Size :** 22.7
Culture Photoperiod : 16:8 (light: dark) **% Mortality within 7 days :** 0
Culture Temperature : 20 ± 2 °C **Time To First Brood :** 8 Days
Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number : -

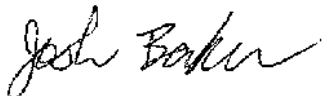
Job Number: B6A2419
Sample Number: QB0027-01

Reference chemical: Sodium Chloride
Test Endpoint 48 hrs LC50 (95% confidence interval) : 7.07 (5.00, 10.0)g/L
Historical Mean LC50 (warning limits) : 6.59 (5.17, 8.40) g/L
Test Date: Nov 12, 2016
Statistical Method : Binomial
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Aynura Rakhmangulova, Chelsea Tessier



Verified By : Joshua Baker, Senior Analyst

Date: Nov 22, 2016 05:03 PM



ATTN: Thomas Davidson
Teck Coal Ltd.
15 Km North HWY 43
Sparwood, British Columbia
Canada V0B 2G0

Received: 2016/11/15
Report Date: 2016/11/21
Version: FINAL

Test Report

Client: TEC164
Reference: 1617-0404
Billing: PO#: 411634

A handwritten signature in cursive script that reads 'Jaclyn Rose'.

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

Result Summary

Client: TEC164
Reference: 1617-0404-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20161114_N

Collection: collected on 2016/11/14 at 0900 by not given

Receipt: received on 2016/11/15 at 1200 by MC

Containers: received 4 x 1 L bottles at 11 °C, in good condition
with no seals and no initials

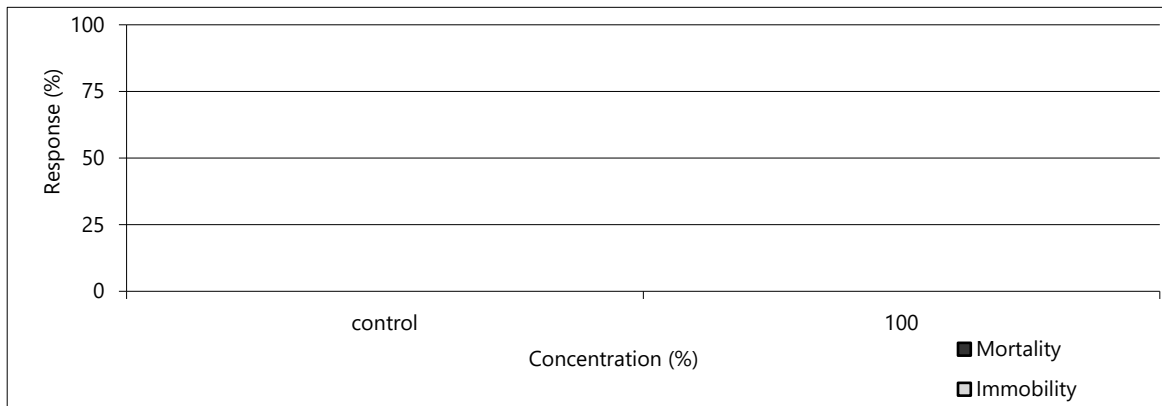
Description: type: water, collection method: grab

Test: started on 2016/11/15 ; ended on 2016/11/17

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control 100	lab control WL_BFWB_OUT_SP21 _20161114_N	0 0	0 0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Jaclyn Rose

Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0404-DAS
--

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
19 neonates per average brood

Sample initial chemistry: pH: 7.7; EC: 1881 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.2 (mg/L); temperature: 18 °C
hardness (mg CaCO_3/L): 1006; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 87 mg CaCO_3/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 20 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0404-DAS
--

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated November 7, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.67 (0.62-0.71) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.71 (0.62-0.81) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0404-DAS

Test Log:

Date	Day	Time	Technician
2016/11/15	0	1400	JN/JW
2016/11/16	1	0930	EP
2016/11/17	2	1030	EP

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.7	7.7	7.7	7.9	7.9	7.9
2	7.9	8.0	8.0	8.0	8.0	8.0

Day	Conductivity (µS/cm @ 25°C)					
0	336	339	343	2060	2070	2080
2	340	349	350	2100	2110	2200

Day	Dissolved Oxygen (mg/L)					
0	8.0	8.0	8.0	8.1	8.1	8.1
2	7.8	7.9	8.0	8.0	8.1	8.1

Day	Temperature (°C)					
0	19	20	20	19	19	19
2	20	20	20	20	20	20

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0

Comments/Statistics

Client: TEC164 Reference: 1617-0404-DAS
--

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: TEC164
Reference: 1617-0404-DAS

Client: Teck Coal Ltd.; operation WLC AWTF

Sample: WL_BFWB_OUT_SP21_20161114_N

Collection: collected on 2016/11/14 at 0900 by not given

Receipt: received on 2016/11/15 at 1200 by MC

Containers: received 4 x 1 L bottles at 11 °C, in good condition
with no seals and no initials

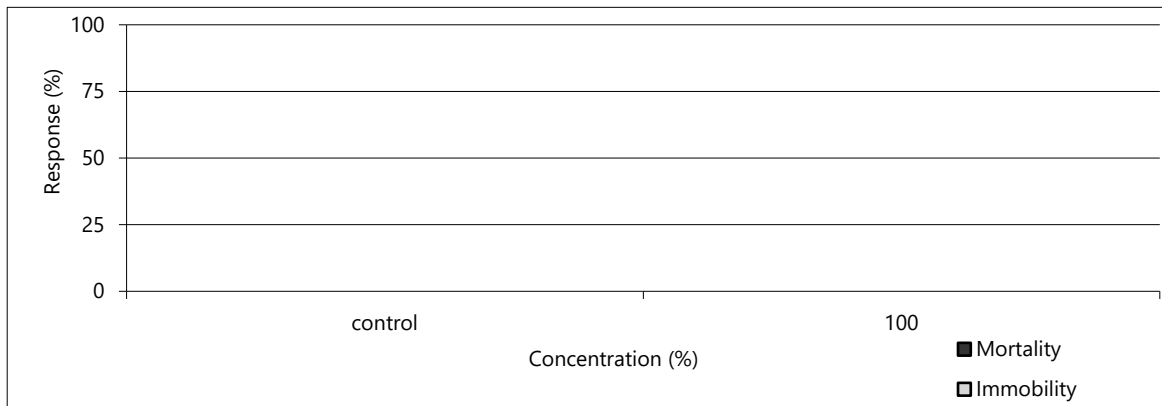
Description: type: water, collection method: grab

Test: started on 2016/11/15 ; ended on 2016/11/17

Result:

Sample	Client Code	Average Mortality (%)	Average Immobility (%)	Comment
control 100	lab control WL_BFWB_OUT_SP21 _20161114_N	0 0	0 0	none

Notes: sd, sample standard deviation; cv, coefficient of variation; nd, not done; na, not applicable;



The test data and results are authorized and verified correct.

Jaclyn Poole

Senior Verifier

Test Conditions

Client: TEC164 Reference: 1617-0404-DAS
--

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition. (December 2000; amended February 2016)

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 8 days to first brood
19 neonates per average brood

Sample initial chemistry: pH: 7.7; EC: 1881 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.2 (mg/L); temperature: 18 °C
hardness (mg CaCO₃/L): 1006; colour: colourless; salinity (ppt): 0

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 0 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control water: Moderately hard reconstituted water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₄ (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 87 mg CaCO₃/L

Test concentrations: Undiluted sample plus a negative control

Test replicates: Three replicates per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 10 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: TEC164 Reference: 1617-0404-DAS
--

Endpoint: Mortality, % mortality at 48-h
Immobility, % immobility at 48-h

Test validity: The control had 100% survival (must \geq 90%)
Control had 0% abnormal behaviour (must \leq 10%), e.g. immobility

Reference toxicant: 48-h test with NaCl initiated November 7, 2016 current results
(48-h LC50 and 95% confidence limits) = 0.67 (0.62-0.71) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.71 (0.62-0.81) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: TEC164
Reference: 1617-0404-DAS

Test Log:

Date	Day	Time	Technician
2016/11/15	0	1430	JN/JW
2016/11/16	1	0930	EP
2016/11/17	2	1030	EP

Chemistry:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	pH (units)					
0	7.8	7.8	7.8	7.6	7.7	7.7
2	7.9	8.0	8.0	8.0	8.0	8.0

Day	Conductivity (µS/cm @ 25°C)					
0	339	345	344	2090	2100	2100
2	345	347	350	1799	1850	1850

Day	Dissolved Oxygen (mg/L)					
0	9.5	9.5	9.5	9.6	9.5	9.5
2	9.1	9.2	9.2	9.0	9.0	9.0

Day	Temperature (°C)					
0	11	11	11	11	11	12
2	12	12	12	12	12	12

Biology:

Conc (%)	control			100		
replicate	a	b	c	a	b	c

Day	Number Alive and Behavior (behavior is in brackets)					
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris

Day	Mortality (%)					
2	0	0	0	0	0	0

Day	Immobility (%)					
2	0	0	0	0	0	0

Comments/Statistics

Client: TEC164 Reference: 1617-0404-DAS
--

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:The test temperature was $10 \pm 2^{\circ}\text{C}$, as per the client's request

Your P.O. #: 441369
Your C.O.C. #: 20161121-ACUTETOXICI

Attention:Chris Stroich

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/12/06
Report #: R2312374
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6A5198
Received: 2016/11/22, 12:08

Sample Matrix: Water
Samples Received: 2

Analyses	Date		Laboratory Method	Analytical Method
	Quantity	Extracted		
Daphnia magna Single Concentration-100%	2	N/A	2016/11/26 EENVSOP-00154	EPS 1 RM14 2nd ed
Technician Time - Customer Service	2	N/A	2016/11/26	

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods. Results relate to samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your P.O. #: 441369
Your C.O.C. #: 20161121-ACUTETOXICI

Attention:Chris Stroich

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/12/06
Report #: R2312374
Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6A5198
Received: 2016/11/22, 12:08

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Micheline Piche, Project Manager

Email: MPiche@maxxam.ca

Phone# (780) 577-7100

=====
This report has been generated and distributed using a secure automated process.

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B6A5198
Report Date: 2016/12/06

TECK COAL LIMITED
Your P.O. #: 441369
Sampler Initials: TW

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		QC6178	QC6351		
Sampling Date		2016/11/21 08:00	2016/11/21 09:00		
COC Number		20161121-ACUTETOXICI	20161121-ACUTETOXI		
	UNITS	LC_WTF_IN_20161121_NP	WL_BFWB_OUT_SP21_20161121_N	RDL	QC Batch
Industrial - Calculated					
Hours of Labour	hr	1.0	1.0	0.01	ONSITE
Daphnia Magna Bioassay					
Mortality	%	ATTACHED	ATTACHED	N/A	8485651
RDL = Reportable Detection Limit N/A = Not Applicable					

Maxxam Job #: B6A5198
Report Date: 2016/12/06

TECK COAL LIMITED
Your P.O. #: 441369
Sampler Initials: TW

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	17.0°C
-----------	--------

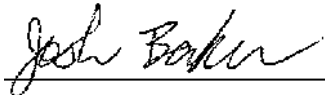
Results relate only to the items tested.

Maxxam Job #: B6A5198
Report Date: 2016/12/06

TECK COAL LIMITED
Your P.O. #: 441369
Sampler Initials: TW

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Joshua Baker, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood

Job Number: B6A5198

Client Project Name & Number:

Sample Number: QC6351-01

Test Result:

48 hrs Mortality % 0% Statistical Method:

Mean percent mortality: Sample 0 Control 0

Sample Name : WL_BFWB_OUT_SP21_20161121_N

Sample Matrix : Water

Description: Clear

Sample Prior to Analysis:

Sample Collected: Nov 21, 2016 09:00 AM

Sampling Method : N/A

pH: 7.4

Sample Collected By: TW

Site Collection: N/A

Temperature : 16 °C

Sample Received: Nov 22, 2016 12:08 PM

Volume Received: 1 L

Dissolved Oxygen: 9.2 mg/L

Analysis Start : Nov 26, 2016 09:40 AM

Temp.Upon Arrival: 17 °C

Sample Conductance: 1611 µS/cm

End : Nov 28, 2016 10:39 AM

Storage: 2-6°C

Hardness: 800 mg CaCO₃/L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	21	7.8	388	7.6	0	0	0	0	20	7.7	383	7.8
0	21	7.9	389	7.6	0	0	0	0	20	7.9	391	7.8
0	21	7.9	390	7.6	0	0	0	0	20	7.9	382	7.8
100	20	7.6	1751	8.1	0	0	0	0	20	7.8	1710	7.7
100	20	7.6	1758	8.1	0	0	0	0	20	7.9	1706	7.8
100	20	7.6	1760	8.0	0	0	0	0	20	7.9	1731	7.6

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	0	0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water

Hardness: 160 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)

Organisms per Vessel : 10 **Pre-aeration Time :** 30 min **Rate of Pre-aeration :** 25-50 mL/min/L

Total # of Organisms Used : 60 **Test Temperature :** 20 ± 2 °C **Test Hardness Adjusted :** No

Test Volume : 150 mL **Vessel Volume :** 225 mL **Test pH Adjusted:** No

Loading Density : 15.0 mL/Daphnia **Photoperiod :** 16:8 (light: dark)

Test Organism : *Daphnia magna* **Source :** In House Culture

Age at Test Initiation : <24 hrs **Average Brood Size :** 22.3

Culture Photoperiod : 16:8 (light: dark) **% Mortality within 7 days :** 1.6

Culture Temperature : 20 ± 2 °C **Time To First Brood :** 8 Days

Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number:

Job Number: B6A5198
Sample Number: QC6351-01

Reference chemical: Sodium Chloride
Test Endpoint 48 hrs LC50 (95% confidence interval) : 7.07 (5.00, 10.0)g/L
Historical Mean LC50 (warning limits) : 6.59 (5.17, 8.40) g/L
Test Date: Nov 12, 2016
Statistical Method : Binomial
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Aynura Rakhmangulova, Natasha Mouck



Verified By : Joshua Baker, Senior Analyst

Date: Dec 06, 2016 04:07 PM



Acute Toxicity Test Results

WL_BFWB_OUT_SP21 samples collected November 21,
2016

Final Report

December 12, 2016

Submitted to: **Teck Coal Ltd.**
Sparwood, BC

SAMPLE INFORMATION

Sample ID/ Internal ID	Dates					Receipt temperature
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> 10°C test initiation	<i>Daphnia magna</i> 20°C test initiation	
WL_BFWB_OUT_SP21_20161121_N/ 1617-0426-02	21-Nov- 16 at 0800h	22-Nov- 16 at 0800h	23-Nov- 16 at 1100h	22-Nov- 16 at 1410h	22-Nov- 16 at 1415h	12°C

METHODS

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test (conducted at 10°C)

RESULTS

Toxicity test results

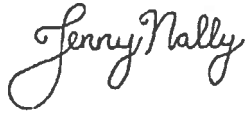
Sample ID	Percent survival in 100% (v/v) sample		
	Rainbow trout	<i>Daphnia magna</i> 10°C	<i>Daphnia magna</i> 20°C
WL_BFWB_OUT_SP21_20161121_N	100	100	100

Sample ID	Percent Immobility in 100 (% v/v)	
	<i>Daphnia magna</i> 10°C	<i>Daphnia magna</i> 20°C
WL_BFWB_OUT_SP21_20161121_N	0	0

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i> 10°C	<i>Daphnia magna</i> 20°C
Reference toxicant LC50 (95% CL)	2.9 (2.3-3.5) (g/L KCl) ¹	5.3 (5.0-5.5) g/L NaCl ²	5.3 (5.0-5.5) g/L NaCl ²
Reference toxicant historical mean (2 SD Range)	3.2 (2.3-4.6) (g/L KCl)	5.1 (4.3-6.0) g/L NaCl	5.1 (4.3-6.0) g/L NaCl
Reference toxicant CV	11.2	5.31	5.31
Organism health history	Acceptable	Acceptable	Acceptable
Protocol deviations	None	Test ran at 10°C	None
Water quality range deviations	None	None	None
Control performance	Acceptable	Acceptable	Acceptable
Test performance	Valid	Valid	Valid

¹ Test date, November 23, 2016; ² Test Date November 21, 2016
 CL = Confidence Limit



Report By:
Jenny Nally, MSc., BSc.
Biologist



Reviewed By:
Claudio Quinteros
Laboratory Technical Lead

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) survival test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Miracle Springs
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	22-L plastic pails with polyethylene liners
Test volume	20 L (depending on size of fish)
Test solution depth	Minimum 15 cm
Test concentrations	100% (undiluted) sample plus laboratory
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	De-chlorinated City of Calgary tap water
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light/8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test Measurements	pH, conductivity, dissolved oxygen and temperature were measured at test initiation and test completion; salinity measured at test initiation; evaluated for survival daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Statistical software	CETIS version 1.9.0.8
Test endpoints	Percent survival
Test acceptability criteria for controls	Survival ≥ 90%
Reference toxicant	Potassium chloride (KCl)

Table 2. Summary of test conditions: 48-h *Daphnia magna* survival test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24 hours
Test type	Static
Test duration	48 hours
Test vessel	385 mL glass jars
Test volume	150 mL
Test concentrations	100% (undiluted) plus laboratory
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water supplemented with B12 (2 µg/L) and Na ₂ SeO ₄ (2 µg Se/L)
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test measurements	pH, conductivity, dissolved oxygen and temperature measured at test initiation and completion; salinity and hardness measured at test initiation in undiluted sample; evaluated daily for survival
Test protocol	Environment Canada (2000), EPS 1/RM/14
Statistical software	CETIS version 1.9.0.8
Test endpoints	Mean percent survival
Test acceptability criteria for controls	Survival ≥ 90%
Reference toxicant	Sodium chloride (NaCl)

Table 3. Summary of test conditions: 48-h *Daphnia magna* survival test at 10°C

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24 hours
Test type	Static
Test duration	48 hours
Test vessel	385 mL glass jars
Test volume	150 mL
Test concentrations	100% (undiluted) plus laboratory
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water supplemented with B12 (2 µg/L) and Na ₂ SeO ₄ (2 µg Se/L)
Test solution renewal	None
Test temperature	10 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test measurements	pH, conductivity, dissolved oxygen and temperature measured at test initiation and completion; salinity and hardness measured at test initiation in undiluted sample; evaluated daily for survival
Test protocol	Environment Canada (2000), EPS 1/RM/14
Statistical software	CETIS version 1.9.0.8
Test endpoints	Mean percent survival
Test acceptability criteria for controls	Survival ≥ 90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Method TPS Client TEU164 Reference 1617-0476-02

Test Log						Sample Information	
Day	Date	Time	Initial	Chem. Cart	Daily Data Review	Initial pH:	
0	2016/11/23	10:00	FP	1	TW	7.8	
1	2016/11/24	11:00	LC	-	HS	1940	
2	2016/11/25	10:00	LC	-	HS	8.8	
3	2016/11/26	09:30	LC	-	HS	17.4	
4	2016/11/27	09:00	EP	1	JN	0	

Note: * ; time when the test was loaded with fish

Sample Pre-Aeration
 Aeration rate adjusted to 6.5 +/- 1 mL/min/L: yes/no
 Preaeration time: 0.5 hours 1 hour 1.5 hours 2 hours
 DO(mg/L) of 100%: 9.1

Test Chemistry and Biology

Conc.	CTL	100					
-------	-----	-----	--	--	--	--	--

pH (units) (range: 5.5-8.5)

Day 0	7.7	7.8					
Day 4	8.0	8.0					

EC (uS/cm)

Day 0	410	1905					
Day 4	421	1799					

DO (mg/L) (70-100% saturation at test temp.)

Day 0	8.8	9.1					
Day 4	8.9	8.9					

Temperature (°C) (range: 13.5-16.5 °C)

Day 0	14.1	13.8					
Day 4	14.1	14.0					

Number Alive (In brackets number stressed)

Day 0	10	10					
Day 1	10	10					
Day 2	10	10					
Day 3	10	10					
Day 4	10	10					

Validity Criteria: must be ≤ 10% mortality and/or stressed behavior in the control
 Unless otherwise noted, behavior is considered to be normal

Control Organism Data			Test Organism Information	
Control Fish	Length (cm)	Weight (g)		
1	3.0	0.3	Loading Density (g/L): _____ Mean Length (cm): _____ Length Range (cm): _____ Mean Weight (g): _____ Weight Range (g): _____	Batch <u>20161109TR</u>
2	2.9	0.3		Source <u>Miracle Springs</u>
3	2.9	0.3		Days Held <u>14</u>
4	3.0	0.3		Percent stock mortality <u>0.33%</u> (7 days prior to test, must be ≤ 2%)
5	2.9	0.3		Test Volume (L) <u>20L</u>
6	2.9	0.3		
7	2.9	0.3		
8	2.8	0.3		
9	2.9	0.3		
10	3.0	0.3		

Comments :

Method DAS @ 10°C

Client TEC164

Reference 1617-0426-02

Test Log

Day	Date	Time	Technician	Chem. Cart	Daily Data Review
0	2016/11/22	14:0	MS/LL	3	TW
1	2016/11/23	11:5	FP	-	TW
2	2016/11/24	09:55	LL	3	AS

Sample Information

Initial pH:	<u>7.8</u>
Initial EC (µS/cm):	<u>1946</u>
Initial DO (mg/L):	<u>8.8</u>
Initial Temp (°C):	<u>17.4</u>
Salinity (ppt):	<u>0</u>

Lab Code	CTLA	CTLB	CTLC	100A	100B	100C

day	pH (units) (range: 6.0-8.5)					
0	<u>7.5</u>	<u>7.4</u>	<u>7.5</u>	<u>7.5</u>	<u>7.5</u>	<u>7.5</u>
2	<u>7.5</u>	<u>7.5</u>	<u>7.6</u>	<u>8.0</u>	<u>7.9</u>	<u>7.9</u>

day	EC (µS/cm)					
0	<u>350</u>	<u>341</u>	<u>332</u>	<u>1825</u>	<u>1851</u>	<u>1859</u>
2	<u>310</u>	<u>324</u>	<u>320</u>	<u>1660</u>	<u>1736</u>	<u>1758</u>

day	DO (mg/L) (40-100% saturation at test temp.)					
0	<u>9.4</u>	<u>9.4</u>	<u>9.4</u>	<u>9.3</u>	<u>9.3</u>	<u>9.3</u>
2	<u>9.1</u>	<u>9.0</u>	<u>9.2</u>	<u>8.9</u>	<u>9.1</u>	<u>9.2</u>

day	Temperature (°C) (range: 17.5-22.5 °C)					
0	<u>11.0</u>	<u>11.1</u>	<u>11.2</u>	<u>11.3</u>	<u>11.2</u>	<u>11.1</u>
2	<u>12.1</u>	<u>11.9</u>	<u>12.0</u>	<u>12.4</u>	<u>12.0</u>	<u>12.2</u>

day	Number Alive (F, floating; I, immobile; B, stuck on bubble; D, caught in debris)					
0	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>
1	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>
2	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>	<u>10</u>

Validity Criteria: must be ≤ 10% mortality and/or abnormal behavior in the control

Notes: Immobile; daphnid can't swim after 60 sec. even if antenna still move

Unless otherwise noted, behaviour is considered to be normal

Culture	Young jar <u>CTC1</u>	Jar(s) mortality 7 days prior to test (must be ≤25%) <u>0</u>
QA (previous month)	Days to first brood (≤12 days) <u>9</u>	Average number of young produced (≥15 young) <u>18</u>
	Were test treatments randomized on test tray? <input checked="" type="radio"/> Yes / <input type="radio"/> No	
Sample	DO % of sample prior to aeration: <u>97%</u>	Is aeration required (<40% or >100%)? <input checked="" type="radio"/> Yes or <input type="radio"/> No
	Duration of aeration (37.5 +/- 12.5 mL/min/L): <u>—</u>	Filtered with 110µm screen prior to testing <input checked="" type="radio"/> Yes or <input type="radio"/> No
	Hardness (mg CaCO ₃ /L) of 100%: <u>1052</u>	Is hardness adjustment required (<25 mg CaCO ₃ /L)? <input checked="" type="radio"/> Yes or <input type="radio"/> No
	Hardness of sample after adjustment (must be between 25 - 30 mg CaCO ₃ /L) <u>—</u>	
Dilution Water	Pail label / preparation date <u>E 2016/11/16</u>	Weekly water hardness (mg/L) <u>89</u>
Comments:	<u>*24 hour updates*</u>	

Method DAS@ 20°C

 Client TEC164

 Reference 1617-0426-02
Test Log

Day	Date	Time	Technician	Chem. Cart	Daily Data Review
0	2016/11/22	1415	HS/LL	3	YW
1	2016/11/23	1115	EP	-	YW
2	2016/11/24	1000	LL	3	HS

Sample Information

Initial pH:	7.8
Initial EC (µS/cm):	1940
Initial DO (mg/L):	8.8
Initial Temp (°C):	17.4
Salinity (ppt):	0

Lab Code	CTLA	CTLB	CTLC	100A	100B	100C

day

pH (units) (range: 6.0-8.5)

0	7.5	7.6	7.6	7.9	8.0	8.0
2	7.9	7.8	7.8	7.8	7.9	8.0

EC (µS/cm)

0	327	328	327	1843	1889	1893
2	359	319	319	1623	1763	1722

DO (mg/L) (40-100% saturation at test temp.)

0	8.0	8.1	8.0	8.2	8.2	8.2
2	7.8	7.8	7.9	7.9	7.9	7.9

Temperature (°C) (range: 17.5-22.5 °C)

0	19.3	19.3	19.3	19.2	19.2	19.1
2	19.9	20.1	20.0	19.9	19.9	20.0

Number Alive

(F, floating; I, immobile; B, stuck on bubble; D, caught in debris)

0	10	10	10	10	10	10
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Validity Criteria: must be ≤ 10% mortality and/or abnormal behavior in the control

Notes: Immobile; daphnid can't swim after 60 sec. even if antenna still move

Unless otherwise noted, behaviour is considered to be normal

Culture	Young jar <u>C₁X2</u>	Jar(s) mortality 7 days prior to test (must be ≤25%) <u>0</u>
QA (previous month)	Days to first brood (≤12 days) <u>9</u>	Average number of young produced (≥15 young) <u>15</u>
	Were test treatments randomized on test tray? <input checked="" type="radio"/> Yes / <input type="radio"/> No	
Sample	DO % of sample prior to aeration: <u>106</u>	Is aeration required (<40% or >100%)? <input checked="" type="radio"/> Yes or <input type="radio"/> No
	Duration of aeration (37.5 +/- 12.5 mL/min/L): <u>20 min</u>	Filtered with 110µm screen prior to testing <input checked="" type="radio"/> Yes or <input type="radio"/> No
	Hardness (mg CaCO ₃ /L) of 100%: <u>1052</u>	Is hardness adjustment required (<25 mg CaCO ₃ /L)? <input checked="" type="radio"/> Yes or <input type="radio"/> No
	Hardness of sample after adjustment (must be between 25 - 30 mg CaCO ₃ /L) <u>-</u>	
Dilution Water	Pail label / preparation date <u>E 2016/11/16</u>	Weekly water hardness (mg/L) <u>89</u>
Comments:	<u>*24 hour updates*</u>	

APPENDIX C – Chain-of-custody form

Teck

COC ID: 20161121-Acute Toxicity

PROJECT/CLIENT INFO
 Facility Name / Job#: WLC AWTF
 Project Manager: Thomas Davidson
 Email: Thomas.Davidson@teck.com
 Address: 15 Km North HWY 41

LABORATORY
 Lab Name: Nautius Environmental
 Lab Contact: Jacklyn Poel
 Email: jacklyn@nautiusenvironmental.ca
 Address: #4, 6125 - 12 Street SE

TURNAROUND TIME: REGULAR
 Report Delivery Formats:
 Email 1: thomas.davidson@teck.com
 Email 2: teckcoal@equisonline.com
 Email 3: teckw.lclab@epcor.com
 Email 4: Chris.Stevenson@teck.com
 Email 5: colin.lynch@teck.com

OFFICE INFO
 [Facel] [M/D] [I/D/D]

PROVINCE/CLIENT INFO
 City: Sparwood
 Postal Code: V0B 2G0
 Phone Number: 250 603 9417
 Province: BC
 Country: Canada

ANALYSIS REQUESTED
 City: Calgary
 Postal Code: T2H 2K1
 Phone Number: +1 403 253 7121
 Province: AB
 Country: Canada

PO 411014
 [Phone] [Fax] [E-Mail] [Web]

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G-Grab C-Comp	# of Cont.	ANALYSIS REQUESTED				DATE/TIME	ACCEPTE BY/APPLICATION	DATE/TIME
								NAUT 96HR RT Single Concentration Toxicity	NAUT 48HR DVI Single Concentration Toxicity	Test @ 10C	NAUT 48HR DVI Single Concentration Toxicity			
I.C. WTF_IN_20161121_NP	LC_WTF_IN	WS	N	21-Nov-16	0800	G	3	X	X	X	X			
WL_BFWB_OUT_SP21_20161121_N	WL_BFWB_OUT_SP21	WS	N	21-Nov-16	0100	G	8	X	X	X	X			

REQUISITION BY/APPLICATION
 Jacklyn Poel

DATE/TIME
 21-NOV-16

MOBILE #
 21-Nov-16

SAMPLER'S NAME
 Tyson Wolowicki

SAMPLER'S SIGNATURE
 [Signature]

NB OF BOTTLES RETURNED/DESCRIPTION

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

2016/11/22 930 Good Condition
 No S/L
 5 < 20 L Carboys
 6 < 2 L bottles
 Man. fail - MC

END OF REPORT

REP-2017-04-04

TURNAROUND TIME:

PROJECT/CLIENT INFO

Facility Name / Job# Regional Effects Program
 Project Manager Lee Wilm
 Email lee.wilm@teck.com
 Address PO Box 1777, 124B Aspen Drive

City Sparwood BC
 Postal Code V0B 2G0 Canada
 Phone Number 250-425-8202

LABORATORY

Lab Name ALS Burnaby
 Lab Contact Can Dang
 Email can.dang@alsglobal.com
 Address 8081 Loughheed Hwy
 City Burnaby BC
 Postal Code V5A 1W9 Canada
 Phone Number 604-253-4188

Excel PDF EDD
 lee.wilm@teck.com
 teckcoal@equionline.com
 carla.fraser@teck.com
 andrew.wight@teck.com

SAMPLE DETAILS

ANALYSIS REQUESTED

Filtered - Field, Lab, Field & Lab, NI None

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	TECKCOAL-MONTHLY-VA	DOC	nutrients/TOC	Ultra Trace Mercury	Dissolved mercury	Total Metals	Dissolved metals	Methyl mercury (T)
RG_ELKFERNIE_WS_2017-04-04_NP	RG_ELKFERNIE	WS	NO	4/4/2017		G	7	x	x	x	x	x	x	x	
RG_ELKORES_WS_2017-04-04_N	RG_ELKORES	WS	NO	4/4/2017		G	8	x	x	x	x	x	x	x	
RG_ELKMOUTH_WS_2017-04-04_NP	RG_ELKMOUTH	WS	NO	4/4/2017		G	7	x	x	x	x	x	x	x	
RG_WARDB_WS_2017-04-04_NP	RG_WARDB	WS	NO	4/4/2017		G	7	x	x	x	x	x	x	x	
RG_BLANKRIV_WS_2017-04-04_FB	RG_BLANKRIV	WS	NO	4/4/2017		G	7	x	x	x	x	x	x	x	
RG_DUPLICATERIV_WS_2017-04-04_FD	RG_DUPLICATERIV	WS	NO	4/4/2017		G	7	x	x	x	x	x	x	x	

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION

NB OF BOTTLES RETURNED/DESCRIPTION		Sampler's Name	Mobile #
Regular (default)	X	Andy Wight	250-433-1159
Priority (2-3 business days) - 50% surcharge			
Emergency (1 Business Day) - 100% surcharge			
For Emergency <1 Day, ASAP or Weekend - Contact ALS			
Date/Time		Date/Time	
			April 4, 2017

Your Project #: WLC AWTF
Your C.O.C. #: 20161128-AcuteToxici

Attention:Chris Stroich

TECK COAL LIMITED
Bag Service 2000
421 Pine Avenue
Sparwood, BC
CANADA V0B 2G0

Report Date: 2016/12/06
Report #: R2312388
Version: 2 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B6A6860

Received: 2016/11/29, 11:23

Sample Matrix: Water
Samples Received: 2

Analyses	Quantity	Date	Date	Laboratory Method	Analytical Method
		Extracted	Analyzed		
Daphnia magna Single Concentration-100%	2	N/A	2016/11/30	EENVSOP-00154	EPS 1 RM14 2nd ed
Technician Time - Customer Service	2	N/A	2016/11/30		

Remarks:

Maxxam Analytics' laboratories are accredited to ISO/IEC 17025:2005 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Maxxam are based upon recognized Provincial, Federal or US method compendia such as CCME, MDDELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Maxxam's profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Maxxam in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported: unless indicated otherwise, associated sample data are not blank corrected.

Maxxam Analytics' liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Maxxam has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Maxxam, unless otherwise agreed in writing.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods. Results relate to samples tested.

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Micheline Piche, Project Manager
Email: MPiche@maxxam.ca
Phone# (780) 577-7100

=====

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Maxxam Job #: B6A6860
Report Date: 2016/12/06

TECK COAL LIMITED
Client Project #: WLC AWTF
Sampler Initials: LH

RESULTS OF CHEMICAL ANALYSES OF WATER

Maxxam ID		QD5888	QD5889		
Sampling Date		2016/11/28 08:00	2016/11/28 09:00		
COC Number		20161128-AcuteToxici	20161128-AcuteToxici		
	UNITS	LC_WTF_IN_20161128_NP	WL_BFWB_OUT_SP21_20161128_N	RDL	QC Batch
Industrial - Calculated					
Hours of Labour	hr	1.0	1.0	0.01	ONSITE
Daphnia Magna Bioassay					
Mortality	%	ATTACHED	ATTACHED	N/A	8489260
RDL = Reportable Detection Limit N/A = Not Applicable					

Maxxam Job #: B6A6860
Report Date: 2016/12/06

TECK COAL LIMITED
Client Project #: WLC AWTF
Sampler Initials: LH

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.3°C
-----------	-------

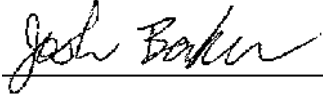
Results relate only to the items tested.

Maxxam Job #: B6A6860
Report Date: 2016/12/06

TECK COAL LIMITED
Client Project #: WLC AWTF
Sampler Initials: LH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Joshua Baker, B.Sc., Senior Analyst

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number : - WLC AWTF

Job Number: B6A6860
Sample Number: QD5889-01

Test Result:

48 hrs Mortality % 0 Statistical Method:

Mean percent mortality:	<u>Sample</u>	0	<u>Control</u>	0
Sample Name :	WL_BFWB_OUT_SP21_20161128_N			Sample Matrix : Water
Description:	clear			<u>Sample Prior to Analysis:</u>
Sample Collected:	Nov 28, 2016 09:00 AM	Sampling Method :	N/A	pH: 7.5
Sample Collected By:	LH	Site Collection:	N/A	Temperature : 18 °C
Sample Received:	Nov 29, 2016 11:23 AM	Volume Received:	1 L	Dissolved Oxygen: 9.6 mg/L
Analysis Start :	Nov 30, 2016 10:53 AM	Temp.Upon Arrival:	2 °C	Sample Conductance: 1664 µS/cm
End :	Dec 02, 2016 10:10 AM	Storage:	2-6°C	Hardness: 800 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	20	7.7	359	7.4	0	0	0	0	20	7.9	354	7.8
0	20	7.8	362	7.5	0	0	0	0	20	8.0	358	7.8
0	20	7.8	362	7.5	0	0	0	0	20	8.0	358	7.8
100	20	7.6	1733	8.2	0	0	0	0	20	8.0	1637	7.9
100	20	7.6	1742	8.2	0	0	0	0	20	8.0	1661	7.8
100	20	7.6	1745	8.2	0	0	0	0	20	8.1	1666	7.8

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	0	0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 160 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
 Organisms per Vessel : 10 Pre-aeration Time : 30 min Rate of Pre-aeration : 25-50 mL/min/L
 Total # of Organisms Used : 60 Test Temperature : 20 ± 2 °C Test Hardness Adjusted : No
 Test Volume : 150 mL Vessel Volume : 225 mL Test pH Adjusted: No
 Loading Density : 15.0 mL/Daphnia Photoperiod : 16:8 (light: dark)

Test Organism : *Daphnia magna* Source : In House Culture
 Age at Test Initiation : <24 hrs Average Brood Size : 23.5
 Culture Photoperiod : 16:8 (light: dark) % Mortality within 7 days : 0
 Culture Temperature : 20 ± 2 °C Time To First Brood : 10 Days
 Culture Diet Pseudokirchnriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: - WLC AWTF

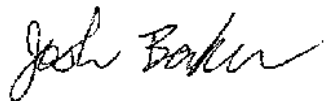
Job Number: B6A6860
Sample Number: QD5889-01

Reference chemical: Sodium Chloride
Test Date: Dec 01, 2016
Test Endpoint 48 hrs LC50 (95% confidence interval) : 6.60 (5.78, 7.52)g/L
Statistical Method : Untrimmed Spearman-Kärber
Historical Mean LC50 (warning limits) : 6.45 (4.58, 9.10) g/L
Concentration : 0,1,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Aynura Rakhmangulova, Chelsea Tessier, Natasha Mouck



Verified By : Joshua Baker, Senior Analyst

Date: Dec 06, 2016 04:18 PM



Acute Toxicity Test Results

WL_BFWB_OUT_SP21 samples collected November 28,
2016

Final Report

December 12, 2016

Submitted to: Teck Coal Ltd.
Sparwood, BC

SAMPLE INFORMATION

Sample ID/ Internal ID	Dates					Receipt temperature
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> 10°C test initiation	<i>Daphnia magna</i> 20°C test initiation	
WL_BFWB_OUT_SP21_20161128_N/ 1617-0445-02	28-Nov-16 at 0900h	29-Nov- 16 at 1020h	30-Nov- 16 at 0830h	29-Nov- 16 at 1345h	29-Nov- 16 at 1345h	11°C

METHODS

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test (conducted at 10°C)

RESULTS

Toxicity test results

Sample ID	Percent survival in 100% (v/v) sample		
	Rainbow trout	<i>Daphnia magna</i> 10°C	<i>Daphnia magna</i> 20°C
WL_BFWB_OUT_SP21_20161128_N	100	100	100

Sample ID	Percent Immobility in 100 (% v/v)	
	<i>Daphnia magna</i> 10°C	<i>Daphnia magna</i> 20°C
WL_BFWB_OUT_SP21_20161128_N	0	0

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i> 10°C	<i>Daphnia magna</i> 20°C
Reference toxicant LC50 (95% CL)	2.9 (2.3-3.5) (g/L KCl) ¹	5.3 (5.0-5.5) g/L NaCl ²	5.3 (5.0-5.5) g/L NaCl ²
Reference toxicant historical mean (2 SD Range)	3.2 (2.3-4.6) (g/L KCl)	5.1 (4.3-6.0) g/L NaCl	5.1 (4.3-6.0) g/L NaCl
Reference toxicant CV	11.2	5.31	5.31
Organism health history	Acceptable	Acceptable	Acceptable
Protocol deviations	None	Test ran at 10°C	None
Water quality range deviations	None	None	None
Control performance	Acceptable	Acceptable	Acceptable
Test performance	Valid	Valid	Valid

¹ Test date, November 23, 2016; ² Test Date November 21, 2016
 CL = Confidence Limit



Report By:
Evan Perdue, BSc
Biologist



Reviewed By:
Claudio Quinteros
Laboratory Technical Lead

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) survival test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Miracle Springs
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	22-L plastic pails with polyethylene liners
Test volume	20 L
Test solution depth	Minimum 15 cm
Test concentrations	100% (undiluted) sample plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	De-chlorinated City of Calgary tap water
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light/8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test Measurements	pH, conductivity, dissolved oxygen and temperature were measured at test initiation and test completion; salinity measured at test initiation; evaluated for survival daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Statistical software	CETIS version 1.9.0.8
Test endpoints	Percent survival
Test acceptability criteria for controls	Survival ≥ 90%
Reference toxicant	Potassium chloride (KCl)

Table 2. Summary of test conditions: 48-h *Daphnia magna* survival test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24 hours
Test type	Static
Test duration	48 hours
Test vessel	385 mL glass jars
Test volume	150 mL
Test concentrations	100% (undiluted) plus laboratory control
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water supplemented with B12 (2 µg/L) and Na ₂ SeO ₄ (2 µg Se/L)
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test measurements	pH, conductivity, dissolved oxygen and temperature measured at test initiation and completion; salinity and hardness measured at test initiation in undiluted sample; evaluated daily for survival
Test protocol	Environment Canada (2000), EPS 1/RM/14
Statistical software	CETIS version 1.9.0.8
Test endpoints	Mean percent survival
Test acceptability criteria for controls	Survival ≥ 90%
Reference toxicant	Sodium chloride (NaCl)

Table 3. Summary of test conditions: 48-h *Daphnia magna* survival test at 10°C

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24 hours
Test type	Static
Test duration	48 hours
Test vessel	385 mL glass jars
Test volume	150 mL
Test concentrations	100% (undiluted) plus laboratory
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water supplemented with B12 (2 µg/L) and Na ₂ SeO ₄ (2 µg Se/L)
Test solution renewal	None
Test temperature	10 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test measurements	pH, conductivity, dissolved oxygen and temperature measured at test initiation and completion; salinity and hardness measured at test initiation in undiluted sample; evaluated daily for survival
Test protocol	Environment Canada (2000), EPS 1/RM/14
Statistical software	CETIS version 1.9.0.8
Test endpoints	Mean percent survival
Test acceptability criteria for controls	Survival ≥ 90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Trout Bench Sheet

Method TRP Client TR2164 Reference 1617-0445-03

Test Log						Sample Information	
Day	Date	Time	Initial	Chem. Cart	Daily Data Review	Initial pH:	
0	2016/11/30	0830	SA	1	JN	7.6	
1	2016/12/01	0800	FP	-	JN	Initial EC (µS/cm):	1943
2	2016/12/02	0815	LC	-	JN	Initial DO (mg/L):	9.2
3	2016/12/03	0930	JN	-	TW	Initial Temp (°C):	13.6
4	2016/12/04	1005	MJTW	-	TW	Salinity (ppt):	0
						Nets used: yes / no	10

Note: *; time when the test was loaded with fish

Sample Pre-Aeration
 Aeration rate adjusted to 6.5 +/- 1 mL/min/L: yes no
 Preaeration time: 0.5 hours 1 hour 1.5 hours 2 hours
 DO(mg/L) of 100%:

4.0			
-----	--	--	--

Test Chemistry and Biology

Conc.	CTL	100					
pH (units) (range: 5.5-8.5)							
Day 0	7.2	7.5					
Day 4	7.8	7.9					
EC (µS/cm)							
Day 0	418	1859					
Day 4	420	1782					
DO (mg/L) (70-100% saturation at test temp.)							
Day 0	8.9	9.0					
Day 4	8.7	8.8					
Temperature (°C) (range: 13.5-16.5 °C)							
Day 0	14.5	14.0					
Day 4	14.2	14.1					
Number Alive (In brackets number stressed)							
Day 0	10	0					
Day 1	10	10					
Day 2	10	10					
Day 3	10	10					
Day 4	10	10					

Validity Criteria: must be ≤ 10% mortality and/or stressed behavior in the control
 Unless otherwise noted, behavior is considered to be normal

Control Organism Data			Test Organism Information		
Control Fish	Length (cm)	Weight (g)			
1	2.4	0.2	Loading Density (g/L):	0.135	
2	2.6	0.3		Mean Length (cm):	2.7
3	2.5	0.3	Length Range (cm):		2.3-2.9
4	2.7	0.3		Mean Weight (g):	0.3
5	2.6	0.3	Weight Range (g):		0.2-0.3
6	2.3	0.2			
7	2.9	0.3			
8	2.9	0.3			
9	2.9	0.3			
10	2.8	0.3			

Batch: 20161109TR
 Source: Miracle Springs
 Days Held: 21
 Percent stock mortality (7 days prior to test, must be ≤2%): 0.1
 Test Volume (L): 202

Comments :

10°C

Method DAS 109

Client TEC164

Reference 1617-0445-02

Test Log

Sample Information

Day	Date	Time	Technician	Chem. Cart	Daily Data Review	Initial pH:	Initial EC (µS/cm):	Initial DO (mg/L):	Initial Temp (°C):	Salinity (ppt):
0	2016/11/29	1345	TWIEP	3	ML	7.6	1943	9.2	13.6	0
1	2016/11/30	1000	TWIEP	-	JN					
2	2016/12/01	1145	LC	3	HS					

Lab Code	C1A	C1B	C1C	100A	100B	100C

day pH (units) (range: 6.0-8.5)

0	7.6	7.7	7.7	7.5	7.5	7.5			
2	7.9	7.8	7.7	8.0	8.0	8.0			

EC (µS/cm)

0	307	304	304	1776	1783	1787			
2	333	325	328	1815	1830	1850			

DO (mg/L) (40-100% saturation at test temp.)

0	9.3	9.4	9.4	9.1	9.1	9.0			
2	9.0	8.9	9.2	9.2	9.2	9.2			

Temperature (°C) (range: 17.5-22.5 °C)

0	11.4	11.8	11.7	12.0	11.8	11.7			
2	11.7	11.5	11.1	10.9	11.1	11.2			

Number Alive
(F, floating; I, immobile; B, stuck on bubble; D, caught in debris)

0	10	10	10	10	10	10			
1	10	10	10	10	10	10			
2	10	10	10	10	10	10			

Validity Criteria: must be ≤ 10% mortality and/or abnormal behavior in the control
Notes: Immobile; daphnid can't swim after 60 sec. even if antenna still move
Unless otherwise noted, behaviour is considered to be normal

Culture
Young jar CA Jar(s) mortality 7 days prior to test (must be ≤25%) 0%

QA (previous month)
Days to first brood (≤12 days) 9
Average number of young produced (≥15 young) 16.9
Were test treatments randomized on test tray? Yes / No

Sample
DO % of sample prior to aeration: 95% Is aeration required (<40% or >100%)? Yes or No
Duration of aeration (37.5 +/- 12.5 mL/min/L): - Filtered with 110µm screen prior to testing Yes or No
Hardness (mg CaCO₃/L) of 100%: 1044 Is hardness adjustment required (<25 mg CaCO₃/L)? Yes or No
Hardness of sample after adjustment (must be between 25 - 30 mg CaCO₃/L) -

Dilution Water
Pail label / preparation date Pail H: 11/25 Weekly water hardness (mg/L) 85

Comments: * glass jars, 24 hr updates

20°C

Method DAS 20°C

Client TEC164

Reference 1617-0445-02

Test Log

Day	Date	Time	Technician	Chem. Cart	Daily Data Review	Sample Information
0	2016/11/29	1345	RW/EP	3	ML	Initial pH: <u>7.6</u>
1	2016/11/30	1000	RW/EP	-	JN	Initial EC (µS/cm): <u>1943</u>
2	2016/12/01	1140	LC	3	HS	Initial DO (mg/L): <u>9.2</u>
						Initial Temp (°C): <u>13.6</u>
						Salinity (ppt): <u>0</u>

Lab Code	CTA	CTB	CTC	100A	100B	100C

day

	pH (units) (range: 6.0-8.5)					
0	7.9	7.9	7.8	7.9	7.9	7.9
2	7.9	7.9	7.8	8.0	8.0	8.0

	EC (µS/cm)					
0	289	301	302	1746	1757	1753
2	316	319	316	1721	1733	1752

	DO (mg/L) (40-100% saturation at test temp.)					
0	7.8	7.9	7.9	7.9	8.2	8.2
2	7.8	7.7	7.7	7.7	7.7	7.7

	Temperature (°C) (range: 17.5-22.5 °C)					
0	18.7	18.5	18.5	18.2	18.1	18.2
2	20.5	20.5	20.3	20.4	20.4	20.3

	Number Alive (F, floating; I, immobile; B, stuck on bubble; D, caught in debris)					
0	10 ⁰	10	10	10	10	10
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Validity Criteria: must be ≤ 10% mortality and/or abnormal behavior in the control

Notes: Immobile; daphnid can't swim after 60 sec. even if antenna still move

Unless otherwise noted, behaviour is considered to be normal

Culture
 Young jar C3 Jar(s) mortality 7 days prior to test (must be ≤25%) 0%

QA (previous month)
 Days to first brood (≤12 days) 9
 Average number of young produced (≥15 young) 16.9
 Were test treatments randomized on test tray? Yes / No

Sample
 DO % of sample prior to aeration: 110% Is aeration required (<40% or >100%)? Yes or No
 Duration of aeration (37.5 +/- 12.5 mL/min/L): 30 mins Filtered with 110µm screen prior to testing Yes or No
 Hardness (mg CaCO₃/L) of 100%: 1044 Is hardness adjustment required (<25 mg CaCO₃/L)? Yes or No
 Hardness of sample after adjustment (must be between 25 - 30 mg CaCO₃/L) -

Dilution Water
 Pail label / preparation date Pail H: 11/25 Weekly water hardness (mg/L) 85

Comments: * glass jars, 24 hr updates

APPENDIX C – Chain-of-custody form

END OF REPORT



Acute Toxicity Test Results

WLC AWTF samples collected December 5, 2016

Final Report

December 15, 2016

Submitted to: **Teck Coal Ltd.**
Sparwood, BC

SAMPLE INFORMATION

Sample ID/ Internal ID	Dates					Receipt temperature
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> 10°C test initiation	<i>Daphnia magna</i> 20°C test initiation	
LC_WTF_IN_20161205_NP/ 1617-0467-01	5-Dec- 16 at 0800h	6-Dec- 16 at 1000h	7-Dec- 16 at 1430h	6-Dec- 16 at 1440h	6-Dec- 16 at 1440h	10°C
WL_BFWB_OUT_SP21_20161205_N/ 1617-0467-02	5-Dec- 16 at 0800h	6-Dec- 16 at 1000h	7-Dec- 16 at 1430h	6-Dec- 16 at 1440h	6-Dec- 16 at 1440h	10°C

TEST TYPES

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test (conducted at 10°C)

RESULTS

Toxicity test results

Sample ID	Percent survival in 100% (v/v) sample		
	Rainbow trout	<i>Daphnia magna</i> 10°C	<i>Daphnia magna</i> 20°C
LC_WTF_IN_20161205_NP	100	100	100
WL_BFWB_OUT_SP21_20161205_N	100	100	100

Sample ID	Percent Immobility in 100 (% v/v)	
	<i>Daphnia magna</i> 10°C	<i>Daphnia magna</i> 20°C
LC_WTF_IN_20161205_NP	0	7
WL_BFWB_OUT_SP21_20161205_N	0	0

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CL)	2.9 (2.3-3.5) g/L KCl ¹	4.9 (4.6-5.3) g/L NaCl ²
Reference toxicant historical mean (2 SD Range)	3.2 (2.3-4.6) g/L KCl	5.0 (4.4-5.8) g/L NaCl
Reference toxicant CV	11.2%	4.8%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹ Test date, November 23, 2016; ² Test Date December 05, 2016

LC = Lethal Concentration; CL = Confidence Limit



Report By:
Evan Perdue, BSc.
Biologist



Reviewed By:
Claudio Quinteros
Laboratory Technical Lead

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) survival test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Miracle Springs
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	22-L plastic pails with polyethylene liners
Test volume	20 L (depending on size of fish)
Test solution depth	Minimum 15 cm
Test concentrations	100% (undiluted) sample plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	De-chlorinated City of Calgary tap water
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light/8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test Measurements	pH, conductivity, dissolved oxygen and temperature were measured at test initiation and test completion; salinity measured at test initiation; evaluated for survival daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Statistical software	CETIS version 1.9.0.8
Test endpoints	Percent survival for single concentration test
Test acceptability criteria for controls	Survival ≥ 90%
Reference toxicant	Potassium chloride (KCl)

Table 2. Summary of test conditions: 48-h *Daphnia magna* survival test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24 hours
Test type	Static
Test duration	48 hours
Test vessel	375 mL glass vessels
Test volume	150 mL
Test concentrations	100% (undiluted) plus laboratory control
Test replicates	3 per treatment for single concentration test
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water supplemented with B12 (2 µg/L) and Na ₂ SeO ₄ (2 µg Se/L)
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test measurements	pH, conductivity, dissolved oxygen and temperature measured at test initiation and completion; salinity and hardness measured at test initiation in undiluted sample; evaluated daily for survival
Test protocol	Environment Canada (2000), EPS 1/RM/14
Statistical software	CETIS version 1.9.0.8
Test endpoints	Mean percent survival
Test acceptability criteria for controls	Survival ≥ 90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Method TRS

Client TEUBA

Reference 1617-0467-01

Test Log

Sample Information

Day	Date	Time	Initial	Chem. Cart	Daily Data Review	Initial pH:
0	2016/12/07	1430	EP	1	JN	7.9
1	2016/12/08	0830	ML	-	JN	Initial EC (µS/cm): 1743
2	2016/12/09	0945	LC	-	JN	Initial DO (mg/L): 8.8
3	2016/12/10	1000	EP	-	JN	Initial Temp (°C): 16.4
4	2016/12/11	1010	EP	1	JN	Salinity (ppt): 0

Note: *; time when the test was loaded with fish

Sample Pre-Aeration

Aeration rate adjusted to 6.5 +/- 1 mL/min/L: yes / no

Preaeration time

0.5 hours 1 hour 1.5 hours 2 hours

DO(mg/L) of 100%

9.0

Test Chemistry and Biology

Conc. CTL 100

pH (units) (range: 5.5-8.5)

Day 0 7.5 7.8

Day 4 7.7 8.1

EC (µS/cm)

Day 0 433 1820

Day 4 430 1611

DO (mg/L) (70-100% saturation at test temp.)

Day 0 9.0 9.0

Day 4 7.6 8.4

Temperature (°C) (range: 13.5-16.5 °C)

Day 0 14.1 14.0

Day 4 15.0 15.0

Number Alive (In brackets number stressed)

Day 0 10 10

Day 1 10 10

Day 2 10 10

Day 3 10 10

Day 4 10 10

Validity Criteria: must be ≤ 10% mortality and/or stressed behavior in the control
Unless otherwise noted, behavior is considered to be normal

Control Organism Data			Test Organism Information	
Control Fish	Length (cm)	Weight (g)	Batch	
1	3.0	0.3	20161109TR	
2	2.0	0.4	Source	Miracle Springs
3	2.9	0.3	Days Held	28
4	2.4	0.2	Percent stock mortality	0.14%
5	3.0	0.2	(7 days prior to test, must be ≤ 2%)	
6	2.8	0.2	Test Volume (L)	20L
7	2.7	0.3		
8	3.0	0.4		
9	3.0	0.4		
10	2.4	0.2		
Loading Density (g/L):			0.16	
Mean Length (cm):			2.9	
Length Range (cm):			2.4-3.0	
Mean Weight (g):			0.3	
Weight Range (g):			0.2-0.4	
Comments :				

Method TR5 Client TEC164 Reference 1617-0467-02
Test Log

Day	Date	Time	Initial	Chem. Cart	Daily Data Review	Sample Information
0	2016/12/07	1430	EP	1	JN	Initial pH: <u>7.7</u>
1	2016/12/08	0830	EP	-	JN	Initial EC (µS/cm): <u>1878</u>
2	2016/12/09	0945	EP	-	JN	Initial DO (mg/L): <u>9.1</u>
3	2016/12/10	1000	EP	-	JN	Initial Temp (°C): <u>15.7</u>
4	2016/12/11	1000	EP	1	JN	Salinity (ppt): <u>0</u>
						Nets used: yes / <input checked="" type="radio"/> no

Sample Pre-Aeration

 Aeration rate adjusted to 6.5 +/- 1 mL/min/L yes / no
 Preaeration time 0.5 hours 1 hour 1.5 hours 2 hours
 DO(mg/L) of 100% 9.1
Test Chemistry and Biology

 Conc. CTL 100

 pH (units) (range: 5.5-8.5)
 Day 0 7.7 7.5
 Day 4 8.1 8.1

 EC (µS/cm)
 Day 0 429 1878
 Day 4 448 1871

 DO (mg/L) (70-100% saturation at test temp.)
 Day 0 9.0 9.1
 Day 4 8.8 8.8

 Temperature (°C) (range: 13.5-16.5 °C)
 Day 0 14.0 13.7
 Day 4 14.1 14.0

 Number Alive (In brackets number stressed)
 Day 0 10 10
 Day 1 10 10
 Day 2 10 10
 Day 3 10 10
 Day 4 10 9

 Validity Criteria: must be ≤ 10% mortality and/or stressed behavior in the control
 Unless otherwise noted, behavior is considered to be normal

Control Organism Data			Test Organism Information	
Control Fish	Length (cm)	Weight (g)	Batch	
1	3.0	0.3	<u>20161109TR</u>	Source <u>Miracle Springs</u>
2	3.2	0.4		
3	2.8	0.3		
4	3.0	0.3		
5	3.4	0.5		
6	3.0	0.3		
7	2.9	0.3		
8	3.0	0.3		
9	3.0	0.3		
10	3.0	0.4		
Loading Density (g/L): <u>0.17</u>			Days Held <u>28</u>	Percent stock mortality <u>0.14</u>
Mean Length (cm): <u>3.0</u>			(7 days prior to test, must be ≤ 2%)	
Length Range (cm): <u>2.8-3.4</u>			Test Volume (L) <u>20L</u>	
Mean Weight (g): <u>0.3</u>				
Weight Range (g): <u>0.3-0.4</u>				
Comments:				

10°C

Method DAS 10°C

Client TECBY

Reference 1617-0467-01

Test Log

Sample Information

Day	Date	Time	Technician	Chem. Cart	Daily Data Review	Initial pH:	7.9
0	2016/12/06	1440	MWJEP	3	JN	Initial EC (µS/cm):	1743
1	2016/12/07	0845	ML	-	H	Initial DO (mg/L):	8.8
2	2016/12/08	0930	HS	3		Initial Temp (°C):	11.4
						Salinity (ppt):	0

Lab Code	CTLA	CTLB	CTLC	100A	100B	100C

day pH (units) (range: 6.0-8.5)

0	7.8	7.8	7.8	7.8	7.1			
2	7.7	7.7	7.7	8.0	8.0			

EC (µS/cm)

0	323	325	327	1720	1736	1751		
2	340	357	344	1740	1796	1801		

9.1^{sw} DO (mg/L) (40-100% saturation at test temp.)

0	8.0	9.2	9.1	9.3	9.3	9.3		
2	9.4	9.3	9.3	9.3	9.3	9.3		

11.9^{sw} Temperature (°C) (range: 17.5-22.5 °C)

0	11.9	11.7	11.6	11.1	11.2	11.1		
2	11.3	11.2	11.2	11.0	11.0	11.1		

Number Alive
(F, floating; I, immobile; B, stuck on bubble; D, caught in debris)

0	10	10	10	10	10	10		
1	10	10	10	10	10	10		
2	10	10	10	10	10	10		

Validity Criteria: must be ≤ 10% mortality and/or abnormal behavior in the control

Notes: Immobile; daphnid can't swim after 60 sec. even if antenna still move

Unless otherwise noted, behaviour is considered to be normal

Culture
 Young jar C3 Jar(s) mortality 7 days prior to test (must be ≤25%) 0%

QA (previous month)
 Days to first brood (≤12 days) 8
 Average number of young produced (≥15 young) 18.6
 Were test treatments randomized on test tray? Yes / No

Sample
 DO % of sample prior to aeration: 99% Is aeration required (<40% or >100%)? Yes or No
 Duration of aeration (37.5 +/- 12.5 mL/min/L): ~ Filtered with 110µm screen prior to testing Yes or No
 Hardness (mg CaCO₃/L) of 100%: 399 Is hardness adjustment required (<25 mg CaCO₃/L)? Yes or No
 Hardness of sample after adjustment (must be between 25 - 30 mg CaCO₃/L) —

Dilution Water
 Pail label / preparation date N: 11/30 Weekly water hardness (mg/L) 92

Comments: * glass jars, 24 hr updates

20°C

Method DAS 20°C

Client TECBY

Reference 1017-0467-01

Test Log

Day	Date	Time	Technician	Chem. Cart	Daily Data Review	Sample Information	
0	2016/12/06	1440	WJ/EP	3	JN	Initial pH:	7.9
1	2016/12/07	0855	ALL	-	HS	Initial EC (µS/cm):	1743
2	2016/12/08	0930	HS	3		Initial DO (mg/L):	8.8
						Initial Temp (°C):	16.4
						Salinity (ppt):	0

Lab Code	CTLA	CTLB	CTLC	100A	100B	100C			

day

	pH (units) (range: 6.0-8.5)								
0	7.8	7.8	7.8	8.0	8.2	8.2			
2	7.8	7.8	7.8	8.0	8.0	8.0			

	EC (uS/cm)								
0	319	319	325	1684	1688	1687			
2	340	349	351	1649	1722	1725			

	DO (mg/L) (40-100% saturation at test temp.)								
0	8.0	7.9	8.0	8.1	8.1	8.1			
2	7.6	7.6	7.6	7.7	7.7	7.7			

	Temperature (°C) (range: 17.5-22.5 °C)								
0	18.9	18.9	18.8	18.7	18.7	18.7			
2	19.6	19.6	19.8	20.1	19.9	19.9			

	Number Alive (F, floating; I, immobile; B, stuck on bubble; D, caught in debris)								
0	10	10	10	10	10	10			
1	10	10	10	10	10	10			
2	10	10	10	10	10(2)	10			

Validity Criteria: must be ≤ 10% mortality and/or abnormal behavior in the control
 Notes: Immobile; daphnid can't swim after 60 sec. even if antenna still move
 Unless otherwise noted, behaviour is considered to be normal

Culture
 Young jar C1 Jar(s) mortality 7 days prior to test (must be ≤25%) 0%

QA (previous month)
 Days to first brood (≤12 days) 8
 Average number of young produced (≥15 young) 12.6
 Were test treatments randomized on test tray? Yes / No

Sample
 DO % of sample prior to aeration: 114% Is aeration required (<40% or >100%)? Yes or No
 Duration of aeration (37.5 +/- 12.5 mL/min/L): 20 min Filtered with 110um screen prior to testing Yes or No
 Hardness (mg CaCO₃/L) of 100%: 799 Is hardness adjustment required (<25 mg CaCO₃/L)? Yes or No
 Hardness of sample after adjustment (must be between 25 - 30 mg CaCO₃/L) —

Dilution Water
 Pail label / preparation date H:11/30 Weekly water hardness (mg/L) 92

Comments: x glass jars, 24 hr updates

10°C

Method DAS 10°C

Client TECIBU

Reference 1617-0467-02

Test Log

Sample Information

Day	Date	Time	Technician	Chem. Cart	Daily Data Review	Initial pH:	Initial EC (µS/cm):	Initial DO (mg/L):	Initial Temp (°C):	Salinity (ppt):
0	2016/12/06	1440	WIEP	3	JN	7.7	1828	9.1	15.2	0
1	2016/12/07	0815	ALL	-	H					
2	2016/12/08	0930	HS	3						

Lab Code	CTLA	CTB	CTL	KWA	UOB	UOC

day pH (units) (range: 6.0-8.5)

0	7.8	7.8	7.8	7.5	7.5	7.5			
2	7.9	7.8	7.8	7.9	8.0	8.0			

EC (µS/cm)

0	320	325	326	1868	1855	1862			
2	340	345	345	1810	1871	1900			

DO (mg/L) (40-100% saturation at test temp)

0	9.1	9.3	9.3	9.4	9.4	9.4			
2	9.3	9.3	9.3	9.4	9.4	9.4			

Temperature (°C) (range: 17.5-22.5 °C)

0	11.5	11.3	11.3	11.1	11.0	11.1			
2	11.2	11.3	11.3	11.3	11.2	11.2			

Number Alive
(F, floating; I, immobile; B, stuck on bubble; D, caught in debris)

0	10	10	10	10	10	10			
1	10	10	10	10	10	10			
2	10	10	10	10	10	10			

Validity Criteria: must be ≤ 10% mortality and/or abnormal behavior in the control

Notes: Immobile; daphnid can't swim after 60 sec. even if antenna still move

Unless otherwise noted, behaviour is considered to be normal

Culture
 Young jar D2 Jar(s) mortality 7 days prior to test (must be ≤25%) 0%

QA (previous month)
 Days to first brood (≤12 days) 9
 Average number of young produced (≥15 young) 17.2
 Were test treatments randomized on test tray? Yes / No

Sample
 DO % of sample prior to aeration: 94% Is aeration required (<40% or >100%)? Yes or No
 Duration of aeration (37.5 +/- 12.5 mL/min/L): - Filtered with 110µm screen prior to testing Yes or No
 Hardness (mg CaCO₃/L) of 100%: 867 Is hardness adjustment required (<25 mg CaCO₃/L)? Yes or No
 Hardness of sample after adjustment (must be between 25 - 30 mg CaCO₃/L) -

Dilution Water
 Pail label / preparation date H: 11/30 Weekly water hardness (mg/L) 92

Comments: * glass jars, 24 hr updates

80°C

Method DAS 20°C

Client JEC164

Reference 1617-0467-02

Test Log

Day	Date	Time	Technician	Chem. Cart	Daily Data Review	Sample Information	
0	2016/12/06	1440	TW/EP	3	JN	Initial pH:	7.7
1	2016/12/07	0815	NL	-	HS	Initial EC (µS/cm):	1828
2	2016/12/08	0930	HS	3		Initial DO (mg/L):	9.1
						Initial Temp (°C):	15.2
						Salinity (ppt):	0

Lab Code	CT1A	CT1B	CT1C	100A	100B	100C

day

	pH (units) (range: 6.0-8.5)					
0	7.8	7.8	7.8	7.8	7.9	7.9
2	7.8	7.8	7.9	8.0	8.0	8.0

	EC (µS/cm)					
0	321	325	326	1805	1874	1817
2	340	360	351	1818	1865	1908

	DO (mg/L) (40-100% saturation at test temp.)					
0	8.0	8.1	8.1	8.1	8.1	8.0
2	7.7	7.7	7.8	7.9	7.9	7.9

	Temperature (°C) (range: 17.5-22.5 °C)					
0	18.7	18.6	18.6	18.8	18.9	19.0
2	19.7	19.7	19.7	19.7	19.7	19.8

Number Alive
(F, floating; I, immobile; B, stuck on bubble; D, caught in debris)

0	10	10	10	10	10	10
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Validity Criteria: must be ≤ 10% mortality and/or abnormal behavior in the control
Notes: Immobile; daphnid can't swim after 60 sec. even if antenna still move
Unless otherwise noted, behaviour is considered to be normal

Culture
Young jar D3 Jar(s) mortality 7 days prior to test (must be ≤25%) 0/1

QA (previous month)
Days to first brood (≤12 days) 9
Average number of young produced (≥15 young) 172
Were test treatments randomized on test tray? Yes / No

Sample
DO % of sample prior to aeration: 111.1 Is aeration required (<40% or >100%)? Yes or No
Duration of aeration (37.5 +/- 12.5 mL/min/L): 20 min Filtered with 110µm screen prior to testing Yes or No
Hardness (mg CaCO₃/L) of 100%: 867 Is hardness adjustment required (<25 mg CaCO₃/L)? Yes or No
Hardness of sample after adjustment (must be between 25 - 30 mg CaCO₃/L) —

Dilution Water
Pail label / preparation date H: 11/30 Weekly water hardness (mg/L) 92

Comments: * glass jars 24 hr upstarts

APPENDIX C – Chain-of-custody form

Teck

COC ID: 20161205-AcuteToxicity		TURN/ROUND TIME: REGULAR		RUSH:	
PROJECT/CLIENT INFO				LABORATORY	
Facility Name / Job# WLC AWTF Project Manager Thomas Davidson Email Thomas.Davidson@teck.com Address 15 km North HWY 43 City Sparwood Postal Code V0B 3G0 Phone Number 250.603.9417		Lab Name Nautilus Environmental Lab Contact Jodylyn Hood Email jodylyn@nautilusenvironmental.ca Address #4, 6125 - 12 Street SE City Calgary Postal Code T2H 2K1 Phone Number +1.403.253.7121		Report Delivery Formats Email 1: thomas.davidson@teck.com <input checked="" type="checkbox"/> Excel <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EDD <input checked="" type="checkbox"/> Email 2: teckcoal@equionline.com <input checked="" type="checkbox"/> Excel <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EDD <input checked="" type="checkbox"/> Email 3: teckwclab@epcor.com <input checked="" type="checkbox"/> Excel <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EDD <input checked="" type="checkbox"/> Email 4: (Trans Send teck Lab) <input checked="" type="checkbox"/> Excel <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EDD <input checked="" type="checkbox"/> Email 5: colin.lynch@teck.com <input checked="" type="checkbox"/> Excel <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EDD <input checked="" type="checkbox"/>	
SAMPLE DETAILS				ANALYSIS REQUESTED	
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	DATE/TIME	DATE/TIME
1617-0167-01	LC_WTF_IN_20161205_NP	WS	N	5-Dec-16 0800	
	WL_BPWV_OUT_SPT1_20161205_N	WS	N	5-Dec-16 0900	

906/1206 Good Condition 5x2L cubers
 1000 NO SIZ 6x11 500Ma
 Macphail 100e
 MC

NB OF BOTTLES RETURNED/DESCRIPTION
 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 Jocelyn Traverse
 Sampler's Signature
 Date/Time 5-DEC-16
 Mobile #

REQUISITIONED BY/AFFILIATION
 DATE/TIME
 ACCEPTED BY/AFFILIATION
 DATE/TIME

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

ANALYSIS REQUESTED
 PRELIM. N N N N N
 PH. N N N N N
 NAUT_96Hr_RT_Single_Concentration_Toxicity Test X X X X X
 NAUT_48Hr_DM_Single_Concentration_Toxicity Test @ 10C X X X X X
 NAUT_48Hr_DM_Single_Concentration_Toxicity Test @ 20C X X X X X
 EXTRA X

City Sparwood
 Postal Code V0B 3G0
 Phone Number 250.603.9417
 Province BC
 Country Canada
 City Calgary
 Postal Code T2H 2K1
 Phone Number +1.403.253.7121
 Province AB
 Country Canada
 PO 423148
 Printed in Canada

END OF REPORT

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

Job Number: B6A9165
Sample Number: QE9860-01

Test Result:

48 hrs Mortality % 0 Statistical Method:

Mean percent mortality:	<u>Sample</u>	0	<u>Control</u>	0
Sample Name :	WL_BFWB_OUT_SP21_20161205_N			Sample Matrix : Water
Description:	clear			<u>Sample Prior to Analysis:</u>
Sample Collected:	Dec 05, 2016 09:00 AM	Sampling Method :	N/A	pH: 7.5
Sample Collected By:	JT	Site Collection:	N/A	Temperature : 8 °C
Sample Received:	Dec 06, 2016 09:15 AM	Volume Received:	1 L	Dissolved Oxygen: 10.8 mg/L
Analysis Start :	Dec 07, 2016 10:58 AM	Temp.Upon Arrival:	0 °C	Sample Conductance: 1315 µS/cm
End :	Dec 09, 2016 10:22 AM	Storage:	2-6°C	Hardness: 1000 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	21	7.9	364	7.7	0	0	0	0	20	8.0	358	7.7
0	21	8.0	365	7.7	0	0	0	0	20	8.0	357	7.7
0	21	8.0	364	7.7	0	0	0	0	20	8.1	363	7.8
100	21	7.5	1767	8.4	0	0	0	0	20	8.1	1662	7.7
100	21	7.6	1778	8.5	0	0	0	0	20	8.2	1686	7.8
100	21	7.6	1778	8.4	0	0	1	10.0	20	8.1	1691	7.7

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	0	0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 160 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
 Organisms per Vessel : 10 Pre-aeration Time : 30 min Rate of Pre-aeration : 25-50 mL/min/L
 Total # of Organisms Used : 60 Test Temperature : 20 ± 2 °C Test Hardness Adjusted : No
 Test Volume : 150 mL Vessel Volume : 225 mL Test pH Adjusted: No
 Loading Density : 15.0 mL/Daphnia Photoperiod : 16:8 (light: dark)

Test Organism : *Daphnia magna* Source : In House Culture
 Age at Test Initiation : <24 hrs Average Brood Size : 26.4
 Culture Photoperiod : 16:8 (light: dark) % Mortality within 7 days : 0
 Culture Temperature : 20 ± 2 °C Time To First Brood : 10 Days
 Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: WLC AWTF

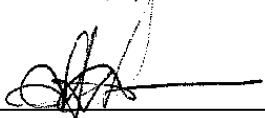
Job Number: B6A9165
Sample Number: QE9860-01

Reference chemical: Sodium Chloride
Test Date: Dec 01, 2016
Test Endpoint 48 hrs LC50 (95% confidence interval) : 6.60 (5.78, 7.52)g/L
Statistical Method : Untrimmed Spearman-Kärber
Historical Mean LC50 (warning limits) : 6.45 (4.58, 9.10) g/L
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Andrea Rowe, Aynura Rakhmangulova, Chelsea Tessier, Natasha Mouck

Verified By : 
Michelle Hospedales, Senior Analyst

Date: Dec 19, 2016 11:54 AM

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: SPARWOOD

Job Number: B6B1087
Sample Number: QG1595-01

Test Result:

48 hrs Mortality % 0 Statistical Method:

Mean percent mortality: Sample 0 Control 0

Sample Name : WL_BFWB_OUT_SP21_20161212_N

Sample Matrix : Water

Description: clear

Sample Prior to Analysis:

Sample Collected: Dec 12, 2016 09:00 AM

Sampling Method : N/A

pH: 7.4

Sample Collected By: JT

Site Collection: N/A

Temperature : 21 °C

Sample Received: Dec 13, 2016 09:56 AM

Volume Received: 1 L

Dissolved Oxygen: 9.3 mg/L

Analysis Start : Dec 15, 2016 02:27 PM

Temp.Upon Arrival: 0 °C

Sample Conductance: 1736 µS/cm

End : Dec 17, 2016 01:46 PM

Storage: 2-6°C

Hardness: 1200 mg CaCO₃/L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	20	8.0	409	8.0	0	0	0	0	19	8.1	430	7.9
0	20	8.0	413	7.9	0	0	0	0	18	8.2	418	8.1
0	20	8.0	413	7.9	0	0	0	0	19	8.1	422	7.9
100	21	7.6	1750	8.0	0	0	0	0	20	8.0	1696	7.4
100	21	7.6	1765	8.0	0	0	0	0	20	8.0	1689	7.3
100	22	7.7	1777	8.0	0	0	0	0	20	8.0	1703	7.4

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	0	0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water

Hardness: 200 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)

Organisms per Vessel : 10 **Pre-aeration Time :** 30 min **Rate of Pre-aeration :** 25-50 mL/min/L

Total # of Organisms Used : 60 **Test Temperature :** 20 ± 2 °C **Test Hardness Adjusted :** No

Test Volume : 150 mL **Vessel Volume :** 225 mL **Test pH Adjusted:** No

Loading Density : 15.0 mL/Daphnia **Photoperiod :** 16:8 (light: dark)

Test Organism : *Daphnia magna* **Source :** In House Culture

Age at Test Initiation : <24 hrs **Average Brood Size :** 23.9

Culture Photoperiod : 16:8 (light: dark) **% Mortality within 7 days :** 0

Culture Temperature : 20 ± 2 °C **Time To First Brood :** 10 Days

Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: SPARWOOD

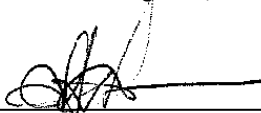
Job Number: B6B1087
Sample Number: QG1595-01

Reference chemical: Sodium Chloride
Test Date: Dec 16, 2016
Test Endpoint 48 hrs LC50 (95% confidence interval) : 6.60 (5.78, 7.52)g/L
Statistical Method : Untrimmed Spearman-Kärber
Historical Mean LC50 (warning limits) : 6.64 (5.25, 8.39) g/L
Concentration : 0,1,25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Aynura Rakhmangulova, Chelsea Tessier



Verified By : Michelle Hospedales, Senior Analyst

Date: Dec 28, 2016 12:27 PM



Acute Toxicity Test Results

WLC AWTF samples collected December 19, 2016

Final Report

December 27, 2016

Submitted to: **Teck Coal Ltd.**
Sparwood, BC

SAMPLE INFORMATION

Sample ID/ Internal ID	Dates					Receipt temperature
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> 10°C test initiation	<i>Daphnia magna</i> 20°C test initiation	
LC_WTF_IN_20161219_NP/ 1617-0516-01	19-Dec-16 at 0800h	19-Dec- 16 at 1615h	23-Dec- 16 at 1130h	20-Dec- 16 at 1410h	20-Dec- 16 at 1410h	15°C
WL_BFWB_OUT_SP21_20161219_N/ 1617-0516-02	19-Dec-16 at 0900h	19-Dec- 16 at 1615h	23-Dec- 16 at 1130h	20-Dec- 16 at 1410h	20-Dec- 16 at 1410h	15°C

TEST TYPES

- Rainbow trout 96-h single concentration screening test, conducted at the Nautilus Burnaby location
- *Daphnia magna* 48-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test (conducted at 10°C)

RESULTS

Toxicity test results

Sample ID	Percent survival in 100% (v/v) sample		
	Rainbow trout	<i>Daphnia magna</i> 10°C	<i>Daphnia magna</i> 20°C
LC_WTF_IN_20161219_NP	100	100	100
WL_BFWB_OUT_SP21_20161219_N	100	100	100

Sample ID	Percent Immobility in 100 (% v/v)	
	<i>Daphnia magna</i> 10°C	<i>Daphnia magna</i> 20°C
LC_WTF_IN_20161219_NP	0	0
WL_BFWB_OUT_SP21_20161219_N	0	0

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CL)	50 (40-62) µg/L Zn ¹	4.7 (4.4-4.9) g/L NaCl ²
Reference toxicant historical mean (2 SD Range)	57 (20-159) µg/L Zn	5.0 (4.4-5.8) g/L NaCl
Reference toxicant CV	67%	4.6%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹Test date, December 19, 2016; ²Test Date December 19, 2016
 LC = Lethal Concentration; CL = Confidence Limit

Harjot Sandhu

Report By:
Harjot Sandhu, BSc
Biologist

M. Lehti

Reviewed By:
Madison Lehti, BSc
Biologist

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) survival test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Commercial hatchery
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquariums
Test volume	10 to 20 L (depending on size of fish)
Test solution depth	Minimum 15 cm
Test concentrations	100% (undiluted) sample plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Municipal dechlorinated water
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light/8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test Measurements	pH, conductivity, dissolved oxygen and temperature were measured at test initiation and test completion; salinity measured at test initiation; evaluated for survival daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Statistical software	CETIS version 1.9.0.8
Test endpoints	Percent survival
Test acceptability criteria for controls	Survival ≥ 90%
Reference toxicant	Zinc (Zn)

Table 2. Summary of test conditions: 48-h *Daphnia magna* survival test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24 hours
Test type	Static
Test duration	48 hours
Test vessel	375 mL glass vessels
Test volume	150 mL
Test concentrations	100% (undiluted) plus laboratory control
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water supplemented with B12 (2 µg/L) and Na ₂ SeO ₄ (2 µg Se/L)
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test measurements	pH, conductivity, dissolved oxygen and temperature measured at test initiation and completion; salinity and hardness measured at test initiation in undiluted sample; evaluated daily for survival
Test protocol	Environment Canada (2000), EPS 1/RM/14
Statistical software	CETIS version 1.9.0.8
Test endpoints	Mean percent survival
Test acceptability criteria for controls	Survival ≥ 90%
Reference toxicant	Sodium chloride (NaCl)

Table 3. Summary of test conditions: 48-h *Daphnia magna* survival test at 10°C

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24 hours
Test type	Static
Test duration	48 hours
Test vessel	375 mL glass vessels
Test volume	150 mL
Test concentrations	100% (undiluted) plus laboratory
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water supplemented with B12 (2 µg/L) and Na ₂ SeO ₄ (2 µg Se/L)
Test solution renewal	None
Test temperature	10 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test measurements	pH, conductivity, dissolved oxygen and temperature measured at test initiation and completion; salinity and hardness measured at test initiation in undiluted sample; evaluated daily for survival
Test protocol	Environment Canada (2000), EPS 1/RM/14
Statistical software	CETIS version 1.9.0.8
Test endpoints	Mean percent survival
Test acceptability criteria for controls	Survival ≥ 90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: Nautilus Calgary

Start Date/Time: Dec 23 /16 @ 11:30h

Work Order No.: 161385

Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: 1617-0516-01
Sample Date: Dec 19 /16
Date Received: Dec 22 /16
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 9
Alkalinity (mg/L CaCO₃): 5

Test Organism Information:

Batch No.: 120516
Source: Spring Valley
No. Fish/Volume (L): 10 / 12L
Loading Density (g/L): 0.42
Mean Length ± SD (mm): 36 ± 2 Range: 33 - 38
Mean Weight ± SD (g): 0.50 ± 0.04 Range: 0.43 - 0.57

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn57
Stock Solution ID: 16Zn02
Date Initiated: Dec 19 /16
96-h LC50 (95% CL): 50.0 (40.2 - 62.2) µg/L Zn

Reference Toxicant Mean and Historical Range: 56.7 (20.2 - 159.0) µg/L Zn
Reference Toxicant CV (%): 67%

Test Results: 100% survival at 96 hours in the undiluted 100% (v/v) sample

Reviewed by: [Signature]

Date reviewed: Jan 5, 2017

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Nautilus Calgary
 Sample I.D. 1617-0516-01
 W.O. # 161385
 RBT Batch #: 120516
 Date Collected/Time: Dec 19 16:00 Not available
 Date Setup/Time: Dec 23/16 @ 11:06
 Sample Setup By: EL

Number Fish/Volume: 10/12L
 7-d % Mortality: 0.2
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L² (VIN): 1

Thermometer: CEH #2 D.O. meter: Z
 Cond./Salinity: Z pH meter: 1

Parameters	Undiluted Sample WQ	
	Initial WQ	Adjustment
Temp °C	14.0	14.0
D.O. (mg/L)	10.3	10.3
pH	8.1	8.1
Cond. (µS/cm)	1784	1784
Salinity (ppt)	0.9	0.9

Concentration	# Survivors												Temperature (°C)			Dissolved Oxygen (mg/L)			pH			Conductivity (µS/cm)
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	
(% v/v)																						
C+1				10	10	10	10	14.0	14.5	14.5	15.0	15.0	10.1	9.9	10.0	9.7	9.7	7.5	7.3	7.2	7.1	7.1
100				10	10	10	10	14.0	14.5	14.5	15.0	15.0	10.3	10.0	9.9	9.7	8.1	8.5	8.6	8.5	8.5	8.5
Initials				EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL	EL

Sample Description/Comments: Clear, colorless, no odour, no particulate.
 Fish Description at 96 h: All fish appear normal Number of Stressed Fish at 96 h: 0

Other Observations: _____
 Reviewed by: EL Date Reviewed: Jan 5, 2017

Rainbow trout (*Oncorhynchus mykiss*) Length and Weight Sheet

Client: Nautilus Calgary
 Sample ID: 1617-0516-31
 W.O. #: 161385

Balance ID: Bal - 2
 Date Measured: Dec 29 / 16
 Batch #: 120516

	Length (mm)	Weight (g)
1	<u>36</u>	<u>0.52</u>
2	<u>36</u>	<u>0.49</u>
3	<u>37</u>	<u>0.43</u>
4	<u>34</u>	<u>0.57</u>
5	<u>33</u>	<u>0.53</u>
6	<u>34</u>	<u>0.48</u>
7	<u>35</u>	<u>0.51</u>
8	<u>36</u>	<u>0.52</u>
9	<u>36</u>	<u>0.51</u>
10	<u>38</u>	<u>0.48</u>

Total	<u>355</u>	<u>5.04</u>
Mean	<u>36</u>	<u>0.50</u>
Std. Dev.	<u>2</u>	<u>0.04</u>
Low	<u>33</u>	<u>0.43</u>
High	<u>38</u>	<u>0.57</u>

Loading Density (g/L) 0.42

Initials JS

Reviewed by: 

Date Reviewed: Jan 4, 2017

10°C

 Method DAS 10°C

 Client TEC 164

 Reference 1617-0516-01
Test Log
Sample Information

Day	Date	Time	Technician	Chem. Cart	Daily Data Review	Initial pH:	Initial EC (µS/cm):	Initial DO (mg/L):	Initial Temp (°C):	Salinity (ppt):
0	2016/12/20	1410	FWI/EP	3	WJ	7.9 FW	1633	6.4	16.7	0
1	2016/12/21	0900	FW	-	EP					
2	2016/12/22	0915	LC	3	HS					

Lab Code	CTVA	CTVB	CTVC	100A	100B	100C

day	pH (units) (range: 6.0-8.5)					
0	7.8	7.8	7.8	7.9	7.9	7.9
2	7.5	7.6	7.6	8.0	8.0	8.1

	EC (µS/cm)					
0	262	270	266	1330	1336	1325
2	252	261	274	1321	1318	1314

	DO (mg/L) (40-100% saturation at test temp.)					
0	9.2	9.2	9.3	9.3	9.1	9.1
2	9.1	9.1	9.1	9.3	9.2	9.3

	Temperature (°C) (range: 17.5-22.5 °C)					
0	11.2	11.2	11.2	11.3	11.2	11.5
2	11.7	11.4	11.6	11.3	11.3	11.5

	Number Alive (F, floating; I, immobile; B, stuck on bubble; D, caught in debris)					
0	10	10	10	10	10	10
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Validity Criteria: must be ≤ 10% mortality and/or abnormal behavior in the control

Notes: Immobile; daphnid can't swim after 60 sec. even if antenna still move

Unless otherwise noted, behaviour is considered to be normal

Culture	Young jar <u>CH</u>	Jar(s) mortality 7 days prior to test (must be ≤25%) <u>0%</u>
QA (previous month)	Days to first brood (≤12 days) <u>9</u>	Average number of young produced (≥15 young) <u>18.6</u>
	Were test treatments randomized on test tray? <input checked="" type="radio"/> Yes / <input type="radio"/> No	
Sample	DO % of sample prior to aeration: <u>95%</u>	Is aeration required (<40% or >100%)? Yes or <input checked="" type="radio"/> No
	Duration of aeration (37.5 +/- 12.5 mL/min/L): <u>—</u>	Filtered with 110µm screen prior to testing Yes or <input checked="" type="radio"/> No
	Hardness (mg CaCO ₃ /L) of 100%: <u>687</u>	Is hardness adjustment required (<25 mg CaCO ₃ /L)? Yes or <input checked="" type="radio"/> No
	Hardness of sample after adjustment (must be between 25 - 30 mg CaCO ₃ /L) <u>—</u>	
Dilution Water	Pail label / preparation date <u>D: 12/14</u>	Weekly water hardness (mg/L) <u>87</u>
Comments:	* in glass jars, 24 hr updates	

Daphnia Bench Sheet

20°C

Method DAS 20°C

Client TEC164

Reference ~~1617-0516-01~~
1617-0516-01 TW

Test Log

Sample Information

Day	Date	Time	Technician	Chem. Cart	Daily Data Review	Initial pH:	Initial EC (µS/cm):	Initial DO (mg/L):	Initial Temp (°C):	Salinity (ppt):
0	2016/12/20	1410	JW/EP	3	<u>W</u>	<u>7.9</u>	<u>1633</u>	<u>0.4</u>	<u>16.7</u>	<u>0</u>
1	2016/12/21	0900	TW	-	<u>W</u>					
2	2016/12/22	0915	LC	3	<u>HS</u>					

Lab Code	CTVA	CTVB	CTVC	100A	100B	100C

day

	pH (units) (range: 6.0-8.5)					
0	7.9	7.9	7.9	8.0	8.1	8.1
2	7.5	7.6	7.6	7.8	7.9	8.0

	EC (µS/cm)					
0	268	269	269	1466	1501	1480
2	248	261	263	1394	1414	1413

	DO (mg/L) (40-100% saturation at test temp.)					
0	7.9	7.9	7.9	8.1	8.1	8.1
2	7.6	7.7	7.7	7.6	7.8	7.7

	Temperature (°C) (range: 17.5-22.5 °C)					
0	19.6	19.6	19.6	19.4	19.4	19.3
2	20.3	20.4	20.5	20.4	20.5	20.6

Number Alive
(F, floating; I, immobile; B, stuck on bubble; D, caught in debris)

0	10	10	10	10	10	10
1	10	10 (ZF)	10	10	10 (IF)	10
2	10	10	10	10	10	10

Validity Criteria: must be ≤ 10% mortality and/or abnormal behavior in the control

Notes: Immobile; daphnid can't swim after 60 sec. even if antenna still move

Unless otherwise noted, behaviour is considered to be normal

Culture
Young jar DS Jar(s) mortality 7 days prior to test (must be ≤25%) 0%

QA (previous month)
Days to first brood (≤12 days) 8
Average number of young produced (≥15 young) 24.5
Were test treatments randomized on test tray? Yes / No

Sample
DO % of sample prior to aeration: 99% Is aeration required (<40% or >100%)? Yes or No
Duration of aeration (37.5 +/- 12.5 mL/min/L): - Filtered with 110µm screen prior to testing Yes or No
Hardness (mg CaCO₃/L) of 100%: 687 Is hardness adjustment required (<25 mg CaCO₃/L)? Yes or No
Hardness of sample after adjustment (must be between 25 - 30 mg CaCO₃/L) -

Dilution Water
Pail label / preparation date D: 12/14 Weekly water hardness (mg/L) 89

Comments: * In glass jars, 24 hr updates

Rainbow Trout Summary Sheet

Client: Nautilus Calgary
Work Order No.: 161385

Start Date/Time: Dec 23 / 16 @ 1130h
Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: 1617-0516-02
Sample Date: Dec 19 / 16
Date Received: Dec 22 / 16
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival

WQ Ranges:

T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 9
Alkalinity (mg/L CaCO₃): 5

Test Organism Information:

Batch No.: 120516
Source: Spring Valley
No. Fish/Volume (L): 10/12L
Loading Density (g/L): 0.36
Mean Length ± SD (mm): 35 ± 1
Mean Weight ± SD (g): 0.50 ± 0.02
Range: 34 - 36
Range: 0.47 - 0.53

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn57
Stock Solution ID: 16Zn02
Date Initiated: Dec 19 / 16
96-h LC50 (95% CL): 50.0 (40.2 - 62.9) µg/L Zn

Reference Toxicant Mean and Historical Range: 56.7 (20.2 - 159.0) µg/L Zn
Reference Toxicant CV (%): 67%

Test Results: 100% survival at 96 hours in the undiluted 100% (v/v) samples

Reviewed by: [Signature]

Date reviewed: Jan 5, 2017

Rainbow trout (*Oncorhynchus mykiss*) Length and Weight Sheet

Client: Nautilus Calgary
 Sample ID: 1617-0516-02
 W.O. #: 161385

Balance ID: Bal - 2
 Date Measured: Dec 27/16
 Batch #: 120516

	Length (mm)	Weight (g)
1	<u>35</u>	<u>0.49</u>
2	<u>35</u>	<u>0.52</u>
3	<u>34</u>	<u>0.51</u>
4	<u>35</u>	<u>0.50</u>
5	<u>36</u>	<u>0.53</u>
6	<u>35</u>	<u>0.51</u>
7	<u>34</u>	<u>0.48</u>
8	<u>35</u>	<u>0.47</u>
9	<u>36</u>	<u>0.53</u>
10	<u> </u>	<u>0.</u>
<hr/>		
Total	<u>315</u>	<u>4.54</u>
Mean	<u>35</u>	<u>0.50</u>
Std. Dev.	<u>1</u>	<u>0.22 0.02</u>
Low	<u>34</u>	<u>0.47</u>
High	<u>36</u>	<u>0.53</u>

Loading Density (g/L) 0.38

Initials OS

Reviewed by: 

Date Reviewed: Jan 4, 2017

10°C

Method DAS 10°C

Client TECBU

Reference 1617-0516-02

Test Log

Sample Information

Day	Date	Time	Technician	Chem. Cart	Daily Data Review	Initial pH:	Initial EC (µS/cm):	Initial DO (mg/L):	Initial Temp (°C):	Salinity (ppt):
0	2016/12/20	1416	JWIEP	3	<i>ML</i>	7.5	1823	7.3	16.3	0
1	2016/12/21	0900	FW	-	<i>EP</i>					
2	2016/12/22	0920	LC	3	<i>HS</i>					

Lab Code	CTVA	CTVB	CTC	100A	100B	100C

day

	pH (units) (range: 6.0-8.5)					
0	7.8	7.8	7.8	7.6	7.7	7.7
2	7.9	7.8	7.7	7.9	8.0	8.0

	EC (µS/cm)					
0	263	266	265	1506	1573	1523
2	334	288	276	1482	1416	1532

	DO (mg/L) (40-100% saturation at test temp.)					
0	9.0	9.1	9.0	9.0	9.0	9.5
2	9.2	9.3	9.2	9.1	9.1	9.2

	Temperature (°C) (range: 17.5-22.5 °C)					
0	11.3	11.4	11.4	11.0	11.1	11.1
2	11.8	11.6	11.5	11.4	11.4	11.3

Number Alive
(F, floating; I, immobile; B, stuck on bubble; D, caught in debris)

0	10	10	10	10	10	10
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Validity Criteria: must be ≤ 10% mortality and/or abnormal behavior in the control

Notes: Immobile; daphnid can't swim after 60 sec. even if antenna still move

Unless otherwise noted, behaviour is considered to be normal

Culture
 Young jar CH Jar(s) mortality 7 days prior to test (must be ≤25%) 0%

QA (previous month)
 Days to first brood (≤12 days) 9
 Average number of young produced (≥15 young) 18.6
 Were test treatments randomized on test tray? Yes / No

Sample
 DO % of sample prior to aeration: 5% Is aeration required (<40% or >100%)? Yes or No
 Duration of aeration (37.5 +/- 12.5 mL/min/L): 99% Filtered with 110µm screen prior to testing Yes or No
 Hardness (mg CaCO₃/L) of 100%: 1010 Is hardness adjustment required (<25 mg CaCO₃/L)? Yes or No
 Hardness of sample after adjustment (must be between 25 - 30 mg CaCO₃/L) -

Dilution Water
 Pail label / preparation date D:12/14 Weekly water hardness (mg/L) 89

Comments: * in glass jars, 24 hr updates

20°C

Method DAS 20°C

Client TECIBY

Reference 1617-0516-03

Test Log

Sample Information

Day	Date	Time	Technician	Chem. Cart	Daily Data Review	Initial pH:	Initial EC (µS/cm):	Initial DO (mg/L):	Initial Temp (°C):	Salinity (ppt):
0	2016/12/20	1410	JWIEP	3		7.5	1823	7.3	16.3	0
1	2016/12/21	0900	JW	-	LL FP					
2	2016/12/22	0920	LC	3	HS					

Lab Code	CUA	CUB	CUC	100A	100B	100C

day

	pH (units) (range: 6.0-8.5)					
0	7.9	7.9	7.9	7.8	7.8	7.8
2	7.9	7.8	7.8	7.9	8.0	8.0

	EC (µS/cm)					
0	263	264	256	1522	1545	1533
2	271	264	270	1434	1463	1483

	DO (mg/L) (40-100% saturation at test temp.)					
0	7.9	7.9	7.9	8.1	8.1	
2	7.7	7.8	7.7	7.9	7.9	7.8

	Temperature (°C) (range: 17.5-22.5 °C)					
0	19.6	19.5	19.5	19.4	19.4	19.3
2	20.2	20.3	20.1	20.4	20.4	20.2

	Number Alive (F, floating; I, immobile; B, stuck on bubble; D, caught in debris)					
0	10	10	10	10	10	10
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Validity Criteria: must be ≤ 10% mortality and/or abnormal behavior in the control

Notes: Immobile; daphnid can't swim after 60 sec. even if antenna still move

Unless otherwise noted, behaviour is considered to be normal

Culture
 Young jar D4 Jar(s) mortality 7 days prior to test (must be ≤25%) 0%

QA (previous month)
 Days to first brood (≤12 days) 8
 Average number of young produced (≥15 young) 24.5
 Were test treatments randomized on test tray? Yes / No

Sample
 DO % of sample prior to aeration: 99% Is aeration required (<40% or >100%)? Yes or No
 Duration of aeration (37.5 +/- 12.5 mL/min/L): - Filtered with 110µm screen prior to testing Yes or No
 Hardness (mg CaCO₃/L) of 100%: 1010 Is hardness adjustment required (<25 mg CaCO₃/L)? Yes or No
 Hardness of sample after adjustment (must be between 25 - 30 mg CaCO₃/L) -

Dilution Water
 Pail label / preparation date 0:12/14 Weekly water hardness (mg/L) 89

Comments: * in glass jars. 24 hr updates

APPENDIX C – Chain-of-custody form

Teck

COC ID: 20161219-Acute Toxicity

TURNAROUND TIME:

REGULAR

RUSH:

PROJECT/CLIENT INFO

Facility Name / Job# WLC AWT#
 Project Manager Thomas Davidson
 Email Thomas.Davidson@teck.com
 Address 13 Km North HWY 43

Lab Name Nautilus Environmental
 Lab Contact Jacklyn Pool
 Email Jacklyn@NautilusEnvironmental.ca
 Address #4, 6125 - 12 Street SE

Report Delivery Formats
 Email 1: thomas.davidson@teck.com
 Email 2: teckcanada@equinonline.com
 Email 3: teckwclab@epcor.com
 Email 4: Chris.Snow@teck.com
 Email 5: colin.lynch@teck.com

City Sparwood
 Postal Code V0B 2G0
 Phone Number 250.603.9417

Province BC
 Country Canada

City Calgary
 Postal Code T2H 2K1
 Phone Number +1.403.253.7121

Province AB
 Country Canada

PO 411614

Preferred - Report to Lab, PO point of contact

Excel PDF EDD

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

X X X

END OF REPORT

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number : - WLC AWTF

Job Number: B6B3064
Sample Number: QH3079-01

Test Result:

48 hrs Mortality % 0 Statistical Method:

Mean percent mortality:	<u>Sample</u>	0	<u>Control</u>	0
Sample Name :	WL_BFWB_OUT_SP21_20161219_N			Sample Matrix : Water
Description:	clear			<u>Sample Prior to Analysis:</u>
Sample Collected:	Dec 19, 2016 09:00 AM	Sampling Method :	N/A	pH: 7.3
Sample Collected By:	JT	Site Collection:	N/A	Temperature : 21 °C
Sample Received:	Dec 20, 2016 09:21 AM	Volume Received:	1 L	Dissolved Oxygen: 9.0 mg/L
Analysis Start :	Dec 22, 2016 10:45 AM	Temp.Upon Arrival:	5 °C	Sample Conductance: 1777 µS/cm
End :	Dec 24, 2016 10:37 AM	Storage:	2-6°C	Hardness: 1200 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	20	7.9	381	8.0	0	0	0	0	20	8.0	385	7.9
0	20	8.0	384	8.0	0	0	0	0	20	8.2	403	7.8
0	20	8.0	385	7.9	0	0	0	0	20	7.8	393	7.8
100	21	7.4	1773	8.2	0	0	0	0	20	8.0	1690	7.7
100	21	7.5	1787	8.2	0	0	0	0	20	8.0	1727	7.8
100	21	7.5	1788	8.2	0	0	0	0	20	8.0	1752	7.6

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	0	0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 200 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
 Organisms per Vessel : 10 Pre-aeration Time : 30 min Rate of Pre-aeration : 25-50 mL/min/L
 Total # of Organisms Used : 58 Test Temperature : 20 ± 2 °C Test Hardness Adjusted : No
 Test Volume : 150 mL Vessel Volume : 225 mL Test pH Adjusted: No
 Loading Density : 15.0 mL/Daphnia Photoperiod : 16:8 (light: dark)

Test Organism : *Daphnia magna* Source : In House Culture
 Age at Test Initiation : <24 hrs Average Brood Size : 23.6
 Culture Photoperiod : 16:8 (light: dark) % Mortality within 7 days : 0
 Culture Temperature : 20 ± 2 °C Time To First Brood : 8 Days
 Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: - WLC AWTF

Job Number: B6B3064
Sample Number: QH3079-01

Reference chemical: Sodium Chloride
Test Date: Dec 16, 2016
Test Endpoint 48 hrs LC50 (95% confidence interval) : 6.60 (5.78, 7.52)g/L
Statistical Method : Untrimmed Spearman-Kärber
Historical Mean LC50 (warning limits) : 6.64 (5.25, 8.39) g/L
Concentration : 0,1.25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: Replicate B of the control concentration was analyzed with 8 neonates. The reference method specifies the use of 10 neonates per replicate. All other culture and test quality indicators met requirements.

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Aynura Rakhmangulova, Chelsea Tessier, Michelle Hospedales, Natasha Mouck



Verified By : Michelle Hospedales, Senior Analyst

Date: Dec 29, 2016 11:40 AM



Acute Toxicity Test Results

WL_BFWB_OUT_SP21 samples collected December 27,
2016

Final Report

January 16, 2017

Submitted to: **Teck Coal Ltd.**
Sparwood, BC

SAMPLE INFORMATION

Sample ID/ Internal ID	Dates					Receipt temperature
	Collected	Received	Rainbow trout test initiation	<i>Daphnia magna</i> 10°C test initiation	<i>Daphnia magna</i> 20°C test initiation	
WL_BFWB_OUT_SP21_20161227_N/ 1617-0532-02	27-Dec-16	27-Dec-16 at 1430h	30-Dec-16 at 0930h	28-Dec-16 at 1500h	28-Dec-16 at 1450h	4.5°C

TEST TYPES

- Rainbow trout 96-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test
- *Daphnia magna* 48-h single concentration screening test (conducted at 10°C)

RESULTS

Toxicity test results

Sample ID	Percent survival in 100% (v/v) sample		
	Rainbow trout	<i>Daphnia magna</i> 10°C	<i>Daphnia magna</i> 20°C
WL_BFWB_OUT_SP21_20161227_N	100	100	100

Sample ID	Percent Immobility in 100 (% v/v)	
	<i>Daphnia magna</i> 10°C	<i>Daphnia magna</i> 20°C
WL_BFWB_OUT_SP21_20161227_N	0	0

QA/QC

QA/QC summary	Rainbow trout	<i>Daphnia magna</i>
Reference toxicant LC50 (95% CL)	50.0 (40-62) µg/L Zn ¹	4.7 (4.4-4.9) g/L NaCl ²
Reference toxicant historical mean (2 SD Range)	57 (20-159) µg/L Zn	5.0 (4.4-5.8) g/L NaCl
Reference toxicant CV	67%	4.6%
Organism health history	Acceptable	Acceptable
Protocol deviations	None	None
Water quality range deviations	None	None
Control performance	Acceptable	Acceptable
Test performance	Valid	Valid

¹ Test date, December 19, 2016; ² Test Date December 12, 2016

LC = Lethal Concentration; CL = Confidence Limit

Harjot Sandhu

Report By:
Harjot Sandhu, BSc
Biologist

Claudio Quinteros

Reviewed By:
Claudio Quinteros
Laboratory Technical Lead

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.

APPENDIX A – Summary of test conditions

Table 1. Summary of test conditions: 96-h rainbow trout (*Oncorhynchus mykiss*) survival test.

Test species	<i>Oncorhynchus mykiss</i>
Organism source	Spring Valley
Organism age	Juvenile
Test type	Static
Test duration	96 hours
Test vessel	20-L glass aquarium
Test volume	15 L
Test solution depth	Minimum 15 cm
Test concentrations	100% (undiluted) sample plus laboratory control
Test replicates	1 per treatment
Number of organisms	10 per replicate
Control/dilution water	Municipal dechlorinated water
Test solution renewal	None
Test temperature	15 ± 1°C
Feeding	None
Light intensity	100 to 500 lux
Photoperiod	16 hours light/8 hours dark
Aeration	6.5 ± 1 mL/min/L
Test Measurements	pH, conductivity, dissolved oxygen and temperature were measured at test initiation and test completion; salinity measured at test initiation; evaluated for survival daily
Test protocol	Environment Canada (2000), EPS 1/RM/13, with 2007 & 2016 amendments
Statistical software	CETIS version 1.9.0.8
Test endpoints	Percent survival
Test acceptability criteria for controls	Survival ≥ 90%
Reference toxicant	Zinc (Zn)

Table 2. Summary of test conditions: 48-h *Daphnia magna* survival test.

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24 hours
Test type	Static
Test duration	48 hours
Test vessel	385 mL glass jars
Test volume	150 mL
Test concentrations	100% (undiluted) plus laboratory control
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water supplemented with B12 (2 µg/L) and Na ₂ SeO ₄ (2 µg Se/L)
Test solution renewal	None
Test temperature	20 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test measurements	pH, conductivity, dissolved oxygen and temperature measured at test initiation and completion; salinity and hardness measured at test initiation in undiluted sample; evaluated daily for survival
Test protocol	Environment Canada (2000), EPS 1/RM/14
Statistical software	CETIS version 1.9.0.8
Test endpoints	Mean percent survival
Test acceptability criteria for controls	Survival ≥ 90%
Reference toxicant	Sodium chloride (NaCl)

Table 3. Summary of test conditions: 48-h *Daphnia magna* survival test at 10°C

Test species	<i>Daphnia magna</i>
Organism source	In-house culture
Organism age	<24 hours
Test type	Static
Test duration	48 hours
Test vessel	385 mL glass jars
Test volume	150 mL
Test concentrations	100% (undiluted) plus laboratory
Test replicates	3 per treatment
Number of organisms	10 per replicate
Control/dilution water	Moderately-hard reconstituted water supplemented with B12 (2 µg/L) and Na ₂ SeO ₄ (2 µg Se/L)
Test solution renewal	None
Test temperature	10 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test measurements	pH, conductivity, dissolved oxygen and temperature measured at test initiation and completion; salinity and hardness measured at test initiation in undiluted sample; evaluated daily for survival
Test protocol	Environment Canada (2000), EPS 1/RM/14
Statistical software	CETIS version 1.9.0.8
Test endpoints	Mean percent survival
Test acceptability criteria for controls	Survival ≥ 90%
Reference toxicant	Sodium chloride (NaCl)

APPENDIX B – Toxicity test data

Rainbow Trout Summary Sheet

Client: Nautilus Calgary
Work Order No.: 161391

Start Date/Time: Dec 30 /16 @ 0930h
Test Species: Oncorhynchus mykiss

Sample Information:

Sample ID: 1617-0532-02
Sample Date: Dec 29 /16
Date Received: Dec 29 /16
Sample Volume: 1 x 20 L
Other: /

Test Validity Criteria:

≥ 90% control survival
WQ Ranges:
T (°C) = 15 ± 1; DO (mg/L) = 7.0 to 10.3; pH = 5.5 to 8.5

Dilution Water:

Type: Dechlorinated Municipal Tap Water
Hardness (mg/L CaCO₃): 9
Alkalinity (mg/L CaCO₃): 5

Test Organism Information:

Batch No.: 170516
Source: Spring Valley
No. Fish/Volume (L): 10 / 15L
Loading Density (g/L): 0.43
Mean Length ± SD (mm): 35 ± 1
Mean Weight ± SD (g): 0.65 ± 0.13
Range: 32 - 37
Range: 0.37 - 0.81

Zinc Reference Toxicant Results:

Reference Toxicant ID: RTZn57
Stock Solution ID: 16Zn02
Date Initiated: Dec 19 /16
96-h LC50 (95% CL): 50.0 (40.2 - 62.2) µg/L Zn

Reference Toxicant Mean and Historical Range: 56.7 (20.2 - 159.0) µg/L Zn
Reference Toxicant CV (%): 67%

Test Results: 100% survival at 96 hours in the undiluted
100% (v/v) sample.

Reviewed by: [Signature] Date reviewed: Jan. 9, 2017

96-Hour Rainbow Trout Toxicity Test Data Sheet

Client/Project#: Nautilus (algae)
 Sample I.D. 1617-0532-02
 W.O. # 161391
 RBT Batch #: 120516
 Date Collected/Time: D-2-27/16 (at 16:15 available)
 Date Setup/Time: 0-5-30/16 (at 09:06)
 Sample Setup By: EA

Number Fish/Volume: 10/15L
 7-d % Mortality: 0-1
 Total Pre-aeration Time (mins): 30
 Aeration rate adjusted to 6.5 ± 1 mL/min/L? (Y/N): Y

Parameters	Undiluted Sample WQ	
	Initial WQ	Adjustment
Temp °C	14.0	14.0
D.O. (mg/L)	10.2	10.2
pH	7.5	7.6
Cond. (µS/cm)	1867	1867
Salinity (ppt)	0.9	0.9

Thermometer: CE7242 D.O. meter: 2
 Cond./Salinity: 2 pH meter: 1

Concentration	# Survivors						Temperature (°C)						Dissolved Oxygen (mg/L)						pH						Conductivity (µS/cm)					
	1	2	4	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	24	48	72	96	0	96	
(% v/v)																														
10				10	10	10	9	14.0	15.0	15.0	15.0	15.0	9.6	9.8	9.8	9.4	9.2	6.6	7.2	7.1	7.2	6.8	41	53						
100				10	10	10	10	14.0	15.0	15.0	15.0	15.0	9.6	9.6	9.4	9.3	7.6	8.4	8.4	8.4	8.3	18.67	1801							
Initials				JW	YUN	MG	EL	JW	YUN	MG	EL	JW	YUN	MG	EL	JW	YUN	MG	EL	JW	YUN	MG	EL	EA	EA					

Sample Description/Comments: (clear, colorless, no foam, no particulates)

Fish Description at 96 h All surviving fish appear normal Number of Stressed Fish at 96 h 0

Other Observations: _____

Reviewed by: [Signature] Date Reviewed: Jan. 9, 2017

Rainbow trout (*Oncorhynchus mykiss*) Length and Weight Sheet

Client: Nautilus Calgary
 Sample ID: 1617-0532-02
 W.O. #: 161301

Balance ID: Bal-2
 Date Measured: Jan 31 17
 Batch #: 120516

	Length (mm)	Weight (g)
1	<u>35</u>	<u>0.71</u>
2	<u>36</u>	<u>0.59</u>
3	<u>32</u>	<u>0.37</u>
4	<u>35</u>	<u>0.59</u>
5	<u>34</u>	<u>0.76</u>
6	<u>36</u>	<u>0.62</u>
7	<u>35</u>	<u>0.55</u>
8	<u>37</u>	<u>0.81</u>
9	<u>36</u>	<u>0.74</u>
10	<u>37</u>	<u>0.772</u> <small>4m</small>

Total	<u>353</u>	<u>6.46</u>
Mean	<u>35</u>	<u>0.65</u>
Std. Dev.	<u>1</u>	<u>0.13</u>
Low	<u>32</u>	<u>0.37</u>
High	<u>37</u>	<u>0.81</u>

Loading Density (g/L) EC 0.54 0.43

Initials EC

Reviewed by: 

Date Reviewed: Jan. 9, 2017

Method DAS10^{°C}

 Client TEU64

 Reference 1617-0532-02
Test Log
Sample Information

Day	Date	Time	Technician	Chem. Cart	Daily Data Review	Initial pH:	Initial EC (µS/cm):	Initial DO (mg/L):	Initial Temp (°C):	Salinity (ppt):
0	2016/12/28	1500	JW	3	EP	7.5	1801	7.6	12.3	0
1	2016/12/29	0830	EP	-	EW					
2	2016/12/30	0850	LC	3	ML					

Lab Code	CTA	CDR	CTC	100A	100B	100C				
----------	-----	-----	-----	------	------	------	--	--	--	--

day	pH (units) (range: 6.0-8.5)									
0	7.8	7.8	7.8	7.7	7.7	7.7				
2	7.3	7.5	7.7	7.9	7.9	8.0				

	EC (µS/cm)									
0	228	227	228	1313	1344	1356				
2	239	238	236	1328	1346	1362				

	DO (mg/L) (40-100% saturation at test temp.)									
0	9.3	9.3	9.2	9.4	9.4	9.4				
2	8.9	9.1	9.1	9.2	9.2	9.3				

	Temperature (°C) (range: 17.5-22.5 °C)									
0	11.5	11.4	11.5	10.9	10.9	10.8				
2	11.3	11.5	11.3	11.9	11.9	11.7				

	Number Alive (F, floating; I, immobile; B, stuck on bubble; D, caught in debris)									
0	10	10	10	10	10	10				
1	10	10	10	10	10	10				
2	10	10	10	10	10	10				

Validity Criteria: must be ≤ 10% mortality and/or abnormal behavior in the control

Notes: Immobile; daphnid can't swim after 60 sec. even if antenna still move

Unless otherwise noted, behaviour is considered to be normal

Culture	Young jar <u>D5</u>	Jar(s) mortality 7 days prior to test (must be ≤25%) <u>01.</u>
QA (previous month)	Days to first brood (≤12 days) <u>9</u>	Average number of young produced (≥15 young) <u>20.5</u>
	Were test treatments randomized on test tray? <input checked="" type="radio"/> Yes / <input type="radio"/> No	
Sample	DO % of sample prior to aeration: <u>107.1.</u>	Is aeration required (<40% or >100%)? <input checked="" type="radio"/> Yes or <input type="radio"/> No
	Duration of aeration (37.5 +/- 12.5 mL/min/L): <u>20 min</u>	Filtered with 110µm screen prior to testing <input checked="" type="radio"/> Yes or <input type="radio"/> No
	Hardness (mg CaCO ₃ /L) of 100%: <u>1000</u>	Is hardness adjustment required (<25 mg CaCO ₃ /L)? <input checked="" type="radio"/> Yes or <input type="radio"/> No
	Hardness of sample after adjustment (must be between 25 - 30 mg CaCO ₃ /L) <u>-</u>	
Dilution Water	Pail label / preparation date <u>F:12124</u>	Weekly water hardness (mg/L) <u>89</u>
Comments:	* In glass jars, <u>24 hr update</u>	

Method DAS 20°C

Client TECUB4

Reference 1617-0532-02

Test Log

Day	Date	Time	Technician	Chem. Cart	Daily Data Review
0	2016/12/28	1450	SW	3	EP
1	2016/12/29	0830	EP	-	TW
2	2016/12/30	0840	LC	3	PL

Sample Information

Initial pH:	7.5
Initial EC (µS/cm):	1801
Initial DO (mg/L):	7.6
Initial Temp (°C):	12.3
Salinity (ppt):	0

Lab Code	CRA	CRB	CLC	100A	100B	100C
----------	-----	-----	-----	------	------	------

day pH (units) (range: 6.0-8.5)

0	7.7	7.8	7.8	8.1	8.1	8.1
2	7.6	7.6	7.6	7.8	7.9	8.0

EC (µS/cm)

0	218	226	228	1309	1315	1314
2	220	226	232	1281	1299	1291

DO (mg/L) (40-100% saturation at test temp.)

0	8.0	7.9	8.0	8.1	8.1	8.0
2	7.9	7.9	7.8	7.8	7.8	7.8

Temperature (°C) (range: 17.5-22.5 °C)

0	19.2	19.1	19.1	19.4	19.4	19.5
2	19.9	20.1	20.2	20.4	20.4	20.2

Number Alive
(F, floating; I, immobile; B, stuck on bubble; D, caught in debris)

0	10	10	10	10	10	10
1	10	10	10	10	10	10
2	10	10	10	10	10	10

Validity Criteria: must be ≤ 10% mortality and/or abnormal behavior in the control

Notes: Immobile; daphnid can't swim after 60 sec. even if antenna still move

Unless otherwise noted, behaviour is considered to be normal

Culture
 Young jar D5 Jar(s) mortality 7 days prior to test (must be ≤25%) 0/

QA (previous month)
 Days to first brood (≤12 days) 9
 Average number of young produced (≥15 young) 20.5
 Were test treatments randomized on test tray? Yes / No

Sample
 DO % of sample prior to aeration: 108.1 Is aeration required (<40% or >100%)? Yes or No
 Duration of aeration (37.5 +/- 12.5 mL/min/L): 20 min Filtered with 110µm screen prior to testing Yes or No
 Hardness (mg CaCO3/L) of 100%: 1000 Is hardness adjustment required (<25 mg CaCO3/L)? Yes or No
 Hardness of sample after adjustment (must be between 25 - 30 mg CaCO3/L) —

Dilution Water
 Pail label / preparation date F: 12/24 Weekly water hardness (mg/L) 89

Comments: 4 mg glass jars, 24 hr updates

APPENDIX C – Chain-of-custody form

Teck

COC ID: 20161227-Acute Toxicity

TURNAROUND TIME: REGULAR

RUSH:

OTHER INFO: Report Delivery Formats: Excel, PDF, EDD
 Email 1: thomas.davidson@teck.com
 Email 2: technical@equisonline.com
 Email 3: teckwclab@epcor.com
 Email 4: Chris.Simpson@teck.com
 Email 5: colin.lynych@teck.com

LABORATORY: Nautilus Environmental
 Lab Name: Jacklyn Pool
 Lab Contact: Jacklyn Nautilus Environmental ca
 Address: 44, 6125 - 12 Street SE
 City: Calgary
 Province: AB
 Country: Canada

PROJECT/CLIENT INFO: WLC A WTF
 Project Manager: Thomas Davidson
 Email: Thomas.Davidson@teck.com
 Address: 15 Km North HWY 43

PROVINCE: BC
COUNTRY: Canada

POSTAL CODE: V0B 2G0
PHONE NUMBER: 250.603.9417

POSTAL CODE: T2H 2K1
PHONE NUMBER: +1 403.253.7121

PO: 411634

Sample ID	Sample Location	Field Matrix	Time (2-4hr)	Date	G-Grab C-Comp	# Of Cont.	Hazardous Material (Yes/No)	ANALYSIS REQUESTED				DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME	
								NAUT 96HR RT Single	NAUT 48HR DV Single	NAUT 48HR DV Single	NAUT 48HR DV Single				
LC_WTF_IN_20161227_NP	LC_WTF_IN	WS	G	27-Dec-16	G	3	N	Test Concentration Toxicity	Test Concentration Toxicity	Test Concentration Toxicity	Test @ 10C	Test @ 20C			
WL_BFWB_OUT_SF21_20161227_N	WL_BFWB_OUT_SF21	WS	G	27-Dec-16	G	8	N	Test Concentration Toxicity	NAUT 48HR DV Single	NAUT 48HR DV Single	NAUT 48HR DV Single	NAUT 48HR DV Single			

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

NB OF BOTTLES RETURNED/DESCRIPTION

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:
SAMPLER'S SIGNATURE:
MOBILE #:
DATE/TIME:

1617-0532-6

2016/12/27 ca
 4.5pc
 RW Hotshot
 1430
 No E/S
 BT: 20L carboys, 2x 1L bottles
 good condition

END OF REPORT

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: - WLC AWTF

Job Number: B6B4931
Sample Number: QI3767-01

Test Result:

48 hrs Mortality % 0 Statistical Method:

Mean percent mortality:	<u>Sample</u>	0	<u>Control</u>	0
Sample Name :	WL_BFWB_OUT_SP21_20161227_N			Sample Matrix : Water
Description:	clear			<u>Sample Prior to Analysis:</u>
Sample Collected:	Dec 27, 2016 09:00 AM	Sampling Method :	N/A	pH: 7.4
Sample Collected By:	JT	Site Collection:	N/A	Temperature : 22 °C
Sample Received:	Dec 29, 2016 10:10 AM	Volume Received:	1 L	Dissolved Oxygen: 8.9 mg/L
Analysis Start :	Dec 30, 2016 11:08 AM	Temp.Upon Arrival:	0 °C	Sample Conductance: 1779 µS/cm
End :	Jan 01, 2017 11:05 AM	Storage:	2-6°C	Hardness: 800 mg CaCO ₃ /L

Concentration	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)	Temperature (°C)	pH (pH)	Conductivity (uS/cm)	Dissolved Oxygen (mg/L)
% vol/vol	Start	Start	Start	Start	24 hrs	24 hrs	24 hrs	24 hrs	48 hrs	48 hr	48 hrs	48 hrs
0	20	7.8	363	7.6	0	0	0	0	18	8.2	365	8.1
0	20	7.8	365	7.6	0	0	0	0	19	7.9	371	7.8
0	20	7.9	365	7.6	0	0	0	0	20	7.9	363	7.7
100	21	7.5	1753	8.0	0	0	0	0	19	8.1	1635	7.8
100	21	7.7	1764	8.0	0	0	0	0	20	8.2	1656	7.7
100	21	7.6	1766	8.0	0	0	0	0	20	8.1	1647	7.7

Concentration	Mortality (#)	Mortality (%)	Immobility (#)	Immobility (%)
% vol/vol	48 hrs	48 hrs	48 hrs	48 hrs
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
100	0	0	0	0
100	0	0	0	0
100	0	0	0	0

Comments : None

Culture/Control/Dilution Water: City of Edmonton dechlorinated tap water
Hardness: 200 mg/L CaCO₃ Other parameters available on request.

Test Conditions Test concentration : 0,0,0,100,100,100 (% vol/vol)
 Organisms per Vessel : 10 Pre-aeration Time : 30 min Rate of Pre-aeration : 25-50 mL/min/L
 Total # of Organisms Used : 60 Test Temperature : 20 ± 2 °C Test Hardness Adjusted : No
 Test Volume : 150 mL Vessel Volume : 225 mL Test pH Adjusted: No
 Loading Density : 15.0 mL/Daphnia Photoperiod : 16:8 (light: dark)

Test Organism : *Daphnia magna* Source : In House Culture
 Age at Test Initiation : <24 hrs Average Brood Size : 24.6
 Culture Photoperiod : 16:8 (light: dark) % Mortality within 7 days : 0
 Culture Temperature : 20 ± 2 °C Time To First Brood : 8 Days
 Culture Diet Pseudokirchneriella and YTC at a ratio of 2 mL/L of culture daily. New cultures weekly, 63 daphnids distributed into 6 culture vessels and 3 reproductive vessels.

Client : 3248 TECK COAL LIMITED, Sparwood
Client Project Name & Number: - WLC AWTF

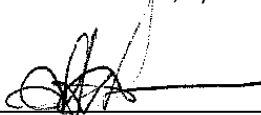
Job Number: B6B4931
Sample Number: QI3767-01

Reference chemical: Sodium Chloride
Test Date: Dec 16, 2016
Test Endpoint 48 hrs LC50 (95% confidence interval) : 6.60 (5.78, 7.52)g/L
Statistical Method : Untrimmed Spearman-Kärber
Historical Mean LC50 (warning limits) : 6.64 (5.25, 8.39) g/L
Concentration : 0,1,25,2.5,5,10,20 g/L

Test Method EPS 1/RM/14
Method Deviations: None

Note: The results contained in this report refer only to the testing of the sample submitted. This report may not be reproduced, except in its entirety, without the written approval of the laboratory.

Analyst : Arthur Juan Mathias, Aynura Rakhmangulova, Chelsea Tessier, Natasha Mouck



Verified By : Michelle Hospedales, Senior Analyst

Date: Jan 06, 2017 02:49 PM



ATTN: Lyudmyla Shvets
ALS Laboratory Group
2559 29th St. N.E.
Calgary, Alberta
Canada T1Y 7B5

Received: 2016/01/19
Report Date: 2016/01/27
Version: FINAL

Test Report

Client: ALS106
Reference: 16-0076
Billing: L1724596

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

Result Summary

Client: ALS106 Reference: 16-0076-01-DAD

Client: ALS Laboratory Group; operation Calgary

Sample: L1724596-2 LC_WTF_OUT_WS_2016-01-11_N

Collection: collected on 2016/01/18 at not given by not given

Receipt: received on 2016/01/19 at 1130 by MC

Containers: received 1 x 1 L bottle at 4 °C, in good condition with no seals and no initials

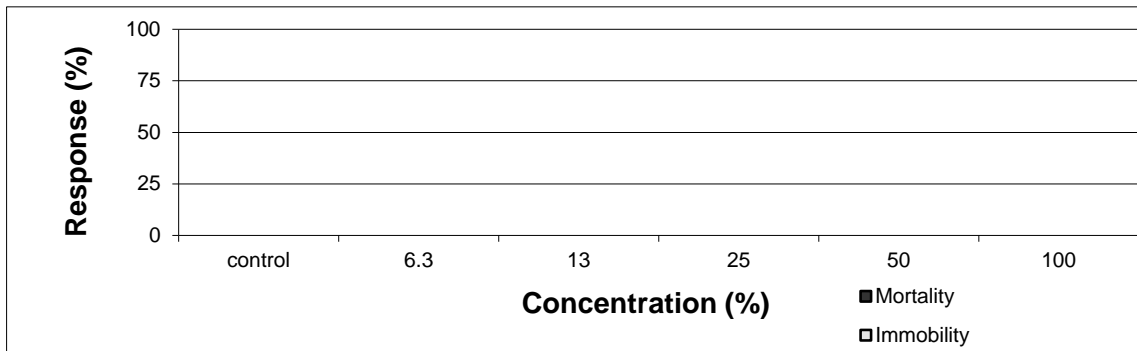
Description: type: water, collection method: not given

Test: started on 2016/01/19 ; ended on 2016/01/21

Result: _____

	Endpoint (48-hour)	Value (%)	Confidence Limits (95%) lower upper	Method Calculated
Acute: (mortality)	LC50	>100		could not be calculated
	LC25	>100		could not be calculated
Acute: (immobility)	EC50	>100		could not be calculated
	EC25	>100		could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0076-01-DAD

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition.

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 10 days to first brood
20 neonates per average brood

Sample initial chemistry: pH: 7.8; EC: 1938 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.7 (mg/L); temperature: 17 °C
hardness (mg CaCO₃/L): 1188; colour: colorless; odour: odourless

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing
The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)
The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control/dilution water: Moderately hard water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₃ (5 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 98 mg CaCO₃/L

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 20 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: ALS106 Reference: 16-0076-01-DAD

Endpoint: Mortality, 48-h LC50 (95% confidence limits)
Immobility, 48-h EC50 (95% confidence limits)
Test validity: The control had 100% survival (must \geq 90%)
Control had 0 percent (%) abnormal behaviour (must \leq 10%, immobility)

Reference toxicant: 48-h test with NaCl initiated January 6, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.72 (0.67-0.76) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.69-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: ALS106
Reference: 16-0076-01-DAD

Test Log:

Date	Day	Time	Technician
2016/01/19	0	1420	JK
2016/01/20	1	0840	HD
2016/01/21	2	1030	EP/DS

Chemistry:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

pH (units)

0	7.9	7.9	8.0	8.0	8.0	8.0		
2	8.0	7.9	8.1	8.1	8.2	8.1		

Conductivity (µS/cm @ 25°C)

0	178	308	448	700	1125	1904		
2	198	343	443	712	1098	1829		

Dissolved Oxygen (mg/L)

0	7.9	7.9	7.9	7.8	7.8	8.3		
2	7.9	7.9	8.0	8.0	7.9	7.9		

Temperature (°C)

0	20	20	20	20	20	18		
2	20	20	20	20	20	20		

Biology:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

Number Alive and Behavior (behavior is in brackets)

1	10	10	10	10	10	10		
2	10	10	10	10	10	10		

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris; nd, not done; na, not applicable;

Mortality (%)

2	0	0	0	0	0	0		
---	---	---	---	---	---	---	--	--

Immobility (%)

2	0	0	0	0	0	0		
---	---	---	---	---	---	---	--	--



Daphnia (48-h LC50/EC50) Test Report

Comments/Statistics

Client: ALS106 Reference: 16-0076-01-DAD

Test Result Comments:

None

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Endpoints for immobility could not be calculated. No effect occurred.

Protocol Deviations:

None

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, H₂S 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.



Rainbow Trout Bioassay Test Report - LC50

Sample ID:	L1724596-2
------------	------------

Summary Results

96-hour LC50 v/v (%):	Non-Lethal
95% Lower Confidence Interval (%):	n/a
95% Upper Confidence Interval (%):	n/a
Method of Calculation:	n/a
Confirmed by Graph:	n/a

Sample Information

Sample Origin:	Teck Coal Limited (West Line Creek)
Sample Description:	LC_WTF_OUT_WS_2016-01-11_N
Sampling Date and Time:	18-Jan-16 09:00
Sampling Method:	Grab
Sampled By:	Jocelyn Traverse
Container(s) Description:	2 x 20L cube containers
Sample Volume:	40L
Date and Time Received:	20-Jan-16 10:00
Transit Irregularities:	None
Storage Temperature (°C):	n/a

Test Information

Test Organism:	Oncorhynchus mykiss
Test Description:	Acute, 96-hour, Static, LC50
Reference Method(s):	EPS 1/RM/13, 2nd Ed. Dec. 2000, with May 2007 amendments, Environment Canada EPS 1/RM/9, May 1996 with May 2007 amendments, Environment Canada
Performed By:	AGJ/DJG
Starting Date and Time:	20-Jan-16 16:30
Deviations from Reference Method:	None



Initial Parameters

Observations

Colour:	Light Yellow		
Odour:	Mild		
Turbidity:	Low		
Solids:	Low		
Hardness (mg/L):	1.8	mL Titration Solution/	1 mL of Sample x 1000 = 1800
Alkalinity (mg/L):	2.9	mL Titration Solution/	10 mL of Sample x 1000 = 290
Temperature (°C):	14.6	Thermometer	S/N 91154465
Dissolved Oxygen (mg/L):	10.48	YSI Dissolved Oxygen Meter	S/N 97A0728 AJ
Conductivity (µmhos/cm):	2110	VWR Portable Conductivity Meter	S/N 51071543
pH (5.5-8.5 pH units):	7.80	VWR SympHony pH Meter	S/N D01908
pH Adjustment:	Not Adjusted		
pH Adjustment Procedure:	n/a		

Pre-Aeration

Aeration Time (min):	30					
Sample Test Concentration (v/v):	100%	50%	25%	12.5%	6.25%	0%
Aeration Rate (5.5-7.5 mL/min/L):	6.1 ± 0.2	6.1 ± 0.2	6.1 ± 0.2	6.1 ± 0.2	6.1 ± 0.2	6.1 ± 0.2
Oxygen (D.O.) Before Pre-Aeration (%):	101.2	n/a	n/a	n/a	n/a	94.4
Average D.O. After Pre-Aeration (%):	99.4	n/a	n/a	n/a	n/a	94.5

Test Organism Data

Lot Number:	23/09/15 T4
Weekly Mortality Preceding Test (%):	0
Sample Size:	10

Conditions Common to All Concentrations During Test

Source of Holding/Dilution Water:	Dechlorinated UV Treated City of Winnipeg Tap Water
Container Description:	20 L Polyethylene Pail with Liner
Aeration Method:	Compressed air bubbled through silica-glass air diffuser
Aeration Rate (5.5-7.5 mL/min/L):	(as set during pre-aeration above)
Test Solution Volume (L):	20
Test Solution Depth (cm):	34
Number of Test Organisms per Container:	10
Loading Density (g/L):	0.38



Conditions During Test

Concentration (% v/v)	Temperature (°C) (15 ± 1°C)					Dissolved Oxygen (mg/L)					pH (pH units)				
	0h	24h	48h	72h	96h	0h	24h	48h	72h	96h	0h	24h	48h	72h	96h
0	15	n/a	n/a	n/a	15	9.45	n/a	n/a	n/a	8.90	7.36	n/a	n/a	n/a	7.44
6.25	15	n/a	n/a	n/a	15	9.70	n/a	n/a	n/a	8.73	7.49	n/a	n/a	n/a	7.55
12.5	15	n/a	n/a	n/a	15	9.80	n/a	n/a	n/a	8.72	7.57	n/a	n/a	n/a	7.70
25	15	n/a	n/a	n/a	15	9.81	n/a	n/a	n/a	8.73	7.67	n/a	n/a	n/a	7.75
50	15	n/a	n/a	n/a	15	10.10	n/a	n/a	n/a	8.71	7.79	n/a	n/a	n/a	7.91
100	15	n/a	n/a	n/a	15	10.40	n/a	n/a	n/a	8.68	7.84	n/a	n/a	n/a	8.04

Conc. (% v/v)	Conductivity (µmhos/cm)	Number of Fish Dead				Number of Fish Stressed			
		0h	24h	48h	72h	96h	24h	48h	72h
0	319	0	0	0	0	0	0	0	0
6.25	456	0	0	0	0	0	0	0	0
12.5	593	0	0	0	0	0	0	0	0
25	827	0	0	0	0	0	0	0	0
50	1298	0	0	0	0	0	0	0	0
100	2080	0	0	0	0	0	0	0	0

Control Fish Information at End of Test

Mean Fork Length (mm):	45
Lower Range Fork Length (mm):	41
Upper Range Fork Length (mm):	48
Mean Wet Weight (g):	0.76



Mortality and Stressed Behaviour Information

Conc. (% v/v)	Mean Number of Fish at End of Test		Mean Rate of Fish at End of Test (%)	
	Dead	Stressed	Dead	Stressed
0	0	0	0	0
6.25	0	0	0	0
12.5	0	0	0	0
25	0	0	0	0
50	0	0	0	0
100	0	0	0	0

Median Lethal Concentration Results for Multi-Concentration Tests

LC50:	Non-Lethal
LC50 Lower 95% Confidence Limit:	n/a
LC50 Upper 95% Confidence Limit:	n/a
Statistical Method:	n/a

Note: Non-lethal = 0 mortality

Reference Toxicant Test Results

Reference Toxicant:	Zinc Sulfate
Date Reference Toxicant Initiated:	21-Jan-16
Recent 96h Reference Toxicant Test LC50 (mg/L Zinc):	0.48
Lower 95% Confidence Limit (mg/L Zinc):	0.30
Upper 95% Confidence Limit (mg/L Zinc):	0.67
Historic Geometric Mean LC50 (mg/L Zinc):	0.71
Lower 95% Confidence Limit (mg/L Zinc):	0.35
Upper 95% Confidence Limit (mg/L Zinc):	1.41
Method of Calculation:	Stephan LC50 Program, Probit
Confirmed by Graph:	Yes



Sublethal Biological Effects

No sublethal biological effects observed.

Observations/Comments

No toxicity observed.



February 4, 2016

Lyudmyla Shvets
ALS Laboratories Group
2559 29 Street NE
Calgary, AB T1Y 7B5

Dear Lyudmyla:

On January 28, 2016, Pollutech EnviroQuatics Limited personnel received a water sample (LC WTF OUT WS 2016-01-26 N L1727615-2) from ALS Laboratories in Calgary. The following acute toxicity test was performed on this sample observing Environment Canada methods:

- Rainbow trout 96-hour LC50 toxicity test according to criteria outlined in "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout", Second Edition, Method Development and Applications Centre, Ottawa, Ontario, Report EPS 1/RM/13, 2000 (with 2007 Amendments).

The result of the acute toxicity test is summarized in the following table.

**Summary of LC50 Toxicity Results for LC WTF OUT WS 2016-01-26 N L1727615-2
Water Sample Collected January 26, 2016**

Sample Name and Sample #	Toxicity Test	Endpoint	Effect	Result ¹
LC WTF OUT WS 2016-01-26 N L1727615-2 #873101602	Rainbow Trout	96-Hour LC50 (95% Confidence)	Mortality	Non-lethal

1 - Results relate only to the sample tested

Toxicity Test Endpoint Descriptions

LC50 The estimated concentration which causes acute lethality to 50% of the test organisms.

The following pages contain the required details for reporting of the acute lethality toxicity tests. If there are any further details which you require, please do not hesitate to contact us.

Sincerely,
Pollutech EnviroQuatics Limited

Rachel (Abma) Giacomin, M.Sc.
QA/QC Leader

File ID: \bioassay\2016\8000\87310\87310ja1 T LC50

bringing clarity to your environment

Rainbow Trout 96-Hour LC50 Toxicity Test

METHOD: Environment Canada, "Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout", Second Edition, Method Development and Applications Section, Ottawa, ON., Report EPS 1/RM/13, 2000 (with 2007 amendments) Pollutech Test Method RT-LC-R12.10.

Test Material

Client Name/Location: ALS Laboratories Group, Calgary, AB

Sample #: 873101602 **Sample Name:** LC WTF OUT WS 2016-01-26 N L1727615-2

Sample Method: Grab **Collected by:** N/A

Date/Time Collected: January 26, 2016; 0900 **Arrival Temp.:** 4.5°C

Date/Time Received: January 28, 2016; 1110 **Sample Description:** Clear, light green

Sample Point Description: Other **Sample Type:** N/A

Transportation: Road/Air

Storage: None

N/A – not available

Test Organisms

Species: Rainbow Trout (*Oncorhynchus mykiss*)

Source: Rainbow Springs Hatchery

Culture Temp.: 15 ± 2°C **Batch Number:** RS121715

Water Source: Dechlorinated municipal drinking water

Mean Weight: 0.56 g **Min:** 0.45 g **Max:** 0.87 g

Mean Fork Length: 39.9 mm **Min:** 35 mm **Max:** 45 mm

Loading Density: 0.28 g/L **Sample Size:** 10 fish

Life Stage: Fry

Number Dead Daily In Previous 7 Days For Fish Culture: 0+1+0+1+0+0+0=2

Previous 7-Day Holding Mortalities For Fish Culture: 0.3%

Rainbow Trout 96-Hour LC50 Toxicity Test - Continued

Sample Number: 873101602

Sample Name: LC WTF OUT WS
2016-01-26 N L1727615-2

Test Conditions

Date/Time Started: January 28, 2016; 1535

Test Volume: 20 L/Vessel **Number of Fish Per Vessel:** 10

of Vessels Per Conc.: 1 **Test Temperature:** 15 ± 1°C

Pre-aeration: Yes **Duration of Pre-aeration:** 120 minutes

Pre-aeration Rate: 6.5 ± 0.26 ml/min·L⁻¹ **Aeration Rate During Test:** 6.5 ± 0.26 ml/min·L⁻¹

Sample Adjustment: No **Sample pH Adjustment:** No

Test Method Deviations: None

Test Facilities



CALA
Testing
Accreditation No. A1225

Testing Laboratory:

Pollutech EnviroQuatics Limited, 704 Mara St.,
Suite 122, Point Edward, Ontario, N7V 1X4

This laboratory is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). The test included in this report is within the scope of this laboratory.

Test Performed By:

E. Pasiak/ K. Ferguson/ C. Hamill/ M. Long

Initial Measurement of Variables in Unadjusted Sample

Cond: 1800 µmhos **DO:** 11.6 mg/L **pH:** 7.8 **Temp:** 14.1 °C

Test Results

Conc'n (% Volume)	NUMBER OF MORTALITIES			
	Time (hours)			
	24	48	72	96
Control	0	0	0	0
6.25	0	0	0	0
12.5	0	0	0	0
25	0	0	0	0
50	0	0	0	0
100	0	0	0	0

Number of Control Fish Showing Atypical/Stressed Behaviour: 0

Rainbow Trout 96-Hour LC50 Toxicity Test - Continued

Sample Number: 873101602

Sample Name: LC WTF OUT WS
2016-01-26 N L1727615-2

Test Results

TOXICITY TEST VARIABLES

Conc'n (% Volume)	Variables	Time (hours)				
		0	24	48	72	96
Control	Cond. (μ mhos)	197				n/r
	DO (mg/L)	10.1				9.5
	pH (units)	7.5				7.8
	Temp. (°C)	14.8				15.1
6.25	Cond. (μ mhos)	355				n/r
	DO (mg/L)	10.1				9.3
	pH (units)	7.6				7.9
	Temp. (°C)	14.6				14.9
12.5	Cond. (μ mhos)	472				n/r
	DO (mg/L)	10.2				9.2
	pH (units)	7.7				8.0
	Temp. (°C)	14.4				14.9
25	Cond. (μ mhos)	674				n/r
	DO (mg/L)	10.3				9.7
	pH (units)	7.8				8.2
	Temp. (°C)	14.2				14.8
50	Cond. (μ mhos)	1105				n/r
	DO (mg/L)	10.5				9.7
	pH (units)	7.8				8.4
	Temp. (°C)	14.1				14.6
100	Cond. (μ mhos)	1778				n/r
	DO (mg/L)	10.8				9.7
	pH (units)	7.8				8.3
	Temp. (°C)	14.2				14.7

n/r = not required

Rainbow Trout 96-Hour LC50 Toxicity Test - Continued

Sample Number: 873101602

Sample Name: LC WTF OUT WS
2016-01-26 N L1727615-2

Summary of Test Results

96-Hour LC50: Non-lethal
95% Confidence Limits: Not Applicable
Analysis Method: No Mortality
Test Results Verified By: R. C. Ferguson

Reference Toxicant Results

Reference Chemical: Zinc **Date Test Initiated:** 01/07/16
Fish Lot #: RS121715 **Method:** Spearman-Kärber ($\alpha = 10\%$)
96-Hour LC50 (95% Confidence Limits): 0.41 mg/L (0.28 mg/L; 0.61 mg/L)
95% Historic Geometric Mean LC50: 0.35 mg/L (0.21 mg/L; 0.59 mg/L)
(Historic Warning Limits) (± 2 Standard Deviations)



Subcontract Request Form

Subcontract To:

POLLUTECH ENVIROQUATICS LTD

704 MARA STREET, SUITE 122
POINT EDWARD, ON N7V 1X4

NOTES: Please reference on final report and invoice: PO# L1727615
ALS requires QC data to be provided with your final results.
Spec. request : 96-hour Trout LC50 PK

Please see enclosed **1** sample(s) in **2** Container(s) *stabilized test RG*

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED	DUE DATE	Priority Flag
L1727615-2 LC_WTF_OUT_WS_2016 -01-26_N	Special Request Pollutech EnviroQuatics (SPECIAL REQUEST -PQ 14)	1/26/2016	2/17/2016	<i>No pH as per client</i>

Subcontract Info Contact: John Forbes (403) 291-9897
Analysis and reporting info contact: Lyudmyla Shvets, B.Sc.
2559 29 STREET NE
CALGARY, AB T1Y 7B5
Phone: (403) 291-9897 Email: Lyudmyla.Shvets@alsglobal.com

Please email confirmation of receipt to: **Lyudmyla.Shvets@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: _____ Date Received: _____

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____



ATTN: Lyudmyla Shvets
ALS Laboratory Group
2559 29th St. N.E.
Calgary, Alberta
Canada T1Y 7B5

Received: 2016/01/27
Report Date: 2016/02/02
Version: FINAL

Test Report

Client: ALS106
Reference: 16-0120
Billing: L1727615

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

Result Summary

Client: ALS106
Reference: 16-0120-01-DAD

Client: ALS Laboratory Group; operation Calgary

Sample: L1727615-2 LC_WTF_OUT_WS_2016-01-26_N

Collection: collected on 2016/01/26 at not given by not given

Receipt: received on 2016/01/27 at 1250 by MC

Containers: received 2 x 1 L bottle at 3 °C, in good condition with no seals and no initials

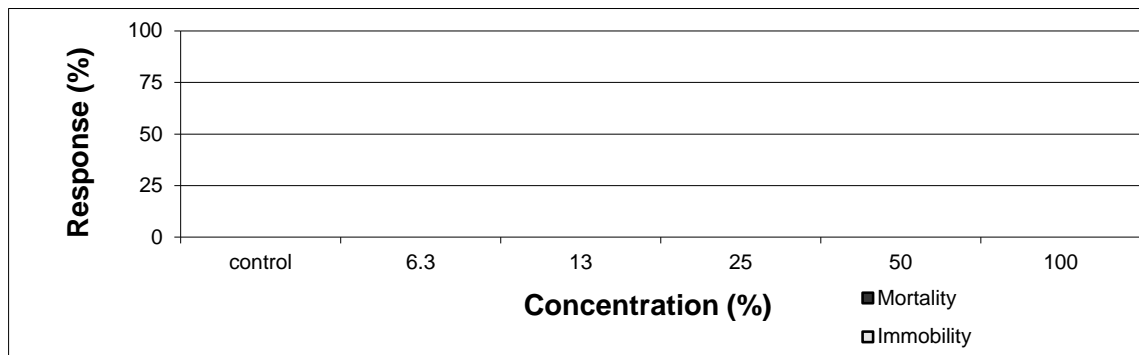
Description: type: water, collection method: not given

Test: started on 2016/01/27 ; ended on 2016/01/29

Result:

	Endpoint (48-hour)	Value (%)	Confidence Limits (95%)		Method Calculated
			lower	upper	
Acute: (mortality)	LC50	>100			could not be calculated
	LC25	>100			could not be calculated
Acute: (immobility)	EC50	>100			could not be calculated
	EC25	>100			could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0120-01-DAD

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition.

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 7%

Culture brood data: 10 days to first brood

20 neonates per average brood

Sample initial chemistry: pH: 8.0; EC: 1909 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 8.9 (mg/L); temperature: 16 °C
hardness (mg CaCO₃/L): 957; colour: colourless; odour: odourless

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: 385 mL plastic vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing

The sample was pre-aerated for 20 minutes (rate of 37.5 \pm 12.5 mL/min.L-1)

The hardness of the sample was not adjusted (mg CaCO₃/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control/dilution water: Moderately hard water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na₂SeO₃ (5 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 93 mg CaCO₃/L

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 20 \pm 2°C

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: ALS106 Reference: 16-0120-01-DAD

Endpoint: Mortality, 48-h LC50 (95% confidence limits)
Immobility, 48-h EC50 (95% confidence limits)

Test validity: The control had 100% survival (must \geq 90%)
Control had 0 percent (%) abnormal behaviour (must \leq 10%, immobility)

Reference toxicant: 48-h test with NaCl initiated January 25, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.79 (0.76-0.81) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.76 (0.69-0.84) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: ALS106
Reference: 16-0120-01-DAD

Test Log:

Date	Day	Time	Technician
2016/01/27	0	1520	JK/JN
2016/01/28	1	0915	JK
2016/01/29	2	0935	JK

Chemistry:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

pH (units)

0	7.9	7.9	7.9	8.1	8.0	8.0		
2	8.0	8.0	8.1	8.1	8.1	8.0		

Conductivity ($\mu\text{S/cm}$ @ 25°C)

0	194	326	452	700	1144	1901		
2	222	338	467	712	1125	1829		

Dissolved Oxygen (mg/L)

0	8.0	8.1	8.0	8.0	7.9	8.8		
2	8.0	8.0	7.9	8.1	7.9	7.9		

Temperature (°C)

0	19	19	19	19	19	18		
2	19	19	19	19	20	20		

Biology:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

Number Alive and Behavior (behavior is in brackets)

1	10	10	10	10	10	10		
2	10	10	10	10	10	10		

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris; nd, not done; na, not applicable;

Mortality (%)

2	0	0	0	0	0	0		
---	---	---	---	---	---	---	--	--

Immobility (%)

2	0	0	0	0	0	0		
---	---	---	---	---	---	---	--	--



***Daphnia* (48-h LC50/EC50) Test Report**

Comments/Statistics

Client: ALS106 Reference: 16-0120-01-DAD

Test Result Comments:

None

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Endpoints for immobility could not be calculated. No effect occurred.

Protocol Deviations:

None

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, H₂S 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.



ATTN: Lyudmyla Shvets
ALS Laboratory Group
2559 29th St. N.E.
Calgary, Alberta
Canada T1Y 7B5

Received: 2016/04/01
Report Date: 2016/04/07
Version: FINAL

Test Report

Client: ALS106
Reference: 16-0374
Billing: L1750561

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



Trout (Single Concentration) Test Report

Result Summary

Client: ALS106
Reference: 16-0374-01-TRS

Client: ALS Laboratory Group; operation Calgary

Sample: L1750561-3 LC_WTF_OUT_WS_03312016_N

Collection: collected on 2016/03/31 at not given by not given

Receipt: received on 2016/04/01 at 1100 by MC

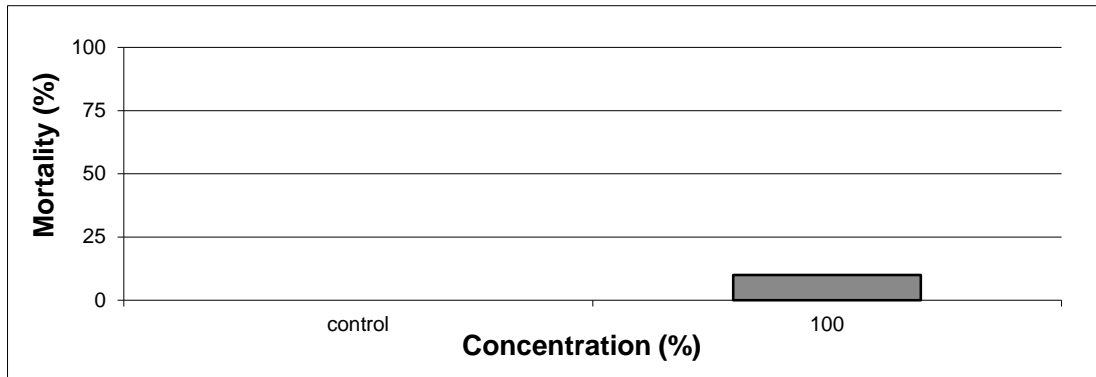
Containers: received 2 x 20 L carboys / 4 x 1 L bottles at 11 °C, in good condition with no seals and no initials

Description: type: water, collection method: not given

Test: started on 2016/04/01 ; ended on 2016/04/05

Result:

Sample	Client Code	Mortality (%)	Comment
control	lab control	0	
100%	LC_WTF_OUT_WS_0 3312016_N	10	none



The test data and results are authorized and verified correct.

Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0374-01-TRS

Method: Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, 2000. Environment Canada, EPS 1/RM/13. Second Edition (amended 2007).

Test type: Trout 96-h Static Acute Test (WTR-ME-041)

Species: *Oncorhynchus mykiss*

Organism source: Miracle Springs (Batch 20160316TR)

Acclimation: 16 days (must be ≥ 2 weeks)

Stock mortality: 0% (seven days preceding testing)

Sample initial chemistry: pH: 7.2; EC: 1983 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.3 (mg/L); temperature: 13 °C
hardness (mg CaCO₃/L): 912; colour: colourless; odour: -

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: 4 \pm 2°C in darkness

Test vessel: The test was conducted in 22 L plastic pails with polyethylene liners

Test volume: 20 Litres (depth of solution in each test vessel $\geq 15\text{cm}$)

Sample pre-treatment: All test solutions and controls were pre-aerated for 30 minutes at 6.5 \pm 1 mL/min/L
Dissolved oxygen in full strength sample was 9.1 mg/L after pre-aeration
The sample was not filtered or pH adjusted prior to or during testing

Loading density: 0.155 g/Litre (must be ≤ 0.5 g/Litre)

Control water: Dechlorinated City of Calgary water acclimated to test conditions

Test concentrations: Undiluted sample plus a negative control

Test replicates: One replicate per treatment; 10 fish per replicate

Feeding: Fish are not fed 24 hours before test initiation and no feeding during test

Measurements: pH, conductivity, dissolved oxygen and temperature measured at test initiation and termination

Aeration: All treatments aerated at 6.5 \pm 1 mL/min/L by oil-free compressed air passed through airline tubes connected to disposable air stones

Lighting: Overhead full spectrum fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: 15 \pm 1°C

Endpoint: Mortality, % mortality at 96-h

Test validity: The control had 100% survival (must $\geq 90\%$)

The control had 0 percent (%) stressed behaviour (must $\leq 10\%$)

Reference toxicant: 96-h test with Potassium Chloride (KCl) initiated March 31, 2016; current results
(96-h LC50 and 95% confidence limits) = 0.50 (0.43-0.55) log (g/L KCl)
historical results:
(96-h LC50 and 95% confidence limits) = 0.58 (0.49-0.67) log (g/L KCl)

Note: Outlined sections are protocol deviations explained on the comment page; v/v, volume per volume



Trout (Single Concentration) Test Report

Test Data

Client: ALS106
Reference: 16-0374-01-TRS

Test Log:

Date	Day	Time	Technician
2016/04/01	0	1405	ML/BH
2016/04/02	1	1020	JW
2016/04/03	2	0845	BH
2016/04/04	3	1015	EP/KLO
2016/04/05	4	1030	DS/HS

Chemistry:

Conc. (%)	control	100
-----------	---------	-----

Day

	pH (units)	
0	8.1	7.3
4	8.2	7.9

Conductivity ($\mu\text{S}/\text{cm}$ @ 25°C)

0	485	1946
4	493	1934

Dissolved Oxygen (mg/L)

0	9.1	9.1
4	8.7	7.7

Temperature (°C)

0	14	14
4	15	15

Number Alive (In brackets number stressed):

Conc. (%)	control	100
-----------	---------	-----

Day

0	10	10
1	10	10
2	10	10
3	10	10
4	10	9

Mortality (%)

4	0	10
---	---	----

Stressed (%)

4	0	0
---	---	---



Trout (Single Concentration) Test Report

Test Data

Client: ALS106
Reference: 16-0374-01-TRS

Biology Summary Tables:

Control Fish	Length (cm)	Wet Weight(g)
1	2.8	0.2
2	2.7	0.5
3	3.1	0.4
4	2.9	0.3
5	3.1	0.3
6	2.8	0.2
7	2.9	0.3
8	2.8	0.2
9	3.1	0.3
10	3.2	0.4

Sample	Group Wet Weight (g)
control	3.1
100	3.5

average	2.9	0.3
sd	0.2	0.1
cv(%)	5.8	32.1

Notes: nd, not done; na, not applicable;
sd, standard deviation; cv(%), coefficient
of variation

Comments/Statistics

Test Result Comments:

None

Data Analysis:

None

Protocol Deviations:

None

Result Summary

Client: ALS106
Reference: 16-0374-01-DAD

Client: ALS Laboratory Group; operation Calgary

Sample: L1750561-3 LC_WTF_OUT_WS_03312016_N

Collection: collected on 2016/03/31 at not given by not given

Receipt: received on 2016/04/01 at 1100 by MC

Containers: received 2 x 20 L carboys / 4 x 1 L bottles at 11 °C, in good condition with no seals and no initials

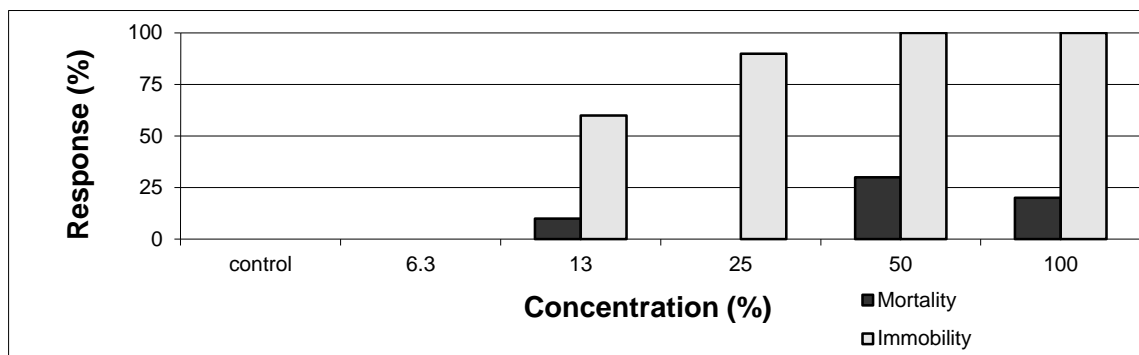
Description: type: water, collection method: not given

Test: started on 2016/04/01 ; ended on 2016/04/03

Result:

	Endpoint (48-hour)	Value (%)	Confidence Limits (95%)		Method Calculated
			lower	upper	
Acute: (mortality)	LC50	>100			could not be calculated
	LC25	>100			could not be calculated
Acute: (immobility)	EC50	13	9.5	17	Log Normal (Probit)
	EC25	9.6	5.9	12	Log Normal (Probit)

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0374-01-DAD

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition.

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 9 days to first brood

29 neonates per average brood

Sample initial chemistry: pH: 7.2; EC: 1983 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.3 (mg/L); temperature: 13 °C
hardness (mg CaCO_3/L): 912; colour: colourless; odour: -

Sample holding time: 1 day (must be \leq 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing

The sample was pre-aerated for 20 minutes (rate of 37.5 ± 12.5 mL/min.L-1)

The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must \leq 1 organism/15 mL)

Control/dilution water: Moderately hard water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 84 mg CaCO_3/L

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $20 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: ALS106 Reference: 16-0374-01-DAD

Endpoint: Mortality, 48-h LC50 (95% confidence limits)
Immobility, 48-h EC50 (95% confidence limits)
Test validity: The control had 100% survival (must \geq 90%)
Control had 0 percent (%) abnormal behaviour (must \leq 10%, immobility)

Reference toxicant: 48-h test with NaCl initiated March 28, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.77 (0.75-0.79) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: ALS106
Reference: 16-0374-01-DAD

Test Log:

Date	Day	Time	Technician
2016/04/01	0	1600	DS/EP/JW
2016/04/02	1	1125	ML
2016/04/03	2	1130	HS

Chemistry:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

pH (units)

0	7.9	7.9	7.8	7.7	7.6	7.5		
2	7.9	7.9	8.0	8.1	8.1	8.1		

Conductivity ($\mu\text{S/cm}$ @ 25°C)

0	339	440	562	772	1157	1806		
2	336	447	571	801	1261	1964		

Dissolved Oxygen (mg/L)

0	8.0	8.0	8.0	8.0	8.0	8.3		
2	8.1	8.2	8.3	8.2	8.2	8.1		

Temperature (°C)

0	20	20	20	20	20	20		
2	20	20	20	20	20	20		

Biology:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

Number Alive and Behavior (behavior is in brackets)

1	10	10	10	10	10(7I)	10(9I)		
2	10	10	9(5I)	10(9I)	7(7I)	8(8I)		

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris; nd, not done; na, not applicable;

Mortality (%)

2	0	0	10	0	30	20		
---	---	---	----	---	----	----	--	--

Immobility (%)

2	0	0	60	90	100	100		
---	---	---	----	----	-----	-----	--	--



Daphnia (48-h LC50/EC50) Test Report

Comments/Statistics

Client: ALS106 Reference: 16-0374-01-DAD

Test Result Comments:

None

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Endpoints for immobility were calculated using a Linear Regression model (Log-Normal Probit) with CETIS v. 1.9.0.8

Protocol Deviations:

None

Result Summary

Client: ALS106
Reference: 16-0374-01-DAD

Client: ALS Laboratory Group; operation Calgary

Sample: L1750561-3 LC_WTF_OUT_WS_03312016_N

Collection: collected on 2016/03/31 at not given by not given

Receipt: received on 2016/04/01 at 1100 by MC

Containers: received 2 x 20 L carboys / 4 x 1 L bottles at 11 °C, in good condition with no seals and no initials

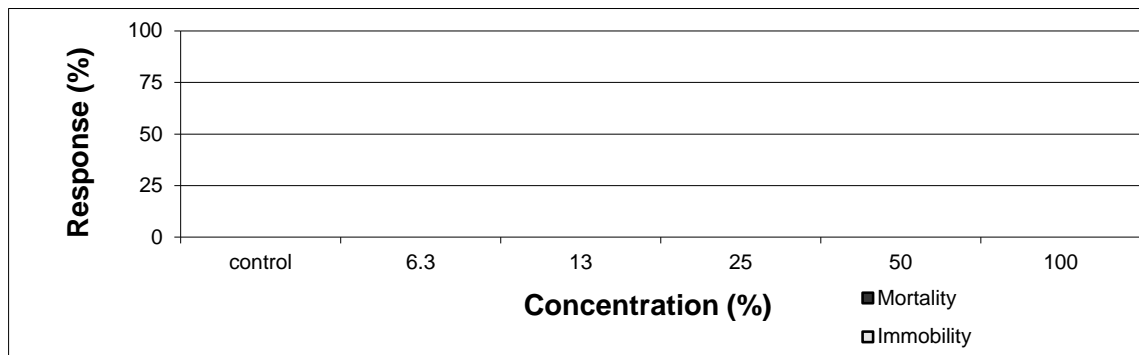
Description: type: water, collection method: not given

Test: started on 2016/04/01 ; ended on 2016/04/03

Result:

	Endpoint (48-hour)	Value (%)	Confidence Limits (95%) lower upper	Method Calculated
Acute: (mortality)	LC50	>100		could not be calculated
	LC25	>100		could not be calculated
Acute: (immobility)	EC50	>100		could not be calculated
	EC25	>100		could not be calculated

Notes: LC25 & LC50, concentrations lethal to 25% and 50% of the test population



The test data and results are authorized and verified correct.



Senior Verifier

Test Conditions

Client: ALS106 Reference: 16-0374-01-DAD

Method: Biological Test method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, 2000. Environ. Can., EPS 1/RM/14. Second Edition.

Test type: *Daphnia* 48-h Static Acute Test (WTR-ME-015)

Species: *Daphnia magna*

Age: < 24 hours old

Organism source: in-house culture

Stock mortality: 0%

Culture brood data: 9 days to first brood

29 neonates per average brood

Sample initial chemistry: pH: 7.2; EC: 1983 ($\mu\text{S}/\text{cm}$ @ 25°C); DO: 9.3 (mg/L); temperature: 13 °C
hardness (mg CaCO_3/L): 912; colour: colourless; odour: -

Sample holding time: 1 day (must be ≤ 5 days)

Sample storage: $4 \pm 2^\circ\text{C}$ in darkness

Test vessel: 375 mL glass vessels

Test volume: 150 mL

Sample pre-treatment: The sample was not filtered or pH adjusted prior to or during testing

The sample was pre-aerated for 0 minutes (rate of 37.5 ± 12.5 mL/min.L-1)

The hardness of the sample was not adjusted (mg CaCO_3/L) prior to or during testing

Loading density: One daphnid/15 mL (must ≤ 1 organism/15 mL)

Control/dilution water: Moderately hard water supplemented with vitamin B12 (2 $\mu\text{g}/\text{L}$)
and Na_2SeO_4 (2 $\mu\text{g}/\text{L}$)

The hardness of the control/dilution water was 89 mg CaCO_3/L

Test concentrations: 5 effluent concentrations (6.3, 12.5, 25, 50, 100% (v/v) plus a negative control)

Test replicates: One replicate per treatment, 10 daphnids per replicate

Feeding: None

Aeration: None

Measurements: pH, conductivity, dissolved oxygen and temperature at test initiation and termination

Lighting: Cool white fluorescent lights

Photoperiod: 16h light:8h dark

Test temperature: $10 \pm 2^\circ\text{C}$

Note: Outlined sections are protocol deviations explained on the comment page

Test Conditions

Client: ALS106 Reference: 16-0374-01-DAD

Endpoint: Mortality, 48-h LC50 (95% confidence limits)
Immobility, 48-h EC50 (95% confidence limits)
Test validity: The control had 100% survival (must \geq 90%)
Control had 0 percent (%) abnormal behaviour (must \leq 10%, immobility)

Reference toxicant: 48-h test with NaCl initiated March 28, 2016; current results
(48-h LC50 and 95% confidence limits) = 0.77 (0.75-0.79) log (g/L NaCl)
historical results:
(48-h LC50 and 95% confidence limits) = 0.77 (0.68-0.85) log (g/L NaCl)

Note: Outlined sections are protocol deviations explained on the comment page

Test Data

Client: ALS106
Reference: 16-0374-01-DAD

Test Log:

Date	Day	Time	Technician
2016/04/01	0	1600	DS/EP
2016/04/02	1	1120	JW/ML
2016/04/03	2	1040	HS

Chemistry:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

pH (units)

0	7.9	7.9	7.8	7.8	7.7	7.6		
2	7.9	7.8	7.8	7.9	7.9	8.1		

Conductivity ($\mu\text{S/cm}$ @ 25°C)

0	319	440	551	770	1145	1830		
2	325	458	566	792	1169	1866		

Dissolved Oxygen (mg/L)

0	7.8	7.8	8.1	8.1	8.1	8.1		
2	9.2	9.2	9.4	9.3	9.4	9.4		

Temperature (°C)

0	11	11	11	11	11	11		
2	10	10	10	10	10	10		

Biology:

Conc. (%)	control	6.3	13	25	50	100		
-----------	---------	-----	----	----	----	-----	--	--

Day

Number Alive and Behavior (behavior is in brackets)

1	10	10	10	10(2D)	10(2D)	10		
2	10	10	10	10	10	10		

Notes: F, floating; I, immobile; B, stuck on bubble; D, caught in debris; nd, not done; na, not applicable;

Mortality (%)

2	0	0	0	0	0	0		
---	---	---	---	---	---	---	--	--

Immobility (%)

2	0	0	0	0	0	0		
---	---	---	---	---	---	---	--	--

Comments/Statistics

Client: ALS106 Reference: 16-0374-01-DAD

Test Result Comments:

None

Data Analysis:

Endpoints for mortality could not be calculated. No effect occurred.

Endpoints for immobility could not be calculated. No effect occurred.

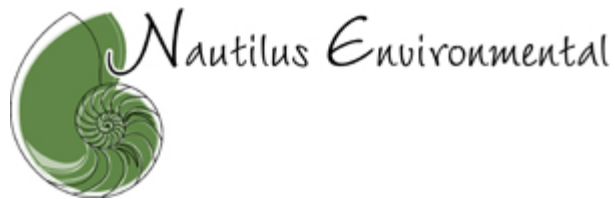
Protocol Deviations:

The test temperature was 10 +/- 1°C as per the client request.

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, H₂S 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 OR 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.



Mar 7, 2016

Memo: Follow-up testing on EV_DC1

<i>To</i>	Marty Hafke	<i>From</i>	Josh Baker
<i>Affiliation</i>	Elkview Operations- Teck Coal Ltd.	<i>Tel</i>	604-420-8773
<i>e-mail</i>	marty.hafke@teck.com	<i>e-mail</i>	josh@nautilusenvironmental.ca

Introduction

A sample identified as EV_DC1_WS_2016-02-02_N (EV_DC1) was collected on February 2, 2016 and received at the Nautilus Environmental laboratory (Burnaby, BC) on February 4, 2016. Acute toxicity tests (i.e., 96-hr rainbow trout and 48-hr *D. magna* single concentration survival tests) were initiated on the day of reception at the laboratory. Testing demonstrated 100% survival of rainbow trout after 96 hours and 0% survival of *D. magna* after 48 hours in the undiluted 100% (v/v) EV_DC1. As requested by Teck Coal, follow-up testing was performed to identify the cause of the reduced *D. magna* survival.

Approach

A Toxicity Identification Evaluation (TIE) was designed to target the possible causes of toxicity; TIE treatments involve physico-chemical sample manipulations which selectively alter the toxicity of different classes of toxicants. The treated and untreated samples are then tested to identify which treatment(s) affected the toxicity of the sample.

EV_DC1 had high hardness and alkalinity, and a white precipitate was observed in the test containers during the initial *D. magna* testing. This suggested that the formation of calcite, a precipitate that has been previously linked to mortalities in acute *D. magna* tests (Nautilus Environmental, 2015), may have occurred and caused the reduced survival observed in EV_DC1. For this reason, treatments that specifically targeted calcite were performed (test temperature alterations, pH 5.5 aeration and pH 10 filtration), in addition to those treatments that target common groups of toxicants (i.e., EDTA complexation of metals and C18 filtration to remove organics).

Results

The TIE testing was performed on EV_DC1 on February 11 (7 days after the initial testing and 9 days after sample collection); however, no adverse effects on survival of *D. magna* were observed in the 100% v/v untreated sample (Table 1). Unfortunately, the lack of toxicity in the untreated sample precluded meaningful interpretation of the TIE treatments (Tables 1 and 2), since there were no responses against which to compare the effectiveness of the TIE manipulations. Due to the change in toxicity observed in the sample between the first and

Nautilus Environmental Company Inc.
8664 Commerce Court
Burnaby, BC
V5A 4N7

second tests, a third test was initiated on February 17 to verify the results. This test also resulted in 100% survival of *D. magna* after 48 hours (Table 1). While a white film was noted in the follow-up testing at 25°C, no mortalities were associated with this treatment, making it problematic to speculate on the cause of toxicity in the sample when originally tested.

The reduction in toxicity observed over time may have been due to the equilibration and/or degradation of the toxicant during storage. The follow-up testing was initiated outside of the holding time for this test (Environment Canada, 2000), therefore it may be advisable in the future to initiate TIE treatments on samples as soon as possible in an attempt to characterize the mechanism of toxicity prior to sample storage. In addition, performing side-by-side temperature testing during the initial testing of samples (Nautilus Environmental, 2015) would aid in understanding the potential contribution of calcite to toxicity.

Alternatively, it should be recognized that organism and method variability may have contributed to the differences observed between tests, although all organisms were of appropriate age (<24 hr old) and sensitivity (demonstrated through reference toxicant testing), and the tests did not deviate from protocol (Environment Canada, 2000). Of note, a daphnid acute test conducted on a subsequent sample (i.e., collected February 15, 2016) also exhibited no evidence of acute toxicity (Nautilus Environmental, 2016).

Table 1. 48-hr *D. magna* survival in EV_DC1 temperature tests (various dates).

Temperature (°C, ± 2)	Survival (%)		
	February 4, 2016	February 11, 2016	February 17, 2016
10	nt	100	100
20	0	100	100
25	nt	100	100

nt: not tested

Table 2. 48-hr *D. magna* survival in EV_DC1 treatment tests (February 11, 2016)

Treatment	Survival (%)
Untreated	100
pH 5.5 Aeration	100
pH 10 filtration	100
EDTA	100
C18	100

Please feel free to contact me should you have any questions regarding the data and discussion presented. The test data are appended.



Josh Baker, M.Sc., P.Chem.
Environmental Chemist

References

Environment Canada. 2000. Biological test method: reference method for determining acute lethality of effluents to *Daphnia magna*. EPS 1/RM/14, Second Edition, December 2000. Environment Canada, Method Development and Application Section, Environmental Technology Centre, Ottawa, ON. 21 pp.

Nautilus Environmental. 2015. Summary and Implications of Toxicity Identification Evaluations Conducted on Samples Collected from Smith Ponds and Cataract Creek. Memo prepared for Teck Coal, dated October 27, 2015.

Nautilus Environmental. 2016. Toxicity Test Data Report: WO# 16200-16201. Report prepared for Teck Coal, dated February 29, 2016.

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: EV-DC1
 Work Order No.: N/A 16151A
JKB

Start Date/Time: February 11, 2016 @ 1450h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	24		48	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	10.5	9.5	10.0	10.6	11.1	10.7	7.4	7.6	7.8	402	388
	B	10	10	0											
	C	10	10	0											
	D														
100 (10x)	A	10	10	0	10.5	9.5	10.0	10.9	11.0	11.2	7.7	7.8	8.2	1878	1860
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	AS	AS	YML	YML	AS	YML	YML	AS	YML	YML	AS	YML	AS

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCo3)	
Control (MHW)	100	66
Highest conc.	1300	366
Hardness adjusted	—	—

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	10.5		
DO (mg/L)	10.9		
pH	7.7		
Cond (µS/cm)	1878		

Comments: _____ Mortality: Heartbeat checked under microscope 2/1

Sample Description: Clear, no colour, no particulates, no odor

Batch#: 012016B 7-d previous # young/brood: 21 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: JOU Date reviewed: March 4/16

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: EV-DC1
 Work Order No.: N/A 16151A
JAB

Start Date/Time: February 11, 2016 @ 1455
 No. Organisms/volume: 10/200mL
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	10	10	0	19.0	20.0	18.5	8.8	8.6	8.7	7.6	7.7	7.7	351	358
	B	10	10	0											
	C	10	10	0											
	D														
100 (20°C)	A	10	10	0	20.0	20.0	18.5	8.7	8.5	8.6	8.1	8.2	1840	1832	
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	A	A	YML	YML	A	YML	YML	A	YML	YML	A	YML	A

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO3)	
Control (MHW)	100	66
Highest conc.	1260	366
Hardness adjusted	-	-

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	20.0		
DO (mg/L)	8.7		
pH	7.8		
Cond (µS/cm)	1840		

Comments: _____ Mortality: Heartbeat checked under microscope N/A

Sample Description: clear, no color, no particulates, no odor

Batch#: 012016B 7-d previous # young/brood: 21 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: JOU Date reviewed: March 4/16

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: EV-DX1
 Work Order No.: N/A Job 16151A

Start Date/Time: February 11, 2016 @ 1445h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH=113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	19.0	24.0	24.0	8.8	7.9	7.9	7.6	7.6	7.8	354	370
	B	10	10	0	24.0			8.3							
	C	10	10	0											
	D														
100 (25°C)	A	9	9	0	24.0	24.0	24.0	8.4	7.8	8.0	7.8	7.9	7.9	1844	1825
	B	10	10	0									8.0		
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	A	B	YML	YML	A	YML	YML	A	YML	YML	A	YML	A

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO3)	
Control (MHW)	100	66
Highest conc.	1270	376
Hardness adjusted	-	-

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	24.0		
DO (mg/L)	8.4		
pH	7.8		
Cond (µS/cm)	1844		

Comments: _____ Mortality: Heartbeat checked under microscope N/A see

Sample Description: clear, no colour, no particulates, no odor

Batch#: 012016B 7-d previous # young/brood: 21 Previous 7-d Mortality (%): 0 Day of 1st Brood: 10

Reviewed by: JOU Date reviewed: March 4/16

TIF

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Tech
 Sample ID: EV DCI
 Work Order No.: 02716A 16151A

Start Date/Time: Feb 11/16 @ 1405 h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: YTC

Thermometer: Temp -5 DO meter: DO-2/3 pH meter: pH 1/3 Conductivity meter: C-2/3

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	18.5	20.0	18.5	8.9	8.5	8.6	7.7	7.7	7.8	358	360
	B	10	10	0											
	C	10	10	0											
	D														
Control C18	A	10	10	0	19.0	20.0	18.5	9.2	8.4	8.5	7.3	7.7	8.1	348	363
	B	10	10	0											
	C	10	10	0											
	D														
100 - C18 Filtration	A	10	10	0	19.0	20.0	18.5	9.2	8.2	8.0	7.8	7.9	8.0	342	357
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YTC	A		A	YTC	A	A	YTC	A	YTC	YTC	A	A	A

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO3)	
Control (MHW)	100	66
Highest conc.	1140	368
Hardness adjusted	-	-

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	/		
DO (mg/L)	/		
pH	/		
Cond (µS/cm)	/		

Comments: _____ Mortality: Heartbeat checked under microscope N/A

Sample Description: EV-DCI sample filtered through C18

Batch#: 02716A 7-d previous # young/brood: 15 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: JGU Date reviewed: March 4/16

TIF

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: EU DC1
 Work Order No.: 2016 1651A

Start Date/Time: Feb 11/16 @ 1410 h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: YYL

Thermometer: Temp -5 DO meter: DO-2/3 pH meter: pH 1/3 Conductivity meter: C-2/3

Concentration (% of /)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	18.5	20.0	18.5	8.9	8.6	8.7	7.7	7.7	7.8	358	364
	B	10	10	0											
	C	10	10	0											
	D														
Control EDTA 25mg/L	A	10	10	0	19.0	20.0	18.5	9.1	8.7	8.6	7.8	7.7	7.8	363	389
	B	10	10	0											
	C	10	10	0											
	D														
100 EDTA 25mg/L	A	10	10	0	19.0	20.0	18.5	9.2	8.6	8.7	7.7	7.7	7.8	1852	1823
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YYL	A			YYL	A		YYL	A	YYL	YYL	A		

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCo3)	
Control (MHW)	100	66
Highest conc.	1310	354
Hardness adjusted	—	—

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)			
DO (mg/L)			
pH			
Cond (µS/cm)			

Comments: _____ Mortality: Heartbeat checked under microscope N/A

Sample Description: EDTA spiked: 0.684 mL of 0.1M EDTA in 800 mL (25 mg/L)

Batch#: 201716A 7-d previous # young/brood: 15 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: JGU Date reviewed: March 4/16

TIF

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: EU DC1
 Work Order No.: 1615A

Start Date/Time: Feb 11/16 @ 1415h
 No. Organisms/volume: 10/200mL
 Test Organism: D.magna
 Set up by: YLC

Thermometer: Temp - 5 DO meter: DO-2/3 pH meter: pH 1/3 Conductivity meter: C-2/3

Concentration (% of /)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
<u>Control</u>	A	10	10	0	18.5	20.0	18.5	8.9	8.6	8.7	7.7	7.7	7.8	358	365
	B	10	10	0											
	C	10	10	0											
	D														
<u>Control¹</u>	A	10	10	0	19.0	20.0	18.5	9.2	8.6	8.5	7.8	7.9	7.8	2120	2140
<u>100 pH 5.5</u>	B	10	10	0											
	C	10	10	0											
	D														
<u>100 pH 10</u>	A	10	10	0	19.0	20.0	18.5	9.2	8.7	8.6	7.8	7.9	7.8	1567	1603
<u>Filtered</u>	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YLC	A	B	A	YLC	A	B	YLC	A	YLC	YLC	A	B	A

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO3)	
Control (MHW)	100	66
Highest conc. ^{SAB} pH 5.5	110	104
Hardness adjusted ^{SAB} pH 10 Filtered	930	72

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)			
DO (mg/L)			
pH			
Cond (µS/cm)			

Comments: _____ Mortality: Heartbeat checked under microscope N/A

Sample Description: pH 5.5: Spun for 2 hours after adjustment with 1M HCl pH 10: Filtered after 2 hours at pH 10, adjusted with mill of lime
 Batch#: 02716A 7-d previous # young/brood: 15 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: JGU Date reviewed: March 4/16

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck
 Sample ID: EV-DC1
 Work Order No.: N/A JAB 16151A

Start Date/Time: February 17, 2016 @ 1640h
 No. Organisms/volume: 570/200ml 100ml
 Test Organism: D. magna
 Set up by: YML

Thermometer: temp-5 DO meter: DO-213 pH meter: pH=113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	5	5	0	10.5	9.5	10.0	10.9	11.0	11.1	7.6	7.6	7.5	351	345
	B	5	5	0											
	C	5	5	0											
	D														
100 (10°C)	A	5	5	0	11.0	11.5	10.0	10.6	11.1	10.9	7.8	7.9	7.8	1847	1852
	B	5	5	0											
	C	5	5	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML	YML

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO ₃)	
Control (MHW)	100	66
Highest conc.	1300	366
Hardness adjusted	—	—

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	11.0		
DO (mg/L)	10.6		
pH	7.8		
Cond (µS/cm)	1847		

Comments: _____ Mortality: Heartbeat checked under microscope n/a

Sample Description: clear, no colour, no particulates, no odour

Batch#: 020216A 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 83

Reviewed by: JGU Date reviewed: March 4/16

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teek
 Sample ID: EJ-DC1
 Work Order No.: N/A 16151A

Start Date/Time: Feb 17/16 @ 1640h
 No. Organisms/volume: 10/200mL 5/100mL
 Test Organism: D. magna
 Set up by: YTL

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
Control	A	5	5	0	18.5	19.5	19.0	8.8	8.4	8.3	7.6	7.7	7.6	351	368
	B	5	5	0											
	C	5	5	0											
	D														
100 (20°C)	A	5	5	0	19.0	19.5	19.0	8.9	8.3	8.4	7.8	8.1	8.0	1836	1812
	B	5	5	0											
	C	5	5	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YTL	YTL	YTL	YTL	YTL	YTL	YTL	YTL	YTL	YTL	YTL	YTL	YTL	YTL

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO3)	
Control (MHW)	100	66
Highest conc.	1260	366
Hardness adjusted	—	—

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	19.0		
DO (mg/L)	8.9		
pH	7.8		
Cond (µS/cm)	1836		

Comments: _____ Mortality: Heartbeat checked under microscope n/a

Sample Description: clear, no colour, no particulates, no odour.

Batch#: 020216B 7-d previous # young/brood: 18 Previous 7-d Mortality (%): 0 Day of 1st Brood: 8

Reviewed by: JCH Date reviewed: March 4/16

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Tede
 Sample ID: EU DCL
 Work Order No.: N/A # 16151A

Start Date/Time: FEB 17/13 2:16 PM
 No. Organisms/volume: 510/200ml loose
 Test Organism: D. magna
 Set up by: CTL

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Conductivity meter: C-213

Concentration (% v/v)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	5	5	0	25.9	24.0	24.0	8.3	8.0	8.2	7.6	7.7	7.7	347	351
	B	5	5	0											
	C	5	5	0											
	D														
100 @ 25°C	A	5	5 ⁰	0	24.2	24.0	24.0	8.4	7.9	8.1	7.7	7.8	7.9	1817	1788
	B	5	5 ⁰	0											
	C	5	5 ⁰	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		YMC	YMC	YMC	YMC	YMC	YMC	YMC	YMC	YMC	YMC	YMC	YMC	YMC	YMC

	Hardness*	Alkalinity*
Conc.	*(mg/L as CaCO ₃)	
Control (MHW)	100	66
Highest conc.	1270	376
Hardness adjusted	-	-

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)	24.0		
DO (mg/L)	8.4		
pH	7.7		
Cond (µS/cm)	1817		

Comments: white film on surface Mortality: Heartbeat checked under microscope 1/2

Sample Description: clear, no colour, no particulates, no odour

Batch#: 020216 B 7-d previous # young/brood: 18 Previous 7-d Mortality (%): 0 Day of 1st Brood: 8

Reviewed by: JOU Date reviewed: March 4/16



Toxicity Identification Evaluation testing on GH_CC1_Q_04072016_N

Follow-up Testing Results

Final Report

October 5, 2016

Submitted to: **Teck Coal Ltd.**
Fording River Operations
Elkford, BC

TABLE OF CONTENTS

	Page
Signature Page.....	i
Summary	iii
1.0 Introduction	1
2.0 Methods.....	1
3.0 Results.....	5
4.0 Discussion.....	7
5.0 References.....	9

List of Tables

Table 1.	Summary of test conditions: 48-h <i>D. magna</i> survival test.....	4
Table 2.	Results: <i>D. magna</i> acute survival test with GH_CC1	6
Table 3.	Chemistry: Hardness and alkalinity concentrations determined on GH_CC1 and treatments.....	6
Table 4.	Results of dissolved metals analyses for GH_CC1. Water Quality Guidelines (British Columbia Ministry of the Environment) also presented.....	8

List of Appendices

- APPENDIX A – *Daphnia magna* Toxicity Test Data
- APPENDIX B – Photographs
- APPENDIX C – Chain-of-Custody Forms

SIGNATURE PAGE



Josh Baker, M.Sc., P.Chem.
Environmental Chemist



Curtis Eickhoff, Ph.D.
Senior Environmental Toxicologist

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.

SUMMARY

A summary of sample information and test results from the *Daphnia magna* toxicity tests on untreated and treated samples of GH_CC1_Q_04072016_N (GH_CC1) are provided in the tables below. Original testing with GH_CC1 was performed on August 5th and Toxicity Identification Evaluation (TIE) treatments were prepared and tested on August 9th. All treatments and testing was completed at the Nautilus Environmental laboratory in Burnaby, BC.

The lines of evidence presented in this report identify calcite precipitation onto the *D. magna* as the primary cause of the *D. magna* mortalities observed in the testing of the Aug 2 GH_CC1 sample. This was highlighted by the evidence of precipitate in the test container and on the organisms, as well as the effective removal of toxicity with treatments which targeted the reduction of calcite formation. Specifically, the removal of bicarbonate in the pH 5.5 aeration and pH 10 filtration inhibited calcite production in the sample and completely removed adverse effects to *D. magna* in testing of GH_CC1. A review of GH_CC1 chemistry, in combination with TIE treatments targeting trace metals and organics, did not identify any other potential contributors to toxicity.

Sample and Test Type Information

Sample ID	GH_CC1_Q_04072016_N
Sample collection date	August 2, 2016
Sample receipt date	August 4, 2016
Treatments performed	Untreated C ₁₈ Filtration EDTA addition pH 5.5 aeration pH 10 filtration

Results

Summary of Treatments and Toxicity Test results

Treatment	48-h Mortality (%)	
	10 degree test*	20 degree test
Control	0	0
C ₁₈ control	0	0
EDTA control (25 mg/L)	0	0
Untreated	7	50
C ₁₈ filtration	23	57
EDTA addition (25 mg/L)	0	0
pH 5.5 aeration	0	0
pH 10 filtration (with CO ₂ aeration)	0	0

* Nominal temperature was 10 °C. Actual recorded temperatures were between 11 - 12 °C.

1.0 INTRODUCTION

Standard testing performed on the GH_CC1_Q_04072016_N (GH_CC1) resulted in 0 % mortality to rainbow trout, after a 96-h exposure, and 100 % mortality to *Daphnia magna*, after a 48-h exposure. A reduced level of mortality (53.3%) was observed when the *D. magna* were exposed to the GH_CC1 sample at nominally 10 °C in comparison to the standard test temperature of 20 °C. A precipitate was noted on the *D. magna* at termination of the testing. Follow-up testing, using Toxicity Identification Evaluation techniques and the remaining GH_CC1 sample (stored at $4 \pm 2^\circ\text{C}$), was requested by Teck Coal to identify the cause of the *D. magna* mortality in the sample. Nautilus Environmental conducted toxicity tests on full-strength untreated and treated samples of GH_CC1 the week following the original testing. This report describes the results of the follow-up toxicity tests and interpretation of these results regarding causes of mortality.

Acute toxicity was established using 48-h *D. magna* single concentration survival tests following procedures outlined in Environment Canada (2000), as was done in the original tests (Nautilus Environmental, 2016). Section 2.0 outlines the TIE techniques which were applied to evaluate the likely cause of toxicity; treatments were focused on the contributions to toxicity from groups of classical contaminants (*i.e.*, organics and metals) and possible calcite (CaCO_3) precipitation on the organism. Significant changes in mortality observed in the various treatments of the sample were used as lines of evidence of the likely cause of mortality. Hardness and alkalinity measurements, conducted by Nautilus Environmental, were used as additional evidence on the effectiveness of the treatments designed to target potential calcite effects.

Copies of laboratory data sheets are provided in Appendix A. Supporting photographic documentation are provided in Appendix B.

2.0 METHODS

A summary of the test conditions for the *D. magna* testing can be found in Table 1. Percent mortality and immobility (*i.e.*, the lack of movement) were the test endpoints.

Calcite precipitation onto *D. magna* has been observed in solutions with high hardness and alkalinity (Bogart et al. 2016). The hardness and alkalinity of GH_CC1 were determined to be 2030 and 430mg/L (as CaCO_3), respectively. Calcite solubility is controlled by temperature, alkalinity, pH and calcium; precipitation of calcite increases at increased temperature. The original sample and sample treatments were all tested at two test temperatures, $10 \pm 2^\circ\text{C}$ and

20 ± 2 °C, to examine the potential role of calcite. The lowered test temperature of 10 °C should provide a partial control against the precipitation of calcite onto *D. magna*.

In addition to the temperature testing, a number of TIE treatments were applied to the GH_CC1 sample to evaluate the likely cause. The following details the TIE treatment methodology used.

Untreated

An exposure to the full-strength GH_CC1 sample was conducted as a 'baseline' by which to measure the effectiveness of the treatments in the removal of toxicity. It also allowed for a comparison of the original testing, initiated on August 5th, and the follow-up testing, initiated on August 9th.

C₁₈ filtration

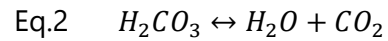
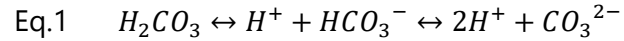
This treatment is used to remove non-polar organic toxicants from the sample by selective sorption to the column substrate. GH_CC1 was filtered through a 6-mL C₁₈ solid-phase extraction column (J.T. Baker) at 10 mL/min and then evaluated for toxicity. Control dilution water was also filtered through a C₁₈ column and tested as a C₁₈ control treatment.

EDTA addition

The sample was treated with EDTA (25 mg/L) and evaluated for toxicity. EDTA is a chelating agent that binds to various divalent metal cations, including copper, cadmium and zinc, and reduces their bioavailability. Thus, a reduction in toxicity following treatment with EDTA indicates that a metal that can be chelated with EDTA may be responsible for toxicity. A treatment control with the same concentration of EDTA added to control water was also tested to confirm that the treatment did not exhibit toxicity due to the EDTA addition.

pH 5.5 Aeration

This treatment reduces the concentration of bicarbonate (or alkalinity) in the sample, thereby reducing a component necessary for calcite production. The bicarbonate buffer system was pushed to carbonic acid (H₂CO₃), to the left in Equation 1, by adjusting the sample to a pH of 5.5 through the addition of H⁺ (as 1 M HCl). Once the bicarbonate buffer system had been pushed to H₂CO₃, this species is in equilibrium with CO₂ and H₂O as described by Equation 2. The CO₂ can be off-gassed by stirring the sample on a stir-plate for two hours at this lowered pH. After the CO₂ was liberated, the sample was re-adjusted to its initial pH with 1 M NaOH, and would be expected to contain a proportionately lowered amount of bicarbonate in the sample as had been liberated as CO₂. This treatment would not be expected to significantly alter the concentrations or characteristics of metals found in the sample.



pH 10 filtration

The sample was adjusted to pH 10 with a saturated solution of $Ca(OH)_2$ (i.e., milk of lime), allowed to equilibrate for two hours and then filtered through a 0.45 μm filter. This treatment removes a number of inorganic constituents, including metals and calcium, as insoluble hydroxides and carbonates. Using $Ca(OH)_2$ promotes the saturation of the calcium compounds, like calcite, allowing for increased insolubility and removal of these compounds. The sample was then re-adjusted back to its initial pH with 1M HCl.

Table 1. Summary of test conditions: 48-h *D. magna* survival test

Test organism	<i>Daphnia magna</i>
Test organism source	In-house culture
Test organism age	<24 h
Test type	Static
Test duration	48 h
Test vessel	250 mL glass beakers
Test volume	150 mL
Test volume/daphnid	15 mL
Test concentrations	Full strength (<i>i.e.</i> , 100%) or treatments of full-strength
Test replicates	3 test replicate per treatment
No. of organisms	10 per replicate
Control/dilution water	Moderately hard reconstituted water (hardness 80-100 mg/L CaCO ₃)
Test solution renewal	None
Test temperature	20 ± 2°C and 10 ± 2°C
Feeding	None
Light intensity	400 to 800 lux
Photoperiod	16 hours light/8 hours dark
Test protocol	Environment Canada (2000), EPS 1/RM/14
Statistical software	CETIS (2013)
Test acceptability criteria for controls	Survival ≥ 90%
Reference toxicant	Sodium chloride
Test endpoint	48-h mortality (%)

3.0 RESULTS

Results of the toxicity tests on the untreated and treated samples using *D. magna* are provided in Table 2. Daphnid mortalities were observed in the untreated sample, although at a lower magnitude than was originally observed in the Aug 5th testing. Immobility was also observed at termination; in the untreated sample at 20 °C all of the living organisms at 48 h were immobilized. The organisms that exhibited effects, either through mortality or immobilization, were generally associated with a white precipitate (Figure B-1).

No improvement in *D. magna* performance was determined due to C18 filtration, while toxic effects of the sample were completely removed by treatment using either EDTA-addition, pH 5.5 aeration or pH 10 filtration.

The pH 5.5 aeration and pH 10 filtration treatments reduced alkalinity substantially (Table 3) while alkalinity in the remaining treatments was largely unaltered. Reductions in hardness were not large in any of the treatments, with the largest reduction of 480 mg/L observed in the pH 10 filtration treatment (Table 3).

A difference was observed between the *D. magna* survival and immobility at 20 °C in comparison to that observed at 10 °C. Reductions in mortality and immobility of 43 % and 70 %, respectively, were observed when untreated sample tests at 20 °C were compared with those at 10 °C. The response of *D. magna* in the sample treatments at 10 °C mirrored that which was previously described above for the 20 °C, with no improvement from C₁₈ filtration but toxicity removal following the other treatments.

Table 2. Results: *D. magna* acute survival test with GH_CC1

Sample ID	Mortality (%)		Immobility (%) ¹	
	10 °C	20 °C	10 °C	20 °C
Control	0	0	0	0
C18 control	0	0	0	0
EDTA control (25 mg/L)	0	0	0	0
Untreated	7	50	30	100
C18 filtration	23	57	53	80
EDTA addition (25 mg/L)	0	0	0	0
pH 5.5 aeration	0	0	0	0
pH 10 filtration (with CO2 aeration)	0	0	0	0

1- Immobility: calculated as sum of surviving-immobile and dead-immobile organisms. For surviving-immobility values alone, please refer to test datasheets in Appendix A.

Table 3. Chemistry: Hardness and alkalinity concentrations determined on GH_CC1 and treatments

Sample ID	Hardness (mg/L)	Alkalinity (mg/L)
Untreated	2030	430
C18 filtration	1750	400
EDTA addition (25 mg/L)	1700	430
pH 5.5 aeration	2000	220
pH 10 filtration	1550	30

4.0 DISCUSSION

A review of the results of the tests conducted on TIE treatments targeting classic groups of toxicants demonstrated that organics and metals were likely not responsible for the effects in GH_CC1. The treatment targeting organic toxicants, C₁₈ filtration, showed no improvement in survival after 48 h despite the removal of non-polar organic compounds. EDTA addition improved survival implicating a divalent metal in the cause of toxicity, yet improvement in survival was also observed in the pH 5.5 aeration, a treatment which would not alter divalent trace metal toxicity. While the EDTA treatment was designed to reduce trace metal toxicity (e.g., copper, zinc and cadmium) (U.S. EPA, 1991), in this case it was likely binding with divalent calcium, limiting a component necessary for calcite precipitation. In corroboration, no white precipitate was observed in the EDTA addition treatment. Further, a review of GH_CC1 chemistry revealed that no divalent trace metals were determined in the sample at concentrations above water guidelines for the protection of aquatic life (Table 4), thus ruling out any divalent trace metal toxicity.

Concentrations of Total Dissolved Solids (TDS) and selenium warrant a brief comment on the possibility of toxic effects from these constituents of the sample. Total dissolved solids (TDS) comprise inorganic salts and small amounts of organic matter that are dissolved in water. The principal constituents are usually the cations calcium, magnesium, sodium and potassium and the anions carbonate, bicarbonate, chloride, sulphate and, nitrate (Environment Canada 1991). The high conductivity of GH_CC1, >3000 µS/cm, indicates an elevated TDS and the possibility of toxic effects from osmotic stress, yet a treatment which did not substantially alter the composition and concentration of the TDS mixture present (i.e., the EDTA addition) was effective in toxicity reduction. Therefore, the *D. magna* mortality in GH_CC1 was likely not due to TDS. The selenium concentration in GH_CC1 was approaching that of previously reported acute thresholds for daphnids (Maier et al., 1993), but treatments that would not affect this metal oxy-anion (i.e., the pH 5.5 aeration and EDTA treatments) were successful in reducing toxicity thereby ruling out selenium in the cause of toxicity observed in the GH_CC1 sample.

Tests that focused on calcite were the most definitive in altering GH_CC1 toxicity. The precipitation of calcite should be boosted by an increase in temperature, because a solution supersaturated in calcium and bicarbonate is more likely to precipitate at higher temperature. This temperature dependence was observed when comparing 10 and 20 °C test results. A white precipitate was again associated with impaired organisms in these follow-up tests, providing evidence of calcite effects. Photographic documentation, taken during the follow-up TIE tests, of the impairment of daphnids by a precipitate in the untreated sample can be found in Figure B-1,

and is similar to photographs presented in previous work with calcite-daphnid impairment (Bogart et al. 2016). This recent study also showed that *Daphnia* were adversely affected by a calcite precipitate formed in the water column which was ingested by and thoroughly coated the *D. magna* causing mortality (Bogart et al. 2016).

Finally, the effectiveness of the two TIE treatments which removed alkalinity/bicarbonate, pH 5.5 aeration and pH 10 filtration, clearly demonstrates the role of bicarbonate in toxicity. No white precipitate was documented in the testing with these two treatments, demonstrating that the precipitate was likely calcium carbonate. Lack of mortality in the treatments which eliminated precipitation further identifies the precipitate as the likely cause of effects. Therefore, the multiple lines of evidence presented suggest that the cause of *D. magna* mortalities in testing of untreated GH_CC1 was calcite precipitation onto the organism.

Table 4. Results of dissolved metals analyses for GH_CC1. Water Quality Guidelines (British Columbia Ministry of the Environment) also presented.

Total metals (mg/L)	GH_CC1	BC WQG
Aluminum	<0.003	0.1
Antimony	0.00056	0.02
Arsenic	<0.0002	0.005
Barium	0.0197	5
Cadmium	0.000204	>0.00045*
Calcium	394	-
Chromium	<0.0002	0.001
Cobalt	<0.0002	0.11
Copper	<0.0005	>0.010*
Iron	<0.02	1
Lead	<0.0001	0.147*
Magnesium	249	-
Manganese	0.00076	>1.9*
Molybdenum	0.00251	2
Nickel	0.0505	-
Potassium	4.61	373
Selenium	0.685	0.002
Silver	<0.00002	0.003
Sodium	1.65	-
Strontium	0.231	-
Tin	<0.0002	-
Zinc	0.0150	>0.240*

* / BC long-term WQG derived using hardness concentration equation

-/No BC WQG

5.0 REFERENCES

- Bogart, S., Woodman, S., Steinkey, D., Meays, C., Pyle, G., 2016. Rapid changes in water hardness and alkalinity: Calcite formation is lethal to *Daphnia magna*. *Science of the Total Environment*, 559, 182-191.
- Environment Canada. 2000. Biological test method: reference method for determining acute lethality of effluents to *Daphnia magna*. Environmental Protection Series. Report EPS 1/RM/14, Second Edition, December 2000. Environment Canada, Method Development and Application Section, Environmental Technology Centre, Ottawa, ON. 21 pp.
- Environment Canada. 1991. Guidelines for Canadian Drinking Water Quality: Guideline Technical Document - Total Dissolved Solids (TDS).
<http://healthycanadians.gc.ca/publications/healthy-living-vie-saine/water-dissolved-solids-matieres-dissoutes-eau/index-eng.php>
- Maier, K.J., Foe, C.G., Knight, A.W., 1993. Comparative toxicity of selenate, selenite, seleno-DL-methionine and seleno-DL-cystine to *Daphnia magna*. *Environ. Toxicol. Chem.* 12, 755–763. doi:10.1002/etc.5620120417
- Nautilus Environmental, 2016. Data Report: WO# 16818-16819. Report prepared for Teck Coal-Fording River Operations and reported on August 17, 2016. Burnaby, BC.
- United States Environmental Protection Agency. 1991. Methods for Aquatic Toxicity Identification Evaluations. Phase I Toxicity Characterization Procedures. Second Edition. U.S. Environmental Protection Agency EPA 600/6-91/003 February 1991. Office of Research and Development, Office of Research and Development, U.S. Environmental Protection Agency, Duluth, Minnesota. 87 pp.

APPENDIX A – *Daphnia magna* Toxicity Test Data

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 16852

Start Date/Time: Aug 9/16 @ 1630h
Test Species: Daphnia magna
Set up by: JAB / YL/ICL

Sample Information:

Sample ID: GH-CC1 0-04072016-N
Sample Date: Aug 2/16
Date Received: Aug 4/16
Sample Volume: 2 L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 072016 A+B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 7

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC37
Stock Solution ID: 16Na01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results:

Tested at 20°C
50% mortality at 48 h in the 100% (v/v) untreated sample
57% mortality at 48h in the C18 treated sample
0% mortality at 48h in the EDTA, pH 5.5 aeration and pH 10 filtration treatments

Reviewed by:

[Signature]

Date reviewed: Aug 29, 2016

20°C

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck Coal
 Sample ID: GH-CC1-Q-04072016-N
 Work Order No.: 16852

Start Date/Time: August 9, 2016 @ 1630h
 No. Organisms/volume: 10/200ml x3 10/150ml
 Test Organism: D.magna
 Set up by: JAB/YYL/KL

Thermometer: temp 5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (@ 20°C)	Number of Live Organisms Rep	No. Immobilized		Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)		
		24	48	0	24	48	0	24	48	0	24	48	0	48	
Control	A	10	10	0	20.0	20.0	20.5	8.8	8.8	8.6	7.7	7.6	7.7	352	369
	B	10	10	0											
	C	10	10	0											
	D														
Untreated	A	10	4 ⁰	4	18.0	20.0	20.5	9.2	8.8	8.7	7.6	7.8	7.8	3210	3080
	B	10	4 ⁰	4											
	C	10	7 ⁰	7											
	D														
C18 Control	A	10	10	0	20.0	20.0	20.5	8.8	8.7	8.6	7.7	7.7	7.6	351	360
	B	10	10	0											
	C	10	10	0											
	D														
EDTA Control	A	10	10	0	20.0	20.0	20.5	8.8	8.8	8.7	7.8	7.7	7.8	372	385
	B	10	10	0											
	C	10	10	0											
	D														
C18 Treated	A	10	8 ⁰	2	19.5	20.0	20.5	9.0	8.7	8.5	7.9	8.0	8.0	3200	3050
	B	10	7 ⁰	3											
	C	10	2 ⁰	2											
	D														
EDTA Treated	A	10	10	0	18.5	20.0	20.5	9.1	8.9	8.5	7.6	8.0	8.0	3220	3120
	B	10	10	0											
	C	10	10	0											
	D														
Technician Initials		KL	KL	KL	KL	KL	YML	KL	KL	YML	KL	KL	YML	KL	YML

Concentration	Hardness* (mg/L as CaCO3)	Alkalinity*
Control (MHW)	100	76
Highest conc.	2030	430
Hardness adjusted	—	—

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)			
DO (mg/L)			
pH			
Cond (µS/cm)			
Salinity (ppt)			

Comments: 0 white precipitate observed Mortality: Heartbeat checked under microscope yes

Sample Description: slight grey color, slightly turbid, no colour, no particulates

Batch#: 072716 ATB 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Aug 29, 2016

20°C

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck Coal
Sample ID: GH-CC1-0-04072016-A
Work Order No.: _____

Start Date/Time: August 9, 2016 @ 1630h
No. Organisms/volume: 10/200ml JAB 10/150ml
Test Organism: D.magna
Set up by: JAB/YYL/KL

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (@ 20°C)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
pH 5.5	A	10	10	0	19.5	20.0	20.5	9.0	9.0	8.6	7.9	8.1	8.1	3660	3680
	B	10	10	0											
	C	10	10	0											
	D														
pH 10	A	10	10	0	20.0	20.0	20.5	7.9	8.9	8.7	7.8	7.8	7.4	2740	2740
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		KL	KL	KL	KL	KL	NMM	KL	KL	NMM	KL	KL	NMM	KL	YMY

Concentration	Hardness* (mg/L as CaCO3)	Alkalinity* (mg/L as CaCO3)
Control (MHW)	100	76
Highest conc.	2030	430
Hardness adjusted	-	-

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)			
DO (mg/L)			
pH			
Cond (µS/cm)			
Salinity (ppt)			

Comments: _____ Mortality: Heartbeat checked under microscope Yes

Sample Description: slight grey color, slightly turbid, no color, no particulates

Batch#: 072716 A+B 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Aug 29, 2016

Daphnia magna Summary Sheet

Client: Teck
Work Order No.: 16852

Start Date/Time: Aug 9/16 @ 1710h
Test Species: Daphnia magna
Set up by: _____

Sample Information:

Sample ID: GH.CC1.0-04092016-N
Sample Date: Aug 2/16
Date Received: Aug 4/16
Sample Volume: 2 x 20L

Test Validity Criteria:

≥ 90% mean control survival and/or mobility and ≤ 2 daphnids exhibit immobility and/or mortality in any single control replicate.

WQ Ranges:

T (°C) = 20 ± 2; DO (mg/L) = 3.6 to 9.4; pH = 6 to 8.5

Test Organism Information:

Broodstock No.: 072016 A+B
Age of young (Day 0): <24 h
Avg No. young per brood in previous 7 d: 16
Mortality (%) in previous 7 d: 0
Days to first brood: 9

NaCl Reference Toxicant Results:

Reference Toxicant ID: DMTC37
Stock Solution ID: 16Na01
Date Initiated: August 10, 2016
48-h LC50 (95% CL): 3.4 (2.9-4.1) g/L NaCl

Reference Toxicant Mean and Historical Range: 4.2 (3.2-5.6) g/L NaCl
Reference Toxicant CV (%): 15

Test Results:

Tested at 10°C
7% mortality at 48 h in the 100% (ulu) untreated sample
23% mortality at 48 h in the 100% C18 treated sample
0% mortality at 48 h in the EDTA, pit S.S aeration and pit 10 Filtration treatments

Reviewed by:

[Signature]

Date reviewed: Aug 29, 2016

10°C

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck Coal
Sample ID: GH-CCLO-04072016-N
Work Order No.: _____

Start Date/Time: August 9, 2016 @ 11:00h
No. Organisms/volume: 10/200ml³⁰ / 150ml
Test Organism: D. magna
Set up by: JAB / TYL / KL

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (@ 10°C)	Number of Live Organisms Rep	No. Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		0	24	48	0	24	48	0	24	48	0	48
Control	A	10	10	0	12.0	11.0	11.0	9.9	10.4	10.5	7.8	7.6	7.6	350	357
	B	10	10	0											
	C	10	10	0											
	D														
Untreated	A	10	10	2 ^{OK}	12.0	11.0	11.0	10.8	10.4	10.5	7.7	8.0	8.0	3230	3200
	B	10	10	3											
	C	10	10	2 ^{OK}											
	D														
C18 Control	A	10	10	0	12.0	11.0	11.0	9.7	10.4	10.6	7.7	7.7	8.1	351	356
	B	10	10	0											
	C	10	10	0											
	D														
EDTA Control	A	10	10	0	12.0	11.0	11.0	9.4	10.4	10.7	7.8	7.6	7.6	333	302
	B	10	10	0											
	C	10	10	0											
	D														
C18 Treated	A	10	10	2	12.0	11.0	11.0	9.7	11.0	10.8	8.0	8.1	8.0	3220	3170
	B	10	10	2											
	C	10	10	5											
	D														
EDTA Treated	A	10	10	0	12.0	11.0	11.0	9.9	11.0	10.6	7.7	8.1	8.0	3240	3220
	B	10	10	0											
	C	10	10	0											
	D														
Technician Initials		KL	KL	KL	KL	KL	KL	KL	KL	KL	KL	KL	KL	KL	KL

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO3)	
Control (MHW)	100	76
Highest conc.	2030	430
Hardness adjusted	-	-

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)			
DO (mg/L)			
pH			
Cond (µS/cm)			
Salinity (ppt)			

Comments: white precipitate observed. Mortality: Heartbeat checked under microscope Yes

Sample Description: slight grey color, slightly turbid, no color, no particulates

Batch#: 072716 A+B 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Aug. 29, 2016

10°C

Freshwater Acute 48 Hour Toxicity Test Data Sheet

Client: Teck Coal
Sample ID: GH-CL-Q-04072016-N
Work Order No.: _____

Start Date/Time: August 9, 2016 @ 17:0h
No. Organisms/Volume: 10/200ml JAB 10/150ml
Test Organism: D.magna
Set up by: JAB/YYL/KL

Thermometer: temp-5 DO meter: DO-213 pH meter: pH-113 Cond./Salinity: C-213

Concentration (@ 10°C)	Number of Live Organisms Rep	Number of Live Organisms		No. Immobilized	Temperature (°C)			Dissolved oxygen (mg/L)			pH			Conductivity (µS/cm)	
		24	48		48	0	24	48	0	24	48	0	24	48	0
pH 5.5	A	10	10	0	12.0	11.0	11.0	9.9	11.0	10.8	7.8	8.0	8.0	3680	3620
	B	10	10	0											
	C	10	10	0											
	D														
pH 10.5	A	10	10	0	12.0	11.0	11.0	9.1	10.9	10.8	7.8	7.4	7.3	2740	2710
	B	10	10	0											
	C	10	10	0											
	D														
	A														
	B														
	C														
	D														
	A														
	B														
	C														
	D														
Technician Initials		KL	KL	KL	KL	KL	MM	KL	KL	MM	KL	K	MM	KL	MM

Concentration	Hardness*	Alkalinity*
	*(mg/L as CaCO3)	
Control (MHW)	100	76
Highest conc.	2030	430
Hardness adjusted	-	-

	Initial WQ	Adjustment	Adjusted WQ
Temp (°C)			
DO (mg/L)			
pH			
Cond (µS/cm)			
Salinity (ppt)			

Comments: _____ Mortality: Heartbeat checked under microscope Yes

Sample Description: slight grey color, slightly turbid, no color, no particulates

Batch#: 072716 A+B 7-d previous # young/brood: 16 Previous 7-d Mortality (%): 0 Day of 1st Brood: 9

Reviewed by: [Signature] Date reviewed: Aug 29, 2016

APPENDIX B – Photographs



Figure B-1. Unimpaired daphnid from control water (L) contrasted with precipitate-impaired daphnid from GH_CC1 (R)

APPENDIX C – Chain-of-Custody Forms

COC ID: 20160802-1413		TURNAROUND TIME:		RUSH:				
PROJECT/CLIENT INFO				LABORATORY		OTHER INFO		
Facility Name / Job# Fording River Operation		Lab Name Nautilus Environmental		Report Format / Distribution		Excel	PDF	EDD
Project Manager Lee Wilm		Lab Contact		Email 1: Lee.Wilm@teck.com		x	x	x
Email		Email		Email 2: Neil.Macdonald@teck.com		x	x	x
Address PO Box 100		Address 8664 Commerce Court		Email 3: teckcoal@equisonline.com				x
City Elkford	Province BC	City Burnaby	Province BC	PO number				
Postal Code V0B 1H0	Country Canada	Postal Code V5A 4N7	Country Canada					
Phone Number 1-250-865-5289		Phone Number 604-420-8773						

SAMPLE DETAILS								ANALYSIS REQUESTED												
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	48 hr Daphnia Sinige Conc. Pass/Fail	48 hr Daphnia Sinige Conc. 10 deg C Pass/Fail	96 Hr Rainbow Trout Single Conc. Pass/Fail	Follow-up TIE 48-h Daphnia									
FR_ECI_Q_04072016_N	FR_ECI	WS		2016/08/02	10:23	G	1	1	1	x										1x 20L - 17.1
GH_CCI_Q_04072016_N	GH_CCI	WS		2016/08/02	12:35	G	2	1	1	x	X									2x 20L - 15.8
GH_SCI_Q_04072016_N	GH_SCI	WS		2016/08/02	12:51	G	2	1	1	x										2x 20L - 15.8

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS		RELINQUISHED BY/AFFILIATION		DATE/TIME		ACCEPTED BY/AFFILIATION		DATE/TIME	
COPY		N. Macdonald		2016/08/02		Nautilus NY - Nan Yamamoto		Aug 04/16 @ 10:10	
						(5x 20L)			
NB OF BOTTLES RETURNED/DESCRIPTION		Sampler's Name		Mobile #		Sampler's Signature		Date/Time	
Regular (default) X		N. Macdonald		250 865 5204		[Signature]		Aug 2 2016	
Priority (2-3 business days) - 50% surcharge									
Emergency (1 Business Day) - 100% surcharge									
For Emergency <1 Day, ASAP or Weekend - Contact ALS									

Sample Description:

- ① Pale green, clear, no particulates, odourless
- ② Grey, slightly turbid, odourless, no particulates
- ③ Pale green, clear, no particulates, odourless

END OF REPORT

Appendix G – 2016 Spills and Incidents

Summary of Spills in 2016

Spill Date	Teck Operation	PEP #
1/3/2016	GHO	DGIR 152821
1/12/2016	GHO	DGIR 152905
1/13/2016	CMO	DGIR 152916
1/16/2016	FRO	DGIR 152944
1/16/2016	FRO	DGIR 152951
1/23/2016	FRO	DGIR 153014
1/28/2016	LCO	DGIR 153071
2/3/2016	FRO	DGIR 153145
2/5/2016	FRO	DGIR 153181
2/7/2016	FRO	DGIR 153192
2/16/2016	CMO	DGIR 153259
3/9/2016	GHO	DGIR 153502
3/14/2016	EVO	DGIR 153564
3/15/2016	CMO	DGIR 153585
3/17/2016	FRO	DGIR 153610
3/18/2016	FRO	DGIR 153625
4/2/2016	FRO	DGIR160011
4/5/2016	LCO	DGIR 160041
4/10/2016	CMO	DGIR 160075
4/12/2016	GHO	DGIR 160098
4/14/2016	EVO	DGIR 160128
4/18/2016	GHO	DGIR 160155
4/18/2016	LCO	DGIR 160177
4/19/2016	LCO	DGIR 160179
4/20/2016	FRO	DGIR 160187
4/20/2016	GHO	DGIR 160203
4/20/2016	FRO	DGIR 160209
5/4/2016	FRO	DGIR160337
5/5/2016	LCO	DGIR 160338
5/6/2016	GHO	DGIR 160371
5/6/2016	GHO	DGIR 160373
5/7/2016	FRO	DGIR160374
5/15/2016	GHO	DGIR 160430
5/17/2016	CMO	DGIR 160462

Summary of Spills in 2016

Spill Date	Teck Operation	PEP #
5/19/2016	GHO	DGIR 160488
5/20/2016	GHO	DGIR 160489
5/22/2016	LCO	DGIR 160511
5/22/2016	EVO	DGIR 160515
5/24/2016	FRO	DGIR160528.
5/25/2016	EVO	DGIR 160534
5/25/2016	GHO	DGIR 160545
5/26/2016	EVO	DGIR 160549
5/29/2016	GHO	DGIR 160583
5/30/2016	CMO	DGIR 160584
5/31/2016	GHO	DGIR 160626
6/2/2016	FRO	DGIR160619.
6/2/2016	GHO	DGIR 160627
6/3/2016	EVO	DGIR 160650
6/5/2016	GHO	DGIR 160666
6/6/2016	FRO	DGIR160687
6/7/2016	GHO	DGIR 160686
6/13/2016	EVO	DGIR 160735
6/23/2016	GHO	DGIR 160840
6/24/2016	GHO	DGIR 160859
6/25/2016	EVO	DGIR 160890
6/26/2016	GHO	DGIR 160888
6/27/2016	EVO	DGIR 160889
7/1/2016	FRO	DGIR 160948
7/2/2016	EVO	DGIR 160952
7/8/2016	FRO	DGIR 161000
7/14/2016	FRO	DGR 161061
7/16/2016	EVO	DGIR 161083
7/17/2016	EVO	DGIR 161093
7/17/2016	GHO	DGIR 161084
7/18/2016	FRO	DGIR 161103
7/28/2016	FRO	DGR 161218
7/28/2016	GHO	DGIR 161210
7/29/2016	FRO	DGR 161222

Summary of Spills in 2016

Spill Date	Teck Operation	PEP #
7/29/2016	FRO	DGR 161231
7/29/2016	LCO	DGIR 161247
7/30/2016	FRO	DGR 161238
8/1/2016	LCO	DGIR 161268
8/2/2016	GHO	DGIR 161265
8/14/2016	FRO	DGIR 161391
8/21/2016	EVO	DGIR 161455
8/23/2016	GHO	DGIR 161487
8/26/2016	LCO	DGIR 161524
9/1/2016	GHO	DGIR 161575
9/1/2016	EVO	DGIR 161585
9/3/2016	GHO	DGIR 161596
9/7/2016	LCO	DGIR 161632
9/10/2016	FRO	DGR 161660
9/11/2016	GHO	DGIR 161662
9/11/2016	GHO	DGIR 161664
9/13/2016	EVO	DGIR 161679
9/14/2016	FRO	DGR 161688
9/14/2016	LCO	DGIR 161700
9/16/2016	GHO	DGIR 161714
9/17/2016	GHO	DGIR 161716
9/18/2016	GHO	DGIR 161728
9/18/2016	EVO	DGIR 161729
9/20/2016	GHO	DGIR 161741
9/29/2016	GHO	DGIR 161820
9/29/2016	EVO	DGIR 161823
9/30/2016	EVO	DGIR 161832
10/2/2016	LCO	DGIR 161842
10/3/2016	GHO	DGIR 161847

Summary of Spills in 2016

Spill Date	Teck Operation	PEP #
10/3/2016	FRO	DGIR 161851
10/4/2016	EVO	DGIR 161871
10/5/2016	GHO	DGIR 161862
10/6/2016	GHO	DGIR 161867
10/6/2016	LCO	DGIR 161877
10/6/2016	GHO	DGIR 161879.
10/8/2016	GHO	DGIR 161902
10/10/2016	GHO	DGIR 161911
10/16/2016	EVO	DGIR 161966
10/20/2016	GHO	DGIR 162024
10/22/2016	GHO	DGIR 162045
10/23/2016	GHO	DGIR 162062
10/24/2016	FRO	DGIR 162076
10/27/2016	LCO	DGIR 162117
10/27/2016	GHO	DGIR 162440
10/30/2016	CMO	DGIR 162144
10/31/2016	LCO	DGIR 162148
11/5/2016	EVO	DGIR 162217
11/16/2016	FRO	DGIR 162326
11/16/2016	FRO	DGIR 162327
11/16/2016	FRO	DGIR 162331
11/20/2016	GHO	DGIR 162548
11/21/2016	EVO	DGIR 162375
11/22/2016	GHO	DGIR 162376
11/26/2016	EVO	DGIR 162518
11/26/2016	EVO	DGIR 162519
11/27/2016	EVO	DGIR 162449
12/1/2016	GHO	DGIR 162510
12/2/2016	GHO	DGIR 162510

Summary of Spills in 2016

Spill Date	Teck Operation	PEP #
12/4/2016	FRO	DGIR 162533
12/5/2016	GHO	DGIR 162551
12/7/2016	LCO	DGIR162567
12/9/2016	EVO	DGIR 162611
12/12/2016	FRO	DGIR 162647
12/17/2016	LCO	DGIR 162686
12/20/2016	EVO	DGIR 162735
12/20/2016	GHO	DGIR 162736
12/23/2016	LCO	DGIR 1162773
12/23/2016	FRO	DGIR 162772
12/30/2016	GHO	DGIR 162805
12/31/2016	EVO	DGIR 162817

Appendix H – MSX Short Dump- MSAN LC7 Statistics

Memorandum

Teck Coal Limited
Line Creek Operations
P.O. Box 2003
15 kms North, Hwy 43
Sparwood, BC Canada V0B 2G0

+1 250 425 2555 Tel
+1 250 425 7144 Fax
www.teck.com



To: Mark Hall, MOE SENT VIA EMAIL Date: 30th October 2015

From: Kevin Podrasky, Line Creek Operations Cc: -

Subject: Statistical evaluation (T-Test) regarding the MSAN MSX Short Dump LC7 (E216142) and 'LC7 alternate' sampling location.

The Mine Services Area North Pond (MSAN) System (identified in Section 1.4 of PE5353 (June 2015) is a series of three separate cells which are used to settle suspended sediment in mine impacted water from the MSAN Pit. Line Creek Operations plans to implement a mine optimization opportunity that involves backfilling of the MSAN Pit with a short dump (MSX Short Dump) which comprises approximately 7.1 Million BCM of waste rock. The runout zone of the Short Dump has the potential to limit access to the Pond System and therefore may limit Line Creek Operations ability to meet compliance monitoring obligations as specified within the permit, unless the sample can be obtained from within the safe zone.

Line Creek Operations propose that for the duration of the spoil development, that compliance samples will be obtained where possible at the current discharge location E216142 and when access is restricted, that sampling is obtained from the '*LC_7 alternate location*' (LC_LC7DSTF).

In support of the request to sample an alternate location, the water quality and physical characteristics at the MSAN Pond discharge (E216142 (LC_7)) and the '*LC_7 alternate location*' (LC_LC7DSTF) were compared. An evaluation of standard deviation and coefficient of variation were applied to the dataset and submitted to MOE on 5th October 2015, concluding that there was a low degree of variation between the datasets. Following review of this submission, the MOE requested (14th October, 2015) that additional statistical evaluation was conducted, to determine the significance of any difference between the datasets from the two locations.

A t-test statistical analysis was undertaken on the original MSAN Pond discharge (E216142 (LC_7)) and the *LC7_alternate* dataset, to verify the hypothesis that no significant difference exists between them. For the purpose of hypothesis testing, the following assumptions applied to the analysis:

- Both datasets exhibit a normal distribution with equal variance
- The direction of difference is unable to be determined (two-tailed test)
- Significance level (α) of 0.05, 95% confidence

Values below detection were not utilized to conduct the t-test analysis as their value is undeterminable and would misconstrue the normal distribution.

The t-test assesses whether the means of two groups are statistically different from each other. In order to conduct the t-test analysis, a P value (or t-value in some references) was calculated for the distributions of parameter values from the two locations, within the assessed dataset (Table 1). To determine the critical P-value (or critical t-value in some references), the degree of freedom was determined for each parameter, by summing the number of samples (N) from LC7 (n_1) and LC7_alternate (n_2) as follows:

$$N = n_1 + n_2$$
$$\text{degree of freedom} = N - 2$$

Once the degree of freedom and the significance level were identified, the critical P-value was determined from t-test tables¹. The T-test identifies that, where the calculated P-value exceeds the critical P-value, the two datasets are deemed to be significantly different.

In this case, the t-test was applied to a dataset of 86 water quality analytes, sampled from both the MSAN Pond discharge (E216142 (LC_7)) and the 'LC_7 alternate' location. The parameters tested are listed in Table 1 and included mining constituents of concern, anions and nutrients (eg. nitrate, nitrite, ammonia and sulphate), total and dissolved metals (eg. selenium and cadmium) and Total Suspended Solids, etc. Data was obtained on 46 sampling events at the MSAN Pond discharge (E216142 (LC_7)) and 16 sampling events at the 'LC_7 alternate location' (LC_LC7DSTF), throughout 2013.

Although the degrees of freedom varied for each parameter, the calculated P-values of all analytes collectively ranged from 0.0175 to 0.998 and critical P-values collectively ranged from 2.021 to 4.303. In all cases the P-value was less than the corresponding critical P-value, which verifies acceptance of the hypothesis that no significant difference exists between the two datasets.

The findings of this statistical comparison of water quality at the MSAN pond discharge and the 'LC_7 alternate' location support the initial hypothesis that the water quality ~400 m downstream of the current sampling location (in the safe sampling zone), is not markedly different than the MSAN Pond Outlet (LC_LC7). The t-test results align with the initial statistical evaluations (submitted to MOE on 5th October) which concluded that there was a low degree of variation between the datasets at each location. Both analyses support the LCO proposal to obtain representative compliance samples where safe to do so at the discharge location (E216142 (LC_7)) and when access is restricted due to safety concerns, that sampling is obtained from the 'LC_7 alternate' location.

Should you have any questions or comments regarding this report, please feel free to contact Kevin Podrasky, Superintendent Environment, at 250-425-3169, or via email at Kevin.Podrasky@teck.com.



Kevin Podrasky

Superintendent Environment - Line Creek Operations

Appendix H 2016 T-Test results for LC7_alternate (E304613) as compared to LC7 (E216142)

Analyte	P-value	Sample Count (LC7 +LC7 alternate)	Degree of Freedom (Sample count -2)	Alpha	Critical P-Value	ACCEPT/REJECT Null Hypothesis (Accept if P-value < Critical P-value)
ALUMINUM (D)	0.892	17	15	0.05	2.131	ACCEPT
ALUMINUM (T)	0.828	41	39	0.05	2.042	ACCEPT
ANTIMONY (D)	0.296	41	39	0.05	2.042	ACCEPT
ANTIMONY (T)	0.324	41	39	0.05	2.042	ACCEPT
ARSENIC (D)	0.960	38	36	0.05	2.042	ACCEPT
ARSENIC (T)	0.885	41	39	0.05	2.042	ACCEPT
BARIUM (D)	0.984	41	39	0.05	2.042	ACCEPT
BARIUM (T)	0.806	41	39	0.05	2.042	ACCEPT
BERYLLIUM (D)		0	*	0.05		N/A
BERYLLIUM (T)	0.404	4	2	0.05	4.303	ACCEPT
BISMUTH (D)		0	*	0.05		N/A
BISMUTH (T)		0	*	0.05		N/A
BORON (D)	0.198	36	34	0.05	2.042	ACCEPT
BORON (T)	0.320	41	39	0.05	2.042	ACCEPT
BROMIDE (D)		0	*	0.05		N/A
CADMIUM (D)	0.561	41	39	0.05	2.042	ACCEPT
CADMIUM (T)	0.781	41	39	0.05	2.042	ACCEPT
CALCIUM (T)	0.455	42	40	0.05	2.021	ACCEPT
CARBON, DISSOLVED ORGANIC (D)	0.366	39	37	0.05	2.042	ACCEPT
CHLORIDE (D)	0.223	27	25	0.05	2.06	ACCEPT
CHLORIDE (N)		2	0	0.05		N/A
CHROMIUM (D)	0.875	23	21	0.05	2.08	ACCEPT
CHROMIUM (T)	0.841	40	38	0.05	2.042	ACCEPT
COBALT (D)	0.302	39	37	0.05	2.042	ACCEPT
COBALT (T)	0.628	41	39	0.05	2.042	ACCEPT
CONDUCTIVITY, FIELD (N)	0.216	38	36	0.05	2.042	ACCEPT
CONDUCTIVITY, LAB (N)	0.952	41	39	0.05	2.042	ACCEPT
COPPER (D)	0.949	16	14	0.05	2.145	ACCEPT
COPPER (T)	0.691	24	22	0.05	2.074	ACCEPT
DISSOLVED OXYGEN, FIELD (N)	0.176	41	39	0.05	2.042	ACCEPT
FLUORIDE (D)	0.968	36	34	0.05	2.042	ACCEPT
Hardness, Total or Dissolved CaCO3 (N)	0.902	42	40	0.05	2.021	ACCEPT

Analyte	P-value	Sample Count (LC7 +LC7 alternate)	Degree of Freedom (Sample count -2)	Alpha	Critical P-Value	ACCEPT/REJECT Null Hypothesis (Accept if P-value < Critical P-value)
IRON (D)		1	*	0.05		N/A
IRON (T)	0.536	29	27	0.05	2.052	ACCEPT
LEAD (D)		1	*	0.05		N/A
LEAD (T)	0.592	25	23	0.05	2.069	ACCEPT
LITHIUM (D)	0.355	41	39	0.05	2.042	ACCEPT
LITHIUM (T)	0.509	41	39	0.05	2.042	ACCEPT
MAGNESIUM (T)	0.749	42	40	0.05	2.021	ACCEPT
MANGANESE (D)	0.391	41	39	0.05	2.042	ACCEPT
MANGANESE (T)	0.996	41	39	0.05	2.042	ACCEPT
MERCURY (D)	*	0	*	0.05	*	N/A
MERCURY (T)	*	0	*	0.05	*	N/A
MOLYBDENUM (D)	0.208	41	39	0.05	2.042	ACCEPT
MOLYBDENUM (T)	0.324	41	39	0.05	2.042	ACCEPT
NICKEL (D)	0.406	41	39	0.05	2.042	ACCEPT
NICKEL (T)	0.543	41	39	0.05	2.042	ACCEPT
NITRATE NITROGEN (NO3), AS N (N)	0.581	42	40	0.05	2.021	ACCEPT
NITRITE NITROGEN (NO2), AS N (N)	0.257	39	37	0.05	2.042	ACCEPT
NITROGEN, AMMONIA (AS N) (N)	0.068	35	33	0.05	2.042	ACCEPT
NITROGEN, AMMONIA (AS N) (T)	0.757	5	3	0.05	3.182	ACCEPT
ORTHO-PHOSPHATE (D)	*	2	*	0.05	*	N/A
ORTHO-PHOSPHATE (N)	0.682	25	23	0.05	2.069	ACCEPT
pH, Field (N)	0.959	41	39	0.05	2.042	ACCEPT
pH, LAB (N)	0.025	42	40	0.05	2.021	ACCEPT
PHOSPHORUS (N)	0.230	11	9	0.05	2.262	ACCEPT
PHOSPHORUS (T)	0.361	20	18	0.05	2.101	ACCEPT
POTASSIUM (T)	0.267	19	17	0.05	2.11	ACCEPT
SELENIUM (D)	0.966	41	39	0.05	2.042	ACCEPT
SELENIUM (T)	0.982	41	39	0.05	2.042	ACCEPT
SILVER (D)		0	*	0.05		N/A
SILVER (T)	0.804	10	8	0.05	2.306	ACCEPT
SODIUM (T)	0.550	37	35	0.05	2.042	ACCEPT
STRONTIUM (D)	0.364	41	39	0.05	2.042	ACCEPT
STRONTIUM (T)	0.222	41	39	0.05	2.042	ACCEPT
SULFATE (AS SO4) (D)	0.499	42	40	0.05	2.021	ACCEPT

Analyte	P-value	Sample Count (LC7 +LC7 alternate)	Degree of Freedom (Sample count -2)	Alpha	Critical P-Value	ACCEPT/REJECT Null Hypothesis (Accept if P-value < Critical P-value)
TEMPERATURE, FIELD (N)	0.349	41	39	0.05	2.042	ACCEPT
THALLIUM (D)	0.851	14	12	0.05	2.179	ACCEPT
THALLIUM (T)	0.909	19	17	0.05	2.11	ACCEPT
TIN (D)	*	0	*	0.05	*	ACCEPT
TIN (T)	*	0	*	0.05	*	ACCEPT
TITANIUM (D)	*	2	0	0.05	*	N/A
TITANIUM (T)	0.679	14	12	0.05	2.179	ACCEPT
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)	0.678	35	33	0.05	2.042	ACCEPT
TOTAL KJELDAHL NITROGEN (N)	0.297	37	35	0.05	2.042	ACCEPT
TOTAL ORGANIC CARBON (T)	0.875	39	37	0.05	2.042	ACCEPT
TOTAL SUSPENDED SOLIDS, LAB (T)	*	3	1	0.05	*	ACCEPT
TURBIDITY, LAB (N)	0.531	61	59	0.05	2.021	ACCEPT
URANIUM (D)	0.615	41	39	0.05	2.042	ACCEPT
URANIUM (T)	0.732	41	39	0.05	2.042	ACCEPT
VANADIUM (D)	*	0	*	0.05	*	N/A
VANADIUM (T)	0.817	10	8	0.05	2.306	ACCEPT
ZINC (D)	0.017	29	27	0.05	2.052	ACCEPT
ZINC (T)	0.497	37	35	0.05	2.042	ACCEPT

*All sample results remained below detection limits for both sample locations.

Appendix I – Maps

Map 1: Fording River Operations Surface Water Sampling Sites

Map 2: Greenhills Operations Surface Water Sampling Sites

Map 3: Line Creek Operations Surface Water Sampling Sites

Map 4: Elkview Operations Surface Water Sampling Sites

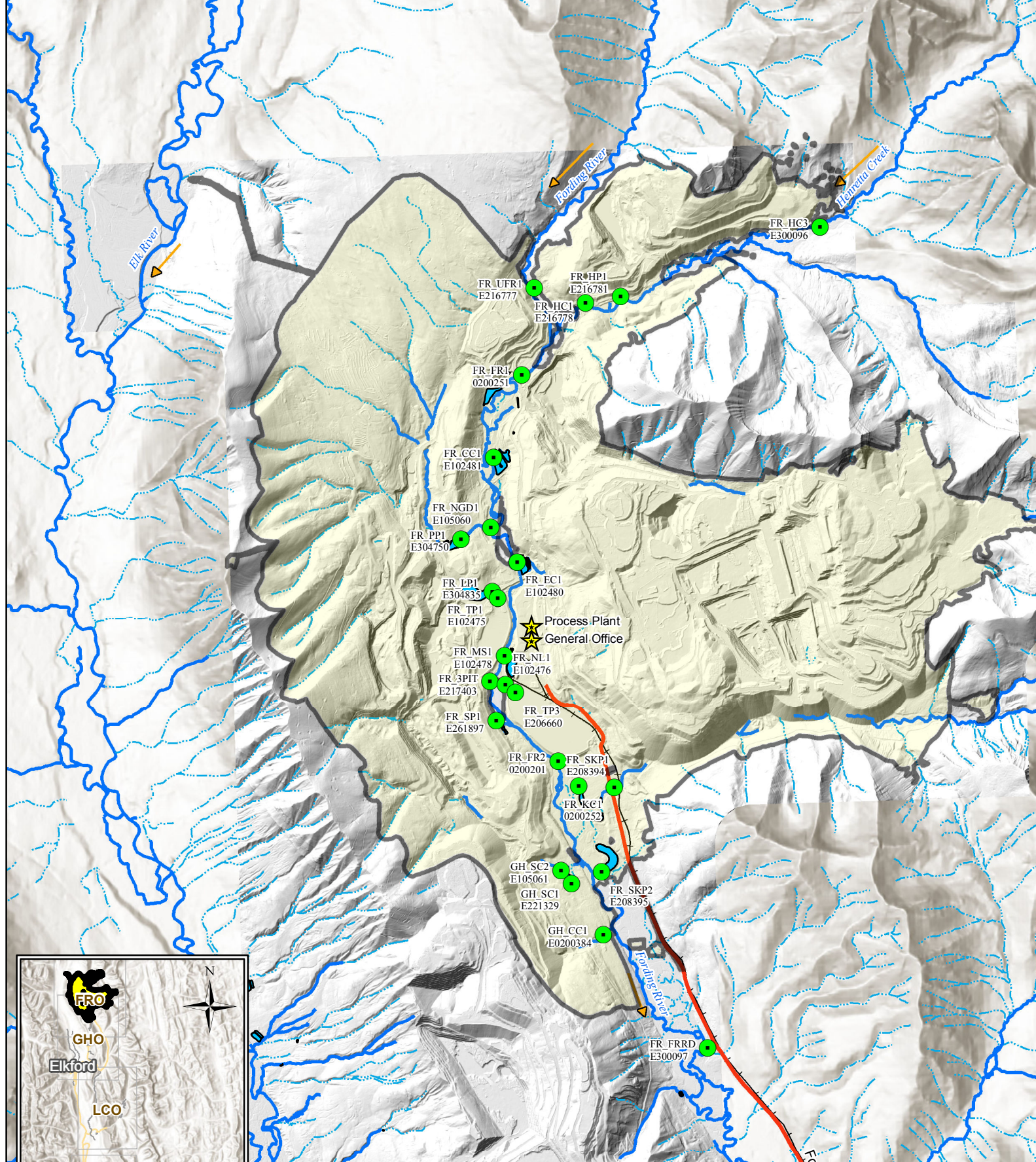
Map 5: Coal Mountain Operations Surface Water Sampling Sites

Map 6: Lake Koochanusa Surface Water Sampling Sites

Map 7: Compliance Points Surface Water Sampling Sites

Map 8: Order Stations Surface Water Sampling Sites

Map 9: West Line Creek Active Water Treatment Facility Water Sampling Sites



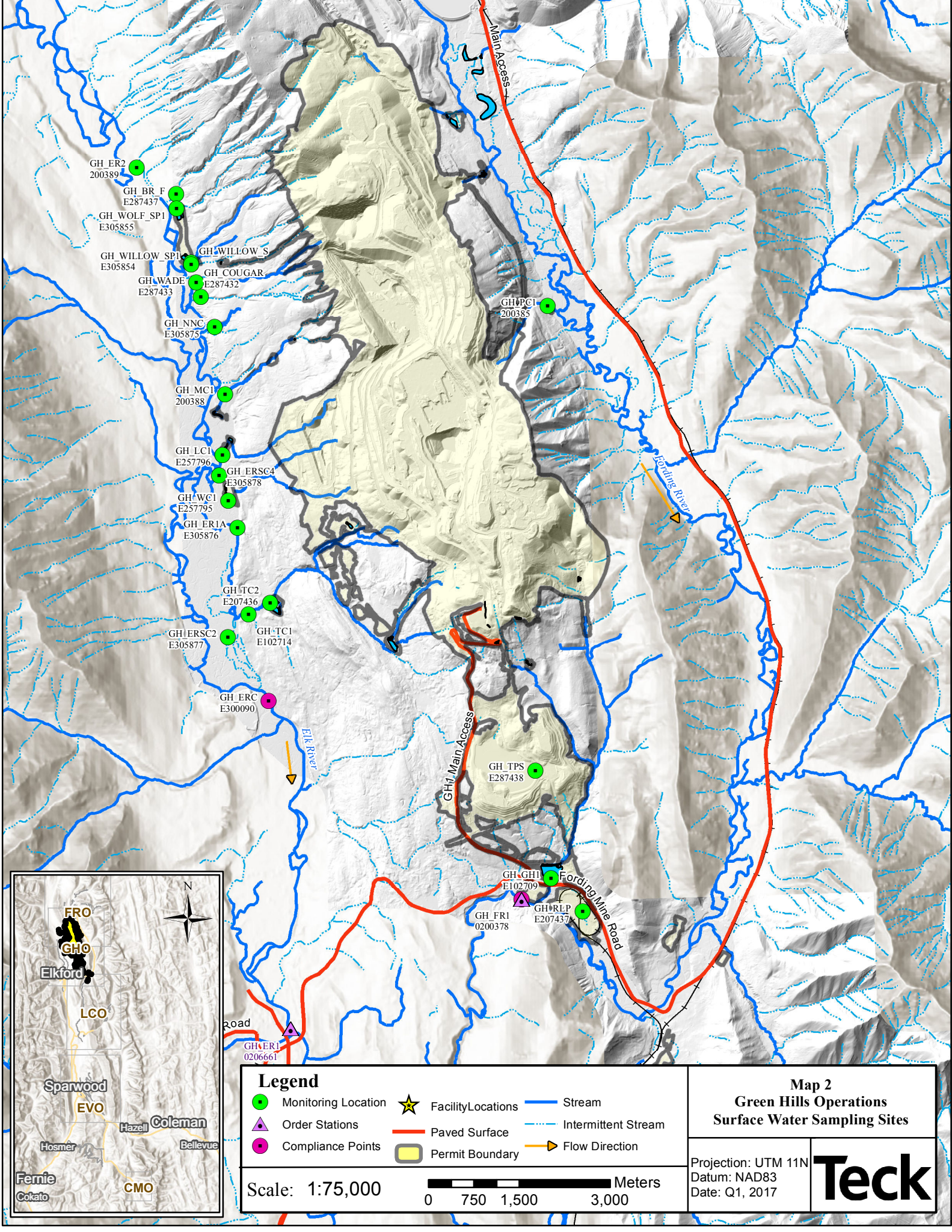
Legend		Stream
● Monitoring Location	★ Facility Locations	— Intermittent Stream
▲ Order Stations	— Paved Surface	▶ Flow Direction
● Compliance Point	▭ Permit Boundary	

Scale: 1:70,000

0 750 1,500 3,000 Meters

Map 1.
Fording River Operations
-Surface Water Sampling Sites

Projection: UTM 11N
Datum: NAD83
Date: Q1, 2017



GH_ER2
200389

GH_BR_F
E287437

GH_WOLF_SP1
E305855

GH_WILLOW_SP1
E305854

GH_WILLOW_S
E287432

GH_WADE
E287433

GH_COUGAR
E287432

GH_NNC
E305875

GH_MCI
200388

GH_LCI
E257796

GH_ERSC4
E305878

GH_WCI
E257795

GH_ER1A
E305876

GH_TC2
E207436

GH_ERSC2
E305877

GH_TC1
E102714

GH_ERC
E300090

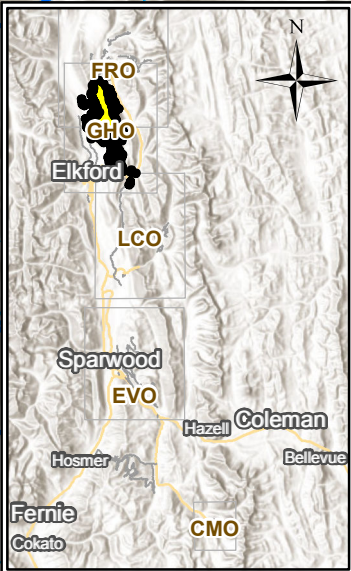
GH_PCI
200385

GH_TPS
E287438

GH_GH1
E102709

GH_FR1
0200378

GH_RLP
E207437

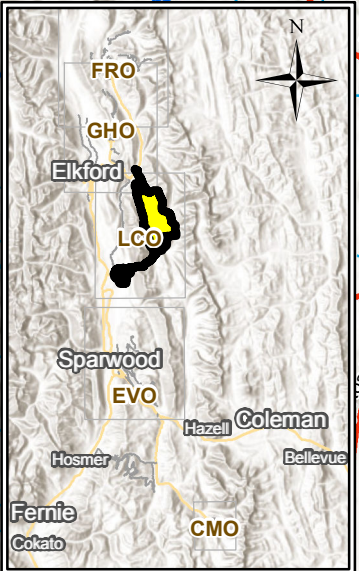
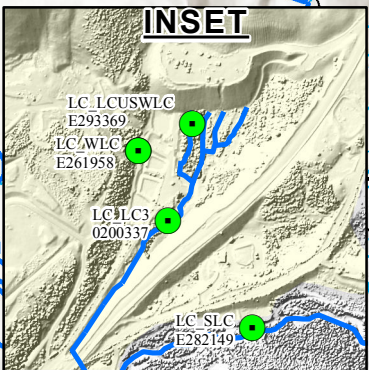
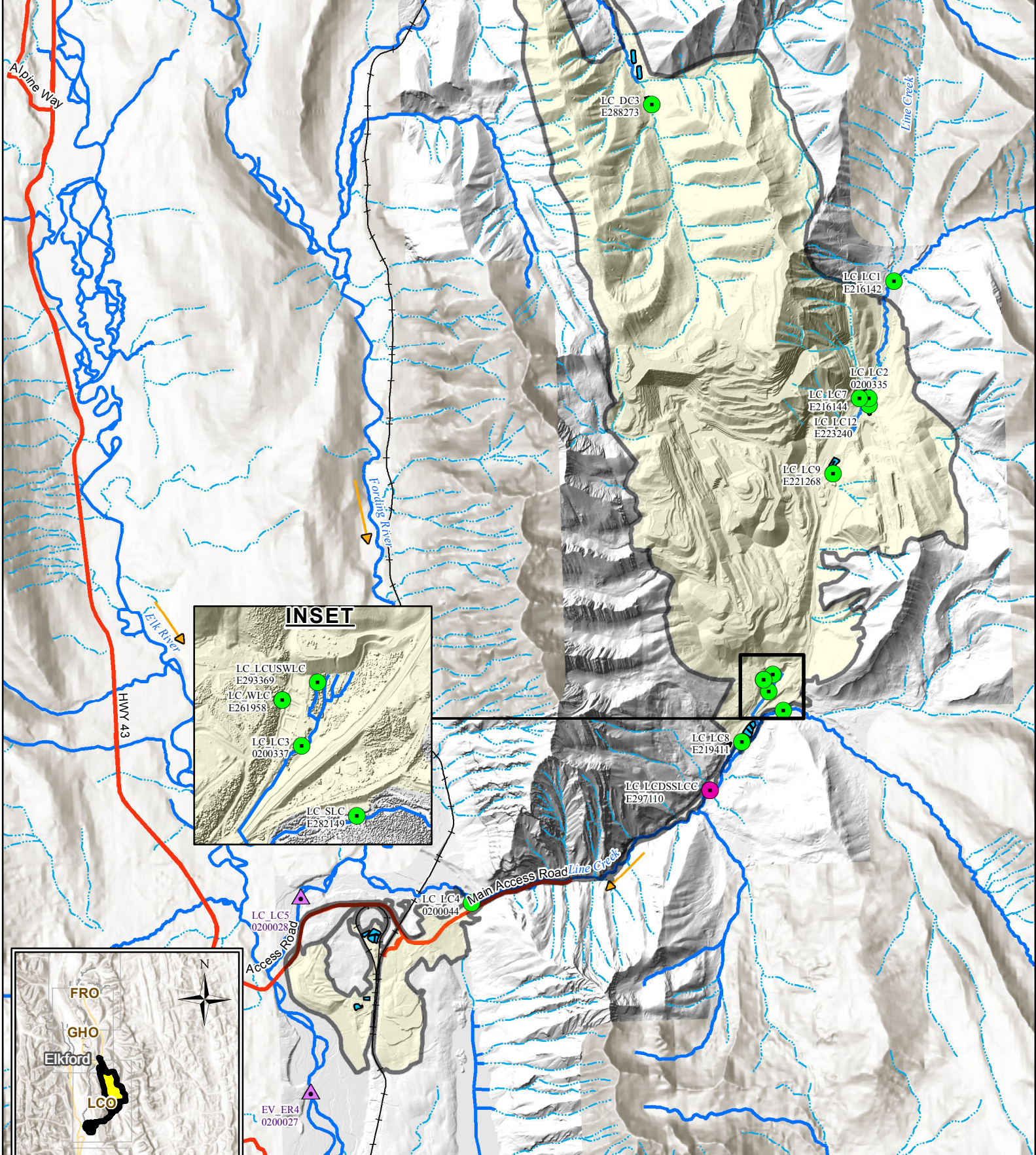


Legend		
● Monitoring Location	★ Facility Locations	— Stream
▲ Order Stations	— Paved Surface	- - - Intermittent Stream
● Compliance Points	 Permit Boundary	▶ Flow Direction

Map 2
Green Hills Operations
Surface Water Sampling Sites

Scale: 1:75,000 Meters
0 750 1,500 3,000

Projection: UTM 11N
Datum: NAD83
Date: Q1, 2017



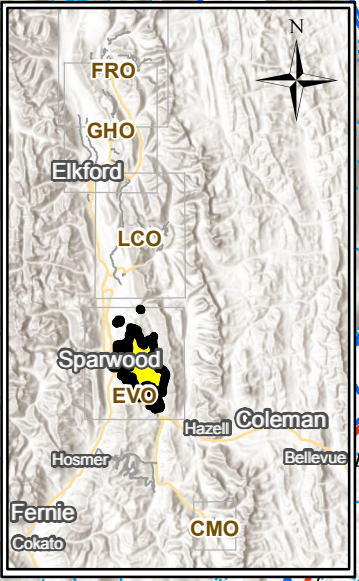
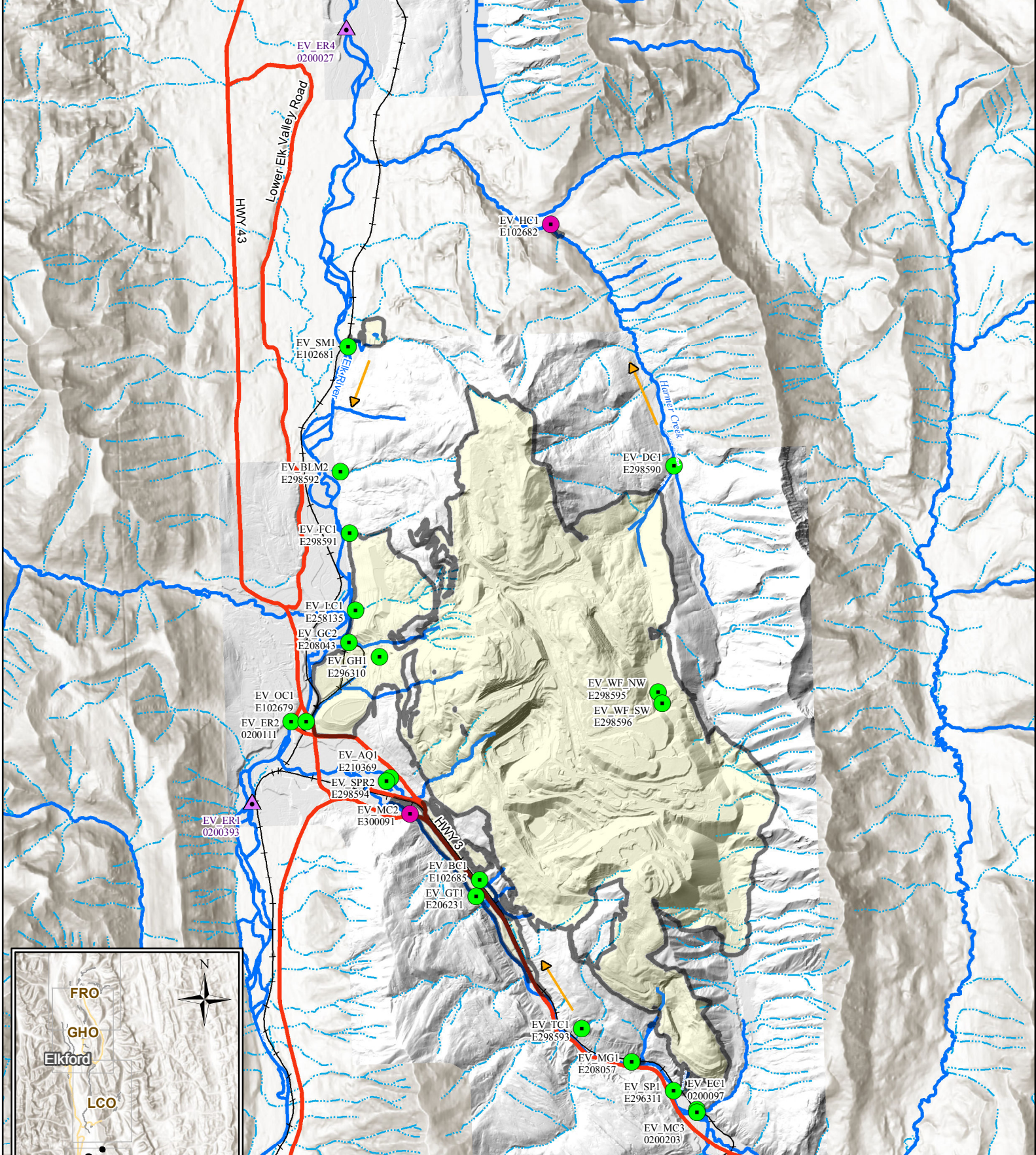
Legend					
	Order Stations		Facility Locations		Stream
	Monitoring Location		Paved Surface		Intermittent Stream
	Compliance Point		Permit Boundary		Flow Direction

Map 3
Line Creek Operations
Surface Water Sampling Sites

Scale: 1:75,000 Meters

Projection: UTM 11N
 Datum: NAD83
 Date: Q1, 2017





Legend

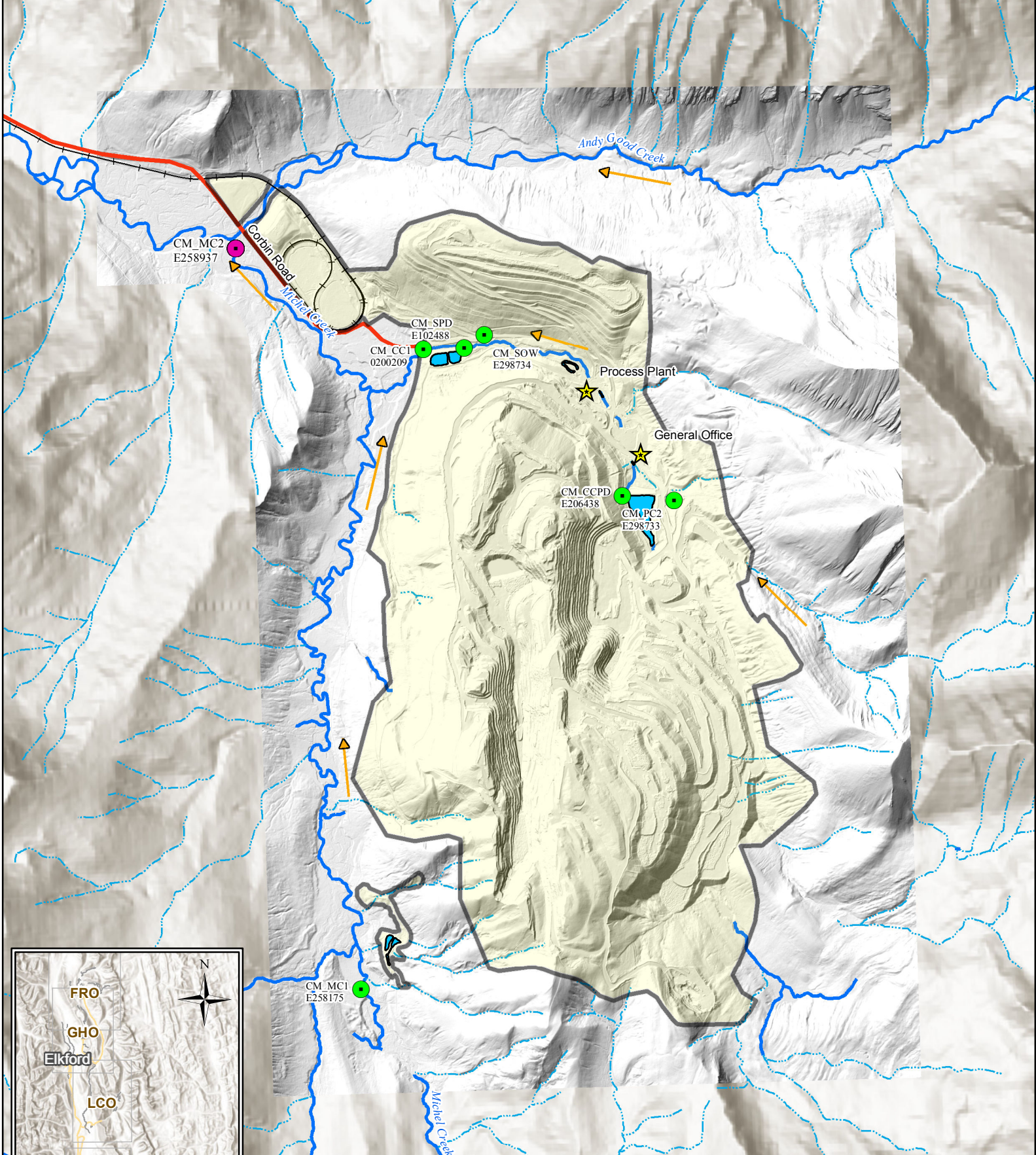
Order Stations	Facility Locations	Stream
Monitoring Location	Paved Surface	Intermittent Stream
Compliance Point	Permit Boundary	Flow Direction

Scale: 1:95,000

0 1,000 2,000 4,000 Meters

Map 4
Elkview Operations
Surface Water Sampling Sites

Projection: UTM 11N
 Datum: NAD83
 Date: Q1, 2017

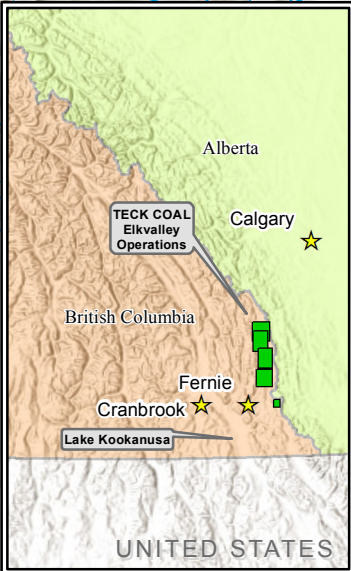
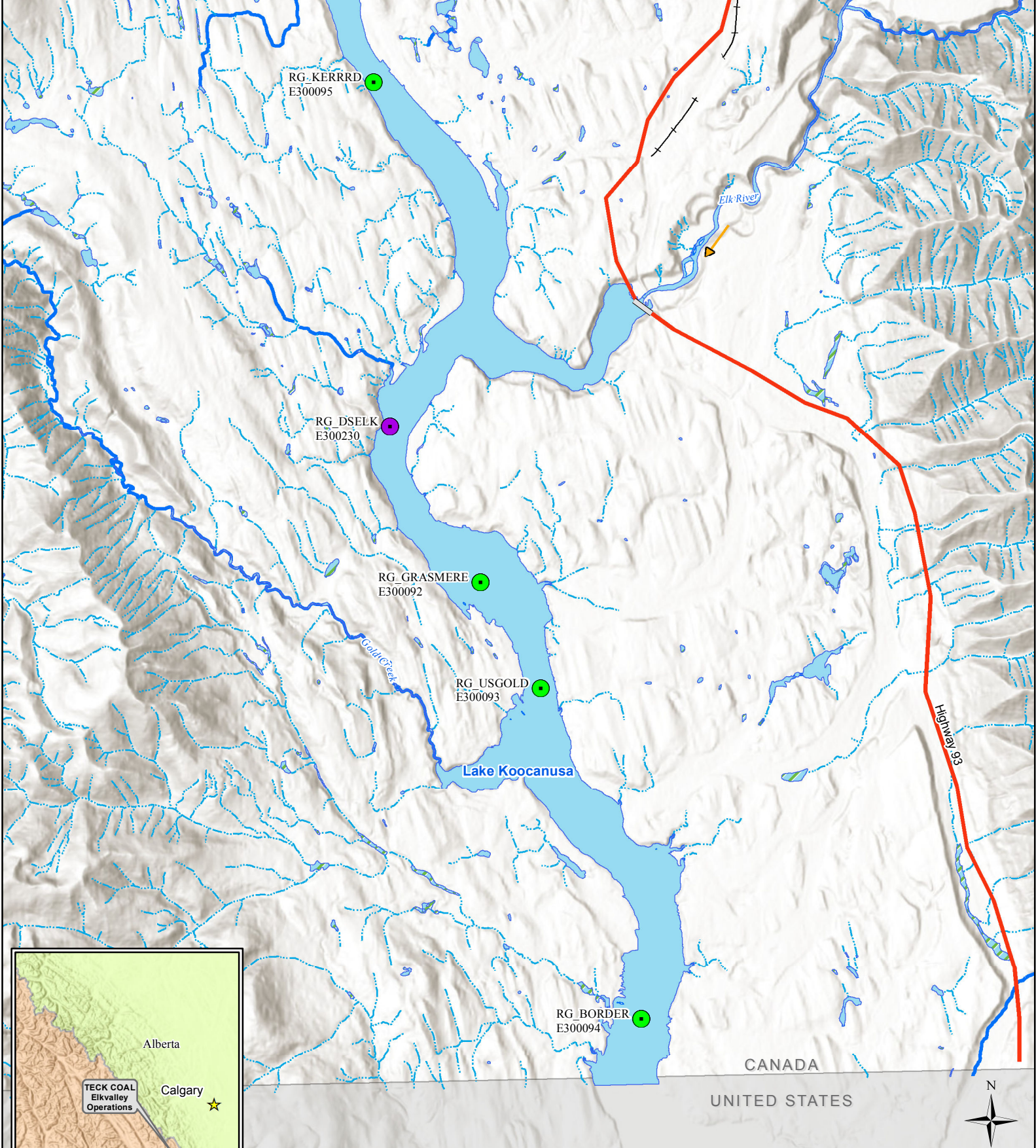


Legend					
	Monitoring Location		Facility Locations		Stream
	Order Stations		Paved Surface		Intermittent Stream
	Compliance Point		C-84 Boundary		Flow Direction

Scale: 1:35,000

0 375 750 1,500 Meters

Map 5	
Coal Mountain Operations Surface Water Sampling Sites	
Projection: UTM 11N	
Datum: NAD83	
Date: Q1, 2017	



Legend

- Monitoring Location
- Compliance Point
- Paved Surface
- ▶ Flow Direction
- Stream
- - - Intermittent Stream

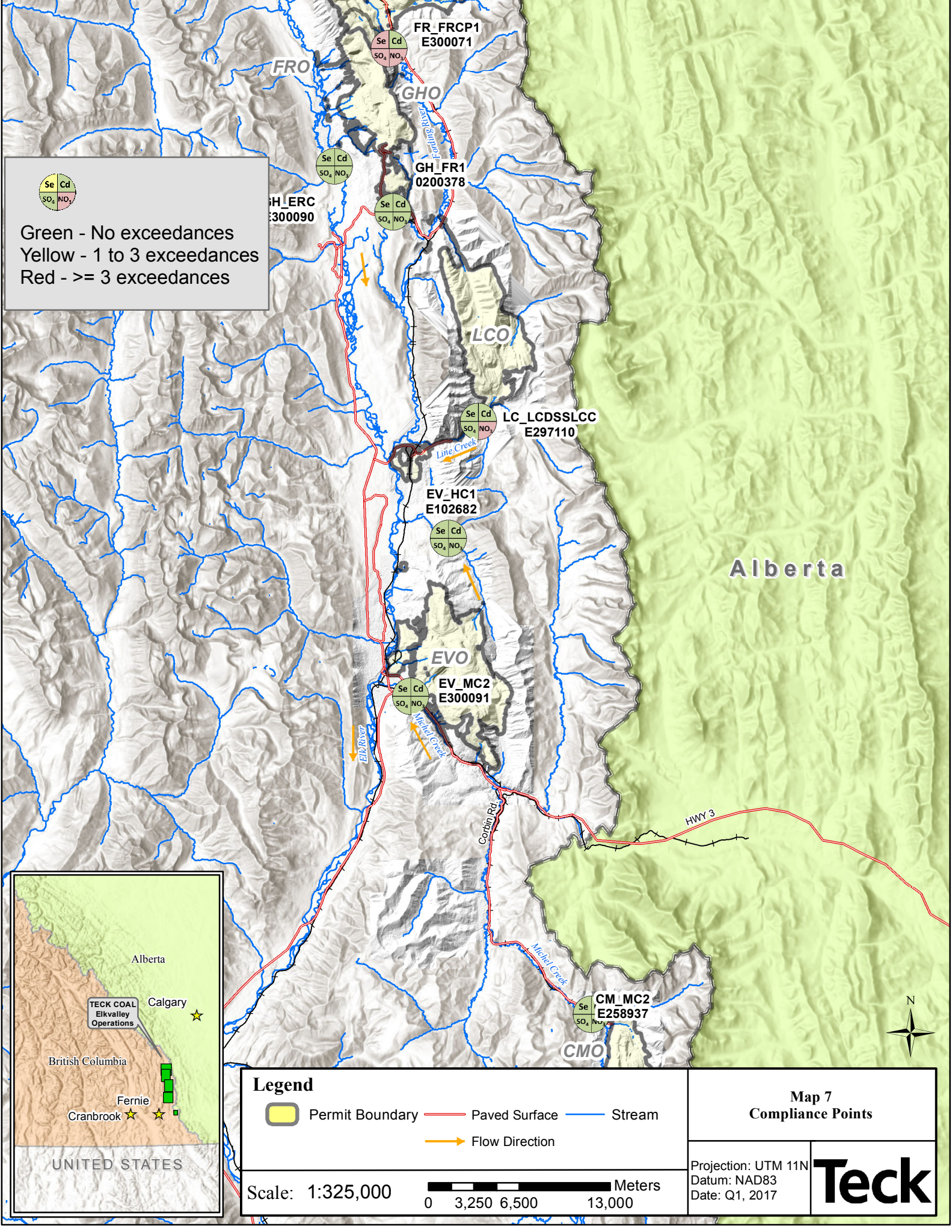
Scale: 1:125,000




0 1,250 2,500 5,000 Meters

Map 6
Lake Koochanusa
Surface Water Sampling Sites

Projection: UTM 11N
Datum: NAD83
Date: Q1, 2017









 Green - No exceedances
 Yellow - 1 to 3 exceedances
 Red - ≥ 3 exceedances



Legend


-  Permit Boundary
-  Paved Surface
-  Stream
-  Flow Direction


Scale: 1:325,000

0 3,250 6,500 13,000 Meters

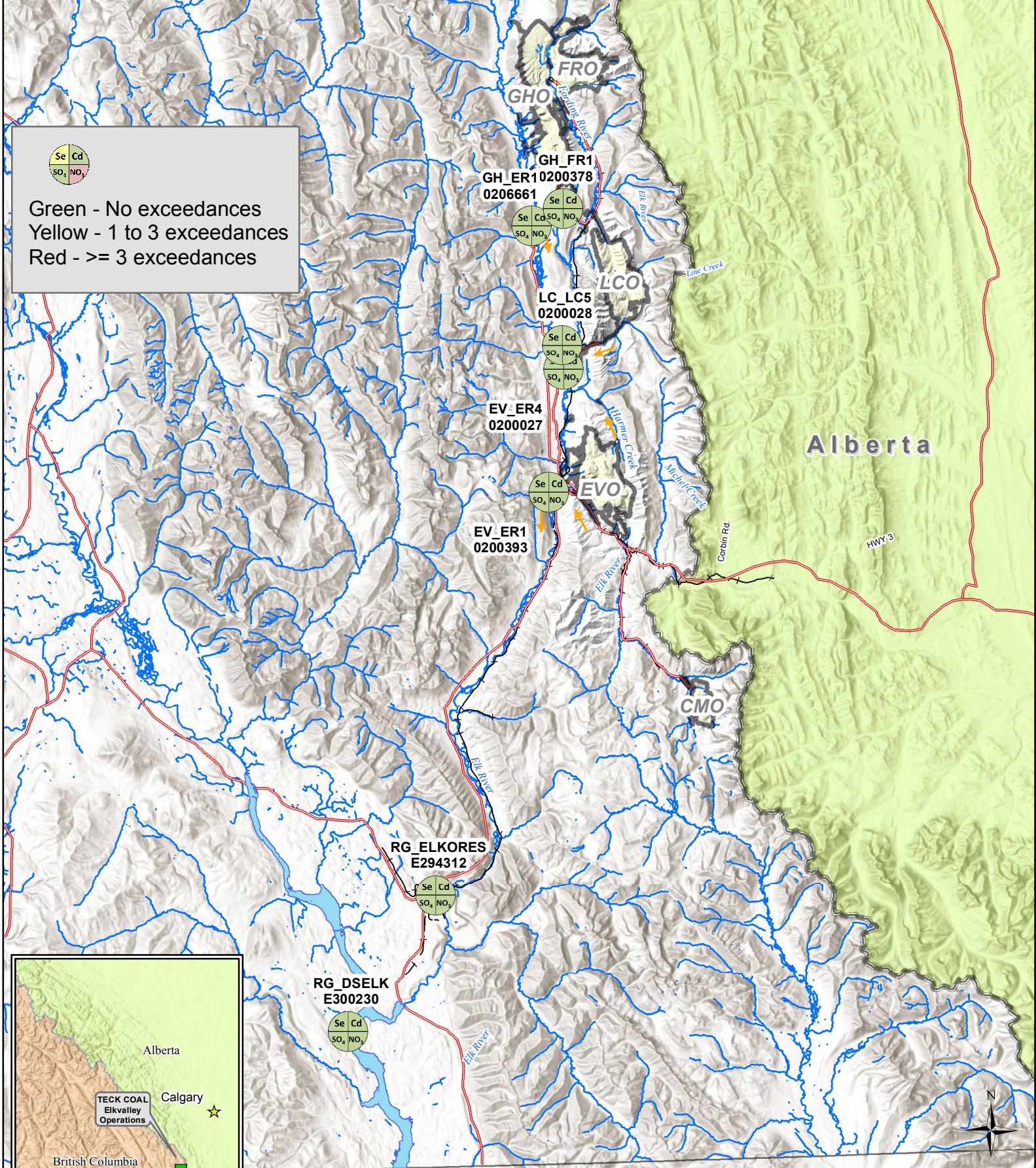
**Map 7
Compliance Points**

Projection: UTM 11N
 Datum: NAD83
 Date: Q1, 2017





 Green - No exceedances
 Yellow - 1 to 3 exceedances
 Red - >= 3 exceedances



Legend


- Paved Surface
- Flow Direction
- Stream
- Permit Boundary

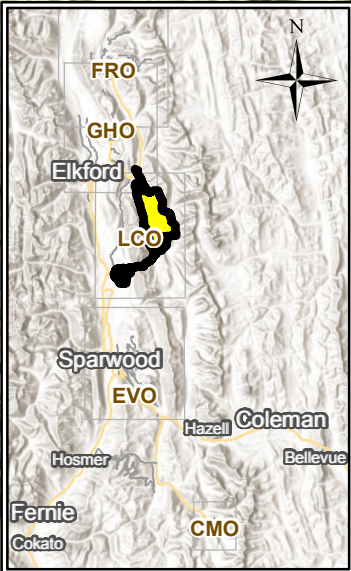
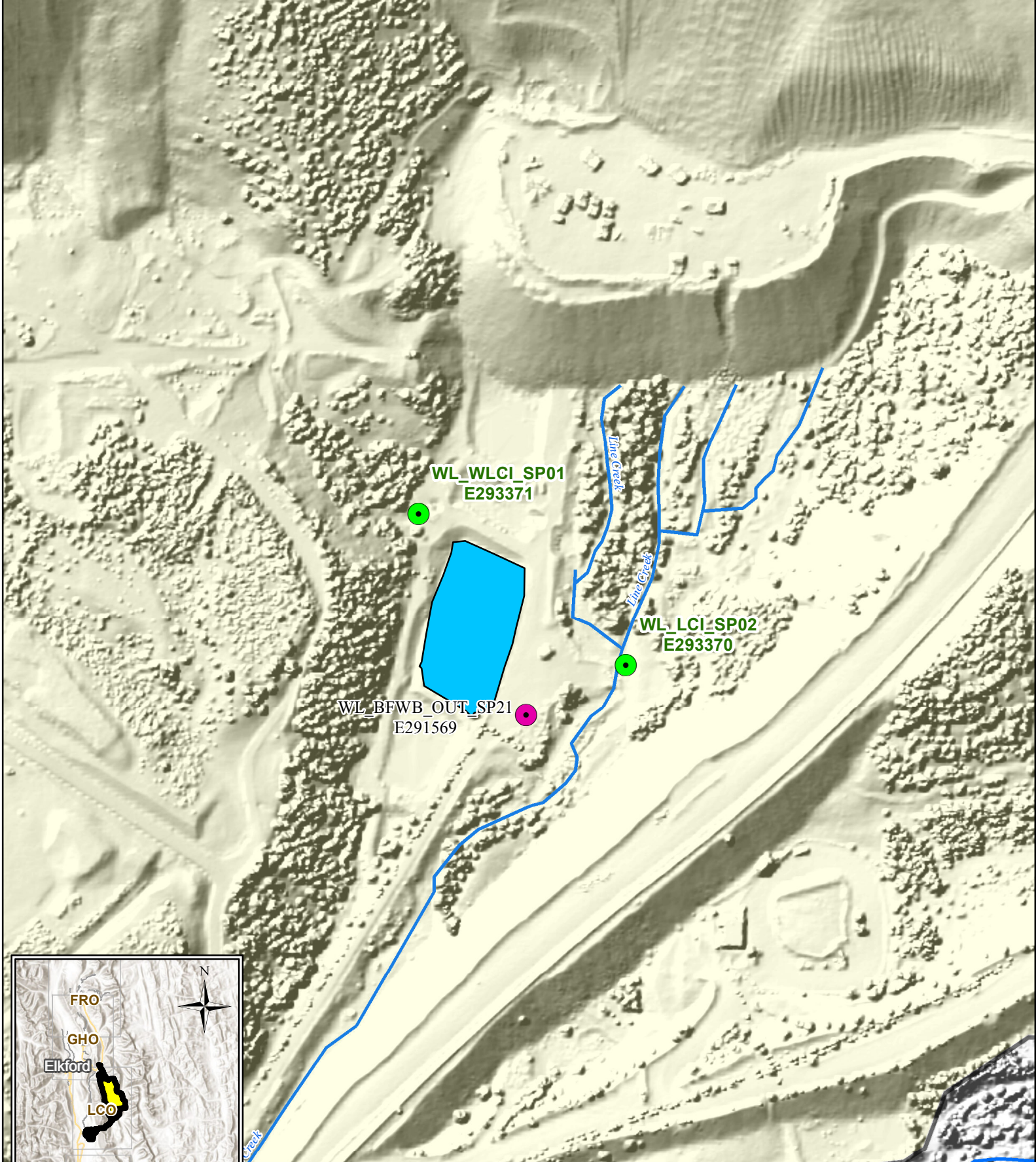
Scale: 1:600,000 Meters

0 5,500 11,000 22,000

**Map 8
Order Stations**

Projection: UTM 11N
 Datum: NAD83
 Date: Q1, 2017





Legend

- Compliance Points
- Monitoring Locations
- ★ Facility Locations
- Permit Boundary
- Paved Surface
- Intermittent Stream
- Railway
- Stream
- ⋯ Intermittent Stream
- ▶ Flow Direction

Scale: 1:3,500

0 35 70 140 Meters

Map 9
West Line Creek Treatment Facility
Surface Water Sampling Sites

Projection: UTM 11N
 Datum: NAD83
 Date: Q1, 2017

Teck