

connect

Volume 27, 2019

TRANSFORMING TECK

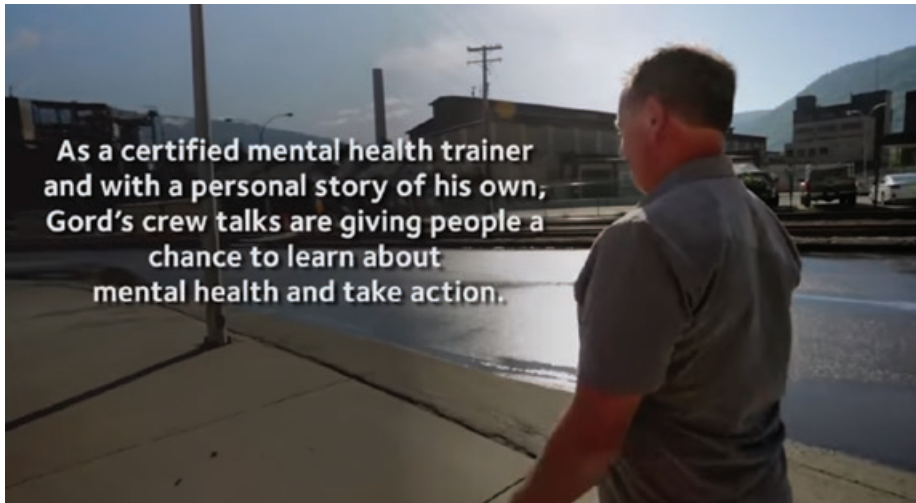
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Teck

SEEN ON SOCIAL



We're sharing Teck's stories on social media. Visit us online to find these and more.

-  /TeckResourcesLtd
-  /TeckResources
-  @TeckResources
-  Teck Resources Limited

Via Facebook: October 10th is #WorldMentalHealthDay. Mental health is an important part of everyone going home safe and healthy every day.



Teck is pioneering new methods to provide key operating data to shovel operators in real-time using a heads up display. Check out how the operator sees information to guide their work on Teck's **YouTube** channel.



Technological advancement, the growing global middle class and more—these are the forces shaping our sustainability strategy. Learn more about the evolution of our sustainability strategy on **LinkedIn**.



On **Twitter** @TeckResources retweeted: @ICMM_com By 2050 it's estimated the world's urban population will be the same as the total global population of 2004. Find out how metals are supporting #SDG11 in creating cities for the future.

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Thank You

Gord Kavaloff, Senior Reliability Specialist, Trail Operations; Adam Bondi, Senior Engineer Supervisor, Elkview Operations; Shane McColman, Senior Engineer Supervisor, Fording River Operations; Khushaal Popli, Engineer-In-Training, Highland Valley Copper; John Thomas, Superintendent Processing, Fording River Operations; Murray Cruickshank, Lead Strategic Planning, Highland Valley Copper; Jeff Hawley, Senior Engineer Supervisor, Sparwood office; Dale Caron, Drill and Blast Lead, Sparwood office; Phillipe Thenoux, Mechanic, Carmen de Andacollo; Jelena Puzic, Director, Geosciences, Vancouver office; Gerry Wong, Senior Safety Coordinator, Highland Valley Copper; Courtney Seeger, Senior Engineer Supervisor, Greenhills Operations; Verna Westlake, Community Investment Coordinator, Red Dog; Chris Adachi, Manager, Sustainability & Climate Change, Vancouver office.



On the Cover

The successful mining company of the future will be built on a fully integrated digital platform. The RACE21™ team is building that platform for Teck.



A Message from our President and CEO

Dear colleagues,

Welcome to the third issue of *Connect* for 2019, the theme for which is Transforming Teck. In the pages that follow, you will find stories and updates about the important work underway across Teck that is shaping the future of our company and its people.

Chief among these is our Quebrada Blanca Phase 2 Project in Chile, which is a key component of our future growth. Construction is now well advanced, and we have more than 5,000 people actively working across six major construction areas on the project. On page 22, we take a closer look at some of the progress being driven through QB2's one-project, one-team approach to building Teck's mine of the future.

We can't talk about Teck's future without also talking about the incredible transformation happening across our business through RACE21™. Numerous RACE21™ initiatives are underway now across Teck that will change how we do business for the better. We've set an initial target of \$150 million in annualized EBITDA improvements by the end of 2019 to be achieved under this initiative, but we know the ultimate value of this business transformation will be much, much greater.

In "RACE21™—The Big Picture of Business Transformation" on page 6, Chief Transformation Officer Andrew Milner talks about the program, the business improvements it's driving, and why people are so important to its success.

In "RACE21™ Explained" on page 9, we take a closer look at the program and why now is the right time for digital innovation at Teck. In "Connecting the Dots" on page 16, we get a sneak peek at three RACE21™ initiatives being implemented at sites across Teck and meet the people making them possible.

People are central to everything we do at Teck, and there are numerous examples across our company of inspiring individuals and teams working together to accomplish incredible things.

On page 18, we highlight another "Idea at Work", this one coming from the Elk Valley where a team, comprised of Teck employees, a local vendor and a service provider, worked together to achieve the 'impossible' and, in doing so, are helping deliver on our commitment to improving water quality in the region.

We'll continue to advance four key priorities. We'll develop QB2 to grow Teck for the future and advance the RACE21™ program to improve efficiency and productivity and transform our business. We'll apply cost discipline to every aspect of our work to achieve the targets set out under our Cost Reduction Program. And we'll execute our priority project at Neptune Terminals to secure a long-term, low-cost and reliable supply chain for our steelmaking coal.

Shining a light on the spirit of excellence at Teck rounds out this issue as 'People and Places' on page 25 takes a look back at some of our previous Excellence Award winners and their reflections on the experience of participating in the Excellence Awards program. Recognizing and rewarding excellence and the efforts of our employees is tremendously important, particularly during challenging times, and this year's Excellence Award program is well underway, with a record number of nominations being received. Thank you to everyone who took the time to nominate a co-worker and celebrate their hard work and commitment to excellence. I look forward to announcing the winners early next year.

As we work through the remainder of 2019 and prepare for 2020, we remain focused on what's most important for our people and for our business: safety, sustainability and productivity. We'll also continue to advance four key priorities. We'll develop QB2 to grow Teck for the future and advance the RACE21™ program to improve efficiency and productivity and transform our business. We'll apply cost discipline to every aspect of our work to achieve the targets set out under our Cost Reduction Program. And

we'll execute our priority project at Neptune Terminals to secure a long-term, low-cost and reliable supply chain for our steelmaking coal.

I would like to thank all employees for their hard work and commitment to Teck as we navigate challenging market conditions while taking advantage of opportunities to transform our company and stay strong for the future.



Don Lindsay
President and CEO



RACE21™—The Big Picture of Business Transformation

Connect recently sat down with Andrew Milner, Chief Transformation Officer, to talk about RACE21™ and the big picture when it comes to business transformation.





RACE21™ is about business transformation. What does Teck—and the way we work—look like when that transformation is complete?

RACE21™ is about demonstrating substantial transformation in our business by the end of 2021. But this is a journey, not a destination, and the long-term transformation now underway will evolve well beyond 2021.

That said, the RACE21™ team is looking at three key time horizons—2021, 2023 and 2025—to better articulate what our working environment could actually look like at those points in time. For example, the team is looking at the ramp-up of predictive maintenance and autonomous trucks to understand what this could mean for our maintenance departments and how the ramp-up of processing analytics could change the way we operate our processing plants.

One thing is for sure, the next several years are going to be very exciting for Teck and our employees as we implement the RACE21™ program. We can expect to see a business where our people are more empowered and people can leverage new technologies to enrich our existing work practices.

The Empower pillar within RACE21™ is about our people. Why are people so important to the success of RACE21™?

Digital transformation clearly has a significant technology component but the transformation

is fundamentally not about the technology. It's about our people, and the Empower pillar recognizes that.

The transformation underway is about making our daily work lives better. That's why we need everyone to contribute to the program as we develop and implement the solutions that should ultimately enrich the way we work.

When it comes to technology, it should work for us, not the other way around, which is why the Empower pillar and our commitment to upskilling our people to work effectively in the Digital Age is so critically important.

We've undertaken RACE21™ to build an organization that will continue to thrive and grow in the Digital Age for the next 100 years. Building such an organization and achieving the right outcomes will take active engagement in and ownership by everyone and it's exciting to see that taking place across the business as the program picks up speed.

You've been with Teck for almost a year now. How have you seen things change over the past 12 months with respect to technology and innovation?

When I arrived at Teck, I was so impressed with the fantastic work done in previous years and it was obvious that the organization was really embracing innovation. Over the past 12 months, I've seen a continuation of this journey, and it's increasingly clear to me that the organization is truly galvanizing

around RACE21™. The tempo has increased, there's excellent support from operations, and there are passionate teams working all over Teck on really exciting projects.

What excites you most when you look at the long list of the RACE21™ initiatives underway across the company and the value they're unlocking?

I've worked at other mining companies and have never seen an organization achieve as much as Teck has in the technology space within a relatively short period of time. I can't single out a particular project but what excites me most is seeing passionate people coming to work each day and embracing the changes that are underway. I am proud to be a part of something special. We're all part of this and will have increasingly important roles to play as we deliver RACE21™! ■

For more about RACE21™, see RACE21™ Explained on page 9.



Innovation and Intellectual Property at Teck

Whether you're developing a new idea or innovation, or would like to use an existing creation at Teck, all employees are asked to be mindful of protecting the Intellectual Property (IP) rights of Teck and others.

The Legal team has developed a helpful infographic that provides guidance on the protection of IP rights, including:

- Scenarios during which IP rights are a factor
- Five common types of IP rights
- How different IP rights can apply to the same innovation

For more details and to view the Innovation and Intellectual Property at Teck infographic, visit teck.com/connect.

Teck

RACE21™ EXPLAINED

A look at RACE21™, why it's important right now and what it looks like on the ground.

You've heard that RACE21™ is transforming our business. But do you know why? Or how? Or who's making it happen? *Connect* has set out to find the answers. To begin, we'll look at the acronym.

Here are the basics: RACE21™ is about taking a company-wide approach to renewing our technology infrastructure, accelerating and scaling our automation and robotics program, connecting our data systems to enable broad application of advanced analytics and artificial intelligence, and empowering our employees, with a focus on making real progress between now and 2021.

Now let's do a deeper dive.



Setting the Stage for RACE21™

No matter where we look, technology and innovation are rapidly changing the way we live and work. And that pace of change is accelerating.

Industry Factors

The story for the mining industry, however, is much different, where the pace of change is considerably slower—and, in some cases, at a standstill. In fact, mining’s basic operating model has remained largely unchanged for decades.

For the most part, there’s been little investment in looking for ways to change that model. An example of this can be seen in Figure A, which illustrates the extent to which the global mining industry is lagging behind others in intensity of R&D investment, a key indicator of an industry’s pursuit of innovation.

Figure A: Global R&D Intensity* in 2015

Pharmaceuticals & Biotechnology	15.0%
Software & Computer Service	10.6%
Technology Hardware & Equipment	8.4%
Electronic & Electrical Equipment	4.7%
Automobiles & Parts	4.3%
Aerospace & Defence	4.3%
Health Care Equipment & Services	3.6%
Industrial Engineering	3.2%
Chemical	2.9%
Mining	1.1%

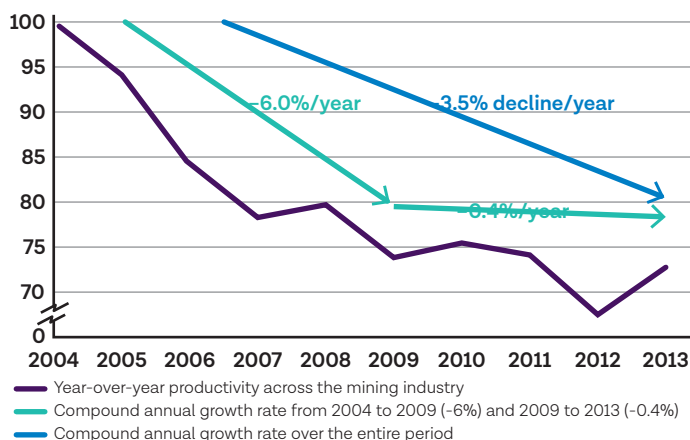
*R&D Intensity = R&D Expenditure / Revenues

Source: 2016 EU Industrial R&D Investment Scoreboard, Team Analysis

At the same time, despite bigger equipment becoming more efficient in the way we operate, global mining productivity has been in a state of decline over the past 15 years (Figure B).

Figure B: MineLens Productivity Index

Indexed, 2004 = 100



Source: Company annual reports; McKinsey analysis

Profound Digital Changes

Moving outside the mining industry and looking at the world more broadly, change is everywhere. This is particularly true in the digital space, where advancements are having a transformative effect on almost every aspect of our lives at work and at home.

Here are four advancements most relevant to RACE21™. (See “RACE21™: Key Terms to Know” on page 13 to learn more about each of the words in **bold**.)

1. The first is the massive—some may say exponential—increase in computing power, created by **the Cloud**.

Why is this important? The Cloud provides the computing power needed to analyze large volumes of data, known as **big data**. This analysis generates **insight**, which leads to better decision-making.

2. The second is the pervasiveness of **sensors** and **data** collection—they’re everywhere, from shovel buckets for sorting ore to our wrists for counting steps.

Why is this important? More data available to compute means better, more accurate insight, which allows for even better decision-making.

3. This brings us to the third advancement in our list—unlimited connectivity—which is the connection or link between computers, sensors and data. (This is sometimes known as The Internet of Things.)

Why is this important? Computers, sensors and data individually are of limited value; however, when these are connected, the real-time input, analysis and insight made possible leads to quicker, more informed decision making.

4. The fourth item on the list is cost. Many digital changes, particularly with respect to sensors and the collection of data, are happening at a very low cost.

Why is this important? Low cost means modest investment in technologies that have the potential to completely transform our business.

RACE21™: Making the Connection

So, there’s clearly a disconnect between what’s been happening in the mining industry and the digital innovation that’s taking place more broadly.

RACE21™ is making that connection and, as a result, RACE21™ is transforming our business.

The Dollars and Cents of Digital Innovation

Digital innovation has the potential to create significant value across the mining industry's value chain. In fact, some estimates indicate the potential value at stake to be \$375 billion annually.¹

To put this into bottom-line terms: Digital innovation has the potential to add 11–16%¹ to the industry's net income.

How much of the estimated value is available to Teck?

Consider the list below of the world's biggest mining companies² and where Teck is positioned in this list. While the exact value available to Teck is not known, it's expected to be material to our business.

Top Global Mining Companies by Market Capitalization as of December 31, 2018

1. BHP
2. Rio Tinto
3. Vale
4. Glencore
5. China Shenhua Energy Company
6. Nornickel
7. Anglo American
8. Coal India Limited
9. Newmont Mining Corporation
10. Grupo México
11. Barrick
12. Ma'aden
13. Freeport McMoRan
14. **Teck**
15. South32
16. Newcrest Mining Limited
17. Mosaic
18. China Molybdenum Company
19. Shaanxi Coal Industry
20. Zijin Mining Group
21. Polyus
22. Alrosa
23. Antofagasta
24. Agnico Eagle

¹100% opportunity ranges from USD \$280 billion (lower range) to USD \$410 billion (higher range) for the entire mining industry by 2025. Source: McKinsey Global Institute.

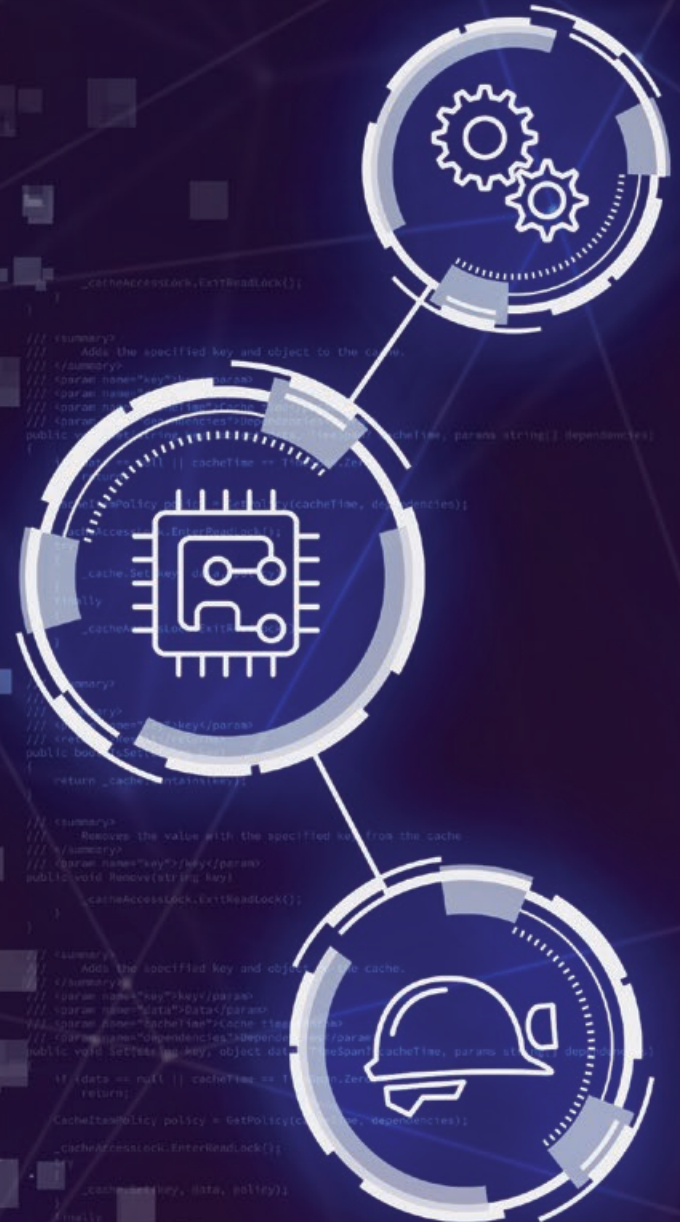
²Top Global Mining Companies by Market Capitalization as of Dec. 31, 2018. Source: Mine 2019: Resourcing the future, PwC.

Digital Innovation 101

Digital innovation is the application of new technologies to existing business problems or practices to:

- improve operational efficiency
- develop innovative products, services or solutions
- empower employees

For other definitions, please see RACE21™: Key Terms to Know on page 13.



The Path to Value

In July of this year, Teck announced an acceleration of RACE21™ and set an initial target of \$150 million in annualized EBITDA improvements to be achieved by the end of 2019.

Initiatives to be implemented in 2019 primarily relate to the expansion of programs in three areas:

- predictive maintenance
- mining analytics
- processing improvements

Examples of initiatives being implemented and their estimated EBITDA value can be found in “Connecting the Dots” on page 16.

Supporting Cost Reduction

RACE21™ is a business critical program that is improving efficiency and productivity across Teck, and supporting Teck’s competitiveness broadly, regardless of market conditions.

RACE21™ initiatives will continue to be implemented across Teck and done so at the lowest cost and with execution discipline.

```
summary>
  Removes the value with the specified key from the cache.
</summary>
<param name="key">key</param>
public void Remove(string key)
{
    _cacheAccessLock.ExitReadLock();

    summary>
      Adds the specified key and object to the cache.
    </summary>
    <param name="key">key</param>
    <param name="data">data</param>
    <param name="cacheTime">CacheTime</param>
    <param name="dependencies">Dependencies</param>
    public void Set(string key, object data, TimeSpan? cacheTime, params string[] dependencies)
    {
        if (data == null || cacheTime == TimeSpan.Zero)
            return;

        cacheItemPolicy policy = GetPolicy(cacheTime, dependencies);
        _cacheAccessLock.EnterReadLock();
        try
        {
            _cache.Set(key, data, policy);
        }
        finally
        {
            _cacheAccessLock.ExitReadLock();
        }

        summary>
        </summary>
        <param name="key">key</param>
        <returns>Result</returns>
        public bool IsSet(string key)
        {
            return _cache.Contains(key);
        }

        summary>
          Removes the value with the specified key from the cache.
        </summary>
        <param name="key">key</param>
        </pre>
```



RACE21™—Key Terms to Know

Agile (Agile Digital Transformation)

Digital transformation through continuous innovation; based on the principles of launch, learn and relaunch

Advanced Analytics

Data science that uses high-level methods and tools to focus on projecting future trends, events and behaviours

Artificial Intelligence

The simulation of human intelligence processes by machines, especially computer systems. These processes include learning (the acquisition of information and rules for using the information), reasoning (using rules to reach approximate or definite conclusions) and self-correction

The Cloud

The Cloud is the term used to describe data centres—warehouses of hundreds, sometimes thousands, of computers that store and process data—that can be accessed over the internet

Data

Collected information. **Big Data** is the large volume of data a company collects on a day-to-day basis. Data analysis refers to the process of evaluating data using analytical and statistical tools to discover useful information and aid in business decision-making.

EBITDA (Earnings Before Interest, Tax, Depreciation and Amortization)

EBITDA is a measure of a company's profitability. To annualize EBITDA (or **Annualized EBITDA**) means to convert a short-term calculation or rate of EBITDA into an annual rate of EBITDA. For example, to annualize one month of EBITDA, one would multiply this by 12 or to annualize three months of EBITDA, one would multiply this by four.

Insight

The understanding and knowledge gained through data analysis

Machine Learning

A branch of artificial intelligence based on the idea that systems can learn from data, identify patterns and make decisions with minimal human intervention

Predictive Maintenance

Maintenance that monitors the performance and condition of equipment during normal operation to reduce the likelihood of failures

Sensors

Devices that monitor, detect, collect and respond to some type of input from the surrounding physical environment



RACE21™: Why the Right Time is Now

Before we take a closer look at RACE21™, consider the following imperatives for change:

1. The technology being implemented under RACE21™ already exists and has proven effective.
2. The timing is right for Teck to become a world leader in digital innovation.
3. Industries that fall behind are being disrupted by companies quick to innovate.
4. Digital innovation makes it possible to move to a new, integrated operating model that will unlock significant economic value and competitive advantage.

RACE21™ Explained

Now let's take a look at the individual streams within RACE21™:



Renew

We are modernizing Teck's technology foundation.

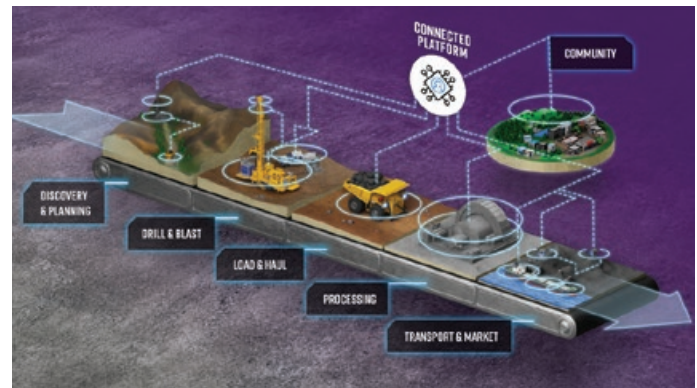
Why? Teck's core systems are being modernized to allow for connectivity, automation and the use of analytics applications. Some of the core systems being modernized include wireless site infrastructure, data platforms, security infrastructure and information technology capabilities.



Automate

We are accelerating our automation and robotics program.

Why? Teck is accelerating the autonomy and robotics program to create a transformational shift in safety by having fewer people in high-risk environments. Automation and robotics will also reduce per-tonne mining costs with smaller fleets and enable implementation of advanced analytics to drive cycle time improvement and predictive maintenance.



Connect

We are developing a digital platform for sensing and analytics.

Why? There are currently many disparate systems across Teck that capture valuable data, which, in many cases, sits unused in databases. By linking systems across Teck, we'll create a collaborative digital platform with powerful computing tools for sensing and analyzing information in real time. A 'connected' digital platform will also provide dynamic and predictive modelling that will reduce variability across our operations, leading to dramatic improvements in throughput and recovery.



Empower

We are designing a future operating model to empower our employees.

Why? Employees will be critical to the success of RACE21™ and, as a result, we'll be reimagining what it means to work at Teck and redesigning how we upskill/reskill, attract, train and retain the workforce of the future. ■

Ideas at Work Fund

Helping bring big ideas to life

Our people are the best source of ideas to help improve health and safety, sustainability and productivity across Teck. The Ideas at Work Fund helps foster big ideas and bring breakthrough innovations to life by providing funding and/or resources to projects that have potential high value for our company, but may be too difficult to advance through normal budget processes. This could include projects that require a higher risk tolerance, coordination between multiple sites, or additional research and development support.

Let's put ideas to work and help strengthen our company and our industry for the future.

To learn more about how to advance an idea for consideration, speak to your supervisor or visit connect.teck.com



Teck

Connecting the Dots

In July of this year, Teck announced an acceleration of RACE21™ and set an initial target of \$150 million in annualized EBITDA improvements to be achieved by the end of 2019. Here are just a few of the initiatives being implemented at sites that are helping meet that target.

PROJECT WASH PLANT OPTIMIZATION ●

Powering Processing Improvements at Fording River Operations

Fording River Operations (FRO) has embraced innovation for years, automating processes to achieve operational efficiencies. And now, through RACE21™, they're taking on the 'Connect' pillar of the program and developing digital systems that leverage existing sensors and instrumentation and incorporate advanced analytics, to help drive improvements in throughput and yield.

This next phase of technology advancements at FRO is targeting wash plant optimization—a key step in the steelmaking coal processing cycle—by creating an operator advisory tool that recommends ideal set points in the wash plant, based on an analysis of incoming material and historical data. By reacting sooner to changes in the material and adjusting set points accordingly, yield is improving which is expected to achieve sustainable EBITDA value over time.

In addition, insights provided by the advanced sensing and analytics have also unlocked additional value, by identifying improvements to the thickener process, allowing the FRO wash plant to process additional coal from Greenhills Operations, thereby optimizing its processing capacity.

“Working with the RACE21™ teams' resources and expertise has been instrumental in getting us set up on Google Cloud so that we can harness the power of big data,” says Shane McColman, Senior Engineer, Process Supervisor at FRO. “Working with RACE21™, we're much better able to accelerate how we assess, model and implement changes to our systems.”

“This is an exciting 'next step' for us and an area that can drive real results in our business.”

For an explanation of EBITDA and other RACE21™
“Key Terms to Know”, see page 13.

PROJECT MILL ANALYTICS

Big Data Drives New Gains at Highland Valley Copper

Mill optimization requires continuously evaluating and improving a number of subprocesses to ensure maximum productivity; ore is processed efficiently, and copper recovery is optimized. At Highland Valley Copper (HVC) Operations, big data and machine learning are opening up cutting-edge opportunities in this area, and with the backing of RACE21™, HVC recently took on two optimization projects with the biggest potential to deliver value.

Semi-autogenous (SAG) mill and bulk flotation optimization were selected as the processes to target, based on the readiness and quality of data to enable the application of advanced analytics. By working with the RACE21™ team and with data scientists from Boston Consulting Group (BCG), HVC developed a new, powerful tool that uses machine learning to deliver real-time recommendations to operators on optimal grinding and flotation operating conditions.

Early estimates project these improvements will create significant value by increasing copper throughput and recovery.

“We’re able to better use the data coming from the mine to determine optimal operating set points,” says Murray Cruickshank, Deployment Specialist, Technology and Innovation. “On top of that, we’re using Cloud-based technology to share these insights with operators, via a dashboard, so they can continuously evaluate and make real-time decisions.”

And a key aspect of this project has been working closely with operators throughout the process—keeping them informed of upcoming changes and receiving continuous feedback along the way.

“Having the support and input from operators—the people who use these tools everyday—has been critical to ensuring the testing goes smoothly,” adds Murray. “The operator buy-in to field-test the tool has been strong, which will help guide our next steps as we move to future phases and roll out the tool more broadly.”

Khushaal Popli, Specialist, Process Control, HVC, who has been working closely with data scientists from BCG, is encouraged by the early results and even more excited about how these investments can help pave the way for step changes in predictive maintenance—predicting and mitigating equipment failures, and thereby minimizing unexpected downtimes.

“We are at the leading edge of revolutionizing our processes so that we can work smarter, faster, and most importantly, safer,” says Khushaal.

PROJECT CONDITION-BASED MONITORING

Advances in Data Science Boost Predictive Maintenance at Trail Operations

Predictive maintenance presents enormous opportunities for operations to achieve innovation-driven efficiencies, by using sensors and powerful tools to analyze data in real time so that equipment is used optimally. At Teck’s Trail Operations, where they’ve been using machine learning for several years, RACE21™ is providing the resources and expertise to accelerate work in their predictive maintenance program, allowing the team to react more quickly and reduce maintenance costs.

“Several years ago we started with basic condition-based monitoring; using data derived from sensors to establish trends with our equipment. Now, with the support of RACE21™ and McKinsey we’re able to apply advances in data science, namely advanced analytics, to make our predictive maintenance software even more powerful,” says Gordon Kavaloff, Senior Reliability Specialist, Trail Operations. “Now, we can detect a failure, have a work order planned and a fix ready, all in one go—this type of efficiency allows us to work in a whole new gear.”

“RACE21™ is empowering us to think differently about how we can enhance performance in all areas—from safety, environment and production. The opportunities are pretty exciting,” adds Gordon. ■

Ideas at Work: New Blasting Practices to Protect Water Quality

How a team in the Elk Valley is helping deliver on our commitment to improving water quality in the region.

As part of our commitment to improving water quality in B.C.'s Elk Valley region, a number of research projects are underway to prevent nitrate from entering the environment.

One source of nitrates is from explosives that interact with water during the blasting process. When this occurs, nitrates can leach out of blastholes and enter the natural environment. To stop this from occurring, plastic liners are used to prevent explosive materials from coming into contact with water.

However, in order to use plastic liners, blastholes have historically needed to be dewatered so that the liner can reach the bottom of the hole and stay there. For blastholes that refill with water, a new approach was required.

The Project

To tackle this problem, Teck undertook a research project to determine how plastic liners could be used in blastholes that naturally refill with water (often called dynamic blastholes). The research project

was led by Teck with support from suppliers Maxam, Teck's explosives provider, and Friesen Plastics, Teck's liner supplier. Together, various combinations of procedures, liner types/packaging and explosive bulk truck modifications were trialled until a new system was developed.

The emulsion in a liner system involves using the charging hose on the explosives truck to place the plastic liner in the bottom of a dynamic blasthole. The hole is then loaded with water-resistant explosive from the bottom up, both filling the liner and keeping it in place. Once complete, the end result is a lined blasthole with the explosives protected from the water.

This will significantly reduce nitrate at source and help protect water quality.



In order for the plastic liner to be effectively placed down the blasthole, a hydraulic arm and funnel were added to the explosive bulk truck hose and the traditional borehole plastic liners had to be compressed into an accordion shape. The hydraulic arm allows for the hose to be placed directly over the blasthole and the funnel removes the wrinkles from the compressed plastic liner as it unfolds and is pushed to the bottom of the hole. This ensures consistent lining of every blasthole while meeting our needs of durability and functionality.

A common problem identified during early tests was the plastic liner being pulled back up the blasthole as the hose was withdrawn. To address this, a system was developed that applies mineral oil to the bulk truck hose which acts as a lubricant, allowing the hose to be withdrawn while keeping the plastic liner and blast material in the hole.

This process has now been successfully field-tested on over 400 holes and has proven to be a safe and effective design.

Going Forward

Today, nearly 1,500 holes are being inserted with a liner each month, and the new process is being piloted at Teck's Fording River and Greenhills operations. The plan is to implement this process across all of Teck's steelmaking coal operations in 2019. As a result, every blasthole in the Elk Valley that is operationally accessible will contain a liner that protects both the explosive product and the environment. This will significantly reduce nitrate at source and help to protect water quality.

Emulsion in a liner system.



Left to right: Gonzalo Cornejo, MAXAM; Jeff Hawley, Senior Engineer Supervisor; Dale Caron, Drill and Blast Lead; and David Watson and Nathan Friesen, both of Friesen Plastics.

A Culture of Innovation

This innovation was made possible by a team, one which was told repeatedly that what they were trying to accomplish could not be done.

But Jeff Hawley, Senior Engineer Supervisor, Business Improvement, and Dale Caron, Drill and Blast Lead, both with Teck, along with Nathan Friesen of Friesen Plastics and Gonzalo Cornejo of MAXAM, refused to be discouraged and set out to do the impossible.

And through hard work, ingenuity and a culture of innovation, that's what they did.

"Each and every person who worked on this project was integral to its success," said Jeff. "Many people thought that our goals were unachievable, but it just goes to show that great things can happen when you get the right team together."

Achieving the impossible doesn't happen overnight. This idea was the result of months of testing, prototype development, and of course, teamwork.

"I remember seeing our prototype work for the first time," said Nathan. "That was a really proud moment for me. We had to go back to the drawing board several times, but everyone supported each other until the product was perfected. Working with Teck was a very special experience."

Gonzalo applauded the diversity of perspectives and ideas that team brought forward. "When we encountered a problem, we worked on it together. And when we found a solution, we'd all go home proud."

For Dale, the way that Teck encourages creativity in its people was pivotal. "Teck was very accommodating throughout the whole process," he said. "In some cases, the site had to take a loss of production so that we could test our product. I've been with Teck for 25 years, and it's great to see the company continue to foster this kind of innovation." ■


Great things can happen when you get the right team together.

Jeff Hawley, Senior Engineer Supervisor,
Business Improvement

Mining for a Better World

For the 10th straight year, Teck has been named to the Dow Jones Sustainability World Index (DJSI), indicating that our sustainability practices are in the top 10% of the 2,500 largest companies in the S&P Global Broad Market Index.

Teck was the top-ranked mining company on both the World and North American Indices, scoring the highest in the industry in supply chain management, biodiversity, environment policy and management systems, operational eco-efficiency, corporate citizenship and philanthropy, human capital development and social reporting.

 To watch a video and learn more about Teck's commitment to responsible resource development, visit teck.com/connect



Teck

QB2: Project Update

The successful delivery of QB2 depends on a unified team with a shared vision of building Teck's mine of the future.





With a project the size and scale of QB2, significant planning is required to safely mobilize the workforce across the six construction areas that span 200 kilometres and 10,000 square kilometres. That's why Karl Hroza, Project Director, kicked off the first of many one-team alignment meetings and a series of workshops for the various project areas and supporting functions. QB2's one-project, one-team approach is aligning all aspects of the project to set a new standard for project delivery.

Construction Begins at the Tailings Management Facility

In May of this year, the Teck QB Mine Fleet successfully completed the main haul road required to support the construction of the tailings management facility (TMF). Construction to develop the TMF is now underway, including the lateral access roads to the starter dam and valley drains. The first deliveries of rock for the TMF cofferdam were received by Teck's construction and management partners, Excon, Bechtel and Golder, who are responsible for compacting the materials. This process involves building 1.2 metre individual layers until a height of 120 vertical metres is reached. This is currently expected to be completed in the summer of 2021, in order to start filling the pond to support commissioning of Line 1 of the Concentrator.

Focusing on Health and Safety

With construction well underway and resources increasing daily, the risks related to the interactions between heavy-duty equipment and light vehicles highlights the importance of maintaining a controlled, safe operation. Careful planning on the part of Teck and Bechtel continues to be a key focus and is essential for the machinery to safely transport and unload material.

Pipeline Area Work Advances

While activity related to the overall facility advances, construction on key elements of the pipeline area are also underway with mass earthworks and development of platforms for pumping stations No. 2 and No. 5. These are two of the five pumping stations that will supply desalinated water to the mine.

The first of two pipeline camps, which will accommodate over 3,000 construction workers, is now in service.

The delivery of pipe segments continues with over 25 truck transports per day from the Port of Angamos. More than 10,000 units are expected to arrive before the end of the year. Techint, the pipeline contractor for QB2, will be responsible for constructing the pipeline and has mobilized to three work fronts on the project.

QB2: EMPLOYMENT BY REGION

2,511
Tarapacá Region

970
Coquimbo

1,463
Valparaiso

1,882
Region
Metropolitana

503
Ñuble

889
Maule

1,628
Biobio

Growing the Local Economy

Tapping into the local resources and workforce is key to our sustainability strategy and an important requirement for all contractors engaged in the construction of QB2. By sourcing materials locally, working with local vendors and employing construction workers from the region, we're helping to grow Tarapacá and Chile's economy while generating value for the communities surrounding the project areas.

As of September, QB2 purchased a total of USD \$21 million of goods from local suppliers, and this is set to grow significantly over the course of the project. At the same time, QB2 has employed nearly 2,500 local construction/service workers from the Tarapacá Region.

Supporting gender diversity of the QB2 workforce is another important focus in our efforts to grow the local economy. Women currently make up 9% of the construction workforce, which is slightly above the industry average of 8.5%³. While this is positive, we know there is still much more we can do to advance the inclusion of women at QB2 and across our operations in Chile. Our ongoing work through Women in Teck, a support network for women, is just one way we are driving gender diversity. You can learn more about our efforts at teck.com/responsibility ■

Beyond the Tarapacá Region, Teck is helping grow the Chilean economy by drawing on a workforce from many regions across Chile.

To learn more about Women in Teck, see "Creating a Diversity Network in Chile" in Connect, Volume 26.

³Undersecretary of Mining and Undersecretary of Women and Gender Equity launch a series of lectures to boost female participation in the industry. Ministry of Mining. 2019.

As of October 18, 2019

Celebrating Excellence at Teck

Our Excellence Awards program recognizes employees from every part of our company who go above and beyond, and celebrates their achievements, innovations and leadership.

Thank you to everyone who took the time to acknowledge the outstanding work of their colleagues by submitting nominations for the 2019 program.

Nearly 1,600 employees were nominated individually and as part of teams from across every level and area of our business, demonstrating that the commitment to excellence at Teck is as strong as ever.

Nominations are now being reviewed by selection committees, and winners of the 2019 Excellence Awards will be announced in early 2020. ■

Get to know a few of our previous Excellence Awards winners and learn about their experiences in 'People & Places'. Watch for more on the 2019 Excellence Awards in upcoming issues of *Connect*.



PEOPLE & PLACES



Phillippe Thenoux

Mechanic

Carmen de Andacollo Operations

When did you start at the company, and at which site/office?

I joined Teck in 2012 at Carmen de Andacollo (CDA) as a mechanic in Mine Maintenance. Today, I'm also the Electrical Leader for my team.

Could you provide a description of what you do in your role?

I am in charge of repairs and maintenance for our mining equipment, including motors, shovels, excavators, bulldozers, drilling machines and more. I am also responsible for hydraulic and mechanical repairs and maintenance related to CDA's engineering and infrastructure.

What is your favourite part about your job?

I enjoy developing projects related to continuous improvement and innovation in mining, and working to improve the existing tools and processes in place in order to maximize their potential.

What did it mean to you to be nominated by your peers for an Excellence Award?

Being nominated was something that was very special for me. I am proud to be a Teck employee and proud of the company I work for. It was meaningful to have my colleagues recognize and value the work that I do and my leadership, and I am thankful to them for that. This type of award opportunity helps keep us inspired and motivated.

Can you describe the moment you found out you were a winner?

It was when I was in the final stages of finishing a project. CDA's HR Manager called me to ask what I was doing, how my day was going, and so on. At the end of our conversation, he informed me that I had won an Excellence Award—I was so excited! He also told me that in a couple of days I would be contacted with more details and that I should expect another call; however, I didn't know that it was going to be Don Lindsay who was going to call me, so that was a big surprise! I don't speak English, so he was on the call with a translator, where he congratulated me for my work and for being a winner. It was amazing.

Where did you travel on your Excellence Awards winners' trip, and what was the most memorable moment?

We travelled from La Serena to Santiago, from Santiago to Vancouver and finally from Vancouver to South Korea for the 2018 Olympic Winter Games. South Korea was beautiful—we did a lot of sightseeing and got to watch live sporting events that we don't normally see in Chile. Spending time getting to know the other Excellence Award winners was terrific, but the most memorable moment was the final dinner and awards ceremony, where Don presented me and the other winners with a beautiful piece of art and recognized our achievements at Teck, which felt very special.

Phillippe is a 2016 Excellence Award winner in the category of Cost Reduction, Productivity and Innovation.



Jelena Puzic

Director, Geoscience Services, Exploration
Vancouver office

When did you start at the company, and at which site/office?

I was hired straight out of my undergraduate degree (a Bachelor of Science in Geology at Queen's University) to work with Teck's Exploration group in the Pelly Mountains region of the Yukon.

In what other roles or at what other sites/offices have you worked?

I have had the great privilege to work across early stage exploration and advanced project/operations with teams in over 10 different countries, including four years living in Peru, followed by five years living and working in Australia. Each experience enriched my perspective through its people and culture.

Could you provide a description of what you do in your role?

As Director of Geoscience Services, I am now based in Vancouver and lead a technical team who are passionate about integrating geoscience with other technical disciplines to create value for Teck at our operations and advanced projects. Our mandate is to grow the resource base at our brownfield sites through exploration and discovery, and to characterize our deposits to reduce risk and recognize opportunity in project design and operation.

What is your favourite part about your job?

I love that our team can make a difference at Teck. Whether this is through discovery of additional resources for the future, or understanding the properties of the rocks we mine so we can make more sustainable decisions in mining, I enjoy collaborating with amazing people across the organization to deliver value to the business.

What did it mean to you to be nominated by your peers for an Excellence Award?

This was the highlight of my career! It is the greatest honour to be recognized by your colleagues. In exploration, we work together in remote and challenging locations and you rely on your workmates like family. It is very rewarding when co-workers acknowledge the contribution of their teammates in this way.

Can you describe the moment you found out you were a winner?

I was living in Australia at the time and I received a phone call on a Saturday...it was Don Lindsay! I was surprised and in disbelief. Just then, my phone lost reception and Don probably thought I hung up on him. Thankfully, he called me right back and I was very touched and thrilled to hear the news of winning one of Teck's first-ever Excellence Awards in 2008.

Where did you travel on your Excellence Awards winners' trip, and what was the most memorable moment?

We travelled to Beijing for the 2008 Summer Olympic Games. We were in awe of the host country's spirit, and the dedication and excellence we witnessed from the Olympic athletes in their drive for gold. Watching Canadian athlete Simon Whitfield win silver in the triathlon was a highlight, as was getting to know the other Teck family members.

Jelena is a 2008 Excellence Award winner in the category of Spirit and Progress.

PEOPLE & PLACES



Gerry Wong

Senior Safety Coordinator
Highland Valley Copper
Winners' Trip: London, England, for the London 2012
Summer Olympic Games

What year and in which category were you an Excellence Awards winner?

I won in two categories in 2012: Safety in the Workplace, and Mentor.

What did it mean to you to be nominated by your peers for an Excellence Award?

It was super cool. This recognition is from your fellow workers at site, and to me, that recognition is bigger than the award itself. The London trip was a huge bonus on something that was awesome to begin with.

Can you describe the moment you found out you won?

It was like winning the lottery, but more about accomplishment and respect than a lucky draw. The notification came directly from Don Lindsay by phone: "Hi, this is Don Lindsay from Teck". My first thought was, "Yeah, sure buddy - who is this really?". Then it sunk in that it was real. And then I thought, "YAHOO! WOW! OMG! Don't wake me up if I'm just dreaming!"

Who was your guest on your trip?

My guest was my wife, Diane.

What were your favourite activities you participated in or favourite events you watched?

Everything about the Olympics and visiting London was amazing, from attending the sporting events (tennis,

swimming, track, beach volleyball), to touring Buckingham Palace, the Royal Garden, and the Canadian Consulate High Commission. We stayed near Big Ben, and during our free time we explored downtown and the Tower of London. Then during our down time, our group was able to relax together and watch the Olympics in a space back at the hotel. To top it all off, our dedicated hosts and guides throughout the trip were excellent.

Was there a local food specialty or restaurant you recommend trying?

All the food venues we tried were great, but I particularly liked the English pubs, which were tourist attractions themselves.

What was the most memorable moment of your trip?

Visiting London was pretty incredible, but the most memorable part overall was meeting all the winners from other operations and Don, having great casual conversations with everyone and enjoying each other's company throughout the time there.



Courtney Seeger

Senior Engineer Supervisor, Long Range

Greenhills Operations

Winners' Trip: Rio de Janeiro, Brazil, for the Rio 2016 Summer Olympic Games

What year and in what category were you an Excellence Awards winner?

I was a winner in 2016 in the Cost Reduction, Productivity and Innovation category.

What did it mean to you to be nominated by your peers for an Excellence Award?

You always want to do your best at your job, and so it meant a lot to me to know that people thought highly enough of my work to nominate me for an award.

Can you describe the moment you found out you won?

I was definitely in shock. I hadn't realized that I had even been considered for nomination. Once that wore off, I don't think I stopped smiling all day.

Who was your guest on your trip?

I brought a close friend of mine, Jeremy, with me as my guest.

What were your favourite activities you participated in or favourite events you watched?

We were able to watch the Brazilian women's soccer team play. Seeing the home country's team play their most popular sport was an amazing experience. The amount of energy and excitement in that arena was incredible.

Was there a local food specialty or restaurant you recommend trying?

Pao de queijo (cheese bread) was a food that was served frequently as an appetizer and also for breakfast. It was delicious!

What was the most memorable moment of your trip?

We went up to see the Christ the Redeemer Statue, which is at the peak of Mount Corcovado. From that height, we could see all of the city of Rio de Janeiro below us; it was an amazing view.

SITES & SCENES

1 Representatives of Trail Operations' Inclusion & Diversity Committee joined in this summer's community celebration recognizing the installation of a rainbow crosswalk in downtown Trail, B.C. Pictured here are Inclusion and Diversity Committee representatives Bryan Lauzon, Chair, accompanied by his daughter Max, and Carol Vanelli Worosz, Community Engagement Leader. Pride Trail representative Addison Oberg led the drive for the crosswalk installation, with support coming from Freedom Quest, the City of Trail, United Steelworkers and Trail Operations. During her remarks at the gathering, Addison noted that the crosswalk serves as a symbol of inclusivity and support for the LGBTQ+ community in Trail, and that it is a colourful and welcoming addition to the city's revitalization efforts.

Trail Operations also raised new Inclusion and Diversity banners on light standards throughout the site, in honour and support of Pride month in the Kootenays, and as a visual representation of Teck's commitment to fostering an inclusive and diverse working environment.

2 A view over Corbin Pond, taken at Coal Mountain Operations near Corbin, B.C. by Nupqu employee Kevin Petryshen. Nupqu is the Ktunaxa word for black bear, and represents the powerful and resourceful nature of the communities of the Ktunaxa Nation.

3 On July 31, 2019, C-Crew posed for a picture at the portal gate prior to completing the last production shift at Pend Oreille Mine (POM). During the six months prior to the transition to care and maintenance, POM achieved safe production, with personal leadership and teamwork prominently displayed throughout the transition. Most impacted employees have now transitioned to new careers, many in mining, while several are taking advantage of educational and retraining benefits available.

4 Representatives from QB2's Human Resources team and the Professionals-In-Training program were on hand at the second annual Inclusion Expo Job Fair in Mapocho Station in Santiago, Chile on September 6 and 7, sharing with attendees the ways that Teck recognizes and values differences in talents, skills, origins and perspectives. In addition to answering questions and addressing concerns, the team was able to connect people with disabilities with information on job opportunities across different areas of the QB2 project.

Do you have a photo for Sites & Scenes? Submissions are welcome from employees across Teck and may be sent to: connect@teck.com.





Broadening Suicide Awareness Through the Arts

Every employee is encouraged to speak up about health and wellness, particularly if they are—or feel someone is—in need of assistance or support.

In addition to a range of health and wellness resources, services and opportunities available to all employees, Teck is proud to support programming that addresses mental health and wellness in the communities in which we operate.

The following article about one such initiative was shared with *Connect* from Teck's Red Dog Operations *Suvisi* newsletter.



For the second year, Red Dog was a primary sponsor for The Winter Bear Project, an outreach program featuring a play with a message of hope, health, well-being and saving lives.

In April, the Winter Bear Project production team of 12 people travelled to the Alaskan communities of Buckland and Shungnak to put on a full performance for the communities that everyone, young and old, could enjoy at no personal cost. During the visits, the cast and crew hosted a variety of performing arts-related workshops for youth, designed to build self-esteem. Before each performance, the communities also held a special potluck for the guests, creating a safe place for open dialogue on suicide awareness.

The Winter Bear play is based on the life of respected leader and role model amongst the Indigenous people of Alaska, the late Sidney Huntington. The performance tells the story of an Alaska Native teenager who is contemplating suicide, and ultimately rises above his trauma to become a leader with the help of Elder Huntington. The Winter Bear is able to present the difficult subject of suicide in a captivating way, under the mission of “changing the climate of fear and hopelessness that breeds suicide by broadening awareness, stimulating dialogue, and promoting healing through the performing arts.”

Red Dog’s community investment focus is on community wellness in the region, supporting programs of health, hope and life. “Suicide has impacted almost every one of us in our region, and our people are looking to leading entities for support. Teck recognizes this and is actively participating,” explains Verna Westlake, Community Investment Coordinator, Red Dog. “The play portrays the seriousness of the message, while incorporating humour and clarity, in a way that students from kindergarten to high school, young adults, adults and Elders are moved by.”

To read more about The Winter Bear Project, visit winterbearproject.com ■



Our Commitment to Health and Wellness at Teck

Supporting each other in taking care of our health and wellness will help us achieve our vision of everyone going home safe and healthy every day.

For more information about mental health resources at Teck, or if you have any questions, please contact your HR advisor.

▶ Learn more in a video on teck.com/connect, ‘Speaking Up About Mental Health’, which features inspiring stories from Trail Operations’ employees Gordon Menelaws and Derek Sordi.

Red Dog’s community investment focus is on community wellness in the region, supporting programs of health, hope and life.

Our Health and Safety Journey: Informing the Next Phase

Safety is a core value at Teck, and we continue to work towards achieving our vision of everyone going home safe and healthy every day.

More than 7,800 employees and contractors from across all levels and locations at Teck participated in Teck's 2019 Health and Safety Culture Survey. The feedback, including thousands of written comments and suggestions, has provided a wealth of information, both on areas where we have made real progress and where we must continue to improve.

Teck completed its first safety culture survey in 2016, the results of which were used to develop CSL4—Exploring our Culture of Safety, as well as to refine other aspects of our health and safety strategy, including the new hazard identification training program currently being implemented.

Given the tremendous response to the 2019 survey, analysis is still underway and will take some time. In the coming months, the results will be analyzed and then key takeaways—both strengths and opportunities—will be shared across Teck. ■

“Thank you for your participation in Teck’s 2019 Health and Safety Culture Survey, and for your continued commitment to our safety vision.”

Lawrence Watkins,
Vice President, Health and Safety





A CONVERSATION WITH

CHRIS ADACHI

MANAGER, SUSTAINABILITY & CLIMATE CHANGE

At Teck, we recognize that climate change is impacting our ecosystems, our societies and our economies, that it is directly influenced by human activities and that addressing it requires decisive global action.

So just how is Teck taking action on climate change? Where do we fit into the transition to a low-carbon economy? And what role do our employees play?

Connect sat down with Chris Adachi, Manager, Sustainability & Climate Change, to talk all things climate change, and to learn more about what it means for Teck and for our people.

Want to learn more about Teck's approach to sustainability and climate change?

Visit teck.com/responsibility for more resources on how we're reducing the carbon footprint of our operations and innovating for a low-carbon future.

 Visit teck.com/connect to watch the video. ■

Low-Carbon Economy: Fast Facts

The transition to a low-carbon economy is an opportunity for our business, as the metals, minerals and energy we produce are essential to building the technologies and infrastructure needed to reduce greenhouse gas (GHG) emissions. Whether it's solar panels, wind turbines or electric cars, they all require metals, minerals and energy, and lots of it. In a low-carbon world, metals are the fuel of the future.

- Each solar panel requires 19 different mineral products and metals, including indium, copper and silver.
 - The average wind turbine requires up to 4 tonnes of copper and 260 tonnes of steel, which in turn requires 170 tonnes of steelmaking coal.
 - Electric cars require four times as much copper as standard internal combustion cars.
-



The Power of Zinc


On September 19, WE Day's new season kicked off with 20,000 young people at Toronto's Scotiabank Arena, where Teck relaunched the Zinc Saves Lives Battery Recycling Campaign.

Zinc deficiency remains a global health challenge—1.2 billion people worldwide are affected and hundreds of thousands of children die every year from complications associated with zinc deficiency. By comparison, every AA battery contains the same amount of zinc that can help save the lives of six children.

First launched in 2014, Teck's Zinc Saves Lives Battery Recycling Campaign provides participants with the opportunity to recycle used batteries and to help save the lives of children. Through the campaign, for every AA battery recycled, Teck donates the value of zinc recycled to WE in support of zinc and health programming in Kenya.

To learn more about the campaign and Teck's Zinc & Health program, visit zincsavelives.com. ■



 Visit teck.com/connect for a new video on the impact of Teck's Zinc Saves Lives campaign.

Above: Students pose in Teck's Zinc Saves Lives photo booth at the event.

Below and opposite: President and CEO Don Lindsay and Asfiya Azeez, a Grade 8 student who collected more than 3,000 batteries, revealed onstage the total number of batteries collected as a part of Teck's Zinc Saves Lives Battery Recycling Campaign to date—more than 2.6 million!





WE

WE

GLOBAL

GLOBAL

10 MILLION

Connect is available at teck.com/connect

Connect, Teck's employee magazine, is now available online from anywhere. To access stories, photos and videos about our people, our business and the communities in which we operate, visit us online at teck.com/connect

