

connect

Volume 23, 2018

POWER OF PARTNERSHIPS

A Perfect Equation

People + Partnerships = Big Benefits

Creating Value, Changing Lives

Insights from Alannah Cervenko, Lead, Strategic Partnerships

Space: The Final Frontier...of Mining

Exploring Space-Based Resources



Teck



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Videos, photos and stories from this and previous issues of *Connect* are also available online from anywhere at www.teck.com/connect

Katelin McKibbin, Haulage Driver, Line Creek Operations

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On the Cover

Working together for a stronger Teck.
Photo taken at Carmen de Andacollo
Operations in Chile.

Thank You

Many thanks to those who contributed to and participated in this issue of *Connect*:

Catherine Adair, Community Relations Leader, Trail Operations; Mohammad Babaei, Lead, Digital Mining Innovation, TDS, Vancouver office; Barbara Brice, Senior Human Resources Generalist, Pend Oreille Operations; Alannah Cervenka, Lead, Strategic Partnerships, Community and Government Relations, Vancouver office; Peter Cunningham, Director, Digital Operations, TDS, Sparwood office; Chris D'Odorico, Manager, Health & Safety, Trail Operations; Rebecca Edwards, Communications Coordinator, Sparwood office; Anna Gravelle, Administrative Assistant, Sparwood office; Zane Gravelle, Certified Electrician, Maintenance, Line Creek Operations; David Hood, Director, Infrastructure, TDS, Santiago office; Deborah Riddick, Security Program Manager, TDS, Vancouver office; Kal Ruberg, Vice President, TDS and Chief Information Officer; Greta Schuerch, Senior Government Relations Coordinator, Red Dog Operations; Susan Stocker, Manager, Knowledge Management & Technical Communication, Vancouver office; Nicole Tapia, Communications Specialist, Corporate Affairs, Vancouver office; Carlos Viejo, Advanced Mining Analytics Specialist, TDS, Sparwood office; Aaron Wylie, Superintendent, Transformational Tech, Highland Valley Copper



Welcome

Developing and nurturing strong partnerships—both within Teck and outside—is fundamental to how we do business. We know through experience that strong partnerships provide many benefits to the communities where we operate and to Teck. They add a depth of experience and perspective to our work and power us to innovate and to build a safer, more sustainable, more productive Teck.

Two of our core values in particular—Integrity and Respect—help guide how we approach these partnerships: we are honest, ethical, and fair in our words and actions, we honour our commitments, work to maintain our reputation as a partner of choice in mining and exploration, and we listen to each other and our communities of interest. These commitments are at the very core of who we are.

In this issue of *Connect*, we highlight a few of the many partnerships we are proud to be engaged in.

We cannot shine a light on partnerships without first acknowledging our relationships with Indigenous People. On August 9, the world and Teck marked International Day of the World's Indigenous Peoples, a day established by the United Nations General Assembly to promote and protect the rights of the world's Indigenous populations. At Teck, our partnerships with Indigenous Peoples are a reflection of our commitment to respecting their unique rights, cultures, interests and aspirations.

We've highlighted a few examples of these in this issue of *Connect*, including "A Spotlight on the Fort McKay First Nation", one of 14 Indigenous groups we have reached agreements with in relation to our Frontier oil sands project. And "Empowering Indigenous Women in Chile" provides an overview of how UN Women and Teck have extended our partnership to work together to provide access to education and training to Indigenous women in northern Chile through a US\$1million investment from Teck.

As we continue to build strong relationships with Indigenous Peoples, we are guided by our commitment to understanding our respective priorities and perspectives, and ultimately creating lasting mutual benefits.

This year we also continue our focus on advancing our work in innovation and technology, an area very important to our future success. Strategic partnerships with industry leaders are helping propel our work in this area. "A Perfect Equation: People + Partnerships – Big Benefits" showcases our partnerships with Google and Pythian, which have already achieved real results at our steelmaking coal operations, while also laying the groundwork for long-term benefits by empowering our people with essential machine learning abilities.

Areas like machine learning, along with many other new technologies and innovations being explored at Teck, have a significant potential to reshape our business and are critical to our long-term success. I have had the opportunity to see first-hand many other grassroots, ingenious ideas across our company, and I encourage all of you to continue being bold when generating new ideas for our business.

As we look to the remainder of 2018, let us all continue to look for ways to leverage the power of partnerships. Whether it's developing new or building on existing relationships among our co-workers, between departments, across our operations, and with the many groups we work with outside of Teck—together, we are stronger and can find innovative solutions to reach our common goals.

Don Lindsay
President and CEO

A PERFECT EQUATION:

PEOPLE+ PARTNERSHIPS= BIG BENEFITS

When it comes to applying machine learning to improve operations, Teck is reaping big benefits thanks in part to partnerships with accelerators like Google and Pythian.



Teck is on the leading edge of mining companies that are applying machine learning. The big advantage is that we have a One Teck platform right across the company, so we can apply machine learning anywhere.

Kalev Ruberg, Vice President, TDS and Chief Information Officer

It all began in spring 2017, when the Technology and Innovation and Teck Digital Systems (TDS) groups began looking at ways to leverage the power of machine learning. Very early on, the team realized that in order to build in-house expertise, including learning how to spot and evaluate opportunities, they would need a partner with extensive machine learning experience.

And what better partner than industry giant and machine learning pioneer Google.

“Once we started working with Google, things began to move really quickly,” says Peter Cunningham, Director, Digital Operations, TDS. “Their tools are powerful and leading-edge, and their people are authoring a lot of machine learning applications.”

And while Google provided Teck with the machine learning framework on their Cloud platform—which includes a range of tools and services that provide the infrastructure to power machine learning—it became quickly apparent that the Teck team would need more training if they were to ‘dabble’ in Google’s space and fully realize the power of the Google Cloud platform.

Enter Pythian, an Ottawa-based IT consulting and managed services company. Pythian was engaged to mentor Teck’s data analytics team to help advance their expertise in this area, improve their understanding of the processes for building machine learning applications, and provide an opportunity to see first-hand how the applications work with end-users.

To bring a real-world application to the training, Pythian and TDS worked with Teck’s Reliability Engineering group to look at how machine learning could be used to identify and predict potential mechanical and system issues in haul trucks at our steelmaking coal operations using the millions of data points generated by the mobile fleet.

This project involved two key phases. The first was uploading the data—faults that had already happened—to Google Cloud. During the second phase, that data was taken by Pythian and used to create custom algorithms that can predict outcomes, e.g., when a failure of an electrical system would occur.

“Progress was slow at first,” says Peter. “The reliability of predicting failures started out at less than 50%. But over a period of three months, during which time we learned more about the data and were able to optimize parameters and include critical inputs into the algorithms, the reliability increased to about 85%.”

Based on the success of that project, Peter says they’re now working on using data from the haul trucks to understand and optimize the relationship between vehicles, haul roads and drivers. Using data that tracks information from multiple sensors, things such as elevation changes, curves on a truck route and the truck speed, the hypothesis is that safety and productivity can be improved by matching the right truck to the right haul route and to the experience of the driver.

This time around, however, instead of Pythian writing the algorithms, they’re being developed by a team of five TDS analysts who attended a four-week course on machine learning in March and April at Google’s head office in Mountain View, California.



The Big Benefits of Machine Learning

Machine learning algorithms for detecting electrical failures are deployed across Teck’s fleet of 930E trucks at our steelmaking coal operations. In just four months, these new algorithms have prevented more than \$550,000 in maintenance costs and are expected to save more than \$1.5 million each year.

“Our partnerships with Google and Pythian have had great results,” says Kalev Ruberg, Vice President, TDS and Chief Information Officer. “In just a year of working together, we’ve built significant internal machine learning capacity that will open up a lot of opportunities across Teck.”



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The Google Machine Learning Intensive

Carlos Viejo, Advanced Mining Analytics Specialist with Teck Digital Systems (TDS), who is originally from Chile but now calls the Elk Valley of British Columbia home, was one of five TDS analysts selected to travel to Google's headquarters in California in March and April to learn about machine learning.

"It was an excellent experience," says Carlos. "The first part of the course involved integrating the students into Google's culture and understanding how they operate. The second was an overview of machine learning, from basic principles to more complex applications. It also provided an opportunity to conceptualize ideas."

"We had access to Google's experts at their campus and got to experience their unique culture and how they work. We discussed potential ideas, showed them data, and received feedback. It was an amazing learning opportunity." ■



Above (l – r): Chris Ison, Supervisor, Operational Analytics, Corey Carlson, Supervisor, Asset Health Systems, Abra Gurnett, Senior Analyst, Technical, Carlos Viejo, Specialist, Advanced Mining Analytics and Ben Danic, Senior Analyst, Mining Systems, all with the Teck Digital Systems group, at the Google campus in California.



A Spotlight on the Fort McKay First Nation

Known for their commitment to establishing and maintaining positive relationships with industry partners including Teck, the Fort McKay First Nation are creating opportunities for their community and people, and preserving their cultural values.

Commerce and Tradition

Commerce and tradition have often intersected in the lives of the people of the Fort McKay First Nation. The Nation's roots run deep in Fort McKay, a community located along the Athabasca River in northeast Alberta, and coincide with the start-up of a Hudson Bay Company trading post in 1820. Over time and due to its geographic location, the Nation expanded its business interests and has since worked with forestry, oil sands and pipeline industries. In 1986, the Fort McKay Group of Companies (FMGOC) was established, an oil sands construction and services company 100% owned by the Fort McKay First Nation. FMGOC, along with numerous joint venture companies, aim to preserve the Nation's cultural values while providing the framework for progressive economic, industrial and social developments in the region.

Strong Leadership

Fort McKay First Nation Chief Jim Boucher's powerful leadership has driven the Nation's economic growth while keeping the Nation's feet firmly planted in its relationship with nature and the environment. Chief Boucher, who has been the Fort McKay First Nation Chief since 1986, was named 2018 Canadian Energy Person of the Year by the Energy Council of Canada, and was recognized by *Report on Business Magazine* as one of 50 most powerful people in Canadian business.

Community Development

Chief Boucher's vision is most clearly demonstrated within the community of Fort McKay itself. Located 65 kilometres north of Fort McMurray, Fort McKay First Nation offers its 800 residents numerous services, including a healthcare centre, family support centre, continuing care facility, youth centre, broadcast station and community arena.

Above: The Fort McKay Day Centre offers a variety of community services to Nation members.



Fort McKay First Nation Chief Jim Boucher

The Fort McKay First Nation and Teck

Teck’s proposed Frontier oil sands project is located in the traditional territory of the Fort McKay First Nation. From the earliest stages of the project in 2008, we have engaged with Indigenous communities in the region, including the Fort McKay First Nation, to understand their priorities and to integrate their perspectives and traditional knowledge into our decision-making.

In 2017, Teck reached a participation agreement with the Fort McKay First Nation, outlining the economic and social benefits connected with the Frontier project. This includes opportunities for employment, training and contracting, and innovative investment opportunities for the Nation. It also establishes a framework for cooperation on shared priorities, including environmental stewardship. ■

Our Nation always strives to find the appropriate balance between economic development and the protection of our natural environment, our culture and our traditional ways of life.

Jim Boucher, Chief, Fort McKay First Nation



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To learn more about the Frontier project, see “Profiling the Frontier Project” on page 32.

Partnerships in Action: Creating Value, Changing Lives

Insights from Alannah Cervenko, Lead, Strategic Partnerships, on why we developed our Zinc & Health and Copper & Health programs, and the value they are generating for Teck and beyond.

On Our Approach to Strategic Partnerships...

So often, when people see companies out in the world doing good, they assume it's because it's a nice thing to do, or it makes the company look good. But we know that when you apply a strategic business lens to social problems—especially problems that resonate with the company—you can have a profound impact on social good and truly make the world a better place.

Teck's approach to developing programs like Zinc & Health and Copper & Health is fourfold:

- First, we build smart partnerships. This means that we partner with organizations who can deliver excellent programs on the ground, and who can leverage our funding to ensure we reach the greatest number of people in the most cost-effective way.
- Second, we invest in sustainable projects in areas of strategic interest to the company.
- Third, we align our projects with the priorities of the government. That may be here in Canada, or in developing countries where our projects operate, because often it is policy change that truly opens the door to innovation in healthcare.
- Fourth, we are always thinking about how these projects can help us engage with key audiences, including our employees, our future employees and the people in the communities where we operate.



We know that when you apply a strategic business lens to social problems—especially problems that resonate with the company—you can have a profound impact on social good and truly make the world a better place.

On Zinc & Health: What We've Achieved and What's Ahead...

When Teck launched the Zinc & Health program in 2011, the goal was to help more children around the world reach their fifth birthday; Teck has played a role in making that happen, and to date:

- 44 million children have received life-saving zinc treatments
- 140 million people have improved health
- Child mortality rates have decreased in all project countries
- 1 million women have been educated and empowered

Despite our progress, 138 million people will be at new risk of zinc deficiency by 2050 due to the impact of climate change on crop nutrition. This means that now more than ever, we have to build partnerships that can be brought to scale to reach the greatest number of people in the most cost-effective way.

Moving forward, we're focusing on two key Zinc & Health partnerships. We are working with international organizations to improve food security and nutrition by increasing the use of zinc fertilizer among rural, small-scale farmers in Gansu, China. If successful, this pilot project has the potential to lift millions of people out of poverty and improve health around the world. And we have extended our partnership with UNICEF in India for another five years, as we have made significant progress in reducing child deaths, but there is more work to be done.



Above: Don Lindsay, President and CEO, and Ralph Lutes, Vice President, Asian Affairs, with representatives from UNICEF and community members on a visit to a village in India that is benefiting from our Zinc & Health program.

Below: Emma Schwartz, daughter of Michael Schwartz, Manager, Market Research, Toronto office, on a WE trip to Tanzania. Emma has been a strong supporter of the Zinc Saves Lives campaign, collecting batteries and even taking the stage at WE Day, inspiring other youth to help save children's lives.



On Copper & Health: Our New Program...

Teck's new Copper & Health program applies the same strategy and the same principles, with the goal of making a difference in the lives of people in Canada through the use of antimicrobial copper to reduce the spread of infections.

Healthcare-acquired infections are the fourth leading cause of death in Canada—250,000 Canadians will contract a healthcare-acquired infection this year, costing the healthcare system more than \$1 billion annually.

Antimicrobial copper surfaces kill 99.9% of all the bacteria and viruses that come in contact with it. And studies show that introducing copper surfaces in a hospital can reduce dangerous infections like *C. difficile* and MRSA by up to 80%. But Canada has been slow to introduce innovations like copper surfaces, which is why we developed our Copper & Health program, which is funding critical research that will help increase the adoption of copper in hospitals across Canada.

Today, we are partnering with local hospitals to introduce copper surfaces in areas where patients are at the greatest risk of infection, and we are launching a nationwide Copper Saves Lives campaign with students across Canada to challenge them to think about where in their lives copper surfaces could help keep people healthy.

On How These Programs Create Value...

These programs are more than just a 'nice thing to do'; these programs are also creating value for Teck and beyond in a number of ways.

How? We are leveraging opportunities to build trust and relationships through Zinc & Health and Copper & Health, which have helped position Teck as a partner of choice for government, NGOs, and the general public. These programs also create a positive profile for Teck as a good corporate citizen in emerging markets such as China and India.

These programs are also helping us recruit the best and brightest employees. Employees have better morale and are more likely to stay at a company longer when their company is making a positive contribution to society.

And finally, they are giving us new ways to talk about our products. Zinc and copper are game-changing solutions to some of the world's most pressing health challenges. They can save lives, and that is pretty incredible. ■



Where would you put copper in your community?



Copper Saves Lives, and So Can You

Since 2011, Teck has partnered with WE, the world's largest organization of children helping children, to raise awareness about zinc deficiency.

This year for WE Day, Teck is challenging students across Canada to create a video demonstrating where in their communities copper surfaces can help keep people healthy and safe. Teck will then select a winning video and install copper surfaces in the location of their choosing.

For more information, visit coppersaveslives.com



PEOPLE & PLACES



Chris D'Odorico

**Manager, Health & Safety
Trail Operations**

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

I joined Teck at Trail Operations straight out of UBC in 1995, and have worked in various roles here since then.

Could you provide a brief description of your role?

I am responsible for guiding the development of our Safety Management System, including our Health and Safety team, Occupational Health Services and Health Centre, and our Emergency Response function.

What is your favourite part about your job?

I enjoy getting out in the operating plants and talking to people about health and safety. I get my personal satisfaction out of helping my team to develop and achieve our goals.

What is your most memorable moment working at Teck to date?

As an engineer, I was involved in converting our pressure-leaching process from a feed of Sullivan concentrate to Red Dog concentrate, a concentrate that many believed could not be successfully pressure-leached. However, my best, most recent memories involve working closely with my team.

What is your favourite activity outside of work?

Rosslund comes alive in the winter and I love to spend time outdoors skiing and snowshoeing. In the summer, my wife Kelly and I enjoy searching out great live music.



Greta Schuerch

**Senior Government Relations
Coordinator**

Red Dog Operations

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

I started my role with Teck in November 2017. I am based in the Anchorage office and am responsible for Government Relations functions for Red Dog.

Could you provide a brief description of your role?

I am responsible for monitoring and analyzing legislation that could impact our operation and our workforce, including forecasting and responding to policy matters. I also represent Red Dog in various trade associations and coalitions, including the Council of Alaska Producers, the Alaska Miners Association, the Resource Development Council, and Stand for Alaska.

What is your favourite part about your job?

I enjoy sharing with people the far-reaching benefits that the development of the mine has provided throughout Alaska. I especially enjoy the challenging and fast-paced nature of the work that I do.

What is your favourite activity outside of work?

I enjoy the outdoors in general and especially love being able to go back to my home community of Kiana. There, I enjoy driving boats, hunting, fishing and camping on the Kobuk River.



Vancouver, B.C.

Nicole Tapia

**Communications Specialist
Vancouver office**

What brought you to Vancouver?

I relocated from our Santiago office to support the sustainability strategy, sustainability reporting, and internal/external communications within the Corporate Affairs team.

What has been your experience working in a new Teck location?

It has been amazing. It is great to work in person with a lot of people that I have been talking to and emailing with for so many years. Downtown Vancouver is a great place to work.

What is your favourite thing to do in your new city?

I love walking around the city and going hiking. Vancouver has many unique places to visit that are near downtown, including suspension bridges, mountains, rivers, lakes and beaches.

What stands out as a key feature of the city?

There are three things that especially stand out to me: the sense of security, recycling and polite people.

Is there something you were surprised to learn about your new city?

I'm not sure if it's unique to Vancouver or Canada in general, but the recycling culture is very strong and integrated in all areas of life.



Santiago, Chile

David Hood

Director, Infrastructure, Teck Digital Systems

Santiago office

What brought you to Santiago?

I've wanted to work in Chile for the past 13 years. The QB2 project was the catalyst that finally got me here.

What has been your experience working in a new Teck location?

So far, it's been a great experience. I certainly have a long road ahead with learning the language!

What is your favourite thing to do in your new city?

First: exploring! We recently hiked at Santuario de la Naturaleza and a few weekends ago, we drove through San José de Maipo. We have heaps of other places we want to see. Second: walking to the grocery store. There's an awesome trail from our home to the local Jumbo. The kids love it and it helps remind me I'm not in Vancouver anymore.

What stands out as a key feature of the city?

Manquehue. It's a prominent extinct volcano that acts as my North Star when I get lost driving in the city; I just aim towards Manquehue and I'll find my way home again.

Is there something you were surprised to learn about your new city?

When filling up at the gas station, you'll be expected to tip the attendant if they clean your windshield. Also, when someone bags your groceries at the supermarket, you tip them according to the number of bags they fill. Consequently, always keep spare change on you.

Trading Places: Global Mobility at Teck

As part of Teck's development and talent management strategy, work assignments at different locations provide a range of unique career development opportunities, positioning employees—and Teck—to thrive in the global economy.

A PICTURE IS WORTH 1,000 WORDS

1. The mine rescue team and 'Women in Teck' groups from Pend Oreille Mine pose in front of the two Teck floats they walked with in the Down River Days parade, an annual summer community festival in Lone, Washington.



2. Red Dog Operations sponsored the Kobuk 440 dogsled race, a traditional community event that takes place each April in Alaska. The event shines a spotlight on local mushers and attracts racers from across Alaska and beyond, while engaging the next generation of mushers from the NANA region.



3. Highland Valley Copper's community investment fund supported the installation of a new rainbow sidewalk on Railway Avenue at 4th Street in the nearby town of Ashcroft, B.C., as a sign of welcome and inclusion. (Photo credit: Barbara Roden, *Ashcroft-Cache Creek Journal*)



4. Through Teck's joint partnerships with the Family Action Network (FAN) and the Trail Area Health & Environment Program, Trail area families have enjoyed the Family Zone at the Trail Market throughout the summer, experiencing toys, games, and information about local programs and resources.

5. In July, CESL celebrated 10 years LTI-free, with a breakfast and a plaque to commemorate the event. During those 10 years, which included over 1.3 million hours worked, over 300 employees have been employed at CESL in a dynamic and hands-on piloting and testing environment. Employees are a

[continued on page 18]

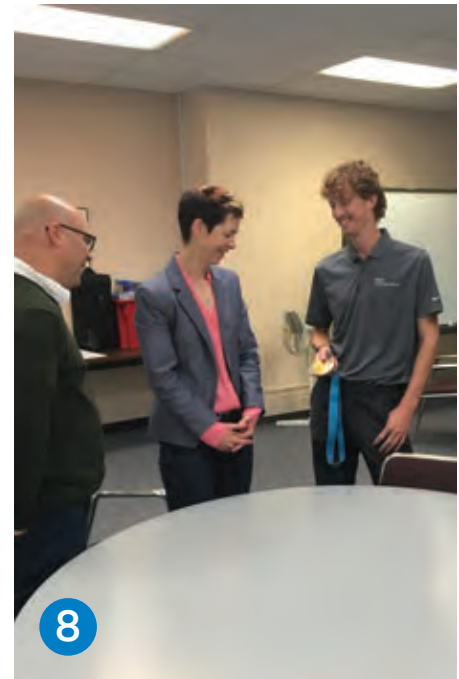


mix of students and recent graduates with no prior work experience, supervised and supported by experienced Teck employees. A positive safety culture and a commitment to our safety systems and protocols all contributed to reaching this important safety milestone.

6. Eight employees on Team Teck were part of the 2,500 participants riding in the 10th annual two-day 200-kilometre Ride to Conquer Cancer benefitting the BC Cancer Foundation on August 25–26. Collectively, the group fundraised \$39,000 towards the more than \$10.6 million total that the event raised this year. (l – r) Scott Charles, Andrew Thrift (riding for Natalia Zarate), Stephen Kelleher, Cassandra Parker, Stephanie Dunlop, Krishnan Iyer, Adrian Anzulovich, Debbie Dossantos.



7. This past May, Highland Valley Copper (HVC) received a Canadian Industry Partnership for Energy Conservation (CIPEC) Leadership Award, in the Energy Performance Management category for their work targeting and implementing energy projects that led to significant results in reducing electricity consumption and costs. CIPEC, an award-winning partnership between the Government of Canada and Canadian industry, includes more than 2,500 facilities representing over 21 industrial sectors and over 50 trade associations across Canada. James Myers, Senior Engineer at HVC (right) accepted the award on behalf of HVC.



8. Olympian Evan Dunfee (right) visited Trail Operations to promote their Inspiring Wellness and Learning program by taking employees on a hike and by joining crew talks to share his experiences, and to show off his 2015 Pan American Games gold medal and Olympic ring made with Teck metals. Pictured with Evan are Trail employees Steven Martin and Tammy Salway.

9. Carmen de Andacollo Operations commemorated the 10-year anniversary of their mine rescue team with a special celebration recognizing members who have provided service since its inception.





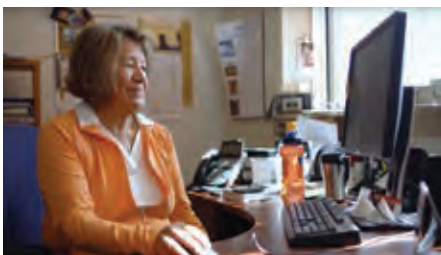
SEEN ON SOCIAL



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

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Teck recognizes that access to water is a human right and we are committed to protecting water where we operate. #WWWeek



Kathryn Teneese, Ktunaxa Nation Council Chair, talks about the value of working together for responsible resource development. #UNDRIP #IndigenousPeoplesDay #Reconciliation



Teck was on hand for the grand opening of the new trades training facility at the College of the Rockies. We're proud to support students in the region looking to pursue an exciting career in skilled trades. @COTR_Updates



Meet the woman behind some of the cutting-edge mining technologies being deployed at Teck. From smart shovels to our participation in Canada's Digital Technology Supercluster, Victoria Sterritt is helping people solve problems, remove barriers and navigate new possibilities.

Growing Together

Anna and Zane Gravelle take relationships to heart, both at home and at work.

The married couple of four years are both Teck employees and residents of the Elk Valley in British Columbia, Canada. Together with their blended family of five children, Anna and Zane are members of the Aq'am (St. Mary's Indian Band) and Tobacco Plains Indian Band, respectively, two of the four Ktunaxa Nation communities in B.C. When not on the job, the pair spend their time fishing on the lakes near their home, hunting wild game, and enjoying music and adventures with their kids.

"Even though our community is the smallest within the Ktunaxa Nation and our nation is one of the smallest within Canada, with a population of around 1,500–2,000, we've done a lot of footwork to ensure our cultures and traditions are still being practised," says Anna.

Gaining Knowledge

The Ktunaxa people are a distinct Indigenous and linguistic group who have historically occupied and protected their land while living in balance with nature. Preserving their culture remains of high importance today, but so does integrating with the communities within and surrounding their territory, which spans southeastern British Columbia, southwestern Alberta, and parts of Washington, Idaho and western Montana.

In May 2016, Teck signed an Impact Management and Benefits Agreement (IMBA) with the Ktunaxa Nation Council that is creating numerous long-term benefits for the Ktunaxa people and increased certainty around future

sustainable mining development in the region. Spanning approximately 40 years and all five of our steelmaking coal operations in the Elk Valley, it is one of the most comprehensive agreements of its kind in place in Canada.

"When I first started at Teck, there was very little knowledge about the Ktunaxa Nation; people didn't know who the nation in the area was," says Zane. "I really like the IMBA program and the steps that are being taken."

Developing Careers

Zane's relationship with Teck began through the Mining Apprenticeship Program (MAP) at the College of the Rockies, when he enrolled in a training program for Industrial Electricians and Heavy Duty Equipment Technicians.

"It was a great opportunity because you're moving around from mine to mine and learning different things while progressing within your apprenticeship," says Zane.

He knew he wanted to work close to home and family, so after completing the program he was pleased to accept a job as one of eight running repair field electricians at Line Creek Operations. Today, his primary duties involve keeping the shovels and drills running, as well as taking care of the mine facilities.

"I find it rewarding helping out at the mine site and knowing that there are a lot of things that are basically on my shoulders at certain times. My co-workers rely on my abilities, as I rely on theirs, while at the same time watching out for each other's safety."

Anna's career with Teck began in a temporary role in 2017 and advanced to a permanent position earlier this year as an administrative assistant for the Environment and Social Responsibility team in Sparwood, B.C. Here, her day-to-day work includes onboarding staff during new-hire orientations, coordinating meetings, finance reconciliations, and vacation and schedule management.

Building Relationships

Along the way, both Zane and Anna say they have developed positive relationships with the people they work with. And, as the first Ktunaxa Nation couple both working at Teck, the Gravelles note they've seen a shift in the relationship between Teck and their community, and still see more opportunities in the future.

"Teck recently helped fund the Administration and Health Building in Tobacco Plains, which was quite an achievement," says Zane. "We have our own healthcare system in our band, and Teck purchased a van for the healthcare workers. There are a lot of things that they do in general to help out the communities in the area, as well as in Ktunaxa communities."

Adds Anna, "I feel like we have quite a few strong leaders right now who are guiding us in the right direction, and we make our presence well-known. It's still a growing relationship, but it's growing in the right direction for us." ■



Anna and Zane Gravelle

Learning More: The Ktunaxa Nation

The Ktunaxa, also known as the Kootenai or Kootenay, have occupied their land for over 10,000 years. The Elk Valley area is the main home of the easternmost branch of the Ktunaxa people, who are closely connected to families living at what is now Tobacco Plains. Additionally, three other Ktunaxa communities currently exist in Canada near Windermere, Cranbrook and Creston.

Over their long history, the Ktunaxa people have enjoyed the natural bounty of the land, seasonally migrating throughout their territory to follow vegetation and hunting cycles.

“Our homeland really defines who we were and who we are today; we have a huge responsibility to ensure this place continues to exist for future generations of Ktunaxa, as well as non-Ktunaxa people,” says Ktunaxa Nation Council Chair Kathryn Teneese. “We need to try to figure out how we can move forward together in a way that makes sense, but that recognizes and acknowledges that we have a unique identity and connection to our homeland that no one else really has.”

The Ktunaxa Nation is achieving this by educating and supporting its neighbours, all while building relationships and economic opportunities for its people. Work done at the governing table is guided by the group’s vision statement that celebrates cultural identity, partnerships, and managing land and resources in a self-sufficient way.

For more on the Ktunaxa Nation, visit www.ktunaxa.org



MEET THE INNOVATOR

AARON WYLIE

In this second of a series profiling innovators across Teck, we meet Aaron Wylie, Superintendent, Transformational Technology, Highland Valley Copper

Father, Mountaineer, Change-Maker

“If you’re not growing, you’re dying,” says Aaron Wylie, Superintendent, Transformational Technology at Highland Valley Copper (HVC) near Kamloops, B.C. An avid snowboarder and mountaineer, Aaron is always looking to push the limits, and he brings that same attitude to work in pushing the boundaries of technology at Teck.

After graduating from the University of British Columbia as a Mining Engineer, Aaron has held many roles in his 13 years at Teck, from mine operations to mine engineering to health and safety, all of which have involved significant shifts in culture and change in practices.

With this experience, Aaron was tasked with leading the implementation of groundbreaking new technologies at the mine to improve safety performance, increase productivity, enhance sustainability, and ultimately extend the life of the operation. And it’s a task he has embraced enthusiastically.

“It’s not just an evolution; it’s a revolution. Implementing these kinds of new technologies at HVC has major potential to extend the life of the mine, sustain existing jobs, improve environmental performance and, most importantly, improve safety,” says Aaron.

Operationalizing these technologies, such as Smart Shovels and blast movement monitoring, does present challenges, though.

“When implementing new technology, there are three elements for successful organizational transformation: people, process and technology. Technology can be installed and process can be created, but people need to understand the benefits and be equipped with the skills in order to support change. That’s why focusing on people is the first and most important priority as we transform mining today and in the future.”

“Together, we can maximize the value of the resources we extract and improve sustainability by using technology,” says Aaron. “We have an obligation to our employees, communities and shareholders to be as innovative and competitive as possible.” ■

“Together, we can maximize the value of the resources we extract and improve sustainability by using technology.”

IDEAS AT WORK

Ideas work best when they're shared, so we've created a media series that demonstrates the innovations and technologies Teck teams have been implementing recently.

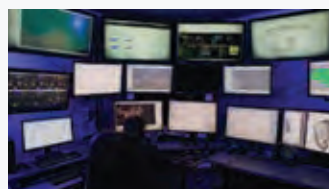
Here's an initial snapshot of how we're proudly sharing our ideas—with each other, industry peers and our communities:

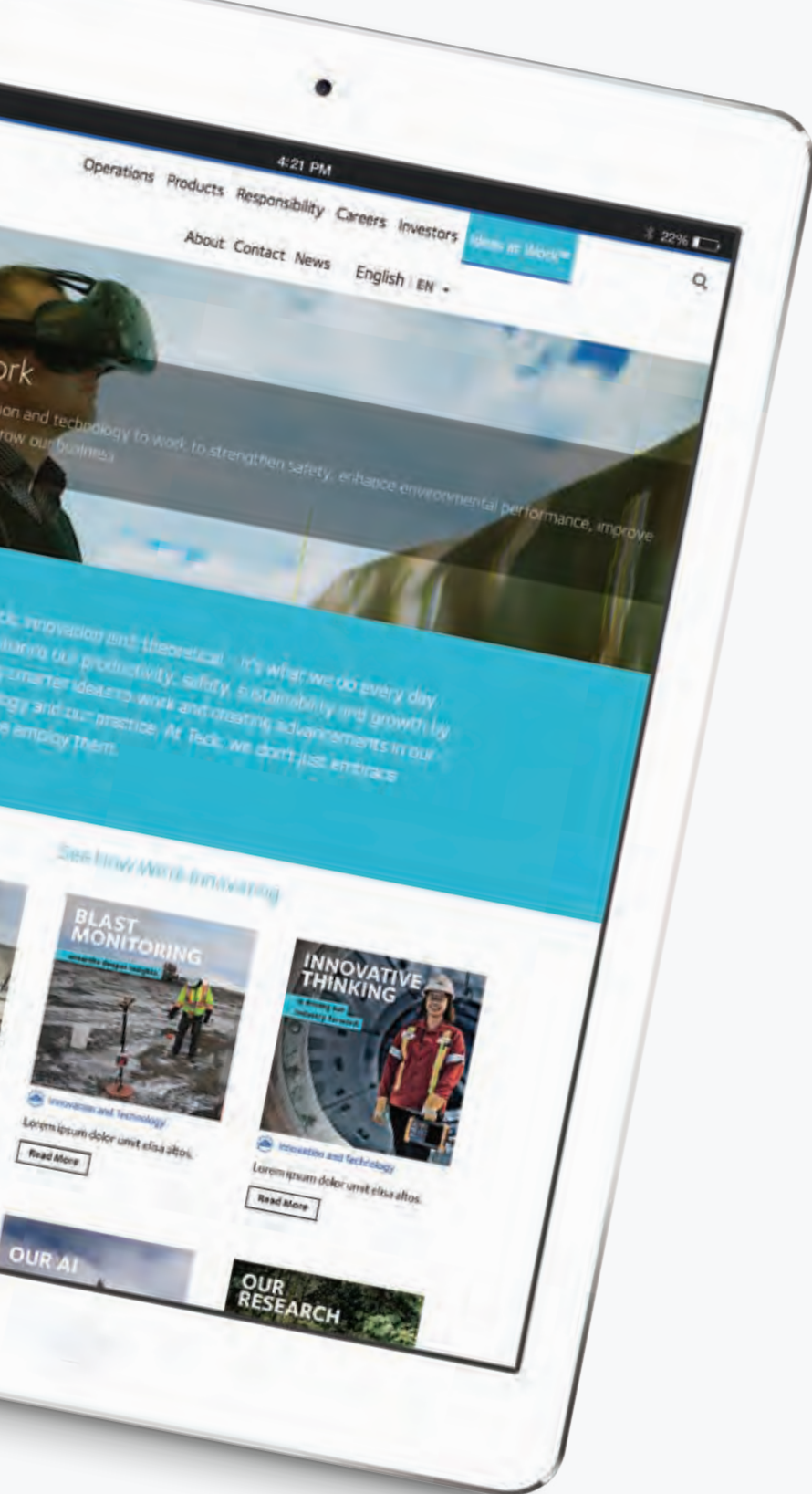
VIDEOS

Seeing is believing. We've created videos to highlight our employees and the innovations and technologies they've adapted.



Visit teck.com/connect or scan this page with Layar app to watch video





➔ WWW.TECK.COM

Our Ideas at Work web page—teck.com/ideasatwork—serves as a hub for all the information we’ve put together about Teck innovations and technologies.

↓ DIGITAL & SOCIAL ADS

People all over the world are interested in the advances we’re making. We’re taking advantage of the digital world we live in to reach them through a series of targeted digital and social ads.







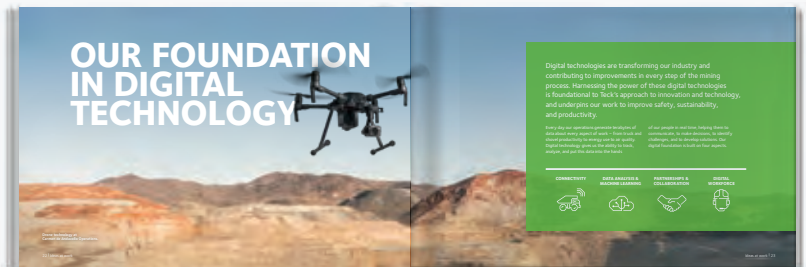
IDEAS AT WORK PUBLICATION

For those who want it all, our Innovation & Technology Approach document details how we go about creating a future through innovation and technology. We discuss how we use our four key strategic pillars, and provide insight, and fascinating case studies, into Teck's approach to innovation and technology.



This is just the beginning. Visit teck.com/ideasatwork and follow us on social media as we share more of Teck's Ideas at Work.

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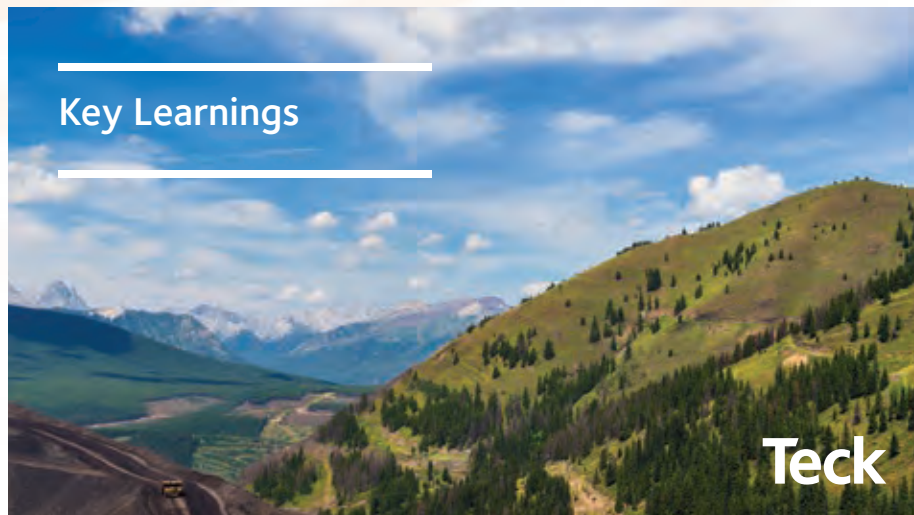


Learning from Loss

In April of this year, Teck was deeply saddened by the fatal incident that took the life of Pat Dwyer at our Fording River operation in southeast British Columbia, and our thoughts remain with Mr. Dwyer's family, friends and colleagues.

To ensure we learned everything possible from the incident and to help prevent a reoccurrence, an animated reenactment has been produced and is being shared across our company and our industry. We are doing so because we believe that the tragedy of losing Mr. Dwyer would be compounded if we fail to learn from this loss or if we fail to share those learnings with others.

To view the animation, which includes key learnings identified as a result of the investigation, please visit:
www.teck.com/connect ■



Conservation Champions

Red Dog Operations recognized for its support of the Chukchi Sea polar bear research program.

On May 18, 2018, the U.S. Fish & Wildlife Service announced the recipients of the 2017 Recovery Champion award, which honours its own employees and partners for outstanding efforts to conserve and protect endangered and threatened species. Altogether, 18 individuals were honoured as Recovery Champions for work to conserve plants and animals ranging from the Atlantic salmon, to the Miami blue butterfly, to the polar bear, for which the team from Red Dog Operations was recognized.

The following article was shared with *Connect* from Red Dog's *Suvisi* newsletter. Congratulations to the the team at Red Dog Operations on this impressive accolade.





Did you know that for the past 10 years Red Dog Operations (RDO) has contributed significant in-kind support to the U.S. Fish & Wildlife Service (FWS) Marine Mammals Management Program for Chukchi polar bear research?

Since 2008, a Fish & Wildlife Service team of four people has staged a two-month spring research camp at the RDO port, where Port Supervisor John Tobin and his staff have provided critical support to the Service's Chukchi Sea polar bear research program.

RDO's contributions include lodging, meals, labour, equipment, a warm indoor area to work on samples, and most importantly, a safe landing zone, a fuelling system and fuelling operators.

"The Fish & Wildlife Service provides its own helicopter and fuel," said John. "We provide the ISO storage tank and fuelling system. We also take care of their research gear—they have a lot of gear."

By helping coordinate shipping of capture gear to the mine, providing accommodations for staff, and troubleshooting any issues that arise during the capture season, John and his team have been able to assist with the research team's needs.

John's commitment to the research program has enabled them to collect invaluable information on bears in the Chukchi Sea, including polar bear ecology and how the animals are responding to sea ice loss.

The research Teck has supported allowed for the first estimate of the population's size in over two decades, which is critically needed to inform sustainable levels of subsistence harvest in the region. Additionally, the information gained on polar bear habitat use in the Chukchi Sea will be vital for ensuring that offshore activities can be conducted with minimal impacts on the population.

In a congratulatory email to John and team, Fish & Wildlife Service Wildlife Biologist Michelle St. Martin wrote, "I'm excited to tell you that Teck Alaska Inc. has been selected as the National U.S. Fish & Wildlife Service Recovery Champion for your important contributions to polar bear conservation. This award is the agency's way of saying thank you for all you've done for us over the years. We couldn't do what we do out there without your support, and we appreciate the partnership we have."

John shared his appreciation for the honour, and to those who help make it possible: "I want to thank everyone who was involved, including NMS [a local supplier of hospitality, security, and management services] who supports catering and housekeeping, for clean rooms and beds and warm meals; the environmental group, and our maintenance team for labour support and equipment and repairs."■



Introducing: Teck's New Water Targets

Water is one of Teck's most important sustainability issues and a key focus of our sustainability strategy.

In order to maintain support by our neighbouring communities and build trust in the locations where we plan to develop projects, it is critical that we be effective water stewards.

To improve Teck's water performance, two new water targets have been established. The targets have been developed through a consultative process led by our Water Steering Committee and are designed to bring focus to our most important water challenges and opportunities.

Operations will be supported in implementing projects that are identified to help us achieve these new targets.

Our Water Targets

We have set a company-wide target of zero significant water-related incidents, which is helping bring focus to the work underway across Teck to address water quality challenges. Significant water-related incidents are those incidents that result in either lingering or irreversible impacts to the environment or people, a significant regulatory response, or material financial costs.

And in Chile, where our operations and major projects are located in regions where water is a scarce resource, we've set an ambitious goal to reduce our freshwater consumption by 15% by 2020. ■

Teck's Water Policy

These new water targets build on our recently released Water Policy, which commits us to applying a consistent approach to water management and to being effective water stewards at our operations and in the watersheds where we operate.

For the complete Water Policy and more on Teck's approach to water stewardship, visit [teck.com/responsibility](https://www.teck.com/responsibility), and watch for more articles on this topic in upcoming issues of *Connect*.



Empowering Indigenous Women in Chile

UN Women and Teck extend their partnership, working together to provide access to education and training to Indigenous women in Northern Chile.

In April 2018, UN Women and Teck announced the extension of their partnership and the development of a new training centre to empower Indigenous women in northern Chile, funded through a US\$1 million investment from Teck.

The investment will extend the Originarias program and support the goal of providing Indigenous women in northern Chile with access to high-quality, culturally relevant, flexible training programs with a focus on economic development, entrepreneurship and business management skills.

“UN Women works to give visibility to Indigenous women, promoting their rights and helping to make their voices heard,” said Luiza Carvalho, UN Women Regional Director for the Americas and the Caribbean. “Chile is one of the countries of Latin America where we

are working hard to strengthen the leadership of Indigenous women, and thanks to the Originarias programme we are expecting to be one step ahead in this challenge.”

“Teck is focused on helping to empower women and Indigenous Peoples in the areas where we operate so they can fully share in the economic benefits created by responsible resource development,” said Don Lindsay, President and CEO, Teck. “We are proud to build on our partnership with UN Women to provide access to education and training that will strengthen women and Indigenous communities, and create a more diverse and thriving regional economy.”

The partnership between Teck and UN Women was launched in 2016 with an initial US\$1 million investment from Teck to fund the Originarias programme.

From 2016 to 2018, the Originarias program undertook research and engagement involving over 250 women in the region. This research identified access to education and training as a key factor for improving socio-economic opportunities for women in northern Chile.

The next phase for the Originarias program will be the development of a new training centre to provide education and capacity building to empower Indigenous women in the regions of Tarapacá, Antofagasta, Atacama and Coquimbo in Chile. ■

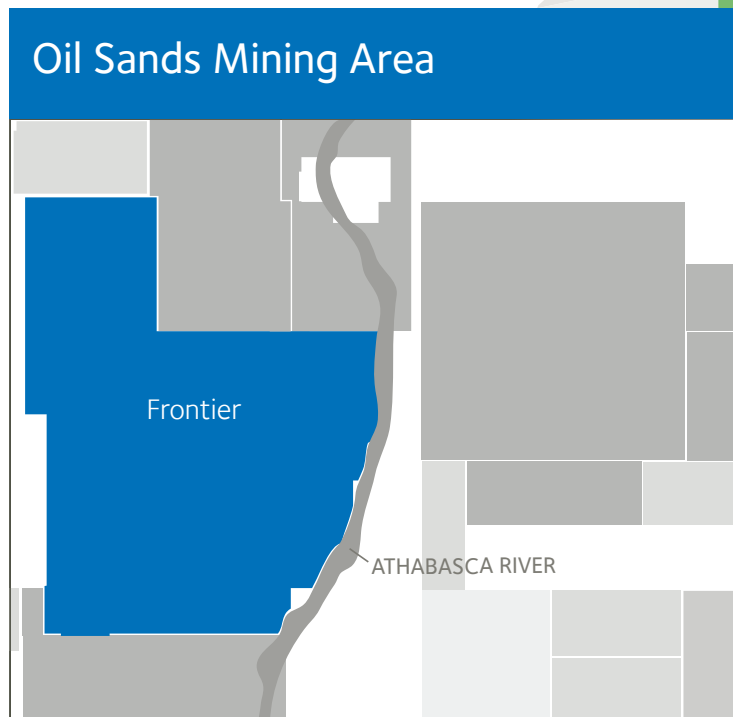
Profiling the Frontier Project

Overview

Frontier is a truck-and-shovel oil sands mine project proposed by Teck, located between Fort McMurray and Fort Chipewyan in northeast Alberta, Canada. Frontier will consist of surface mining operations, a processing plant, tailings management facilities, water management facilities, and associated infrastructure and support facilities.

Frontier has been progressing through a joint federal-provincial regulatory review process since 2011, and a public hearing in front of a Joint Review Panel began on September 25, 2018. Following the hearing, government will make a final regulatory approval decision for the project.

At full production, Frontier is designed to produce 260,000 barrels per day of bitumen. Frontier would have an anticipated 41-year mine life, and would directly employ up to 7,000 workers during construction and up to 2,500 workers during operation.





Sustainable Development

Teck is committed to developing Frontier responsibly, and the project will incorporate leading-edge technology and practices to minimize its environmental impact:

- **Water:** Designed to minimize water usage; 90% of water used will be recycled, with no water withdrawals from the Athabasca River during low river flow periods. Groundwater and surface water quality will be protected through a robust water management plan.
- **Greenhouse Gas Emissions:** Frontier will be among the lowest GHG-intensity oil sands operations and will have a lower carbon intensity than about half of the oil currently refined in the United States.
- **Reclamation:** Land will be reclaimed as mining progresses, in order to return it to a productive state faster. As a result, the actual footprint of active mining will be smaller than the total project area.
- **Wildlife:** A comprehensive wildlife mitigation and monitoring plan and Adaptive Management Plan has been developed in consultation with Indigenous communities, governments and stakeholders, and will minimize potential effects on wildlife.

Indigenous and Community Engagement

Engagement with Indigenous communities and regional stakeholders has been ongoing since the earliest stages of the project, starting in 2008. Input from Indigenous communities was considered during early phases of planning, and we have modified a number of specific project design aspects in response to the feedback received. In addition, Teck has achieved agreements covering all 14 local Indigenous groups potentially affected by the project. ■



Visit teck.com/connect or scan this page with Layer app to watch video

Update on QB2

In August, Teck received regulatory approval for the Quebrada Blanca Phase 2 (QB2) project, a major milestone towards advancing the project. Next, Teck will look towards a possible construction sanction decision by our Board of Directors, potentially before the end of 2018.

Teck has initiated a partnership process to seek an additional funding partner for QB2, with the objective to ultimately hold a 60% to 70% interest in the project. That transaction will most likely be announced in the fourth quarter of 2018.

The QB2 project is expected to be a tier one asset in Teck's portfolio, with low all-in sustaining costs, an initially permitted mine life of 25 years utilizing only a quarter of reserves and resources, and significant potential for further growth. Learn more about QB2 in "Profiling Our Growth Projects: QB2" in Volume 22 of *Connect* magazine.



SPACE:

The Final Frontier...

Tumbling alone through the blackness of space, following a lonely orbit around the sun that cuts across the paths of both Earth and Venus, you will find asteroid Amun 3554.

At 2.5 kilometres in diameter—roughly the size of downtown Vancouver—Amun doesn't seem like a particularly noteworthy celestial body. It's among the smallest metallic asteroids ever discovered, and just another one of the more than 16,000 known near-Earth asteroids.

But there is something about Amun that makes it very interesting: that one little space rock may contain 30 times as much metal as has been mined in all of human history.

...of Mining?

It's been estimated that the composition of asteroids like Amun 3554 include massive percentages of iron, nickel, cobalt and platinum-group metals, with some early projections putting the total value of the metal in that asteroid alone at \$20 trillion. Finding ways to tap into these cosmic cash cows is already spurring the formation of new companies and new investment in the growing—though still mostly theoretical—field of asteroid mining.

But why would anyone go all the way to space to find materials available right here on terra firma? According to Professor Scott Dunbar, head of the Norman B. Keevil Institute of Mining Engineering, the enormous cost and complexity of going to the asteroids, mining them, and then returning the metals back to earth make it an unlikely scenario. It's much more likely that at some point in the future, asteroid mining would be used to provide the raw materials necessary for further space exploration or human colonization of space.

"The economics and practicalities of travelling to an asteroid and transporting metals back to earth have been discussed at length and they just don't add up," says Professor Dunbar, referencing a recent book that talks about the complexities of asteroid mining.¹

Travel into space requires transporting rocket propellant, roughly 80% of the mass of a rocket. Getting back to Earth is easier because you would be leaving a microgravity environment. However, you would probably want to refine large amounts of ore before transport back to Earth, and current refining methods require gravity. Spinning a large, space-based refinery very fast would achieve gravity but also require energy. Given all these challenges, Professor Dunbar says that a more feasible scenario would be to use smaller amounts of the mined metals or minerals as part of a space habitation or exploration program.

Asteroids would provide a ready source of minerals and metals to build components for spacecraft or other space infrastructure, without the need to boost the building materials out of Earth's gravity first. NASA is even examining the possibility of redirecting asteroids into new orbits around the Earth or moon, to serve as orbital sources of metals for construction.

Another major target for space-mining entrepreneurs isn't ore at all—it's water. Water extracted from asteroids could be used to create propellant for spacecraft or to support human life in space, essentially turning asteroids into refueling depots for human space exploration.

"And even if bringing asteroid riches back to earth isn't likely, the breakthroughs spurred by space mining could have real-world applications," says Professor Dunbar. He points to automated missions like the European Space Agency's Rosetta probe as an example of the natural intersection between space exploration and ground-based mining. In 2014, Rosetta's robotic Philae lander made the first touchdown on a comet. Those kinds of advances could ultimately lead to new approaches or technologies for how we mine here.

"Asteroid mining is an interesting idea, since pursuing it leads to possible innovation in Earth-based mining," says Professor Dunbar. "For example, we likely won't send people to asteroids, so there would be a high reliance on robotics and autonomy."

To date, space mining is still in its infancy, with various start-up companies working to perfect probes that could better analyze the mineral content of asteroids, and identify the best targets for future exploration.

So for the foreseeable future, Earth-based mining will remain our best and only source of metals and minerals. And there may well never be an economic way to bring space-based resources back down to Earth. However, decades or even centuries from now, the future of space exploration may well depend on our ability to take the mining industry to the stars. ■

1. Kelly Weinersmith and Zachary Weinersmith, *Soonish, Ten Emerging Technologies That'll Improve and/or Ruin Everything* (New York: Penguin Press, 2017).

Staying Cyber Secure

Teck Digital Systems Cyber Security team works to protect our corporate and operational systems from internal and external risks such as virus attacks, network outages and costly repairs. By working in partnership with these experts and following best practices in cyber safety, you can help keep Teck's networks secure.



Lock It Before You Leave It

Take a moment to think about the information you have direct access to via your Teck computer. Consider the people outside of your team and outside of Teck who should not have access to this information, and the risks associated with unauthorized access to your computer.

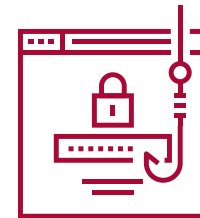
Even the best cyber security solutions cannot stop someone from initiating an attack from your computer when it's left unlocked, so always remember to lock your computer when you're not using it.



Improve Password Security

Strong passwords help mitigate the risk of a cyber attack against you and against Teck. The most effective passwords are:

- **Unique:** Never use the same password twice.
- **Long:** Try a pass phrase, one that is easy to remember and hard to crack.
- **Secure:** Never write down or share your passwords; use a password management application, such as LastPass, which is Teck supported and can securely store and manage your passwords for you. LastPass can be requested via the Teck Service Portal.



Catching Phish

Phishing is a type of cyber attack that uses email or a messaging service to trick you into taking an action, such as clicking on a link or opening an email attachment that will download a malicious program or give the sender access to your computer.



If you receive an email that you think might be suspicious, click the Report Phishing button on your Outlook toolbar, or, forward the original email from a mobile or other device to **phishing@teck.com**. The email will automatically be forwarded to the Cyber Security Incident Response Team, who will review it for any suspicious activity and let you know if it's safe.

For more tips around catching phish, check out "How to Spot a Phishing Scam" on the opposite page. ■

HOW TO SPOT A PHISHING SCAM

Attachments

When an attachment comes from someone you don't know or if you weren't expecting the file, make sure it's legitimate before opening it.

Log-in Pages

Spear phishers will often forge log-in pages to look exactly like the real thing in order to steal your credentials.

Links

Roll your mouse pointer over the link and see if what pops up matches what's in the e-mail. If they don't match, don't click.

Greed

Phishing e-mails often dangle a financial reward of some kind if you click a link or enter your log-in information. If an e-mail offers you something that seems too good to be true, it probably is.

Urgency

If an e-mail provides a strict deadline for performing an action, be suspicious. Phishing e-mails will try to fluster recipients by creating a sense of urgency.

Curiosity

People are naturally curious, and phishers take advantage of this by sending e-mails that promise to show us something exciting or forbidden.

Fear

Scaring recipients is a common tactic in phishing e-mails. E-mails that threaten you with negative consequences or punishment should be treated with suspicion.

E-mail Signatures

A signature block that is overly generic or doesn't follow company protocols could indicate that something is wrong.

Sender Address

If the address doesn't match the sender name, be suspicious of the entire e-mail.

E-mail Tone

We know how our co-workers and friends talk, so if an e-mail sounds strange, it's probably worth a second look.



By the Numbers: Economic Contribution Report

Teck's operations and activities generate significant economic value and help to support opportunity, jobs and growth in communities around the world.

In July 2018, Teck released our second annual Economic Contribution Report, which provides information about the economic benefits generated by our activities, including payments to suppliers, employee wages and benefits, and payments to governments.

For more information and to download Teck's 2017 Economic Contribution Report, visit www.teck.com/responsibility ■



OUR ECONOMIC CONTRIBUTIONS



\$10.3

BILLION

in economic contribution across all areas where we operate



\$1.5 BILLION

in wages and benefits for employees

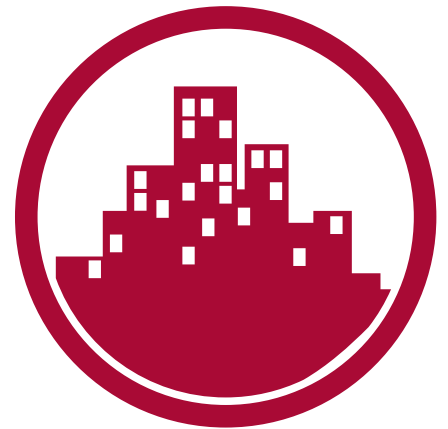


\$7 BILLION

in payments to suppliers

**\$1.6
BILLION**

in payments to different levels of government where we operate





Indigenous Peoples Around the World

There are more than 370 million Indigenous Peoples, living around the world in 90 countries, who have unique rights, cultures and connections to the land. Ten of Teck's 12 operations in Canada, Chile and the United States and the majority of our exploration and development projects are located within or adjacent to Indigenous Peoples' territories.

In addition to the United Nations declaration of the International Day of the World's Indigenous Peoples on August 9, there are a number of annual days of recognition and celebration of regional Indigenous Peoples that Teck would like to acknowledge:

Australia: National Reconciliation Week, May 27 – June 3

Canada: National Indigenous Peoples Day, June 21

Chile: National Day of World Indigenous People, June 24, and International Day of Indigenous Women, September 5

Alaska: Indigenous Peoples Day, October 8

USA: Native American Heritage Day, November 23