

# connect



Volume 25, 2019

## BUILDING A STRONGER FUTURE

A Spotlight on QB2

From Next Steps to Mine of the Future,  
How People Make It Possible and More



Teck



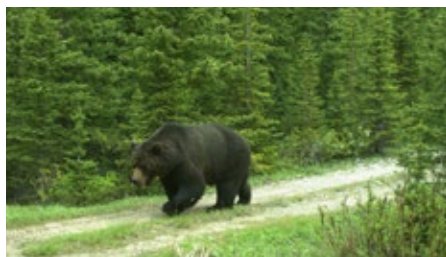
# SEEN ON SOCIAL



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

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

Local young athletes and community members recently had the unique opportunity to hear from three-time Olympian and Olympic champion Beckie Scott and former national cross-country skiing coach Justin Wadsworth at the 2019 Teck Coaching Series with Team Canada. Watch a video about the experience on YouTube.



Teck has developed a Grizzly Bear Denning Management Plan to reduce the likelihood of interaction with Grizzly Bears during their active denning period, as part of our mitigation and management strategies for wildlife. Learn more about our commitment to Biodiversity at [www.teck.com/biodiversity](http://www.teck.com/biodiversity) #EarthDay



@TeckResources tweeted: Jake Sandstrom, the son of Teck employee Neil Sandstrom, took home silver medals in style in the Big Air and Slopestyle events at the 2019 @CanadaGames. Fun fact: Jake's medal was provided by his dad's company as Teck is the exclusive medals supplier for the Canada Games.



Since 1987, Pacific Salmon Foundation has supported over 3,300 projects including habitat restoration and monitoring, stock enhancement, science and research, and classroom salmon education. Teck is proud to contribute to their important mission. #WorldWildlifeDay

# Contents

---

Welcome .....	4
QB2: A Next Phase .....	5
QB2: Mine of the Future .....	10
QB2: People Make It Possible .....	12
From Seawater to Freshwater .....	15
People & Places .....	16
A Picture is Worth 1,000 Words .....	18
Stronger Together .....	20
In the Spotlight: Jackie Scales .....	22
Six Things to Know about Tailings Management at Teck .....	23
Innovation & Technology at Teck .....	24
Asked and Answered .....	26
Meet the Innovator: Mario Ortiz .....	28
Copper Products: Who Knew? .....	30
Pastel de Choclo: A Mixture of Cultures .....	31

## Thank You

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

Catherine Adair, Community Relations Leader, Trail Operations; Andrés Castillo, Senior Geologist, Highland Valley Copper; Eric Goss, Superintendent, Maintenance, Quebrada Blanca Phase 2; Mark Helms, Mine Engineer, Mine Technical Department, Red Dog Operations; Rob Klein, Senior Engineer, Projects, Water Quality Management, Sparwood office; Andrea Lobos, Senior Communications Specialist, Santiago office; Andrew Milner, Senior Vice President, Innovation and Technology, Vancouver office; Mario Ortiz, Manager, Integrated Operations, Quebrada Blanca Phase 2; Angélique Rosenthal, Environmental Engineer, Trail Operations; Jackie Scales, Director, Inclusion and Diversity, Vancouver office; Stephanie Shaw, Manager, Human Resources, Teck Chile, Santiago office; Nicole Tapia, Communications Specialist, Corporate Affairs, Vancouver office; Herman Urrejola, Social Responsibility Manager, Teck Chile, Santiago office; Verna Westlake, Community Relations Coordinator, Red Dog Operations



## On the Cover

Quebrada Blanca Phase 2 (QB2) will develop the deeper sulphide resource underlying the pre-existing Quebrada Blanca operation. To access the QB2 resource, new infrastructure is being constructed now through to 2021. Read more in “QB2: A Next Phase”.



# Welcome

This is a very exciting time for Teck, as we transition to a new phase of growth for our company, one that will generate new value for our employees, shareholders and the communities in which we operate.

In 2018, we saw solid operating results across the business and achieved key milestones on a number of important initiatives, some of which we've been working on for close to a decade. We received Board approval for full construction of Quebrada Blanca Phase 2 (QB2) in Chile, which is now underway. We also entered into a partnership with Sumitomo Metal Mining Co., Ltd. and Sumitomo Corporation, a transaction that confirmed QB2 as one of the world's premier undeveloped copper projects, significantly de-risked our investment in it and improved the project economics for Teck. The production start-up at our Fort Hills mine exceeded nameplate capacity in December. And earlier in 2019, we received investment grade credit ratings from four rating agencies.

The exciting progress on QB2 brings us to this issue of *Connect*, "Building a Stronger Future," with much of the focus on a project that, once complete, will transform our copper business and make Teck a major global copper producer.

To begin, I encourage you to start with "QB2: A Next Phase", where the "who, what, where, when, why" of the project are highlighted, as well as other key aspects of the project's construction phase, a phase that will take us to the second half of 2021, when we expect to see first production.

Until that time, tremendous effort is underway by a very talented and experienced team. As we know, it's really our people who make it all possible, and in this issue of *Connect*, you'll learn more about just a few of the many people making an impact on this project and others across Teck.

We've also seen huge momentum and energy building around technology and innovation, and at QB2, it will be a hallmark of how that operation is set up for future success. "QB2: Mine of the Future" examines how we are leveraging existing and new technologies that will make QB2 our most innovative and integrated operation.

Looking ahead at the remainder of 2019, in addition to focusing on meeting production and cost targets, making progress on the construction of QB2, and advancing studies associated with our various development projects, we'll also take the next important step in our safety journey. And we'll do that by rolling out a new program called Introduction to Hazard Identification across Teck.

Nothing is more important than the health and safety of our people, and it's the first consideration in everything we do. And yet we continue to have incidents. To understand why, we reviewed our investigation outcomes and determined that hazard identification is an area in need of improvement. To address this, Introduction to Hazard Identification was developed to equip employees with a common understanding of hazards, hazard types, risk and control, as well as the skills necessary to identify hazards and manage risk in the workplace.

We can't talk about our safety journey without remembering the fatal incidents that took place at Fording River and Elkview in 2018. We were deeply saddened by the loss of Pat Dwyer and Stefan James Falzon, and our thoughts remain with their loved ones. Investigations have been completed, and we are sharing lessons learned across our company and our industry.

Teck's success relies on the innovative thinking and commitment to excellence of our people—those who, each day, drive our culture of safety, of sustainability and of innovation. As we enter into this exciting time of growth for Teck, and continue to build on the milestones we reached in 2018, we know that together, we are building a strong future for our company.

Don Lindsay  
President and CEO

# QB2

## A NEXT PHASE

As Teck transitions to full execution of our most important and transformational growth project—Quebrada Blanca Phase 2—we take a look at the key features of the project and what to expect over the coming years.



## What

The Quebrada Blanca Phase 2 (QB2) project is one of the world's largest undeveloped copper resources.

The supergene orebody (near-surface deposit) was mined during the initial phase of Quebrada Blanca, and now, QB2 will develop the sulphide resource underlying the pre-existing operation. As a result, QB2 is effectively pre-stripped, which reduces long term sustaining capital costs and operating costs.

To develop the QB2 resource, new infrastructure is being built which includes the construction of a concentrating plant, tailings facility, infrastructure installations for transporting concentrate and seawater, and facilities to receive, filter and ship concentrate in the North Patache sector, south of Iquique.

During the peak of construction, QB2 will employ over 10,000 people.

QB2 incorporates the first large-scale use of desalinated seawater for mining in the Tarapacá Region of Chile, in place of freshwater use. The QB2 project has also consulted extensively with local communities and will continue to work cooperatively with stakeholders throughout the life of the project.

## Where

QB2 is located in the Tarapacá Region of northern Chile at an elevation of 4,400 metres, approximately 240 kilometres southeast of the city of Iquique and 1,500 kilometres from Santiago.

Construction personnel will live in camp facilities and the majority will commute from large population centres, including Iquique, Arica and Santiago.

## When

Construction is expected to take approximately three years, with first production slated for the second half of 2021.

## Why

QB2 will be a long-life, low-cost operation with major expansion potential—what we are calling QB3—which includes the option to double production or more to potentially become a top five global copper producer. The copper growth from QB2 will, over time, help to rebalance our portfolio so that the contribution of our copper business could be similar to our world-class steelmaking coal business.

## Who

A project of this size requires significant resources both internally and externally, leveraging a broad range of expertise.

Teck's internal project team includes approximately 125 people, and is expected to grow to 150 over the course of the project. Bechtel, a global construction management company with extensive expertise in complex mega-projects, will oversee all construction activities.

Throughout this edition of *Connect*, we shine a light on just a few of the many people involved in the project, including Karl Hroza, Project Director, QB2, featured on the next page.

# QB2 HIGHLIGHTS

316,000  
TONNES

copper-equivalent annual production for the first five years

TOP 20  
GLOBAL Cu PRODUCER

long-life, low-cost operation; top 20 global copper producer

28  
YEARS

initial mine life using less than 25% of current reserves and resources

TOP 5  
POTENTIAL GLOBAL  
Cu PRODUCER

significant future expansion potential



## Introducing Karl Hroza

Karl Hroza joined Teck and was appointed Project Director of QB2 in September 2018, with responsibility for leading the QB2 team through permitting, detail design, procurement, construction, commissioning and turnover for operations.

Prior to joining Teck, Karl was Senior Vice President at North West Redwater, where he led the delivery of the Sturgeon Refinery in Alberta, Canada. He brings to the role more than 25 years of experience as both Project and Construction Manager and/or Director on complex mega-projects in the oil and gas, chemical, mining and mineral industries, in various countries around the globe.

“We’re now seeing a major shift in the project, from planning and permitting, to mobilizing a workforce of over 1,600 across six major construction areas, as we work to effectively execute and build QB2,” says Karl.

“We have many goals and objectives during the execution phase of the project, and we want to add and drive value at each and every opportunity. We want to create efficiencies in how we work together to enable our contractors, and to set up the operation for future success. This will be accomplished by establishing strong processes and procedures, and getting



the right people, drawings and materials in the right place, at the right time.”

“Most importantly, we want to establish the highest standard of excellence for health and safety, environmental protection, engagement with local communities and overall project delivery. We have a very strong team to accomplish this here at Teck and with Bechtel and our key engineering providers, Golder and Ausenco.”

“I’m truly excited to be on board to help develop this world-class resource, while ensuring everyone goes home safe and healthy every day.”

## About Bechtel

Bechtel is a global leader in engineering, procurement and construction, with experience executing more than 25,000 projects in 160 countries. In December 2018, Teck delivered full notice to proceed to Bechtel, the engineering, procurement and construction management (EPCM) provider for QB2. Bechtel has worked with Teck since 2011, supporting the feasibility study process.

“Through our work on the QB2 feasibility study, we established a strong working relationship with Teck,” said Bill Swanson, General Manager, Chile, Bechtel. “For this next phase, we are focused on implementing plans and executing the project safely and

successfully, with quality, innovation and productivity at the forefront.”

Bechtel will manage all aspects of EPCM services and construction contractors, including the integration of third party engineering providers, suppliers and vendor representatives to complete the pre-operational testing to mechanical completion and handover. ■

## Ownership Structure

Teck holds an 60% indirect interest in Compañía Minera Teck Quebrada Blanca SA (“QBSA”) which owns QB2. Sumitomo Metal Mining Co., Ltd. and Sumitomo Corporation together have a collective 30% indirect interest in QBSA. ENAMI, a Chilean state agency, has a 10% non-funding interest in QBSA.

# Quebrada Blanca Phase 2

An aerial view of QB2 infrastructure once complete



**Linear Works Area**  
1. 220 kV HVL (102 km)  
2. Concentrate pipeline (165 km)  
3. Water pipeline (165 km)  
4. Pumping stations (5 in total)

Diameter: 8 inches

Diameter: 36 inches

Colonia Pintados

Pozo Almonte

Concentrate pipeline

Water pipeline

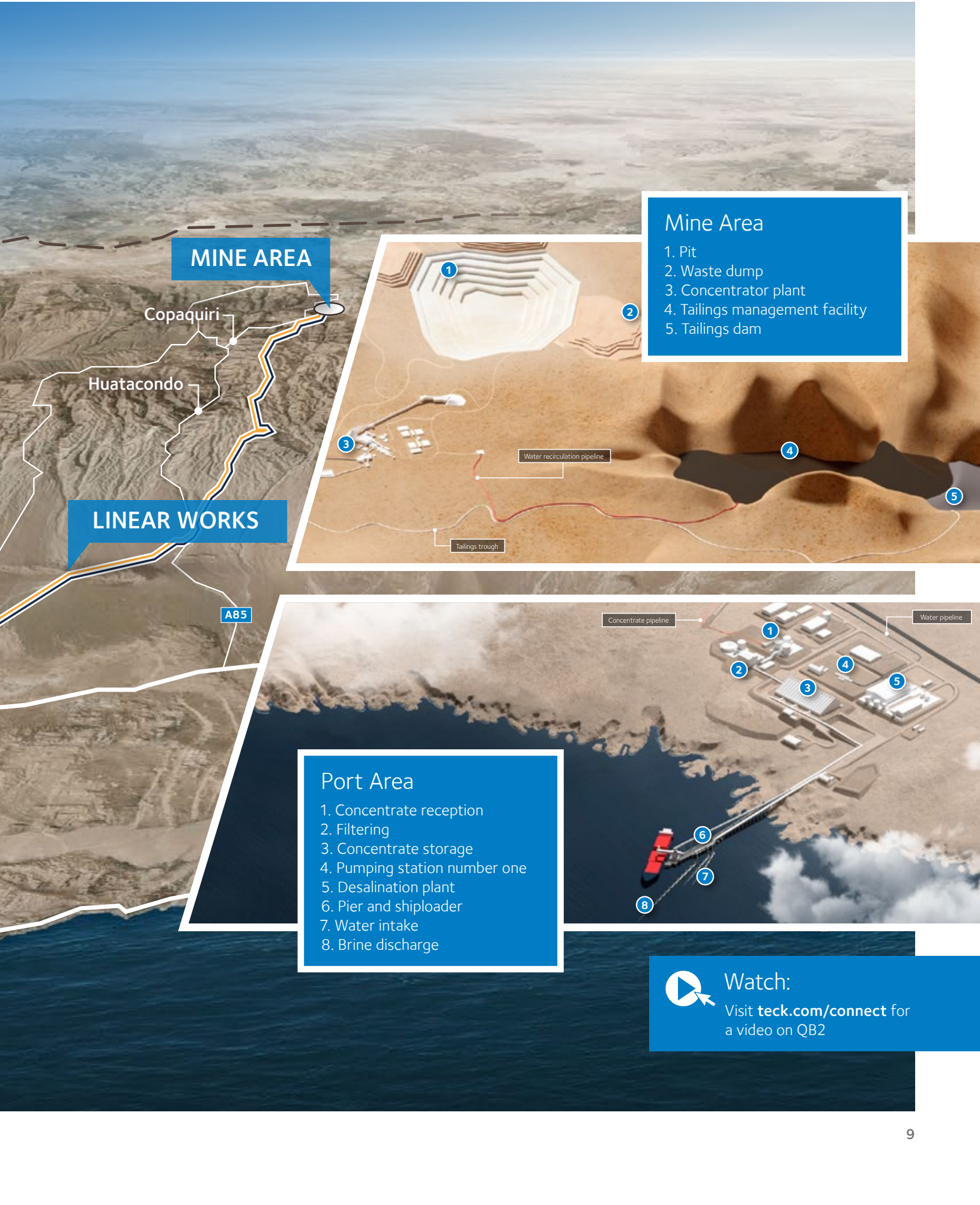
**PORT AREA**

IQUIQUE

Puerto Patillos

Punta Patache





## MINE AREA

- ### Mine Area
1. Pit
  2. Waste dump
  3. Concentrator plant
  4. Tailings management facility
  5. Tailings dam

## LINEAR WORKS

A85

- ### Port Area
1. Concentrate reception
  2. Filtering
  3. Concentrate storage
  4. Pumping station number one
  5. Desalination plant
  6. Pier and shiploader
  7. Water intake
  8. Brine discharge

Watch:  
 Visit [teck.com/connect](http://teck.com/connect) for  
 a video on QB2



# QB2: Mine of the Future

Quebrada Blanca Phase 2 (QB2) is redefining mining at Teck through integration and innovation.

The global mining industry faces a number of challenges, from declining ore grades and increasing energy requirements to growing community expectations and stricter regulations.

It has resulted in the emergence of technological disruption as companies turn towards automation and digitization to not only help address these challenges, but also improve safety performance and achieve efficiencies in a sustainable way.

Because QB2 is more of a greenfield project—with the opportunity to reimagine how the operation will run—it is leveraging both new and proven technology applications in use at other Teck operations and elsewhere around the world, that will make it Teck's most innovative and integrated operation when it begins production in the second half of 2021.

“We’re incorporating a range of technology solutions to further improve safety, sustainability, productivity, reduce costs, as well as further improve workforce planning including inclusion and diversity,” says Dale Webb, General

Manager, Operational Readiness. “At QB2 we see integration of technology, process and people as the foundation of how we work—it will power our success by allowing us to be more creative, flexible and adaptable.”

Here are just a few examples of how that’s being applied at QB2.

## IOC Promotes a Collaborative Environment and Improved Decision-Making

QB2 will be the first operation at Teck to incorporate a remote Integrated Operations Centre (IOC). Located in Santiago, the IOC will bring together all the resources and data necessary for centralized decision making to help achieve better operational performance. Among the main benefits identified for QB2 are improved integration and flexibility, a more inclusive workforce, a safer work environment and increased productivity.

“Collaboration and access to real-time information are the keys to a modern and successful organization,” says Mario Ortiz, Manager, Integrated Operations. “Having a physical location that promotes this type of culture and that gives us such an integrated and holistic view of the operation will be key to QB2’s future success.”

## Renew Business Systems Initiative: Piloting Best-in-Class Systems at QB2

The operational needs of QB2 are also the initial focus of—and a key business driver for—the development of the Renew Business Systems initiative, an initiative that will see the implementation and integration of applications for Asset Management and Maintenance; Human Resources; Health, Safety, Environment and Community; Finance and Cost Management; and Contingent Worker Management.

“The Renew Business Systems initiative will bring together into an integrated environment many of the critical

business applications in use across Teck today,” says Justin Webb, Program Director, Teck Digital Systems. “For QB2, this means that, from the outset, the operation will benefit from a best-in-class system that delivers operational efficiency, improved productivity, and the insight and information our business needs.”

## Autonomous Haul Means a Safer, More Efficient Mine

QB2 is expected to start operating with a mixed fleet of traditional and new autonomous haul trucks, with a five-year transition to a fully autonomous fleet. One of the key benefits of autonomous trucks is improved safety performance, since they allow people to be removed from high-risk processes, along with improved operational efficiency and availability of the haulage fleet. Teck will be offering training opportunities on autonomous haulage systems and also has a transition plan that provides opportunities for all workers for the future operation. ■

**The future of mining is a more integrated organization where everyone is working together to contribute to a sustainable future.**

*Dale Webb, General Manager,  
Operational Readiness*



# QB2: People Make It Possible

Our people have been, and will continue to be, at the heart of what drives major projects like Quebrada Blanca Phase 2 (QB2). From building trust with communities of interest, to laying the physical foundation for construction, to keeping species in the region safe as work advances, Teck’s employees are what make it all possible.

## A New Way of Working

When QB2 is in operation, it is expected to employ a workforce of approximately 2,000 employees and contractors, and will be Teck’s largest operation. And while physical construction of the project is the primary focus right now, so is planning for the workforce that will run this state-of-the-art operation.

“At QB2 there will be a change in the work itself—new technologies and physical workplaces—so we want to make sure we train and recruit a workforce that can succeed in this new era of work,” says Stephanie Shaw, Manager, Human Resources, Teck Chile.

“To help support that, we’re envisioning a ‘QB2 Way’, which builds on the foundation of Teck’s values and will reflect the changing expectations of a future workforce and that will position QB2 for success.”

**We have a tremendous opportunity with QB2 to establish a culture that builds on Teck’s values, and that supports a future of work that promotes innovation, integration, inclusion, diversity, change, contribution, balance and recognition.**

*Stephanie Shaw, Manager, Human Resources, Teck Chile*



## Walking the Talk

Maintaining good relationships with communities surrounding our operations is essential to Teck’s continued success. Herman Urrejola, Social Responsibility Manager, Teck Chile, opens every dialogue with that in mind, with a sincere desire to find mutual interests between our company and our communities of interest.

Since joining Teck in 2012, Herman, an Excellence Award winner in the category of Environment and Sustainability, has been dedicated to establishing collaborative relationships with communities of interest for our existing operations in Chile but particularly in recent years, laying the foundation for those around QB2.

A key example of this was in February 2017, when Herman played an integral role in reaching an agreement with a group of fishing unions in the coastal zone of Tarapacá, Chile which provided stability to the permitting stages of QB2.

He and his team have been able to reach final agreements with eight Indigenous communities in the region around QB2.

“Through his leadership, respect for values, and appreciation for culture and history, Herman was able to create inroads for mutual success in consultations with Indigenous communities,” says Chris Dechert, Vice President, South America. “He is personally invested in ensuring that both Teck and the communities of interest reap the benefits from trust-based, socially responsible agreements.”



## Collaborative Growth

In order to help grow the workforce that will be required during the construction phase of QB2, Teck and Fundación Chile have partnered over the past two years on a new training program, Choose to Develop (Elige Crecer).

Choose to Develop aims to build local employability and availability of regional suppliers through a variety of training programs offered free of charge to eligible participants. The initiative is open to residents in communities in the Tarapacá Region and has been promoted through municipalities, government entities, local organizations, unions and at trade fairs.

Programs range from 120 to 150 hours of work and include trades such as masonry, carpentry, and concrete laying, as well as training for positions in food services and hospitality.

And while training offered through Choose to Develop centres around labour skills for employment during the construction phase of the project, it is also designed to establish foundational skills that participants can later build on to transition into operational positions at the mine.

“It is our mission to maximize the opportunities for communities around QB2,” says Luis Aylwin, Organizational Development Manager, Teck Chile.

“Through programs like this, we are able to support local training and recruitment, and work to build a sustainable supply chain.”

Opposite: Representatives from the Human Resources group visit Quebrada Blanca Operations (l-r): Francisca Silva, Sebastián Pérez, Stephanie Shaw, Dave DeLong, Valentina Arce, Marcelo Montenegro.



## Focus on Biodiversity: Protecting the Tiny Tern

Even with a project as large as QB2, ensuring a safe and sustainable future for the tern, the smallest bird found in Chile, remains a top priority.

While the terns' migration pattern is not entirely understood—movement has been tracked between Ecuador and the Antofagasta region of Chile—they tend to nest in Chile's coastal zone, near the port region where new infrastructure will be built to support QB2.

Today, there are only approximately 2,000 terns left around the world. The population decrease of these birds is primarily attributed to a global decline in anchovy stocks (their main food source), threats of predators (such as dogs, foxes and other birds of prey) and the loss of nesting land.

With this in mind, one of the key environmental measures voluntarily undertaken in order to sustainably advance QB2 is a protection management plan for the tern, which in part relies on the support of our greatest asset—our people.

"Preservation of this migratory bird is of the utmost importance, and a

key part of making this happen will involve the help of those on the front line," explained Ernesto Vásquez, Senior Advisor, Environment, QB2, who is a biologist working for Teck on the project.

"Procedures established in the protection management plan include educational materials on the tern and steps to take in the event a nest is found in the course of work at site. This information has been built into the onboarding process for all employees and contractors working on the project."

Other elements of the initiative include monitoring and reporting the presence of new nesting locations, and establishing protected zones with clear signage in the area of Ike-Ike Beach.

Cristián Berríos, Communities Coordinator, QB2, adds: "As a part of our long-term commitment, we are taking responsibility for balancing the significant economic and social benefits of this project with conservation of the local environment." ■

# From Seawater to Freshwater

The Quebrada Blanca Phase 2 project will be the first large-scale use of desalinated seawater for mining in Chile's Tarapacá Region.

The Atacama Desert in northern Chile is rich with mineral deposits, including Teck's Quebrada Blanca Phase 2 (QB2) project, one of the largest undeveloped copper resources in the world. However, what the region has in an abundance of minerals, it lacks in available freshwater.

The Atacama Desert is one of the driest places on earth, and freshwater, which is critical to the mining process, is a resource to be used sparingly. To protect this commodity, and as part of the QB2 project, Teck is building a large-scale desalination plant so that desalinated seawater can be used in place of freshwater for the mining process.

"Given our proximity to the Pacific Ocean, we wanted a way to use seawater for the mining process at QB2 so we could protect the region's freshwater supply and support our sustainability commitments," said Francisco Raynaud, Port Manager for Teck's QB2 project. "To achieve this, we have partnered with IDE Technologies, one of the most prominent desalination companies in the world with experience building large-scale plants, to design and engineer our desalination facility."

## The Desalination Process

The seawater desalination process works through reverse osmosis, in which a semi-permeable membrane is used to remove ions, molecules and larger particles to create freshwater.

Seawater is pumped to the desalination plant, purified, then pumped by five booster stations up 4,400 metres

of altitude to QB2's concentrator plant, where it will be used for mining processes. The leftover concentrated saltwater is pumped back into the Pacific Ocean at a depth of 40 metres (750 metres from the coast) to ensure there is enough dilution to be compatible with the ocean's ecosystem.

Suction pipes used to collect seawater are almost a metre in diameter, located nearly 500 metres from land at a depth of 30 metres, and are designed to ensure full compliance with coastal protection requirements.

When operating at full capacity, the desalination plant will purify about 1,000 litres per second, enough to fill an Olympic-size pool in 40 seconds. ■

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

Projects such as the desalination plant in Chile are part of Teck's commitment to reducing freshwater consumption and improving our water performance.

To learn more about Teck's approach to water stewardship, visit [teck.com/responsibility](https://teck.com/responsibility)



# PEOPLE & PLACES



## Eric Goss

**Superintendent, Maintenance  
Quebrada Blanca Phase 2**

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

I started working for Teck in 2008 at Trail Operations as a Maintenance Engineer. I did a short rotation at Elkview Operations in 2010, and have also done some collaborative work at Red Dog and Highland Valley Copper. I am currently working in the Santiago office as part of the QB2 Operational Readiness team.

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

In my current role, we are building the maintenance program for QB2. It's very exciting in that it is a greenfield start-up so we have the opportunity to build in best practices from the start.

**What is your favourite part about your job?**

My favourite part of my job is definitely the people I get to work with. Some of my best friends I have met through work at Teck.

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

The most memorable moment for me is the 2014 KIVCET major shutdown at Trail Operations. It was really neat seeing people come together in a high-pressure job to make great things happen.

**What is your favourite activity outside of work, and why?**

My favourite activity outside of work is spending time in the outdoors with my wife and three sons. We spend a lot of time camping, fishing and hiking.

## Andrés Castillo

**Senior Geologist  
Highland Valley Copper**

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

I started in 2006 in Exploration, based in the Santiago office. I had the opportunity to work at Quebrada Blanca from 2008 to 2011 and again in 2013, then at Carmen de Andacollo in 2014 and in northern B.C. in 2015.

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

I support the HVC geology team by providing geoscience and exploration expertise related to this type of copper deposit.

**What is your favourite part about your job?**

Working with different groups of people—departments, nationalities, cultures—because it's amazing what we all can learn from each other. Also, the advances related to innovation and technology at Teck in geosciences are exciting.

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

I had the opportunity to explore two incredible places by helicopter—Fenix mountain range in Chile and Schaft Creek in northern B.C. I could not believe I was seeing places no one had ever been to before!

**What is your favourite activity outside of work, and why?**

My wife, Romina, and I are relatively new to Kamloops and are currently adapting to the culture here. We have a couple of Chilean friends who we like to catch up with on the weekends.





## Fernie, British Columbia

**Rob Klein**

**Senior Engineer, Projects, Water Quality Management**

**Sparwood office**

### **What is the area's point of pride?**

The mountains—if you don't like playing outside in the mountains, Fernie isn't for you!

### **Is there anything the area is famous for?**

Fernie is famous for winter—the Elk Valley is nicknamed Snow Valley. That said, the local saying is “come for the winter, stay for the summer”. I moved here for the skiing, but now summer is my favourite time of year.

### **What is the area's best-kept secret?**

Heiko's Trail—it's a world-class hike. If I ever moved, I would come back to Fernie just for this hike! Another good one for kids is the Montane hut; it has a great view and is a quick, low-grade 45 minute hike.

### **What is your favourite restaurant in the community?**

It's in my kitchen when I'm making pizza with friends, but if I had to pick a restaurant, I love coffee and breakfast with my wife at Mugshots or the Blue Toque. But the best drink in the world is a Mayan Mocha from the Beanpod.

### **What is a typical weekend like there?**

In the summer it's the bike park with the kids in the morning, then finding a beach in the afternoon, then a barbecue on the deck.



## Bern, Switzerland

**Angelique Rosenthal**

**Environmental Engineer**

**Trail Operations**

### **What is this holiday location best known for?**

Cheese, chocolate, the Swiss Alps, and trains that run on time!

### **What time of year do you like to visit?**

I like to go in the winter, but it is beautiful at all times of year.

### **What is your favourite thing to do while on holiday here?**

Bern (and actually the whole country) is so picturesque! My favourite thing is to travel to the Swiss Alps for a day hike or to ski. Mountain destinations are very close to the city and accessible by transit. The weekend markets are also lovely to walk through, and the Old City in Bern is beautiful.

### **Is there a local food specialty or restaurant you recommend trying?**

Try some fondue, of course! There are many varieties of fondue by region. In Bern, the cheese shop zur Chäshütte sells an excellent fondue mix.

### **What is special to you about this holiday location?**

My sister and my entire extended family live in and around Bern, so my vacations to Switzerland are full of family time—catching up over cups of coffee and family meals. Seeing my family is the best part of visiting Switzerland.

# A PICTURE IS WORTH 1,000 WORDS

1. Members of the Ashcroft Volunteer Fire Department and Highland Valley Copper's Jacqui Schneider and Melissa Pinyon with three of the new pieces of equipment purchased by the department with a donation from Teck. "We were happy to support the department knowing that this equipment will help them work quickly and effectively when required," said Jacqui. Photo credit: Barbara Roden, *Ashcroft Cache Creek Journal*.



2. Trail Operations' Inspiring Wellness and Learning Program annual food drive collected over 2,432 pounds of food, as well as cash and sundry items, for those in need over the December holiday season. Committee members (l-r) Catherine Adair, Catherine Carreiro, Morag Carter and Gord Menelaws delivered the goods to Kate's Kitchen in Trail.



3. Congratulations to Teck's Cyber Security Incident Response Team (CSIRT) on being awarded "2018 Incident Response Team of the Year" in the Cofense Excellence Awards. Companies and individuals recognized are industry leaders, chosen for their innovative, successful programs to combat cyberattacks and protect their enterprises from the risks of malware infiltration and fraud loss. CSIRT members (l-r) Ryan Clarke, Kevin Sahota, Athabasca Witschi, Tim Liu.

4. Members of local government, residents from the Caramucho community and representatives from Quebrada Blanca were on hand at the inauguration of a new neighbourhood centre for use by local organizations, supported in part by Teck.





# Stronger Together

On Friday, November 30, at 8:30 a.m. local time, southcentral Alaska experienced a 7.1 magnitude (Richter scale) earthquake. The earthquake's epicentre was approximately 16 kilometres northeast of the city of Anchorage, home to Teck's Anchorage office and many Red Dog Operations employees.

We are thankful all employees and contractors in the area at the time of the earthquake were safely accounted for with no injuries. And while there was no major damage at the Anchorage office and operations at Red Dog Mine in northwest Alaska were not impacted, communities close to the epicentre did experience extensive damage.

Within hours of the event, Teck developed a plan to help support employees and contractors with impacted homes or family in the affected areas in southcentral Alaska, including transportation arrangements for two planes full of employees out of Red Dog.

A donation of USD\$100,000 was also made to the American Red Cross of Alaska in support of emergency efforts, which included emergency supplies, emergency sheltering, disaster mental health services, damage assessments,

recovery casework, and the disaster workforce. Additional donations made by employees across the company through Team Teck Community Giving were also matched up to CAD\$25,000.

Following the event, stories of employees who personally supported the relief efforts also came to light, like that of Mark Helms [see opposite page], further reminding us of how much stronger we are when we work together.

“Within hours of the event, Teck developed a plan to help support employees and contractors with impacted homes or family in the affected areas in southcentral Alaska, including transportation arrangements for two planes full of employees out of Red Dog.”



## In the Spotlight: Mark Helms

*Mark Helms, Mine Engineer, Mine Technical Department, Red Dog who lives in Anchorage, Alaska, stepped up and volunteered with the Red Cross Disaster Response team following the earthquake. A co-worker heard about his efforts and nominated him to be highlighted. Thank you Mark for supporting your community and for sharing your story with employees across Teck.*

“My R&R [time off-site from Red Dog] began on the Tuesday following the big Anchorage earthquake. I had no major plans and I wanted to be useful, so I put my name in the hat with the American Red Cross as a volunteer.

At their request, I reported to the Anchorage Red Cross office Tuesday morning. They were elated to have a Teck representative join the disaster response effort, as Teck had just made a big donation.

The first day, I assisted in handling several pallets of donated bottled water for distribution among the community. The remainder of the week I helped with damage assessments, an investigative process whereby the families most impacted by the disaster were sought out. My role was to assess the damage to their homes and their situations, then fill out a simple report via a mobile phone app.

This information is then used by the Red Cross to determine how best to allocate donated money for the maximum benefit to the community. The idea is to fill the gap that sometimes exists before state or federal assistance can be provided, focusing on immediate needs.

It was very rewarding to be a part of this process. One day, I had a caseworker with me, and we were able to provide a woman residing in Eagle River (arguably one of the hardest hit areas) immediate financial assistance. She burst into tears—she had major

damage to her home and had spent the past five days cleaning up the mess. That was just the tip of the iceberg for her in sorting out her home, and she was so grateful for the support. Another couple we came across had been living in a home deemed unsafe by inspectors, but they had nowhere else to go. The Red Cross can now assist these folks in getting temporary housing.

Just as rewarding was meeting the other volunteers and making new friends. I was surprised to learn just how many were from rural parts of Alaska. It gave me an appreciation for how close the community in Alaska really is.” ■

Above left: “In my free time, I enjoy exploring the great outdoors, hanging out with my wee nephews, or ideally both!” says Mark Helms, Mine Engineer, Mine Technical Department, Red Dog.

Above right: Mark [right] volunteering with the American Red Cross following the November 30 earthquake in southcentral Alaska.

# In the Spotlight: Jackie Scales

In January 2019, Teck welcomed Jackie Scales as our new Director of Inclusion and Diversity. In this role, Jackie is responsible for leading Teck's Inclusion and Diversity strategy, initiatives and change management in order to continue building a strong and diverse workforce that is engaged and contributing to Teck's social and economic goals, as set out in Teck's Inclusion and Diversity Policy. Here, Jackie shares her own inclusion journey, and where she sees opportunities for Teck moving forward.

## As someone new to Teck, what excites you here around inclusion and diversity?

What I find very exciting and inspiring at Teck is seeing the unwavering commitment to inclusion and diversity through all levels of leadership and a strong commitment to continue this journey. We've made some great progress, and Teck is leading the way in many avenues of inclusion within the mining industry. That in itself is exciting.

I started my career in the banking sector and assumed that being the only woman in the room was an industry-specific phenomenon. After completing my MBA, starting a family, and beginning a new career where I was spending a lot of time with executive leadership teams, I noticed I was still one of the few women in the room. I saw an opportunity to help organizations recognize their challenges with inclusion and diversity, and what they could do to improve. At Deloitte, I helped organizations develop and implement inclusion and diversity strategies that help to recruit and retain more women into leadership roles. I leveraged that experience as I started

to work within the mining sector, specifically in South America. That's where I came across Teck, through work building the inclusive environment we want to establish for QB2.

## What does inclusion and diversity look like at Teck today?

We have a strong commitment from leadership, and our Senior Executive Diversity Committee ensures strong governance in this area. Teck has done some great work around gender equity, and councils have been created within various sites and offices globally. We've seen positive increases across all the inclusive talent metrics. We look forward to continuing to see improvements and determining how we can leverage best practices across the organization.

To be clear, diversity speaks to the visible and invisible characteristics that make us unique, and, by definition, inclusion means the action or state of including or being included within a group or structure. In reality, inclusion usually means something slightly different to everyone. It is to feel valued and that your voice is heard. My goal for inclusion here at Teck is that every employee feels they can speak their truth and they will allow themselves to hear and be impacted by the truth of others. That's what inclusion means to me. Working in an environment that allows us to bring our whole selves to work each day. Diversity is a fact, inclusion is a choice.

## What do you see as Teck's current opportunities in this area?

We have an opportunity to continue to build on the momentum that's been established with our continued focus on



Indigenous Peoples and gender equity. Building on that, there's an opportunity for us to shift the conversation more towards inclusion. I am a firm believer that inclusion leads to diversity, not the other way around. We need to ensure that we have a strong inclusive culture to support Teck's great ongoing work. ■

# Six Things to Know about Tailings Management at Teck

A major tailings dam failure at Vale's Córrego do Feijão mine near Brumadinho, Brazil, in February has led many employees to ask about our approach to tailings management across Teck.

Here are six things to know about the comprehensive systems and procedures in place for the safe and secure management of our tailings facilities in North and South America.

For more information about tailings management at Teck, visit [teck.com/tailings](https://www.teck.com/tailings)

## 1. Surveillance Technology

Sites employ surveillance systems such as GPS hubs, piezometers, inclinometers, pressure gauges, remote sensing and other technologies to monitor tailings dams, abutments, natural slopes and water levels.

## 2. Staff Inspections

Tailings dams are inspected by trained operators and expert technical staff as frequently as several times daily, with formal staff inspections at our operations at least once per month.

## 3. Annual Dam Safety Inspections

Formal dam safety inspections are conducted annually by an external Engineer of Record. Recent annual Dam Safety Inspections for our facilities are publicly available at [www.teck.com/tailings](https://www.teck.com/tailings).

## 4. Detailed Third-Party Reviews

Comprehensive third-party dam safety reviews are conducted by a qualified independent tailings reviewer as frequently as every three years, based upon the consequence classification for each facility.

## 5. Internal Governance Reviews

Teck's Tailings Working Group conducts internal management reviews of our tailings facilities as well as our major tailings projects on a regular basis.

## 6. Independent Tailings Review Boards

Our operations, higher consequence legacy facilities and major development projects have Tailings Review Boards made up of independent experts who meet regularly, at least annually, to conduct a third-party review of design, operation, surveillance and maintenance. ■



# Innovation & Technology at Teck

On April 3, President and CEO Don Lindsay provided an update to employees on our approach to Innovation and Technology and introduced the RACE21™ initiative, which we've included here for *Connect* readers.

Everywhere you look today, new technologies and innovations are changing almost every aspect of our lives. From how we communicate to how we get around to how we do our jobs, innovation is having a profound impact. And the mining industry is no exception. As the pace of change accelerates in our industry, I wanted to share my thoughts on how we are managing the opportunities and the challenges this will present.

Advancements in areas such as automation and digitalization are poised to have a transformative effect on mining in the years ahead. As is the case in every industry, those companies that are best able to adapt and harness the power of technology are the

ones that will remain competitive and succeed in a changing world. History is brimming with cautionary tales of transformational advances and the companies that reacted too slowly (think Blockbuster) and those that embraced or even led the change (think Netflix).

While the speed of change may be accelerating, it's important to keep in mind that change itself is nothing new for our industry. Since the earliest days of mining, people have worked to implement new process and technologies to improve safety, productivity and environmental performance in our industry. As a result, we are now able to find and



develop deposits that would have been considered unreachable or uneconomical just a few decades before, and do so more safely and responsibly than ever.

At Teck, we have a long history of innovation and early adoption in the mining industry that stretches back over 100 years, with technologies and techniques pioneered by our people that have gone on to become the industry standard. Today, we are working to build on that proud heritage and introduce ideas that will make our company even stronger for the future. In the months ahead you will hear more about this work, particularly our RACE21™ initiative. RACE21™ is about taking a company-wide approach to renewing our technology infrastructure, looking at opportunities for automation and robotics, 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. Successfully advancing initiatives like RACE21™ will be critical to our continued success as a business, and help to drive a step-change in our performance.

There is no doubt that the mining workforce of the future will be different than it is today, as technological advancement will change the types of jobs that exist at the mine site. At the same time, it is understandable that undertaking this kind of transformation will raise questions from employees, communities and other stakeholders about how that change will be managed. Regardless of the pace of change or the specific tools or technologies we will use to do our jobs in the future, people will always be central to our work. As roles change and new positions arise, we are committed to becoming an industry leader in upskilling employees into roles that are required for the “Future of Work”. We see future roles being more rewarding and safer.

We will leverage the potential for new technologies to increase the diversity of our workforce and to make mining

**RACE21™ is about taking a company-wide approach to renewing our technology infrastructure, looking at opportunities for automation and robotics, 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.**

jobs accessible to more people. And we will work with our local Indigenous and non-Indigenous communities to ensure the benefits of mining are sustained. Perhaps most importantly, we will maximize the power of innovation and technology to create a step-change improvement in health and safety and environmental performance across our operations.

Since Teck was founded over a century ago, our company has grown and changed significantly. New tools and technologies have come and gone. But what has never changed is the importance of skilled and passionate people and strong relationships with communities.

As we move into this next phase of innovation and transformation, we will continue to put people and communities first. Together, we can maximize the potential of technology to make Teck safer and more competitive, and ensure we can continue to create prosperity and opportunity for the next century. ■

For more on RACE21™ and what it will mean for Teck, read ‘Asked and Answered’, a Q&A with Andrew Milner, Teck’s Senior Vice President, Innovation and Technology on the next page.

# Asked and Answered

As the Technology and Innovation group ramps up RACE21™, meet Andrew Milner, Teck's Senior Vice President, Innovation and Technology



## What is your leadership style and philosophy with respect to innovation and technology?

I believe in transformational, empowering, participative and supportive leadership styles and always trying to learn from leaders who demonstrate these qualities. I believe these leadership traits can help unleash a mindset of innovation and help empower our workforce to explore new ideas and bring them forward.

## How can we promote innovative thinking and harness ideas from employees?

I am focusing on building a culture of Empowerment, Innovation and Performance. New ideas will be actively encouraged at all levels. We have also given our teams a path to fund truly innovative ideas outside of the normal budget process. We are seeing that already with the Ideas at Work Fund, where we're tapping into our operations, encouraging people to bring forward ideas. We are close to getting the first funds flowing—I am very excited to talk more about that soon.

## What are your priorities for 2019?

In 2019 we will begin implementing a strategy called RACE21™, based on the idea that while technology has been a driving force of improvement in mining, the basic operating system has remained unchanged for decades. With the expansion in analytics, automation and digital tools, we are in an era where the transformation of mining to something more like a manufacturing model is possible. This will be a source of enormous value and competitive

advantage for the miners that can capitalize on it.

## What will RACE21™ mean for Teck?

There are four pillars to RACE21™. The first pillar is Renew: looking at our foundational infrastructure, systems and processes, and what we need to do to position Teck to be world class in that space, so we can support a future operating state.

The second is Automate: looking at company-wide automation opportunities for robotics, processes and equipment.

The third pillar is Connect: looking at how we leverage data and treat it like we would any other high-value asset to lower variability across the full value chain.

And the fourth pillar is Empower: the collective impact “Renew”, “Automate” and “Connect” of looking at how we work, what skills we need and how we can truly enable our people to meet these new opportunities.

The 21 represents the focus we will have over the next three years to make sure we can make tangible progress in these areas.

## What other opportunities do you see in applying technology and innovation across Teck?

We're seeing a lot of change and disruption in the world right now, and the pace of change is increasing in the mining industry. So a big focus for me will be to make sure we're ready for

those changes, so we can leverage the right opportunities and partnerships that will strengthen us as a company.

Another key opportunity for us is in sustainability—I'm a father of three and I'm motivated to build a better world for the next generation. I believe that through a combination of innovation, technology and the products we produce, we have huge potential to help contribute to a better world.

## About Andrew

Andrew joined Teck in November 2018 to take on the new role of Senior Vice President, Technology and Innovation, responsible for the development of a long-term, enterprise-wide, technology and digital plan for Teck. He will also be responsible for oversight of the plan's implementation and helping to build a culture of innovation across the entire organization.

Andrew joined Teck from BHP, where he was Vice President, Technology Production Systems. He brings to his role more than 25 years of experience and expertise in strategy development and delivery of technology production systems globally. In an earlier role, Andrew was also General Manager and Global Practice Leader, Innovation Delivery at Rio Tinto. ■



---

## Stay Focused. Stay Safe.

To help all employees and contractors stay focused and safe while driving or operating equipment or company vehicles, Teck's policy on the use of mobile phones and other handheld electronics outlines the following requirements:

- 1.** Mobile phones, including those equipped for hands-free operation and other handheld communication devices, must not be used while operating vehicles or other mobile equipment. Use of two-way radios for the purpose of sending or receiving brief work instructions is permitted.
- 2.** Mobile phones may only be used once the vehicle is stopped in a safe location out of traffic patterns and after other appropriate measures relating to traffic safety are followed. If a safe location cannot be found, the driver should continue onward until such a location is found. This provision does not strictly apply in emergency situations.
- 3.** GPS or other electronic navigation devices or vehicle information systems should only be set or adjusted when the vehicle is stopped in a safe location out of traffic patterns.
- 4.** The typing and reading of text messages, emails or conducting web searches is strictly prohibited while operating any vehicle.

The complete Use of Mobile Phones and other Handheld Electronics while Driving or Operating Equipment or Company Vehicles Policy can be found on [connect.teck](http://connect.teck) under Policies & Procedures, or by speaking with an HR or Health and Safety representative.



# MEET THE INNOVATOR MARIO ORTIZ

---

In this third of a series profiling innovators across Teck, we meet Mario Ortiz, Manager, Integrated Operations, QB2.

---

**M**ario never imagined his career path would lead him to the mining industry, but once he started, that path led him on a journey marked by new experiences—in Chile, Canada, and at steelmaking coal and copper operations. Together, these experiences helped shape his view of how innovation and technology can help integrate all areas of the business and foster a culture of collaboration, an approach that will be critical as he helps establish a new way of working at Teck's Quebrada Blanca Phase 2 project.

## A Career Path Takes Shape

Growing up in the city of Santiago, Chile, Mario was unsure of what he wanted to study when he started university. It was his sister who pointed out that mining was a big part of Chile's future, and with that advice in mind, he pursued a degree in Mining Engineering, then an MBA, at the University of Chile.

With his education in hand, in 2010, Mario joined Teck's Quebrada Blanca Operations (QB) in Chile, first as a Blasting and Drilling Engineer, then as the Head of Mine Management, where he quickly gained a reputation as an expert in blasting.

After a few years at QB, Mario then went to work as a medium-term planning engineer at one of Teck's Canadian steelmaking coal operations, Fording River, in British Columbia.

## Broadening Perspectives

"Working at Fording River was a major turning point in my career, as it helped me understand the business from a different perspective. It was also a key point on my 'innovation journey' because Fording River is always striving towards operational excellence and continuous improvement," says Mario. "That experience helped me better see how we can leverage technologies across our business."

When Mario returned to Quebrada Blanca, he put his mind to thinking about how approaches he'd seen at Fording River could be applied at QB, such as using real-time haul truck data and analytics to improve the management of the truck fleet.

"At Fording River, they're really experts at moving materials as efficiently as possible. I knew we could take that same approach at QB and make better use of technology to improve decision making when it comes to moving materials as efficiently as possible," says Mario. "Ultimately, it helped reduce mine costs and improve overall performance."

"Implementing technologies like this and having real-time data changes the rhythm of decision-making—it allows you to have the right conversations at the right time and establish better routines."

## A New Opportunity

Now, Mario has been appointed the Manager of Integrated Operations at QB2.

"QB2 is going to be the biggest project Teck has ever implemented, and we have a tremendous opportunity to help define a new approach to mining," says Mario.

With that in mind, Mario is leading a team that is establishing a new way of working, where all areas of the business are integrated and collaboration is the standard practice.

"Innovation, from my perspective, has to do with people. Technology is always available, but the real challenge is how people adopt it."

Mario is currently participating in Teck's Emerging Leaders Program. ■

# Copper Products: Who Knew?

Today, the benefits of copper can be found in a wide range of new consumer items. Here are just a few of the copper-infused products currently on the market to consider integrating into your daily routine:



## Phone Cases

Antimicrobial copper phone cases actively eliminate bacteria and help your phone stay germ-free. Wear-resistant and durable, these cases are also 100% recyclable.

## Socks

Socks with copper fibres woven into them offer a number of benefits, including odour and antifungal protection and improved skin condition resulting from increased collagen production.

## Pens

Bacteria often heavily populate frequently touched objects that can't readily be sanitized, such as pens; copper pens can help reduce day-to-day microbial contamination.

## Pillowcases

Studies have shown that sleeping on pillowcases with microscopic copper oxide particles can result in the reduction of wrinkles and fine lines, as well as increased brightness of the skin.

## Skin Cream

Some skin-fortifying anti-wrinkle creams contain copper PCA (pyrrolidone carboxylic acid), which regulates moisture in the skin and is a super-antioxidant.

## Combs

In addition to being antimicrobial, combs with copper in them have been shown to strengthen hair and prevent split ends. ■

## Copper & Health: Technology at Work

As healthcare-acquired infections continue to be one of the leading causes of death in Canada, one innovative copper product in the works stands to make a big impact in the years to come.

Vancouver, B.C.-based Copper Medical is in the process of developing antimicrobial medical scrubs infused with copper ion fibre. The scrubs' fabric—composed of 50% polyester, 21% copper infused polyester, 25% rayon, 4% spandex—is able to continuously eliminate 99.9% of bacteria that come in contact with it, and has the potential to help stop the spread of germs when worn in healthcare facilities.

For more on the benefits of copper and how, through our Copper & Health program, we're building partnerships, raising awareness and improving health outcomes for patients, visitors and healthcare workers, visit

[coppersaveslives.com](http://coppersaveslives.com)

# Pastel de Choclo:

## A Mixture of Cultures

**P**astel de choclo, or corn pie, is a traditional dish in Chilean cuisine, most popular in the central area and the countryside. The key ingredient is generally a ground beef filling, which is then baked in a tender corn mixture.

According to the Chilean anthropologist Sonia Montecino, this dish originated in colonial times, likely by Mapuche (an Indigenous People from southern Chile) cooks, in the kitchens of Spanish settlers.

Today, it is a favourite dish among many Chileans, especially in the summertime when corn is harvested. Here is one version of the recipe to try at home:

### Ingredients:

- 10 large corn (approximately 8 cups) grated or chopped, and then ground
- 2 cups milk
- 3 tablespoons oil
- 3 onions, finely chopped
- 1 teaspoon each paprika, oregano and cumin
- 300 grams lean ground beef
- 2 tablespoons raisins
- 2 hard-boiled eggs, sliced
- 12 black olives
- 3 teaspoons sugar
- Salt and pepper to taste

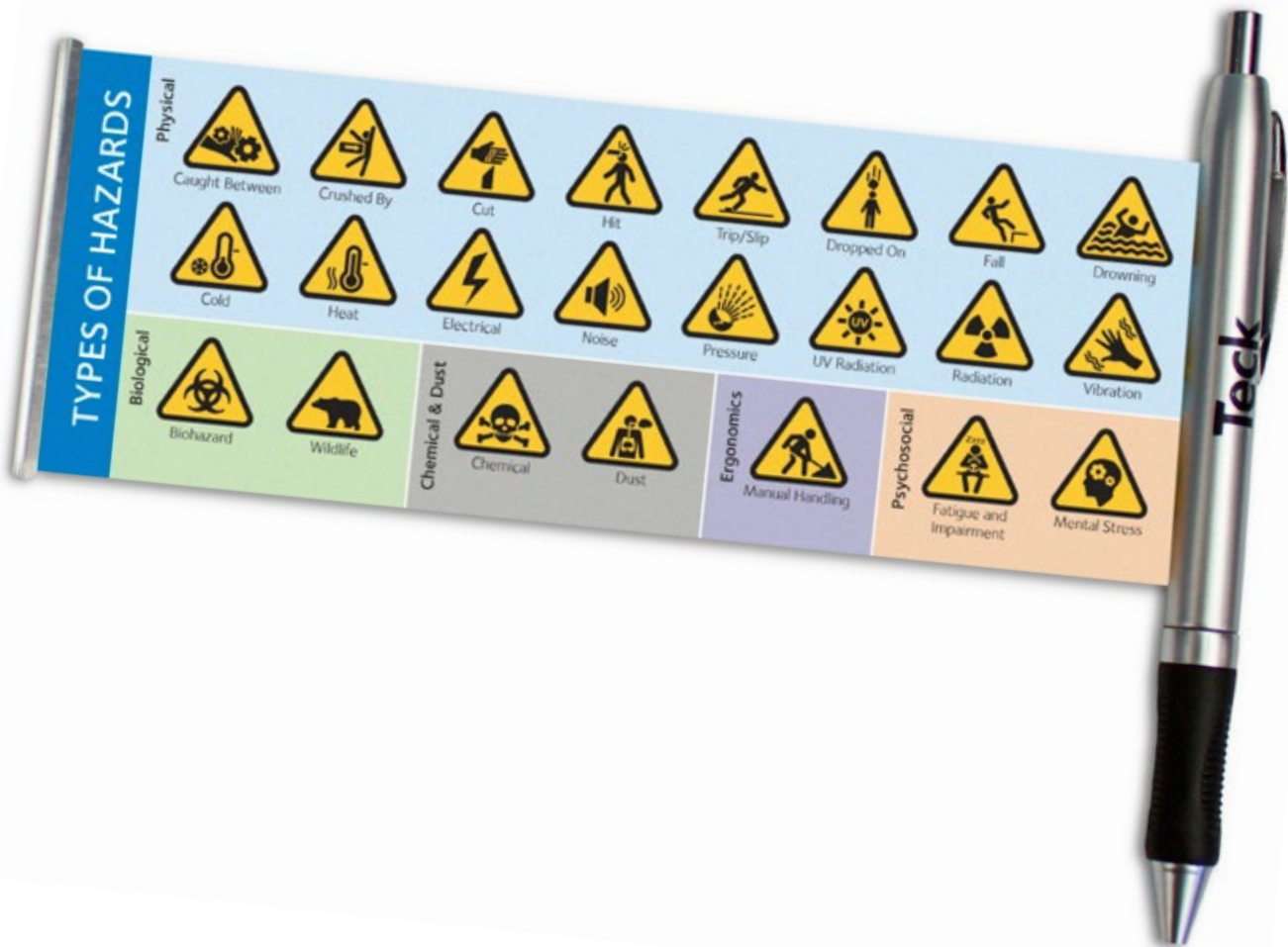
**1.** Cook the ground corn in a saucepan over low heat, stirring constantly until it boils for a few minutes. As it cooks and thickens, slowly add the milk. The result should be a creamy, slightly spreadable paste. If it becomes too thick, add more milk. Season with salt and pepper to taste.

**2.** Separately, heat the oil in another saucepan and sauté the onions for a few minutes until translucent. Add the paprika, oregano, cumin and ground beef and cook for 10 to 15 minutes on low heat, stirring occasionally.

**3.** Pour this filling into a baking dish or individual moulds. Sprinkle raisins, egg and olives on top, then cover completely with the freshly prepared corn mixture.

**4.** Sprinkle the surface with a hint of sugar and heat in a hot oven until the top is warm and browned. Once ready, serve immediately.





---

# Introduction to Hazard Identification

A new program for 2019 will help equip employees with the knowledge and skills to identify hazards and manage risk in the workplace.

Hazard identification is a recurring factor at all levels of the organization when it comes to incidents at Teck. Introduction to Hazard Identification has been developed to help our company improve in this area and will begin rolling out across Teck in 2019.

Participants will develop a common understanding of hazard, hazard types, risk and controls. They'll also learn the skills to apply this knowledge in the workplace and understand the importance of practicing these skills willfully every day.

To learn more about Introduction to Hazard Identification, including how to become a facilitator, please speak to your supervisor.