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2017

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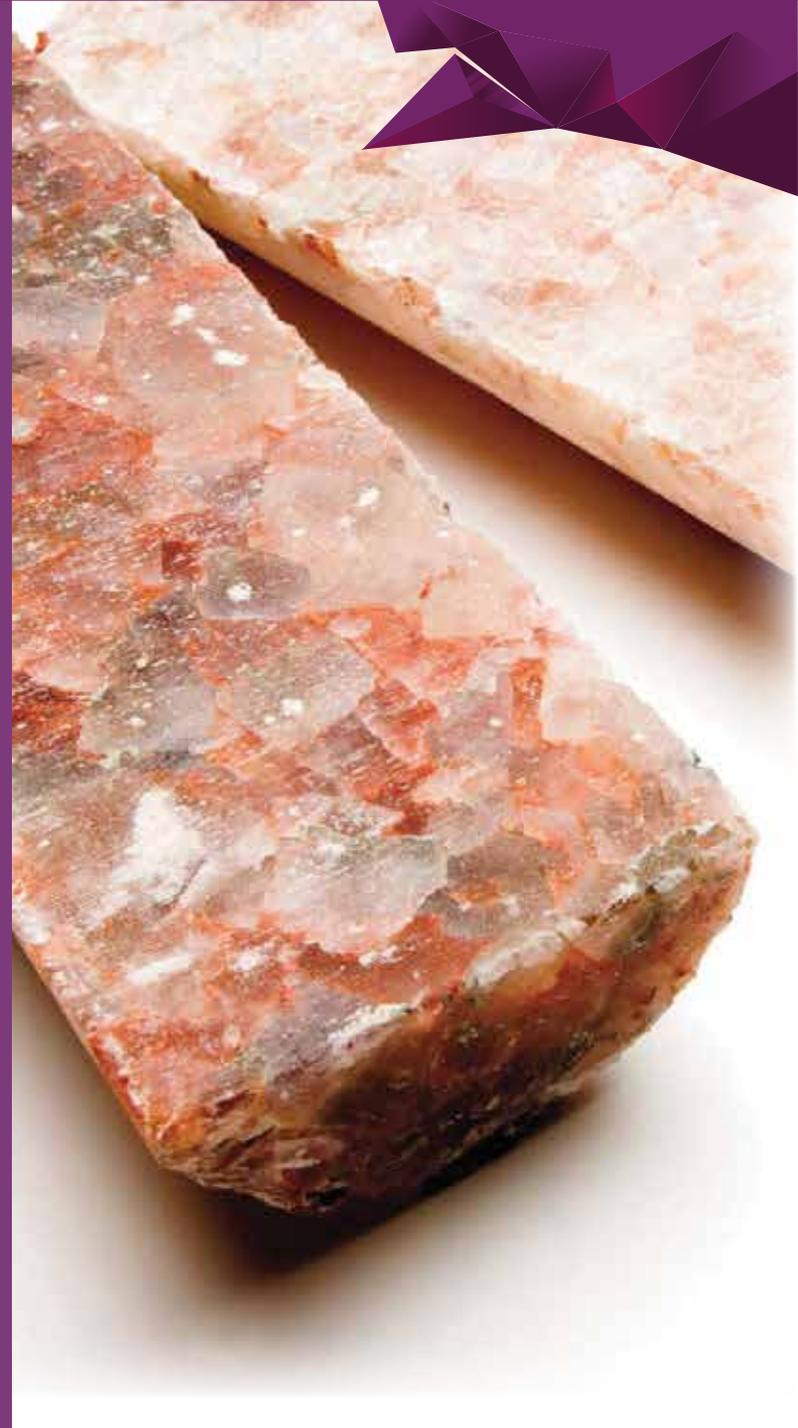
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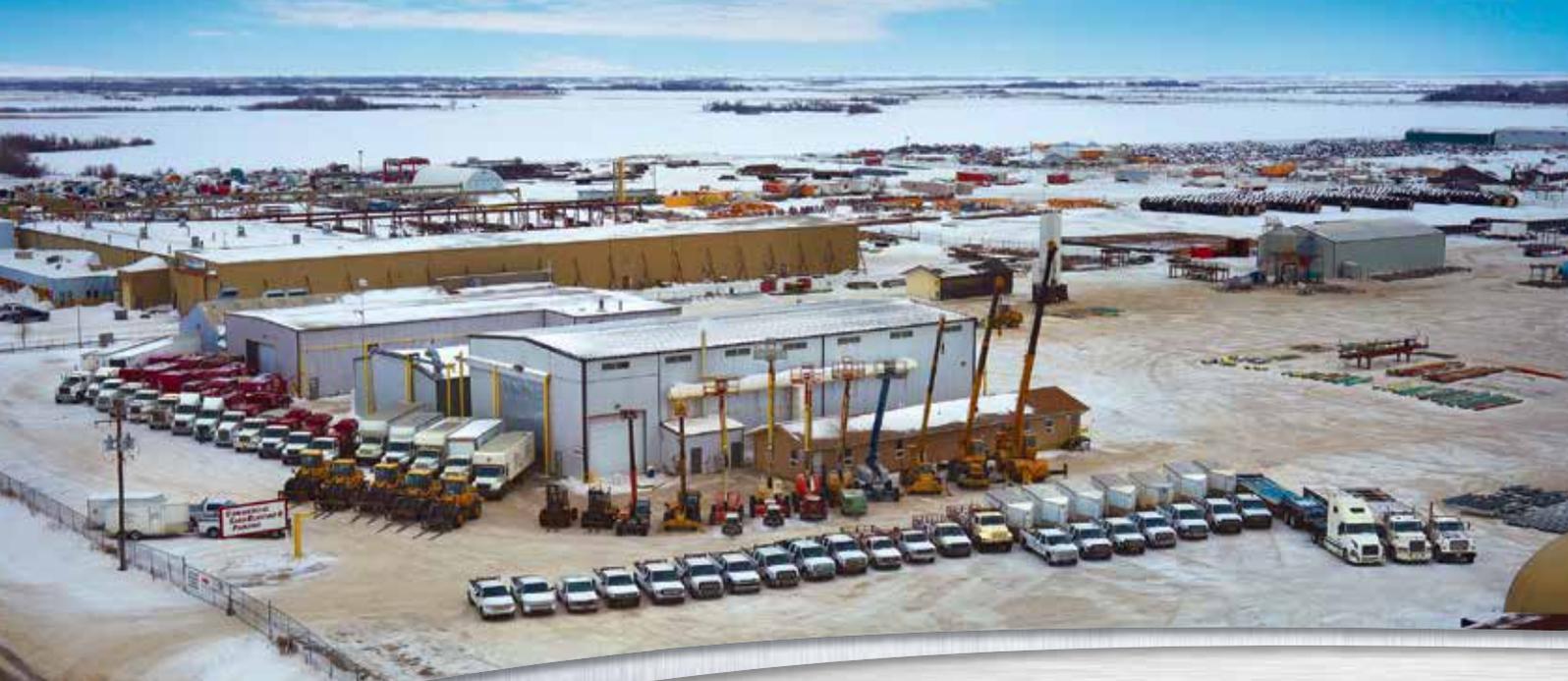
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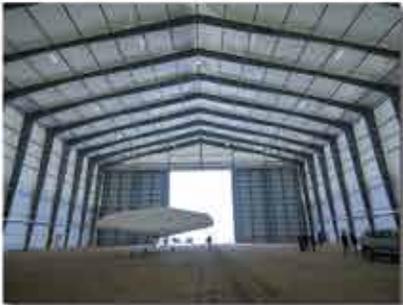
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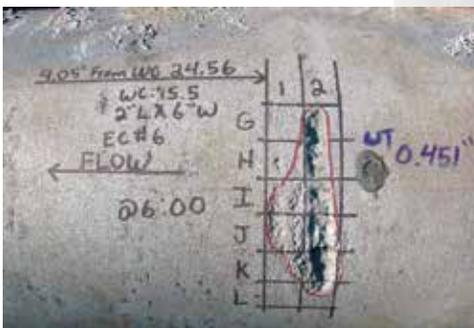
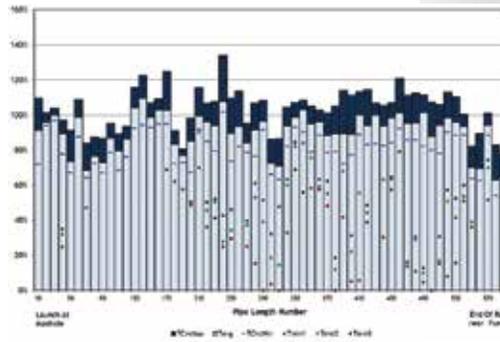
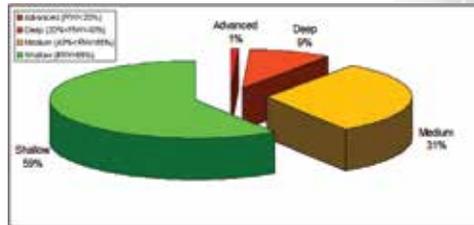
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# Message from the Premier of Saskatchewan **Brad Wall**



**O**n behalf of the Government of Saskatchewan, I am pleased to welcome readers to the 2017 edition of *PotashWorks* magazine, the only publication focused on potash promotion, production and distribution.

Saskatchewan is the largest potash producer in the world, accounting for about 30 per cent of global production. The industry employs over 5,000 people in our province, and contributes to the livelihood of thousands more. Across Saskatchewan, people recognize the tremendous contributions of our potash industry to our enviable quality of life.

Recognized around the world as a reliable and stable long-term source, Saskatchewan has been producing potash continuously since 1962 when Mosaic completed its K-1 mine at Esterhazy. Our deposits of this valuable crop nutrient are substantial in scale. By conservative estimates, Saskatchewan could supply world demand at current levels for several hundred years.

In 2015, Saskatchewan potash production reached a record on the strength of strong world potash demand. Despite a slow start to 2016 due to high inventories in key importing countries, the long-term outlook for the potash industry continues to be positive. Rapid population growth combined with higher incomes and increased bio-fuel consumption will ensure global demand for potash will rise in the years ahead.

To meet this growing demand, most of Saskatchewan's current potash operations have expanded over the past decade, resulting in a 90 per cent increase in the industry's productive capacity. In addition, for the first time in almost 45 years, a new potash mine is being built in the province. The \$4.1B K+S Legacy

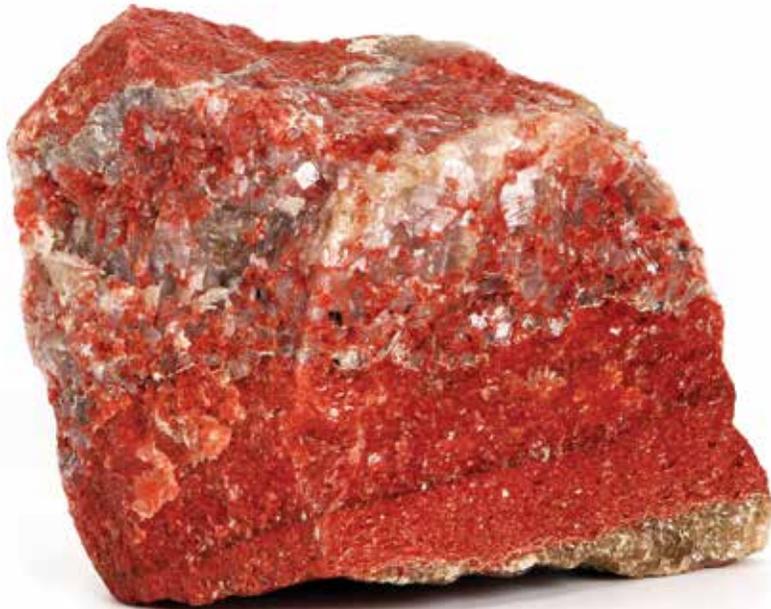
Project, located near Bethune, is expected to begin operations in the second quarter of 2017, creating 300 permanent jobs. In addition to this milestone, other companies are considering constructing new potash mines.

Our government works closely with industry to ensure a healthy future for potash mining in the province. Mineral exploration and development drive employment growth and play a significant role in our economy.

The Fraser Institute's Annual Survey of Mining Companies has repeatedly acknowledged our competitive tax regime and transparent approach to mining policy that encourages investment. In the 2015 Survey, Saskatchewan was ranked as the number one jurisdiction for mining investment attractiveness in Canada and the second most attractive jurisdiction in the world. In that year alone, \$211 million was invested in mineral exploration in Saskatchewan.

Saskatchewan's potash industry is a global leader. Our government will continue to support a healthy, competitive mining sector to ensure our economy remains strong and capable of supporting a high quality of life for our citizens. By supporting a strong and vibrant potash industry, we are building opportunity for families, businesses and communities across Saskatchewan while helping the industry feed a growing world. ♦

Brad Wall  
Premier



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# Message from the former mayor of Esterhazy

## Pauline Chewka



As the former mayor of the town of Esterhazy, council and staff went through the biggest growth of our community and infrastructure since we first heard the word “potash” in the early 1960s. Although we started out as and remain a farming community, we also have a large tourism sector. Over the past few

decades we have become known as a mining town since IMC and IMC Kalium, and now Mosaic, began mining potash in our area over 50 years ago.

I’m not sure any of the residents nor past councils anticipated the new growth that was precipitated by the mine’s expansion growth announcement in 2011. We had been content for

a long time with the status quo. As soon as the expansion was announced, the town needed to go into overdrive to prepare for the most certain growth that was about to occur. Just like many other Saskatchewan towns, we were at a time when all of the infrastructure that was installed in the ‘60s was reaching its lifespan and we had already begun a slow but steady replacement strategy. The prospect of at least 1,000 contract workers in our area, although exciting, was daunting as we did not have the housing and rental space to house such an influx. With Mosaic stepping in with man camps, the town went to work on long-term projects.

We have been able to focus our energy on water and sewer expansion and testing, development, and securing land for future development as we had now filled the spaces our predecessors thought we would need. A very good problem to have and to solve.

Growth brings its own issues of course, because the expansion project itself is short term and the impact on business and infrastructure is temporary, so the goal is always to fill the needs during the expansion while not going overboard with new builds and unrealistic expectations. Thankfully I had a proactive and balanced council to work with and we undertook projects step-by-step as we needed, while actively acquiring developers to invest in our community.

Thanks to this expansion, alongside the three hotels we already had, two new ones were built, a need that we had before and will surely continue to fill. We had five new housing developments form, covering rentals, country estates, mid-range and high-end housing, not to mention the town itself creating two new residential and commercial areas. We have a new A&W, a Tim Hortons, three new fitness centres, a new coffee shop, our out-of-service movie theatre is back in use, as well as many offices, supporting businesses and rumblings of a new restaurant. We also fundraised our share of a new hospital and care home facility. As soon as the government comes up with their share, the face of our healthcare system in Esterhazy and area will dramatically change for the better and we need it now more than ever.

All in all, my term as mayor was a successful one with the landscape of our community dramatically forever changed. Upon arrival from the west, the water tower is not any longer the first thing you see, rather the head frame of K3 towering proudly over the community from miles away, permanently putting its stamp on Esterhazy as a mining community. ♦

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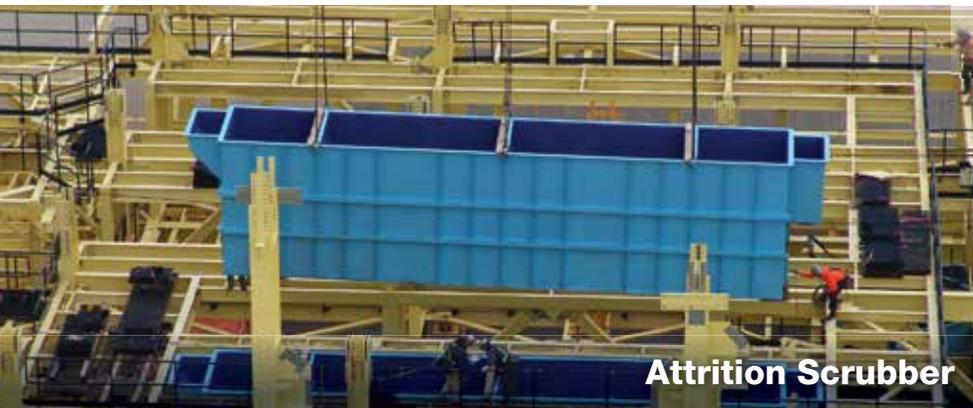
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# Message from the mayor of Rocanville

## Daryl Fingas



**H**ello from the town of Rocanville.

Fall is upon us and the completion of Rocanville's PotashCorp mine expansion is nearing its end. The last eight years have been very challenging and rewarding for our town. There have been many ups and downs, but our town of 1,000 is on its way of getting

back to a normal way of living, especially after the mine camp of over 1,000 workers was closed last year. We did see a few more families move into our town this year after PotashCorp's New Brunswick mine closed and we welcome them to our community.

As I write this article, our new 15,000-square-foot community hall is nearing completion and our first rental was scheduled for October. This is a beautiful state-of-the-art commu-

nity hall and could not have been built without the generous support of PotashCorp. It is great to have a company like this so close to our community. PotashCorp helps with many community projects and is a regular donor and supporter to many functions and facilities.

Rocanville has a great future ahead of us and all our growth has been the result of the potash industry. The potash market has been a bit slower in the last year and selling prices have dropped to a low, but the continued growth of these mines only means they will be around for many years to come.

Rocanville's K-12 school has had steady enrolment in the last few years and young families moving here can enjoy many activities associated with small-town living. Our rinks, swimming pool, golf course, and ski trails are just some of the recreational activities you can enjoy in this area. Rocanville also has a new subdivision for development and tax incentives are in place for anyone that would like to build a new home.

Rocanville is a great town to live in, and I am proud to call this town home. ♦



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A photograph of two construction workers in bright orange safety suits and blue hard hats working on a construction site. One worker is using a power tool on a rebar structure. The background shows a concrete structure under construction.

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# Saskatchewan potash industry prepared for growth in 2017

By Kylie Williams



*Potash in PotashCorp's Rocanville mine.*  
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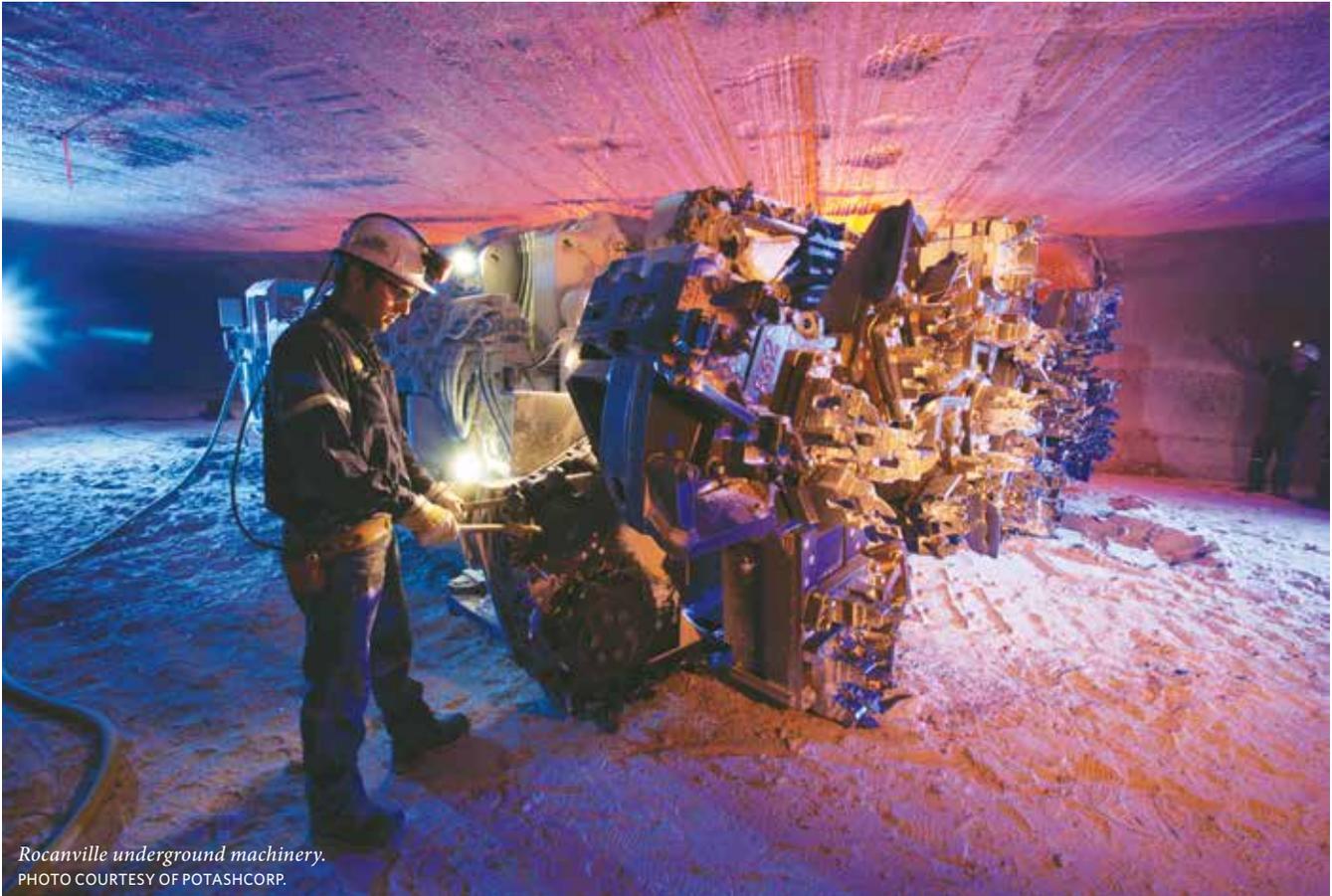


Saskatchewan produced a record 18.2 million tonnes of potassium chloride in 2015, with a value of \$6.1 billion dollars. As the world's largest potash producer, the province is hopeful that the low potash prices of recent years, due to over-supply and lower-than-expected demand, have reached their lowest point. In August 2016 the price of potash was \$220 USD/metric tonne (mt) in, down from \$300 USD/mt the same time last year, and well below the peak price of \$870 USD/mt reached in February 2009.

The Food and Agriculture Organization of the United Nations have predicted steady growth in demand for nitrogen, phosphate, and potassium fertilizer between 2015 and 2019. In addition, signs of improvement in other commodity prices have been observed since January 2016, as economies around the world strengthen. In response, Saskatchewan's potash industry has been building and expanding operations, and a number of projects are set to advance in 2017.

Dominating global agriculture news in 2016 was the announcement of a proposed merger between the Potash Corporation of Saskatchewan (PotashCorp) and Calgary-based fertilizer producer, Agrium Inc. The new company will be the largest crop nutrient company in the world and the third-largest natural resource company in Canada, employing close to 20,000 employees in 18 countries with a value of US\$36 billion.

"This is a transformational merger that creates benefits and growth opportunities that neither company could achieve alone," said Chuck Magro, Agrium president and CEO in a news release on September 12, 2016. The deal is described as a "merger of equals" and the new company expects to generate up to US\$500 million annually as an integrated global supplier of crop inputs.



*Rocanville underground machinery.*  
PHOTO COURTESY OF POTASHCORP.

In January 2016, PotashCorp suspended operations at the Picadilly potash mine in New Brunswick indefinitely, resulting in the loss of over 400 jobs. Extra positions were offered to 100 affected employees willing to relocate to Saskatchewan, where PotashCorp operates five mines. The company's eight-year, \$3-billion expansion to the Rocanville mine, 200 kilometres east of Regina near the Manitoba border, is expected to be completed in November 2016. The expansion will double production capacity, making it one of the biggest underground mines in the world.

PotashCorp's Cory, Allan, and Lanigan mines were temporarily closed for several weeks each in late 2015 and early 2016 to reduce production due to market oversupply. The Patience Lake solution mine accounted for only 2.9 per cent of the company's potash 28 million tonne ore production in 2015.

The new company will also control Agrium's Vanscoy potash mine near

*The company's eight-year, \$3-billion expansion to the Rocanville mine, 200 kilometres east of Regina near the Manitoba border, is expected to be completed in November 2016.*

Saskatoon, if the merger is approved by shareholders. Production at Vanscoy ramped-up in 2015, but the mine was rocked by two serious safety incidents within a few weeks in August 2016.

For Mosaic Company, who operate the remaining three potash mines in Saskatchewan, good news came in the form of a \$3.2 billion K3 mine expansion at the giant Esterhazy mine, while the bad news involved 330 employees temporarily laid-off at Colonsay. The mine will remain idle for the rest of 2016, but employees will be recalled in January 2017. K3 should also be operating in 2017 and is expected to reach capacity of 21 million ore tonnes by 2024.

The first new potash mine to be built in Saskatchewan in almost 40 years should be completed in 2016. K+S Pot-

ash Canada's Legacy solution mining operation is under construction near Bethune, Sask. An incident caused considerable damage to property in mid-July 2016, but nobody was injured and the mine is expected to reach the two-million tonne production capacity by the end of 2017.

In October 2016, K+S Potash Canada announced a \$1 million grasslands protection project in partnership with the Nature Conservancy of Canada. Over 190 hectares of natural grassland impacted by the Legacy Project will be off-set by conserving an additional 400 hectares of high-value grassland in an arrangement that Saskatchewan's Ministry of Environment hopes will be adopted by other stakeholders in the province.

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*BHP's activities are aimed at potash project development. Their interest in potash is via development projects largely within the Canadian province of Saskatchewan. The Jansen Project, located 140 kilometres east of Saskatoon, Saskatchewan, is their most advanced project and is in feasibility study stage.*  
 PHOTO COURTESY OF BHP BILLITON.

*Saskatchewan mines are gearing up to increase production in 2017 as supply and demand even out after a tumultuous few years.*

A number of advanced potash projects are under development around the province. YanCoal Canada, a wholly owned subsidiary of Yanzhou Coal Mining Co. Ltd., received conditional approval from the Saskatchewan Ministry of Environment in August 2016 for their proposed Southey potash solution mine, 60 kilometres north of Regina. The communities around the proposed mine are divided and have voiced concerns over the environmental impact of the project, particularly on water supplies. Several community meetings were held during 2016 and 800 submissions were received by the Ministry of Environment in a 45-day period.

Western Potash Corp. announced a strategic investment of \$80 million from a Chinese private equity firm in September 2015 toward construction of their 100 per cent-owned Milestone Property, 30 kilometres southeast of

Regina. Contracts were awarded in April 2016 for engineering, procurement and subsurface design, and should be complete by the end of 2016.

Karnalyte Resources announced financing for construction of their potash mine at Wynyard, Saskatchewan in March 2015. As of September 2016, they had successfully commissioned the second stage and testing was underway in increase previously reported potash concentrations.

Vale's Kronau Project's final feasibility study has been completed and the company is determining the next steps for the project. Also progressing slowly is BHP Billiton's \$3.4 billion Jansen Project, 140 kilometres east of Saskatoon, which is around 60 per cent complete.

There has been no news on a buyer for the Russell-McAuley potash project, an estimated one-billion-tonne high-grade

potash deposit in Manitoba. Four companies were said to be interested in the deposit in late 2015, but no new announcements have been made in 2016.

Looking ahead, there seems to be little doubt that the potash market will recover to meet the demands of farmers producing food for a growing global population. Saskatchewan mines are gearing up to increase production in 2017 as supply and demand even out after a tumultuous few years.

"Fertilizer markets have been under pressure through the first six months of 2016, however we believe the uncertainty that weighed on potash market sentiment is now lifting and a recovery is beginning," said Jochen Tilk, PotashCorp president and CEO in a company news release in July 2016. "With key Asian contract prices settled by a number of producers - and buyer inventories at reduced levels - we are seeing improved engagement in all key markets." ♦

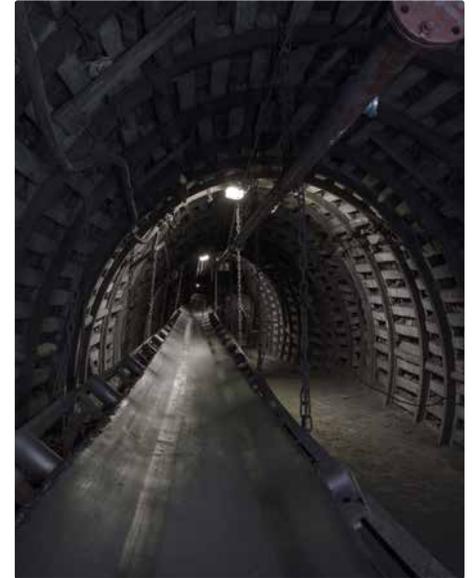
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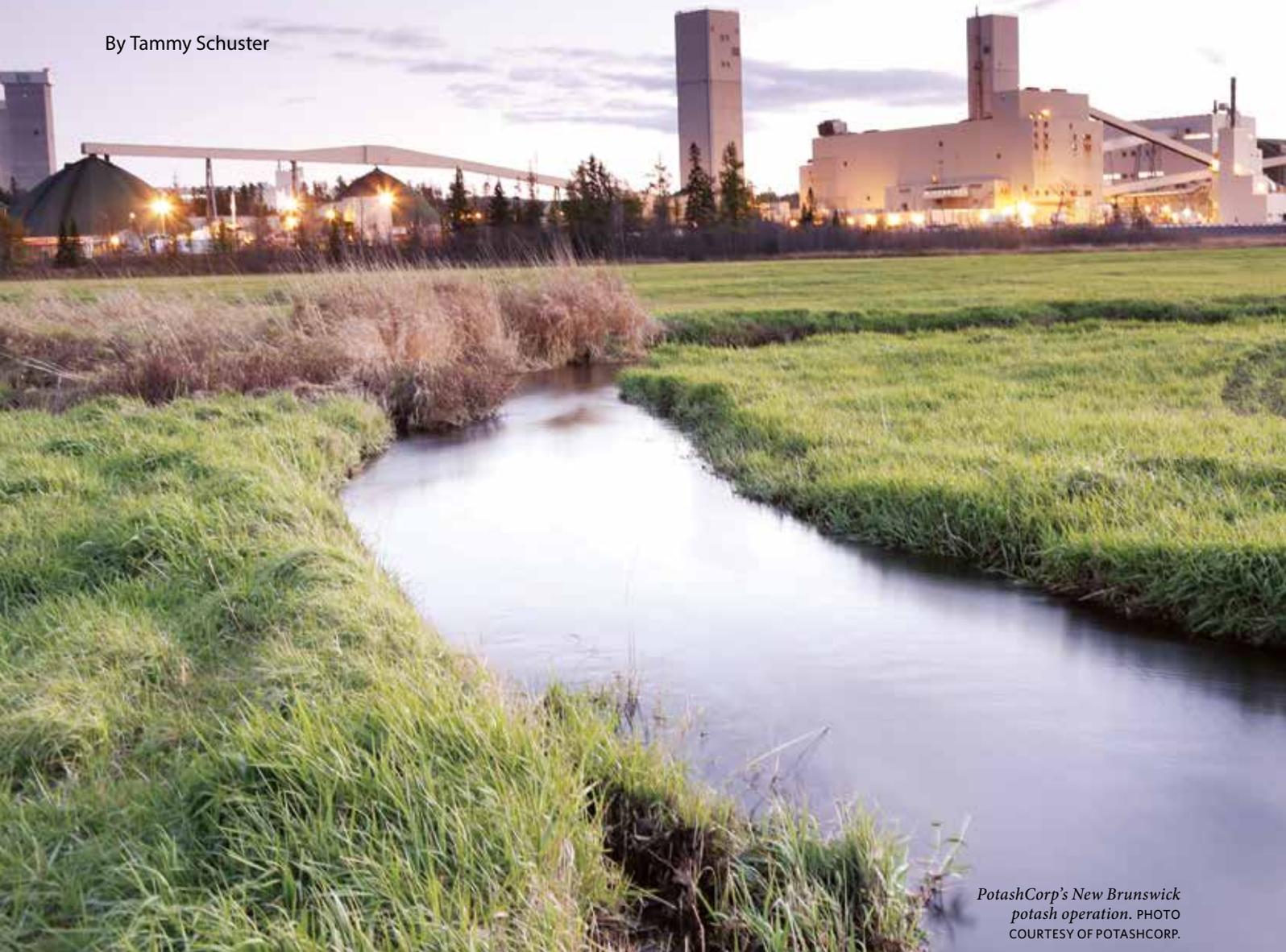
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# Light at the end of the tunnel

## *Rebuilding in the wake of the Piccadilly Mine closure*

By Tammy Schuster



*PotashCorp's New Brunswick potash operation. PHOTO COURTESY OF POTASHCORP.*

Since the sudden closure of the Piccadilly Mine in Sussex, NB, last January, many workers have since transferred to other company operations, relocated, or accepted positions with other mines. But in the aftermath of the mine closure, the province has been working hard to create new opportunities for all of those living in the Town of Sussex.

In January 2016, Potash Corporation of Saskatchewan closed their Picadilly mine operation and cut 430 jobs. While

industry experts say it was a difficult decision for the company, it was a necessary move since the decline of the potash industry in recent years.

Picadilly, a \$2.2-billion project which only recently completed, was expected to have a 73-year lifespan. Now, only about 35 employees remain to handle care and maintenance of the closed facility. PotashCorp says it will cost \$20 million to maintain the mine in the first year of the shutdown and \$15 million in subsequent years.

The loss of up to 430 well-paid jobs — averaging \$80,000 and \$120,000 annually — from Sussex's biggest employer in a community of 4,300 was bound to impact the local economy.

Joel Richardson, vice-president of the New Brunswick and P.E.I. divisions of the Canadian Manufacturers and Exporters, says the closure would result in future job loss in the restaurants, retail, and other businesses that support the potash mine in Sussex if it were to remain closed.



Should the company decide to reopen the mine, it would take about a year to become operational, but Mark Fracchia, president, PCS Potash, says he doesn't foresee that happening anytime in the near future.

PotashCorp offered jobs to a number of workers willing to relocate to Saskatchewan, while others accepted positions at K+S Potash Canada operations in Saskatchewan. "In the first quarter of 2016, K+S hired around 10 former employees from the Picadilly mine with significant potash experience and they have been valuable contributors to our team," says Maeghan Dubois, senior communications specialist, K+S.

But much work has been put into recovery for the town of Sussex. Earlier this year, Opportunities NB announced investment at three Sussex-based businesses that will create 39 local jobs.

"Businesses in the Sussex region continue to pull together to support one

another and the community in the wake of the mine closure," says Stephen Lund, CEO of Opportunities NB.

"Many businesses who were already in growth mode in the Greater Sussex Region have hired displaced employees and Opportunities NB is continuing to work with affected businesses to develop new markets and improve their productivity."

Opportunities NB is a government corporation that works to attract and support opportunities that will grow the economy and create jobs in the province of New Brunswick.

"Through continued one-on-one business counselling and working in collaboration with government partners, we are seeing new leaders emerge in the region and businesses develop plans to diversify and grow. We will continue to work with our clients and the business community at large to support the economic success of the region." ♦



*Alantra Leasing Inc., Timberparts, and Mrs. Dunster's Bakery are three businesses that will open up 39 new local job opportunities in the Town of Sussex.*

*From left: Marcus deWinter, Alantra Leasing; Stephen Lund, CEO of Opportunities NB; Marc Poirier, Timberparts; New Brunswick Premier Brian Gallant; Blair and Rosalyn Hyslop, Mrs. Dunster's; Fundy Royal MP Alaina Lockhart; and Sussex Mayor Marc Throne. PHOTO COURTESY OF OPPORTUNITIES NB.*

# No promises for potash prices

By Melanie Franner

The fact that it took China and India (among the largest purchasers of fertilizer in the world) until the third quarter of 2016 to sign their annual potash contracts with Belarusian Potash Company (BPC) does not bode well for a rebound any time soon for the global potash industry (in which Canada contributes approximately 35 per cent of the market).

It is also disturbing to note that the contract with the Chinese was for the lowest price in over a decade - \$219/tonne, which is approximately 30 per cent lower than the 2015 contract price.

India inked its deal with BPC for 700,000 tonnes of potash at \$227/tonne a month just prior to the Chinese deal. The quantity of potash sold to China was not reported.

"China and India are very shrewd negotiators," explains Steve Hansen, equity research analyst, Raymond James Ltd. "In contrast to most markets where potash is sold to a diverse group of

buyers under short-term commercial terms, China and India leverage their collective purchasing mandates to negotiate bi-lateral, long-term contracts - deals that typically set the near-term floor price globally."

## Wait and see

According to Hansen, one reason for this year's contract delays was elevated inventory levels that afforded both countries the ability to draw out negotiations in search of a better deal.

"I think China and India sat back and adopted a wait-and-see approach, particularly in light of the intense pressures already weighing on spot markets," he explains.

The other complicating factor that affected spot pricing, adds Hansen, was the drastic decline in crop prices and currency depreciation against the U.S. dollar for some of the other major potash-purchasing countries, such as Malaysia, Brazil, and Indonesia.

"These factors decreased the affordability of potash for many key international buyers," he notes. "And once affordability becomes an issue, prices naturally need to adjust lower."

That being said, Hansen suggests that China and India had a lot of inventory on hand to help them ride out a lengthy negotiating process.

"They usually need product in advance of the peak spring demand period, but because of all the supply availability, they were able to bide their time and place some major pressure on the supplier group."

And the waiting proved advantageous to them, given the soft demand for potash and the oversupply in the market.

## The future is dim

Although Hansen admits that the global demand for potash is anticipated to increase by approximately two per cent per year, he doesn't hold out much hope for a significant pricing rebound any time soon.

"Frankly, it's a structurally over-supplied market," he says. "We might see a modest near-term price rebound because Canpotex producers have reigned in production, international contract volumes are now moving, and there is typically a seasonal uplift heading into the busy spring period, but further long-term upside is likely going to be capped by upcoming supply additions."

Another complicating factor is the increased supply of potash coming onto the market, thanks to the new Garlyk mining and processing facility in north-east Turkmenistan (a joint venture between the Republic of Belarus and Turkmenistan) and the commissioning

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*We are positioned to benefit from an improved environment next year and we support Canpotex as they take a cautious approach to the Chinese and Indian markets, committing volumes only through the remainder of 2016.*

of the Saskatchewan-based K+S Potash Canada's Legacy project. Both are expected to come on-stream in 2017, with the former producing 1.4 million tonnes of potash (of which one-million tonnes will be available for export)

and the latter producing two-million tonnes of potash. Russia-based Eurochem is also expected to start commissioning the first of two new potash mines under construction late next year.

### **Other news**

According to Bloomberg Markets, Uralkali has also signed deals with China and India – 600,000 tonnes to China and 650,000 tonnes to India. The contracts will run through July 2017.

Closer to home, PotashCorp president and chief executive officer Jochen Tilk spoke of a more cautious approach to China and India. He made his comments in a statement within the company's Q2 Earnings Report. Among his remarks was the following:

"With customer sentiment improving and announced industry shutdowns, we anticipate a more supportive potash environment through the balance of the year. Importantly, we see the potential for record demand in 2017 with annual shipments in the range of 61-64 million tonnes, as strong affordability incents farmers to replenish soil nutrients. We are positioned to benefit from an improved environment next year and we support Canpotex as they take a cautious approach to the Chinese and Indian markets, committing volumes only through the remainder of 2016."

### **The years ahead**

Despite the cautious optimism from Tilk, most analysts suggest that the pricing for potash in the near years ahead will remain pretty much the same as it currently is – somewhere in the US\$200 to US\$300 range.

The current combative environment between Uralkali and Belaruskali, coupled with a wave of new supply still coming, make for depressed pricing all around. ♦



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Resourcing the world



# Innovation at BHP Billiton's Jansen Project

Building the first conventional greenfield potash mine in Saskatchewan for some decades presents a rare opportunity for innovation that BHP Billiton is grasping with both hands as it builds what the company believes will be the safest and most technologically advanced potash mine in the province.

As the company continues to build the Jansen Potash Project about 140 kilometres southeast of Saskatoon, the drive to innovate runs in-tandem with the drive to ensure this is a safe project building a safe mine. This is in-line with the company's charter values, which ensure a relentless commitment to sustainability; that means putting health and safety first, being environmentally responsible and supporting local communities.

"Every day at Jansen our teams work to find and design safer and better ways of developing a potash mine. That includes finding safer ways to do everything we do," says Giles Hellyer, BHP Billiton's VP of operations for potash.

"We are excavating the shafts mechanically (not using drill and blast) using two Herrenknecht boring machines or shaft boring roadheaders (we call them the SBRs). As we go, a preliminary concrete liner is constructed to protect the shafts' integrity during the sinking process. This liner will be augmented with a permanent composite steel liner from the bottom up once the excavation reaches the planned depth."

Using the Herrenknecht SBRs enables BHP Billiton to remove all people from the bench during shaft excavation and this minimizes safety risks. The company has also installed a pneumatic conveying system to lift all excavated materials to sinking buckets that are hoisted to the surface where the materials are disposed of.

"This technology has been customized for Jansen to improve the safety of employees working in the shafts. The Herrenknecht machines have also been adapted for the installation of the tubing in the area of the Blairmore, where we used a mechanical arm attached to the SBR to install the steel rings. This eliminated the need for people to manually manoeuvre these two-tonne parts into place," Hellyer explains.

Innovation and technology are giving BHP Billiton an advantage throughout their mine's development and value chain in production. A Prevention through Design (PtD) program seeks to eliminate or mitigate hazards during design. The goal is to design facilities that are safe to build, operate, and maintain to



*Workers in the production shaft at BHP Billiton's Jansen Project control the installation of steel tubing by the Herrenknecht Shaft Boring Roadheader.*



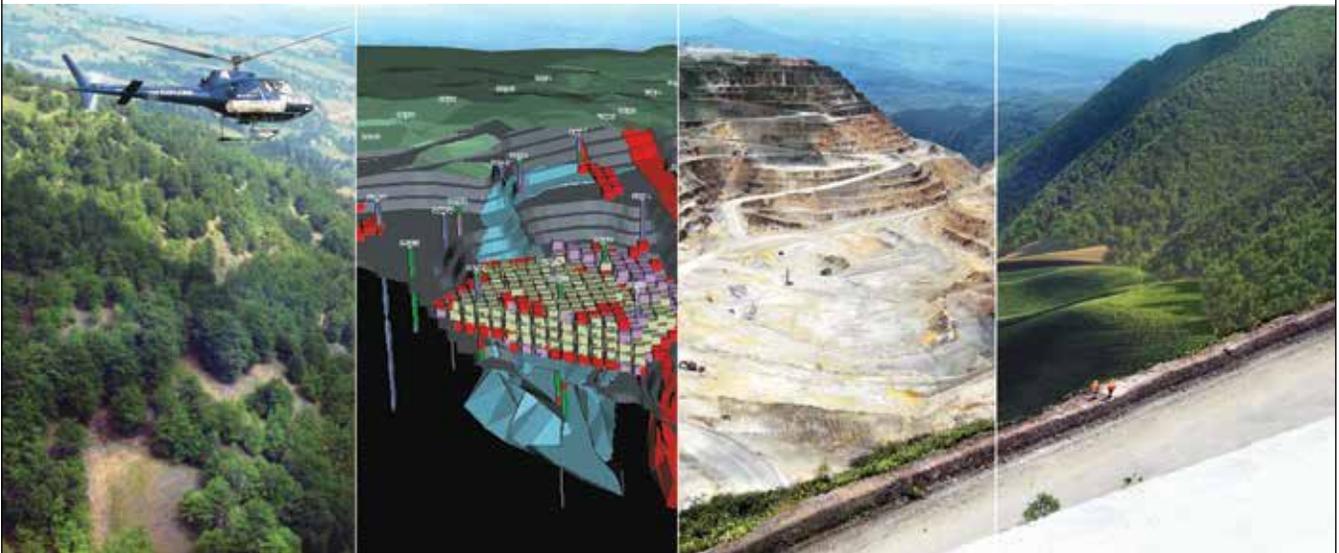
*At work in the production shaft of BHP Billiton's Jansen Project.*

prevent unnecessary occupational exposures to people or harm to the community or environment. Many of the innovations at Jansen have been arrived at through the PtD program. Some have been gained through taking advantage of being part of a leading global resources company.

Leveraging petroleum technology has given a comprehensive understanding of the orebody at Jansen. Underground, the Sandvik MF460 borers will incorporate the latest technology available for automation, production rates, and safety enhancement, supported by a continuous ore conveyance system. In the processing facility, improved on-stream analysis will ensure close monitoring of process upsets and the processed potash will be carried to market on a state-of-the-art logistics system. Technological advances also mean that Jansen's overall energy consumption will be lower than that of other underground potash mines.

"We have taken our time to develop Jansen, making sure we get the details right," says Hellyer. "By sinking the shafts now and by going through an extraordinarily rigorous process of studies and preparation, we are ensuring that when the market is ready for new supply, Jansen will be poised to meet that demand." ♦

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# New year: More potash

By Melanie Franner

By all appearances, 2017 is shaping up to be a year of increased potash supply to an already over-supplied global market. The new Garlyk mining and processing plant located in northeast Turkmenistan is slated to come on-stream next year – bringing with it about 1.4 million tonnes of potash, of which one million will be available for export. Future estimates suggest that total production will increase to four-million tonnes per year.

The increased potash production will undoubtedly affect Canada's current role in the global potash industry. Canada currently supplies about 35 per cent of the global market.

That being said, Canada is not without its own means of upping the ante. Saskatchewan-based K+S Potash Canada is anticipating that it will be capable of producing two-million tonnes of potash from its Legacy site by the end of 2017, with the potential to ultimately ramp up to four million over time. "This added supply is likely to intensify existing headwinds already working against a price recovery," states Steve Hansen, equity research analyst, Raymond James Ltd. "By most accounts, the market is already over supplied, a factor that's weighed heavily on most global pricing benchmarks in recent years."

Hansen goes on to say that the over-supply situation is due to a couple of factors, not the least of which is the lingering "dispute" between Eastern European suppliers Uralkali and Belaruskali.

"In the past, Uralkali and Belaruskali both exhibited a reasonable measure of supply discipline," he explains. "However, subsequent to their fractious marketing dispute in 2013, both producers have since aimed to maximize output in an attempt to retake lost market share." Add to this, the dramatic decline in global crop prices and key international currencies (versus the U.S. dollar) – such as Brazil, Malaysia, and Indonesia – and you end up with a challenged pricing backdrop. "While demand remains solid, the global potash market has nonetheless become structurally oversupplied, with further capacity still on the horizon," notes Hansen.

*In future, we are ready to share with Turkmen partners our own experience in international trade of mineral fertilizers.*

## **Turkmenistan triumph**

According to the Ministry of Foreign Affairs of Turkmenistan, the country is in the midst of reforming its national and state programs to further diversify the national economy. Traditional sectors – like oil and gas, power engineering, agriculture, construction, transportation, and communications – are reported to have grown significantly over the past several years as a result of these reforms.

The ministry cites the Garlyk facility as "symbolizes the birth of a new mining branch for the Turkmen economy, based on the vast resource base".

The Garlyk facility is a large joint-infrastructure project between Turkmenistan and Belarus. The framework agreement for the project was signed in 2009.

Total cost of the first stage of the project is estimated to be US\$1 billion.

"This is a colossal, immense project," noted Gurbanguly Berdimuhamedov, president of Turkmenistan, in May 2016, as reported by *Belarus News*, a Belarus Telegraph Agency. "I think that it will bring us great economic benefits."

The *Belarus News* article went on to state that Berdimuhamedov also praised the work of the intergovernmental commission for trade and economic cooperation.

Alexander Lukashenko, president of the Republic of Belarus, spoke of the importance of the Garlyk project while in an interview with the editorial staff of *Foreign Policy and Diplomacy of Turkmenistan* magazine in October 2015. Lukashenko referred to the project as an "iconic symbol" of the countries' partnership.

"Construction of this plant is carried out rapidly," he stated. "The only factor that constrains the dynamics of construction is the complex grounds with a variety of aquifers, where we use expensive equipment that results in slowing down the pace of construction.

"These temporary challenges do not diminish our determination to fulfill our obligations and complete the construction of this most modern plant that will become a visible symbol of productivity of our cooperation. In future, we are ready to share with Turkmen partners our own experience in international trade of mineral fertilizers, since Belarus, producing up to 10-million tons of valuable chemical products annually, is one of the world's leading exporters of potash." ♦



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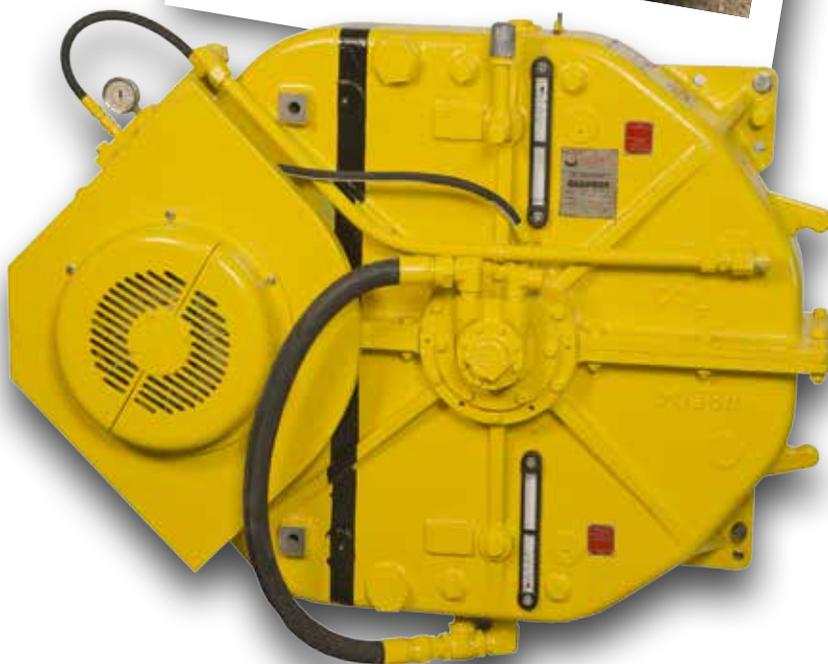
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# Bridging the gap

## Strategies aimed at aboriginal engagement in the mining industry

By Tammy Schuster



In 2008, Saskatchewan Polytechnic created its Aboriginal Student Achievement Plan to identify and address barriers and obstacles for indigenous students. PHOTO PROVIDED BY SASKATCHEWAN POLYTECH.



There are currently 3,700 aboriginal students currently enrolled at Saskatchewan Polytechnic. PHOTO PROVIDED BY SASKATCHEWAN POLYTECH.

Saskatchewan's aboriginal community is the fastest-growing demographic in the province. It is expected to make up to one quarter of Saskatchewan's population over the next 20 years. It is also the youngest demographic with the average age (22) nearly half that of the general population (40+). These two factors are rapidly making this community an essential part of the Saskatchewan economy, and the mining industry is taking notice.

With an education gap of 18 per cent last year, mining companies have undertaken

new strategies that include partnering with education institutions to help engage and promote aboriginal people working in the industry.

Many post-secondary institutions have also developed programs and services aimed at helping aboriginal students enter, and succeed in, a variety of careers through pre-employment training and career awareness.

The Mining Industry Pre-Employment Program is one of the programs offered at the Saskatchewan Indian Institute of Technology (SIIT) designed to prepare

indigenous students interested in a career in the mining industry. The program examines the many job opportunities and the requirements necessary for employment in the mining industry, and it includes in-class training and hands-on skills development.

"The program gives students the insight of what it takes to work directly with the potash industry," says Earl Greyeyes, potash industry job coach and employment coordinator, SIIT. "It gives them a feel for the industry when they go on site and into the mine."

*According to a report released by the Saskatoon Aboriginal Employment Partnership in June, the gap in education is costing the province over a billion dollars a year in lost economic impact.*

The 10-week full-time program includes computer training, communication and interview skills, a one-week practicum, and 100 per cent attendance is required. Offered three times a year, classes are full with 12 students in each of the school's three locations. The program offers job coaching and has access to industry contacts with many trade industries.

"The focus of our program is to overcome some of the historic and cultural barriers that First Nations students encounter when trying to secure and keep employment in the mining industry," says Greyeyes. "Our program is continuously growing and developing with the input from our industry partners. Utilizing feedback on how the school can better prepare and train our students will give our students that competitive edge."

In 2008, Saskatchewan Polytechnic created its Aboriginal Student Achievement Plan — after consultation with approximately 600 individuals, including community members, industry instructors, and students — to identify and address barriers and obstacles for indigenous students. Their goals were to increase indigenous student enrolment and increase the program completion rate.

"If we improve the education gap and training in the indigenous population, we will see that benefit all of society," says Jason Seright, director of aboriginal strategy, Saskatchewan Polytechnic. According to a report released by the Saskatoon Aboriginal Employment Partnership in June, the gap in education is costing the province over a billion dollars a year in lost economic impact.



*The Mining Industry Pre-Employment Program is one of the programs offered at the Saskatchewan Indian Institute of Technology (SIIT) designed to prepare indigenous students interested in a career in the mining industry. PHOTO PROVIDED BY SIIT.*

"In the future, I see the gap closing and indigenous students graduating at the same rate as the non-indigenous students," says Seright. "Enrollment increases each year and industry is paying attention to this. They see the indigenous population as a workforce that they can both support and benefit from."

Seright says student enrollment at Saskatchewan Polytechnic has risen by 900 students in four years, with 3,700 aboriginal students currently enrolled.

Both schools say the mining industry in Saskatchewan has been very supportive of their programs. Greyeyes says that Mosaic and PotashCorp have hired students straight from the SIIT program.

"The Potash Corporation recognises that the commitment to aboriginal inclusion is very critical, particularly to the operating environment in Saskatchewan," says Leanne Bellegarde, director, diversity & inclusion, Potash Corporation. "Given the demographic profile of Saskatchewan with the population of First Nations or Metis expected to increase, PotashCorp needed to be prepared in terms of inclusion in the future of the labour force and in the sustainability of their supply chain."

The company developed an Aboriginal Engagement plan that focuses on a number of areas including recruitment and retention of aboriginal people, relationship building within the community, and employee awareness training.

PotashCorp also has partnerships with the Gabriel Dumont Institute and the College of Engineering at the University of Saskatchewan where they have committed to give aboriginal engineering students a continuous summer employment opportunity for their entire four-year education. "Having a continuity of experience helps to make us attractive to them, but also makes them very competitive and attractive candidates if they choose to go elsewhere in their career."

Bellegarde says the programs and training offered at PotashCorp not only allows for students to learn about opportunities available at the company, it's also introduced employees to an entirely new talent pool that may have been overlooked in the past. "It has been a really positive aspect all around."

To learn more about the programs offered at Saskatchewan Indian Institute of Technology, or at Saskatchewan Polytechnic, please visit their websites at [siit.ca](http://siit.ca) or [saskpolytech.ca](http://saskpolytech.ca). ♦

# Hammond facility highlights PotashCorp's commitment to its customers

*In 2009, PotashCorp decided to build their new rail yard and storage warehouse in Hammond, Indiana, 40 kilometres south of Chicago.*



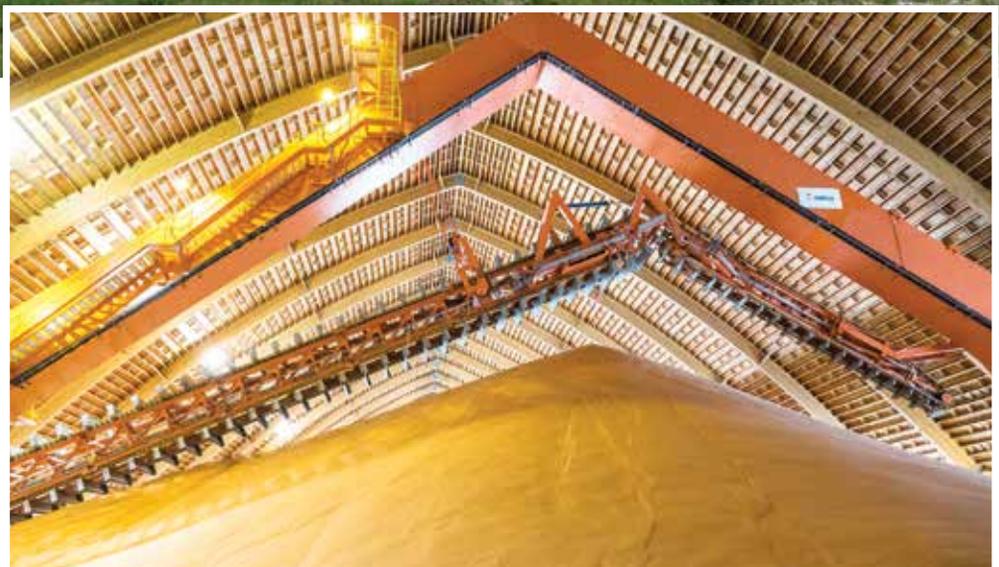
Chicago is the busiest, most important rail hub in the United States – and it's also the most congested.

It takes an average of 30 hours for a rail shipment to make its way across the city. By comparison, freight moves from Los Angeles to Chicago in 48 hours.

Eight years ago, PotashCorp undertook a thorough evaluation of its logistics, exploring alternatives to shipping its product through Chicago, which some have dubbed "America's rail traffic speed bump".

The company, which is the world's largest fertilizer producer by capacity, was beginning the \$6 billion expansion of its five Saskatchewan potash mines and wanted to ensure it would continue to have an efficient way to move its product.

After evaluating 41 U.S. sites, PotashCorp decided in 2009 it would build



*The PotashCorp Hammond Regional Distribution Centre officially opened in August 2016.*

its new rail yard and storage warehouse in Hammond, Indiana, 40 kilometres south of Chicago.

"We chose Hammond because it's past that Chicago market, but still gives us access to all the Class I rail carriers so that we can forward-position material and then effectively and quickly get it to our marketplace," explains Bob Felgenhauer, PotashCorp's vice-president of

transportation and distribution. (There are seven Class I railroads in the U.S., including CN and Canadian Pacific. Rankings are based on operating revenues.)

After years of planning and then construction, PotashCorp representatives, customers and contractors gathered on a warm day in August 2016 to celebrate the completion of the \$90 million Hammond Regional Distribution Centre.

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PotashCorp president and CEO Jochen Tilk describes Hammond as a vote of confidence in the future of potash mining and the fertilizer industry.

“We want to ensure we’re doing our best to meet the needs of our customers – the farmers who count on our products,” says Tilk. “With Hammond, we can have our potash loaded and ready to ship to our customers – getting it to them when they need it.”

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Phase 1 of the project, the rail yard, was completed in mid-2012 in partnership with the Indiana Harbor Belt Railroad. It is the largest rail yard built in the past 100 years within the Chicago area, with 22.5 kilometres of track, for a standing capacity of approximately 1,000 railcars. (PotashCorp owns or leases nearly 5,000 railcars to move its product.)

Phase 2 of the distribution centre is a massive warehouse that has a capacity conservatively estimated at 100,000 tons; observers have said its roofline makes it look like a giant ship turned upside-down. This building was completed in spring 2016.

“There’s a state-of-the-art product handling system that prevents any degradation of material,” says Felgenhauer. “The grade of material that’s stored here is delivered from the mine by rail, unloaded into this warehouse, and then reloaded back into railcars for the marketplace.”

The equipment can unload railcars at 1,200 tons per hour and load at 750 tons per hour, rates that are two to three times faster than a typical potash warehouse.

In describing Hammond, PotashCorp officials say it’s like having a “mini mine” in the U.S.; the competitive advantages are significant.

By positioning its potash outside of Chicago, PotashCorp provides its customers greater peace of mind as they can count on timely, efficient delivery of this vital crop nutrient, says Felgenhauer.

“We can get product to our customers quicker than our competitors. We can be efficient, we can be cost-effective, and we can be a service-oriented organization that puts delivery to our customers before everything else.” ♦

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# Test of skills

## *A recap of the 48th Annual Emergency Response Mine Rescue Skills Competition*

By Tammy Schuster

**E**xtinguishing five-foot flames, carrying the wounded on spinal boards, and performing high-angle rescues – not your typical Saturday afternoon at the park. These heroic feats are actually part of a mock rescue event at Prairieland Park in Saskatoon, Saskatchewan. The 48th Annual Emergency Response Mine Rescue Skills Competition took place on June 4, 2016, where 18 teams from mine sites across the province gathered to participate in a very important series of challenges.

Organized by the Saskatchewan Mining Association, this mine rescue skills competition puts first responders to the test, with teams of underground and surface rescuers competing in five events: fire fighting, first aid, proficiency, practical skills, and simulated surface and underground mine rescue problems.

The competition provides opportunities for teams working in the mining industry to test their skills, identify areas of improvement, and train in a safe and controlled environment. It's also an effective team-building exercise that promotes communication and collaboration.

An emergency responder must react very quickly with very little information. One of the purposes of a rescue skills competition is to practice speed and safety, and it's also used to motivate participants to become comfortable with using emergency tools and procedures.

Under the direction of team coordinators, rescue workers are given basic information to brief their teams before entering into a mock rescue scenario. Responding at a moment's notice to situations such as trapped or injured miners underground, chemical spills or fires, or an accident involving heavy industry machinery.

The full-day event tests the mental and physical endurance using real-life scenarios rescue workers face in their line of work. Responding to rescue operations in an environment similar to what can happen in a day on the job helps build trust among their team, and trust in their own abilities.

This year the honour for overall surface winner was awarded to PotashCorp Patience Lake, the runner up was Mosaic Belle Plaine. The overall underground winner was awarded to PotashCorp Lanigan, and the runner up was Mosaic Esterhazy K2. ♦

### **Results from the 48th Annual Emergency Response Mine Rescue Skills Competition**

#### **Overall winners**

*Surface Winner* - PotashCorp Patience Lake

*Runner Up* - Mosaic Belle Plaine

*Underground Winner* - PotashCorp Lanigan

*Runner Up* - Mosaic Esterhazy K2

#### **The Individual Event winners**

##### **First Aid**

*Surface Winner* - PotashCorp Patience Lake

*Runner Up* - AREVA McClean Lake

*Underground Winner* - Mosaic Esterhazy K2

*Runner Up* - PotashCorp Cory

##### **Fire Fighting**

*Surface Winner* - PotashCorp Patience Lake

*Runner Up* - Mosaic Belle Plaine

*Underground Winner* - Mosaic Esterhazy K2

*Runner Up* - PotashCorp Lanigan

##### **Proficiency**

*Surface Winner* - PotashCorp Patience Lake

*Runner Up* - AREVA McClean Lake

*Underground Winner* - PotashCorp Lanigan

*Runner Up* - PotashCorp Rocanville

##### **Practical Skills**

*Surface Winner* - Mosaic Belle Plaine

*Runner Up* - Westmoreland Coal Estevan

*Underground Winner* - PotashCorp Lanigan

*Runner Up* - Cameco McArthur River

##### **Surface Field Problem**

*Surface Winner* - PotashCorp Patience Lake

*Runner Up* - Westmoreland Coal Estevan

##### **Underground Mine Problem**

*Underground Winner* - PotashCorp Lanigan

*Runner Up* - Cameco McArthur River

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# Certified Mining & Construction Sales & Rentals



## *Supporting safety on the jobsite*

By Tonya Lambert

**S**afety first. These are the words you will hear again and again when you speak to the management and staff at Certified Mining & Construction Sales & Rentals (CMC) in Saskatoon.

At CMC, they know that the key to any successful mining or construction operation is safety. By using well-maintained equipment and following the proper safety procedures, companies are not only able to lessen downtime by preventing accidents, but also to increase efficiency and boost productivity.

### **Quality equipment**

Success through safety begins with the best brands and CMC carries nothing else. Their shelves are filled with products by top manufacturers, such as Thern, 3M, Vitali, Atlas Copco, Multiquip and Wacker Neuson.

"People come to us from across the country to buy and rent products they know they can count on," says Paul Cranford, general manager.

CMC recently added the products of three more industry leaders to their already impressive selection of specialized mining and construction equipment. Welders and compressors by Red-D-Arc, battery-powered mobile mining and tunneling equipment by RDH, and an unparalleled selection of air chain hoists by JD Neuhaus are now available from CMC, the sole Saskatchewan distributor for all three lines.

"The main advantage of RDH equipment is the lack of emissions due to being battery powered. Air quality is a big deal in the mines," explains Cranford. "This equipment can lower mine-operating costs by reducing ventilation upgrades that would be needed with diesel-powered equipment."

All products are available for sale or rent. CMC rents items on a daily, weekly or monthly basis, delivering the equipment to your job site ready to go within 24 hours, complete with paperwork and a maintenance program in place.

As part of their service standard, CMC provides underground-ready rentals, something which few other companies offer. This means they ensure that it has the correct type of batteries, fire suppression and scrubbers for exhaust so that it can be safely operated underground. They will also include a lift plan and, if needed, will disassemble the equipment, transport it underground and reassemble it again.

### **Service & support**

"First, you need good equipment and then you need good support to keep that equipment going," explains Garry Clarke, owner of the Northern Strands Group of Companies, of which CMC is a part. "CMC provides both with the dependable assistance of our valued suppliers."

CMC supplies onsite service, parts and commissioning on all their rental equipment and has emergency support available 24/7. If any tools or equipment need to be taken back to their shop for additional servicing, they will provide a fully certified replacement immediately. Their fleet mechanical services include oil changes, inspections, tune-ups, mechanical work and rough-terrain vehicle service.

### **Regular recertification**

As a charter member of Mission Zero, CMC takes the safety of its clients very seriously. This is why the company has a program in place whereby every time a piece of equipment leaves the shop it is recertified. "Even if it was only used for three weeks, we recertify it," says Clarke. "This way, we know



*Certified has tuggers for every type of job.*

and our clients know that it meets the highest safety standards."

CMC also tests and recertifies older equipment, ensuring that it meets the latest safety regulations. They recertify and repair both chain and level hoists, tuggers, 3M reloads, Kubotas, and rough-terrain vehicles. Their staff members also go onsite to test equipment for those companies who have purchased one of Northern Strands Group of Companies' new rigging test beds.

Another new product provided by CMC is a wireless camera for inspections. Able to record, zoom and pan, these cameras can be attached to cables and guided into areas where you cannot or should not send a person, such as a damaged mine shaft. If need be, Certified can provide trained personnel to operate the camera.

### **Commitment to the community**

As part of the Northern Strands Group of Companies, CMC is dedicated to improving lives both on and off the worksite. As part of its commitment to social responsibility, CMC is a major supporter of the Children's Wish Foundation. Throughout the year, the staff participates in regular events, such as summer barbeques, to raise funds to grant the wish of a child with a life-threatening illness. They also support many community endeavours throughout the province, such as the Agrium Delisle Rodeo and the Vimy Dinner to assist wounded soldiers.

At CMC, they work with their customers and for their customers, to provide them with the equipment they need, ensuring it is ready to go and meets the most stringent safety regulations. ♦

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*Certified has largest recertification facility in Saskatchewan.*



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# Water economics

## *H<sub>2</sub>O Systems to help in water re-use for potash industry*

Potash mines require and consume a significant amount of industrial water. Water is prohibited to be discharged to surface water due to environmental legislations which is a driver that should impel facilities to review water management and technology. Water losses from potash refining processes can occur from power boilers, discharge streams, and clean up water, amongst many other sources. When it comes to recycling and conserving water, we are approaching a time when all companies need to be focused on a triple bottom line: quality, financial and environmental targets. We at H<sub>2</sub>O Systems, a fluid treatment company, have developed and continue to develop cutting-edge technologies and strategies that can be applied to the traditional potash mining processes to offset complex water treatment issues and help make a system more economical. To solve this, we focus on the reducing product loss and re-using the use of water for clean-up purposes.

Since we have a strong belief in listening very closely to the needs and wants of our customers, we have engineered and designed high-performance water treatment systems which deliver exceptional value on cost, reliability, and



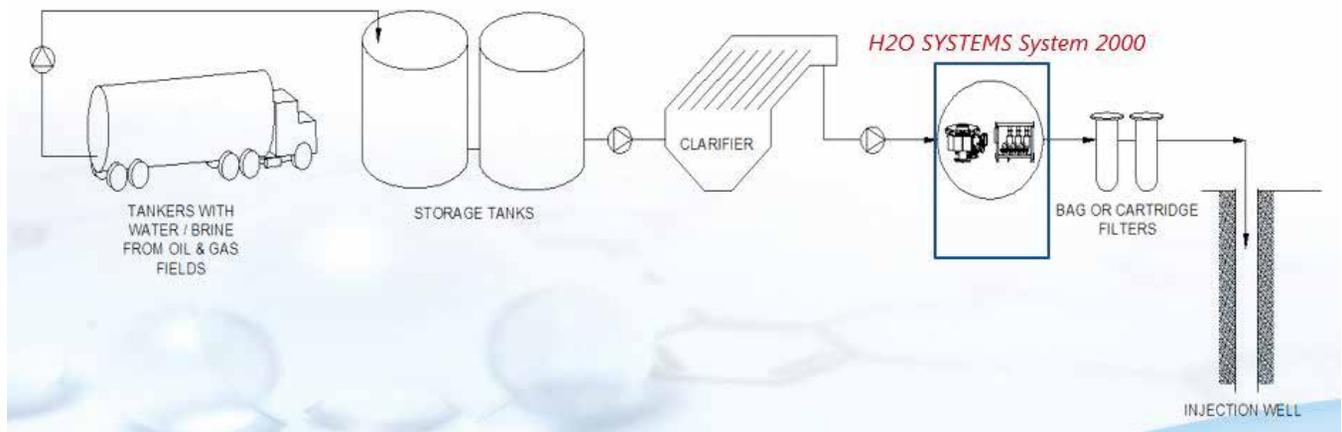
*H<sub>2</sub>O Systems has a collection of innovative filter technologies that can produce water ready for various applications within a process without the use of disposable media, which eliminates excess waste. This allows for an incredibly low-maintenance system.*

un-matched water quality. The result is a collection of innovative filter technologies that can produce water ready for various applications within a process, without the use of disposable media which eliminates excess waste. This allows for an incredibly low-maintenance system. In the potash-refining process this can be used for cooling, seal, and gland protection and water re-use for clean-up.

A recent project highlights the benefits clearly. An H<sub>2</sub>O Systems 2000 TSS Fil-

ter was installed upstream of existing cartridge filter systems, reducing loading on the existing systems. This green solution allowed over \$40,000 annually in cartridge savings to be retained, decreased filter replacements from five times a day to once every two days, cutting maintenance to 10 per cent of the original requirements, and reduced the waste created by the treatment process.

As such, we have created strategies to fully support the shift into new water



*The potash industry has continued to evolve as stakeholder engagement increases and public attitudes shift.*



treatment systems to help with high capital costs, with a special focus on non-disposables. At every step, we provide operational support for our clients by offering fully customizable designs, training, commissioning, start-up, and field support. H<sub>2</sub>O Systems offers trial equipment which can provide our customers with a strong comfort level from a technology performance standpoint and water quality they can expect to achieve.

The potash industry has continued to evolve as stakeholder engagement increases and public attitudes shift. As we continue to deploy both our existing state-of-the-art technologies, along with continued development of new innovations in water treatment, the potash industry can be rest assured they have a trusted partner they can count on to achieve fiscal and performance goals in water management applications within their facility.

If you wish to see what H<sub>2</sub>O Systems can do to improve your operations, simply send us your water quality target and design conditions, and we can show you what your cost savings could be. ♦

*If you are interested in learning more about our technologies, please visit [H2Osystems.ca](http://H2Osystems.ca), or contact Riva Mitra at [RMitra@H2Osystems.ca](mailto:RMitra@H2Osystems.ca).*

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# Competition review for potash industry mergers

By Bruce Harrison and Matthew J. Bennett, Lawyers McKercher LLP

The *Competition Act* (the “Act”) was enacted in Canada in 1889 to regulate activities that the Competition Tribunal considers ‘anti-competitive’, such as price-fixing, bid-rigging, or conspiracies. The Act provides power to initiate a review of mergers or acquisitions that may result in an anti-competitive market. The Act allows the Commissioner of Competition (the “Commissioner”) to review a transaction and reject or demand modifications to the transaction if it would substantially prevent or lessen competition in the market.

Mergers among producers with significant market share, as is the case in the potash industry, could undergo a review by the Commissioner. The combined production of potash between Saskatchewan producers may create the fear of greater control over the fertilizer market and reduced production to raise the price of potash.

The Commissioner will review whether there is effective competition remaining after the merger and could require the merging firms to sell off assets to other competitors to ensure a more balanced marketplace. The Commissioner can challenge the transaction on the basis that it prevents, lessens, or is likely to prevent or lessen, competition within the market.

The Competition Tribunal will consider the concerns of customers, suppliers, various levels of government, competitors, and other stakeholders. The president of the Agricultural Procedures Association of Saskatchewan, the Keystone Agricultural Producers and the American Soybean Association have all raised concerns to the Commissioner regarding vertical integration in the pot-



Matthew J. Bennett



Bruce Harrison

*The President of the Agricultural Procedures Association of Saskatchewan, the Keystone Agricultural Producers and the American Soybean Association have all raised concerns to the Commissioner regarding vertical integration in the potash industry.*

ash industry, particularly as it relates to both production and retail price distortions.

If the agriculture producers are successful in their argument, or the Commission otherwise determines that competition may be substantially lessened within the fertilizer market, a lengthy regulatory process would commence where the parties would be required to justify the transaction or propose divestment of certain assets to maintain competitive balance. This process could block the deal altogether or force the new company to divest some portion of its holdings, perhaps negating some advantages of the deal.

While the Competition Bureau in Canada will assess the impact of any deal in Canada, one can expect that the American competition agencies may undertake their own review or work with the Commissioner to examine the effect on

fertilizer consumers in the United States. Potash companies are no stranger to U.S. scrutiny for anti-competitive practices. Together, Canadian-based potash producers paid nearly \$55 million in 2013 to settle claims in the United States by plaintiffs who alleged price fixing.

Unlike in the United States, Canadian competition law prohibits the Competition Tribunal from issuing an order preventing a merger if the companies can demonstrate that the efficiency gains from the merger would be greater than the potential reduction in competition that would result from it.

While most mergers are approved, high-profile mergers, or mergers between larger publicly traded companies are more complex. All stakeholders should be aware that they have the right to be heard before the Competition Tribunal when the tribunal deliberates whether a merger violates the Competition Act. ♦

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# WorleyParsons turns challenges into environmentally beneficial opportunities



A 3D model of the overall Brazil potash plant.

**W**orleyParsons Canada Services Ltd. (WorleyParsons) was retained by Brazil Potash Corporation (BPC) to complete a bankable feasibility study of their Autazes Potash Project, which is located near the municipality of Autazes, Amazonas State, Brazil. The project consists of a conventional underground mine, processing plant, tailings management area (TMA), product load-out and transportation system, as well as supporting ancillary facilities and systems.

As with all potash mining projects, the question always arises, how can we best manage the tailings to achieve environmen-

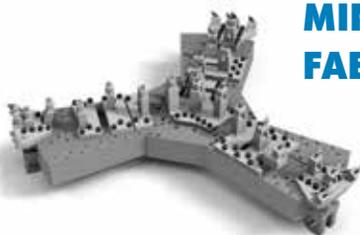
tal and fiscal responsibility? Typically, potash waste tailings are piled on the ground and cover a vast surface area. As an example, in Saskatchewan the piles cover many hectares and reach heights of up to 50 metres using a spigot technique of disposal. In Germany, Russia, and Belarus, tailings are disposed of by using a stacking technique with piles reaching over 150 metres in height. With the Autazes Potash Project, WorleyParsons and BPC seized the opportunity to reduce both the environmental footprint and the cost of the project as compared to conventional tailings piles.



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The unique situation in the Amazonas State is the amount of annual rainfall, which can be up to seven times greater than other locations. This amount of precipitation creates a significant amount of brine when it comes into contact with the tailings pile (for every tonne of KCl that is refined, approximately two t of NaCl is produced along with one m<sup>3</sup> to two m<sup>3</sup> of highly concentrated brine). Without proper management, this brine has the potential to contaminate both surface water and deep aquifers.

To mitigate this challenge, WorleyParsons designed the TMA to meet the project's environmental and financial objectives:

- Long-term storage and secure containment of mining and processing plant solid waste material;
- Collect, contain, and safely dispose of the brine generated during operations;
- Meet or exceed the regulatory requirements for tailings storage and brine disposal;
- Low CAPEX and OPEX; and
- Allow for environmentally responsible decommissioning and reclamation.

These objectives were achieved by designing a conveyors and staking equipment system to collect the tailings in a set of two large prism-shaped piles, built as two separate units. Each unit is comprised of one pile and one brine collection pond located alongside each pile. The piles each measure 1,200-metres-long by 1,200-metres-wide by 21-metres-high (at the highest point), with a 1:5 slope. The maximum pile storage volume is 25M m<sup>3</sup> and the brine ponds are designed to store two weeks of runoff at the peak of the rainy season.

This system capitalizes on the very high rate of precipitation in the area, which creates an opportunity for accelerated decommissioning of the salt tailings. The brine resulting from the natural dissolution is collected in a series of storage ponds where separation of insoluble particles takes place. The clear brine from the ponds is disposed of in a 300-metre-deep brackish aquifer using conventional deep-injection wells. The remaining insoluble residues are sealed from the top, covered by topsoil and re-vegetated as part of mine decommissioning.

This TMA design has the capacity to dispose of 97M m<sup>3</sup> of tailings over the 32 years of Life of Mine (LOM) and by using the natural dissolution of the tailings piles, not only will the process of mine decommissioning and site remediation be significantly accelerated, but the environmental footprint is reduced, thereby resulting in an overall cost savings.

By introducing this innovative tailings management technique to the potash industry, WorleyParsons set a new standard for cost efficient and environmentally responsible management of tailings. ♦

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# Mining for solutions

*Fortis Mining Engineering and Manufacturing provides unprecedented service through its unique methodology*

By Jonathan Hamelin – Originally printed in *Global Ventures* magazine

When Garry Clarke first joined Northern Strands – a leader in mine hoisting and rigging equipment in North America – he brought a problem-solving mentality to the company.

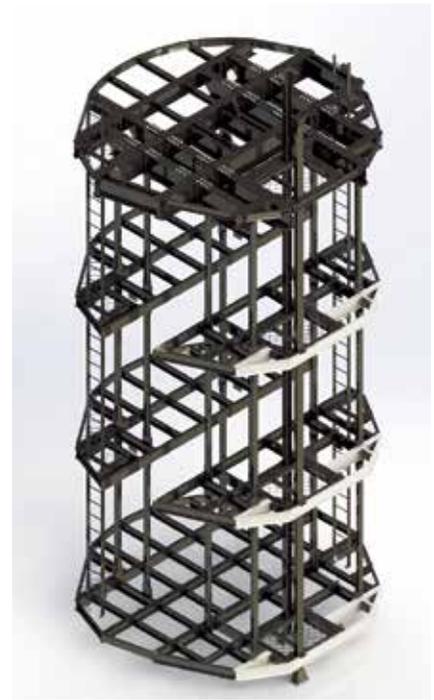
“I had worked underground in the mines for quite a number of years. Basically, I had solid contacts in the mines and I knew the problems they had and gaps where they needed help with certain projects,” said Clarke, who joined Northern Strands in 1998. “One of the big problems involved succession plan-

ning. Around this time, a lot of the miners who had grown up around the same period were beginning to retire and many of the mines really didn’t have a good succession plan in place.”

Early on during Clarke’s time with Northern Strands, he said the company was presented with ample opportunities to provide mining solutions, so much so that it became a bit short staffed. In 2006, Clarke provided a solution to this problem by forming a subsidiary of Northern Strands called Fortis Mining Engineering and Manufacturing. The

privately owned company based out of Saskatoon was created to provide mining, engineering, and manufacturing services to the mining and construction industries.

“We really started off small with a small fabrication and machine shop,” Clarke said. “We wanted people to view us as the full-meal deal. We wanted to be able to take on a job and control whatever it took to get that customer back up and running again. From the beginning, one of Fortis’ biggest assets has been that we hire the right people.”



Fortis quickly expanded to offer a wide range of services to the mining and construction industries. For example, the company is involved in everything from exploration drilling to mine development to steel erection to piling and concrete work to decommissioning. The company performs site assessments and creates safe work procedures to complete jobs, whether through a custom procedure, the design of a new piece of equipment, or a combination of both.

Clarke explained that Fortis has capabilities that other companies don't have. He said the thing that sets the company apart is its policy of approaching a job almost from "before the start" and seeing it through right to the end and commissioning of the system.

"When we go to a mine, we 'take inventory'; what does the mine have for equipment? What resources are available at the mine? Can the work location at the mine change in status?" Clarke said. "Fortis' experience enables the company to analyze a job and break it down into manageable steps, with the tasks to each step outlined.

"Often times, the solutions devised to address a problem or potential prob-

lem are simple and logical and many people wonder why they didn't think of those solutions. The answer is that Fortis performs this work for a living. We have been doing rope work and underground mining work for years and have developed tangible critical analysis skills that are unmatched in the industry. Fortis has been following this methodology for years and well before the mining industry introduced the concept of critical path."

It's an approach that Mike Hydomako can speak to personally. Before joining Fortis, where he now serves as general manager, he was a client of the company. When he was involved in mining operations, he noted that shaft time was valued at upwards of \$1,000 a minute. He said that Fortis really understood the importance of controlling the whole value stream and employing people who understand what needs to be done.

Now as an employee with Fortis, Hydomako is proud to be offering the same high level of assistance.

"We actually rehearse to the point where we pick stuff up in our yard with a crane to mock it up just to make sure everything's going to fit the way we say.

We have computer programs we can use and in some cases we physically do some of the job in our yard before going out to the client," Hydomako said.

"For one project, we had an employee waiting at the airport at 6 a.m. to pick up some parts that needed machining in our machine shop. That machining process was finished at about 3 p.m. and driven straight to a customer four hours away. We did not let the product leave our hands because the downtime is just that important to the customer."

Fortis prides itself on continuously improving its processes, which results in increased efficiencies that are passed along to the customers. The company has achieved and maintained ISO 9001 Quality Management, 14001 Environmental Management, and OHSAS 18001 Health & Safety Management Certifications, which ensures its products and services are safe, reliable and meet standards.

The majority of Fortis' consulting work is done locally in Saskatchewan. However, through its association with Northern Strands, its mining attachments are sold all over North America and overseas in places such as Mongolia and Africa.



*“Safe” and “efficient” are key words for Fortis, as they permeate through every project, procedure and piece of equipment manufactured by the company.*

When it comes to Fortis’ international work, the company has benefitted from being a member of STEP.

“The marketing and industry research that STEP has done for us has been very beneficial,” Clarke said. “They’ve researched different mines throughout

North America and their capabilities and other facts about their mines. They’ve helped organize potential meetings in foreign countries and put us in contact with translators.”

One of the company’s recent achievements that can benefit mines across the

globe has been the development of the Mobile Reel Handler.

“Fortis recognized the challenges that the mines faced when dealing with a 45,000-pound reel at the bottom of the shaft; there was no easy way to move it, safety of the workers was an issue as multiple workers were required to help maneuver the reel itself,” Clarke said. “We designed the Mobile Reel Handler so that one worker could load the reel and position it in place without ever having to leave the seat of the machine. It is safer for the workers, safer for the reel and wire rope, and more efficient.”

“Safe” and “efficient” are key words for Fortis, as they permeate through every project, procedure and piece of equipment manufactured by the company.

“At times, we literally wrote the book on mine safety and the mines appreciate it,” Clarke said. “More often than not, the mines call Fortis when something has gone awry, to assist in repairs and create new safety procedures to prevent it from happening again. It’s a business partnership built on trust. The mines trust Fortis and its employees.”

Whether local or global, Fortis can meet customers’ needs. ♦

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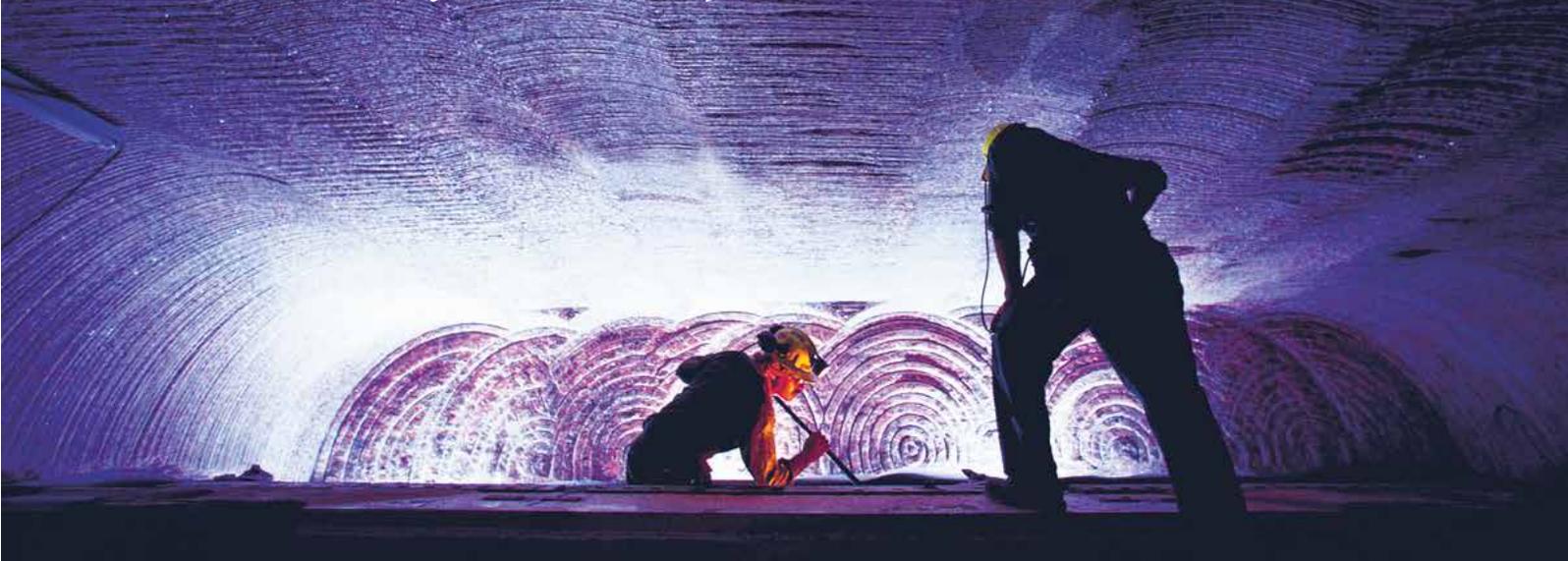
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# Winning Together – Delivering optimized performance for your mineral processing needs

*Akzo Nobel Surface Chemistry*



AkzoNobel, which serves the Canadian potash industry from its facility in Saskatoon, succeeds by working together closely, frequently, and multi-functionally with potash producers. The company and its customers rely on each other's expertise to maximize value and success.

"By combining producers' expertise in processing ore with AkzoNobel expertise in chemistries and their function, the companies win together and maximize recovery and grade," says Mark Podwysocki, AkzoNobel regional manager, mining applications.

Two-way communication is essential, he notes. It is particularly critical prior to a mine starting full-scale production, as technical experts specify the flotation/separation solutions that a particular mine requires.

"Our mining business requires customization at almost every plant to improve the recovery and the yield," says

Podwysocki. "Due to an increasing emphasis on providing environmentally responsible solutions."

For AkzoNobel, a key to optimizing performance is to deliver the most cost-effective and best-performing solution, essentially one that defines value, optimizing recovery and yield for the specified ore. With a passion for excellence, AkzoNobel develops solutions to meet potash processor's market needs, and complements those solutions with technical expertise.

Company technical experts account for process conditions, adjusting reagent chemistry and selection as necessary. Further, systematically organized technical service ensures customers have access to the most appropriate technical experts to assist in responding to their processing challenges and determining the most effective flotation solutions. AkzoNobel backs its product and technical expertise with regulatory support, such as ensuring collector chemistries

meet appropriate processing regulations and obtaining proper permits.

The result is a full-service, collaborative approach, from mining challenge through delivery of an innovative solution to ongoing follow-up.

AkzoNobel's core principles are: safety, integrity, and sustainability. Building on these fundamental concepts, the company has articulated key values that sharpen its offering. The values are organized under the categories of customer focus, delivering on commitments, passion for excellence and winning together. AkzoNobel tailors specific actions and programs within each category to each mining customer.

Tying it all together into one cohesive statement, AkzoNobel expresses its value offering to the potash industry:

"Winning together, delivering optimized performance for your mineral processing needs." ♦

# Yorkton



## Grow with us!

*Gallagher Centre Recreational Complex and Exhibition Grounds.*

There has been substantial growth along the Saskatchewan/Manitoba border over the past 10 years and Yorkton may be the perfect location for your business.

The city hosts a highly diversified economy of essential industries, such as health care, government services, manufacturing, construction, food processing, retail, and the wholesale trade. Yorkton has more than 1,100 registered businesses, employing over 9,000 workers.

A well-educated and skilled workforce, moderate property taxes, and stable commercial, industrial, and residential sectors have made Yorkton one of Saskatchewan's key economic regions and third-largest trading areas. There is an excellent supply of residential and commercial properties, plus a future industrial corridor to be developed.

Yorkton is at the centre of the largest and richest potash fields in east-central Saskatchewan. Regional and international businesses have invested billions in new ventures and expansion projects, creating new employment, which in turn leads to increased recreation and residential opportunities. The city knows collaboration is the key to success, and through partnerships with local and regional agencies, assists new and expanding businesses to ensure a bigger, brighter future for the region.

Yorkton's strategic location on Hwy #16 between Winnipeg and Saskatoon and on Highway's 9 and 10, allows it to play a key role in the distribution of goods and services, either within the western provinces or to the United States. Both the Canadian National and Canadian Pacific Railways have major transportation links to Yorkton

and service the canola crushing plants and other industries in this region. Yorkton Regional Airport also provides air access for commercial businesses and corporate jets, with some limited passenger service to several northern Saskatchewan and Manitoba communities.

Yorkton is also located within a trade corridor that connects Mexico and the mid-western states with the Port of Churchill in Manitoba and other areas of Western Canada. Yorkton has actively participated in the Ports-to-Plains Northern Working Group Strategic Plan to enhance this trade corridor and the numerous markets that exist within it.

In terms of recreation, Yorkton's Gallagher Centre is one of Saskatchewan's best recreation and entertainment complexes. It houses the convention



*Century Field.*



*Deer Park Golf Course, home to provincial and Canadian tournaments.*

centre, hockey arena and curling rink, plus a popular water park including excellent swimming facilities, wave pool and waterslide.

Parkland College provides both university and technical skills programs. The opening of the new Trades and Technology Centre in 2015 introduced training programs for truck and transport technicians and agriculture machinery technicians, specialized training in power engineering, as well as welding and a multi-mechanical trades certificate program. These programs are all geared to provide students, particularly those within the region, with specialized local training to match local job needs.

Yorkton and the surrounding region is well positioned for continued substantial economic growth in the next five to 10 years. ♦



*Richardson Oilseeds Ltd. and the nearby Louis Dreyfus canola crushing plants together process over two-million tonnes of canola annually.*



*The New Parkland College Trades and Technology Centre, home to training programs for truck and transport technicians and agriculture machinery technicians, specialized training in power engineering, as well as welding and a multi-mechanical trades certificate program.*

# Solutions with a vision

By Justin Hunt



*Ens Industrial's electric Toyota Land Cruisers. The first two units are scheduled for delivery to Mosaic's underground potash mine near Colonsay, Sask.*

"I think it's the solution for the future. And I think we're almost there," said Josh Ens, president of Ens Industrial. "Within the next two to five years, that's going to become a big part of the way we do business."

Ens was talking about how rapidly battery technology has developed in the last few years. Today, automotive and commercial vehicle applications are effectively using battery power and electric drives to reduce the need for internal combustion engines and fossil fuels. Ens Industrial, based out of Saskatoon,

Saskatchewan, is one of only a handful of companies worldwide driving the research, development and introduction of this electric vehicle technology to the underground mining industry through personnel carriers, and service and support vehicles. The electric vehicle is particularly attractive to the underground mining industry due to the potential reduction in ventilation and heat, and the obvious occupational health aspects related to diesel exhaust in an underground environment. The elimination of diesel fuel dependency means the elimination of fuel costs.



*Josh Ens, president of Ens Industrial.*

“Our approach was to take our underground-mine-proven Toyota Land Cruiser cab and chassis, equip it with state-of-the-art dual-lithium-ion batteries providing 68 KW of capacity, Remy 90S electric motors, and a battery management system developed for Ens Industrial by EV Drive Systems. In keeping with our original concept, we have designed our electric vehicle drive system to be retrofitted to nearly any Land Cruiser underground application. We did this for a number of reasons; interchangeability and multi-application use is central to our plan,” says Ens. “The batteries replace the engine and the drive motor is coupled to the original power train.” It sounds simple, but rest assured it’s not an easy proposition.

After two years of product development and prototyping, Ens Industrial’s first production trucks are ready to enter the market with first two units scheduled for delivery to Mosaic’s underground potash mine near Colonsay, Saskatch-

ewan. These electric vehicles will each be equipped with two on-board battery chargers, one 120V charger with an eight-hour charge time plugged into a 120V outlet, and a 600V charger with a one-hour charge time designed to be plugged into mine power. The vehicle offers self-diagnostics, a view of operational characteristics such as speed control and state of battery charge through a dash-mounted HMI (human, machine interface) seven-inch touch screen, a regenerative braking system, and a driving range of 108 kilometres under normal load.

Reaching this point represents a significant milestone in achieving Josh Ens’ vision for product development at Ens Industrial, but it is not the end post.

“We have significant interest from the underground hard rock mining sector for our electric vehicles; this poses a number of challenges with regards to a variety of factors. Temperature differences

and grades of operating surfaces are the most significant hurdles. We have a few select clients whom are willing to work with us in the early introduction of the electric Toyota Land Cruisers into this environment, so we are very optimistic of being successful here.”

Ens also announced Ens Industrial has entered into an distribution agreement with Marcotte Mining Machinery Service Inc., a Canadian manufacturer of medium-to-large underground mining equipment, which includes shotcrete gear, anfo chargers, scalers, crane trucks, scissor lifts and scalers, to name a few. This is another important milestone towards realizing Josh Ens’ vision of positioning Ens Industrial as a full product line, full-service provider of underground service and support utility vehicles to the underground mining industry. This new partnership further enables us to serve our customers to a greater capacity, offering a wider variety of products and services. ♦

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# Norwest Corporation

*Providing services to the potash industry*

Norwest Corporation (Norwest) is a leading international energy, mining, and environmental consultant that has been providing services to the resource industry for over 37 years. Norwest's geoscience, mine and geotechnical engineering, hydrogeological and surface water management and

tailings management expertise supports our clients during all stages of exploration, planning, operations, and closure. With the recent formation of Heavy Norwest, the ability to supply design-build services through the combined engineering expertise of Norwest and the construction capabilities of Heavy North

now exists. Heavy Norwest brings the proven HSE performance, experience, and work execution capabilities of both founding companies to our clients to assist them in maximizing the value of their assets by conducting work in a safe and efficient manner.

Norwest has been assisting the potash industry in Saskatchewan since 2007. Norwest's Saskatoon office is supported by our operations in Calgary, Vancouver, Salt Lake City, and Denver. In addition to our potash experience, we continue to leverage off of the knowledge gained from working in various commodities in North America and around the globe to identify innovative and effective solutions for the industry.

*Norwest has been assisting the potash industry in Saskatchewan since 2007.*

Over the years, Norwest has safely completed a wide range of projects for our potash clients, including numerous exploration programs with planning, permitting, procurement, construction, drilling, coring, completion, and core lab data acquisition and management responsibilities. We were the prime contractor for a freeze well drilling program, completed under very strict tolerances, to allow shaft sinking operations at a new mine development in central Saskatchewan. We have also provided maintenance planning support, as well as operational reviews to mines.

Norwest has supplied water-related services for several potash clients. Planning and evaluation work has included the numerical modeling required to predict flow from selected aquifers into mine workings using multiple probabilistic realizations of potential conduit locations, permeabilities, and flow



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rates. Field services work included the construction of cluster-well sites to test the surficial aquifer and evaluate its potential for both water supply and mine inflow issues. Geological deliverables were the identification of low-permeability surficial sediments to act as the bottom seal of a future tailings management area. Hydrologic testing included baseline water data, pumping tests, slug tests, and purge/recovery tests.

Heavy Norwest's civil construction work includes recently completing the final reclamation of potash exploration well pads used during the previous winter's program, as well as the construction of a toe drain and decommissioning of the existing French drain for a tailings management area at an existing operation.

As we continue to expand our presence in the potash industry, providing HSE excellence with the goal of zero harm, the value-added and efficiency focus of our personnel in all aspects of what we do, the support from experienced personnel, and the use of industry-leading systems is our commitment to clients. ♦

For more information on Norwest and Heavy Norwest, please call one of our offices or visit our websites for a full listing of our capabilities at [www.norwestcorp.com](http://www.norwestcorp.com) and [www.heavynorwest.com](http://www.heavynorwest.com).



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# Legacy custom-designed fertilizer storage facility capitalizes on flexibility



*The IEI Barge Services' potash port terminal in Illinois.*

When IEI Barge Services needed to expand the bulk storage capacity of its East Dubuque, Illinois facility in a location with challenging soil conditions, and where traditional building materials were expensive and impractical, they turned to Legacy Building Solutions for a lightweight fabric structure that would keep potash and other materials undercover, while not degrading in the presence of corrosive materials or harsh weather.

Every Legacy project starts with listening and designing to the needs of the specific project. IEI barge needed to store 15,000 tons of potash, plus DAP, urea, MAP and ESN, for a total capacity of 27,000 tons. They also required separated bins for each pile of product with retrieval access via river, truck, and railcar.

Legacy created computer-generated models of the six storage piles and the steel frame, foundation and interior transloading equipment. In addition to storage bins, the building was cus-

tom designed with an offset peak, conveyor, and three operations lean-tos to optimize loading functions and storage space.

The main cavity of the building measures 77-feet-by-580-feet, with the lean-tos measuring 40-feet-by-340-feet, 25-feet-by-130-feet and 25-feet-by-60-feet. The unique shape and features of the building simplify the process of storing and distributing potash. Each lean-to has overhead doors to create a straight drive path for trucks and allow heavy equipment and loaders to maneuver inside the building.

The cast-in-place concrete foundation was specially designed to minimize pressure on the soil. Concrete was also used along the sidewalls to increase the load-bearing capacity and create separate storage bins with lift gates.

The polyethylene fabric of the Legacy structure is ideal for the highly caustic fertilizer environment. It will not corrode, has a flame-retardant coating, and allows natural light inside the building. Because of the corrosive nature of the environment, the steel building frame members were made of hot dip galvanized steel to resist rusting and pitting.

The offset peak design placed the conveyor in an ideal location to reach all six bays, allowing the overhead crane to re-

*The cast-in-place concrete foundation was specially designed to minimize pressure on the soil.*



*Legacy Building Solutions was able to offer IEI Barge a lightweight fabric structure that would keep potash and other materials undercover, while not degrading in the presence of corrosive materials or harsh weather.*

ceive product via barge for maximum cost savings, or to use a rail-unloading method to restock more quickly. IEI Barge turns product three-and-a-half times per year, and having the capacity to load via multiple methods allows their customers to quickly adapt to changing markets.

The passive ventilation system - consisting of 18-inch eave extensions for intake, and 30 peak roof vents for exhaust - further reduced the amount of electricity needed to run the building. The eave extensions also have icebreakers, gutters, and downspouts for moisture control. The ventilation system,

along with the non-conductive nature of the fabric, maintains a temperate environment inside the structure, which feels up to 20-degrees cooler on hot days.

After the design phase was complete, Legacy dispatched experienced crews to install the building according to precise specifications and strict safety protocol. Working with Legacy allowed IEI Barge Services to construct a building customized to receive, store, and distribute fertilizer efficiently, while keeping within their budget and unique environmental needs. ♦



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# FEECO stands out from the crowd with comprehensive potash equipment and process solutions



A 3D FEECO Rotary Dryer.

When it comes to potash processing, few companies can claim the expertise that only comes with decades of working in the potash industry.

FEECO International has been serving the potash industry since 1951, through material testing and process development, product design, custom processing equipment, as well as aftermarket services. It's no wonder that the world's top potash producers rely on FEECO International for all of their potash processing and equipment needs.

## **Material testing | Process development | Product development**

The FEECO Innovation Center is a state-of-the-art material testing and process design laboratory. FEECO utilizes the Innovation Center to gather valuable material and process data in order to engineer custom process solutions and equipment. Material testing in the FEECO Innovation Center is where many potash projects begin. FEECO has built a vast knowledge base around the various derivatives and blends of potash. Producers

*Potash samples created in the FEECO Innovation Center.*





*Potash before and after agglomeration in the FEECO Innovation Center.*

bring their unique sample to FEECO where process experts help explore options in process and product development.

Still, other projects begin at FEECO for different reasons; a product is underperforming; a process isn't running at its rated capacity; a new market has opened up opportunities for an existing product.

Depending on the answers sought, and where a customer is in their process, testing typically begins at batch scale, where process engineers explore the possibility of creating a product from the sample at hand. As testing progresses, proof of product is achieved, then proof of process, and finally, process and product optimization.

The Innovation Center is capable of testing both compaction and pelletizing (tumble growth) methods of agglomeration, as well as drying and glazing. Various binders and equipment configurations can be tested to achieve exact product specifications.

The Innovation Center uses a PLC/MCC system from Rockwell Automation to provide process transparency and data visualization throughout the testing process - an invaluable tool during the process development stages.

Once the process variables have been defined, FEECO engineers can scale up the process.



3D FEECO Bucket Elevator.



*All FEECO equipment is built to the highest-quality standards to ensure optimal and reliable processing for years to come.*

All FEECO equipment is built to the highest-quality standards to ensure optimal and reliable processing for years to come. Various customizations are available to combat the corrosive, abrasive, and hygroscopic nature of potash, including reinforced high-wear areas, specialty materials of construction, and optional components to combat buildup.

As a Rockwell Automation partner, FEECO can provide all equipment and systems with state-of-the-art control systems for process automation, data collection, troubleshooting, and reporting capabilities.

### **Aftermarket services**

In addition to process design and custom equipment, FEECO also provides a wide range of aftermarket services. This includes everything from field services such as laser alignment, to installation and commission support, routine maintenance, process and equipment audits, replacement equipment and spare parts, and even training programs. This includes equipment that was not manufactured by FEECO.

“What’s unique about us is that we can help our customers from start to finish; from taking an idea and turning it into a reality, to manufacturing the equipment they need, helping them to install it, and then maintaining it,” states Dan Madigan, president of FEECO. “Our customers appreciate the background we have and our ability to assist them full-circle because of it.”

In the potash processing industry, no company can provide quite the experience that FEECO can; they’ve developed a reputation as the material problem solvers, the company with the reliable equipment, and the company that can service any of your potash processing equipment. When it comes to potash processing and equipment, FEECO stands out from the crowd. ♦

### **Custom process equipment**

FEECO can engineer custom processing equipment around the unique requirements of the sample that gives the customer an optimal processing operation and the ability to achieve project goals.

FEECO provides an array of processing equipment for the potash industry, including:

- Rotary dryers & coolers
- Disc pelletizers
- Agglomeration, coating, and conditioning drums
- Compactors
- Belt conveyors
- Bucket elevators
- Reversing shuttle conveyors
- Belt trippers & plows
- Belt feeders

# Rock mechanics program for leading fertilizer company



Tim Coleman

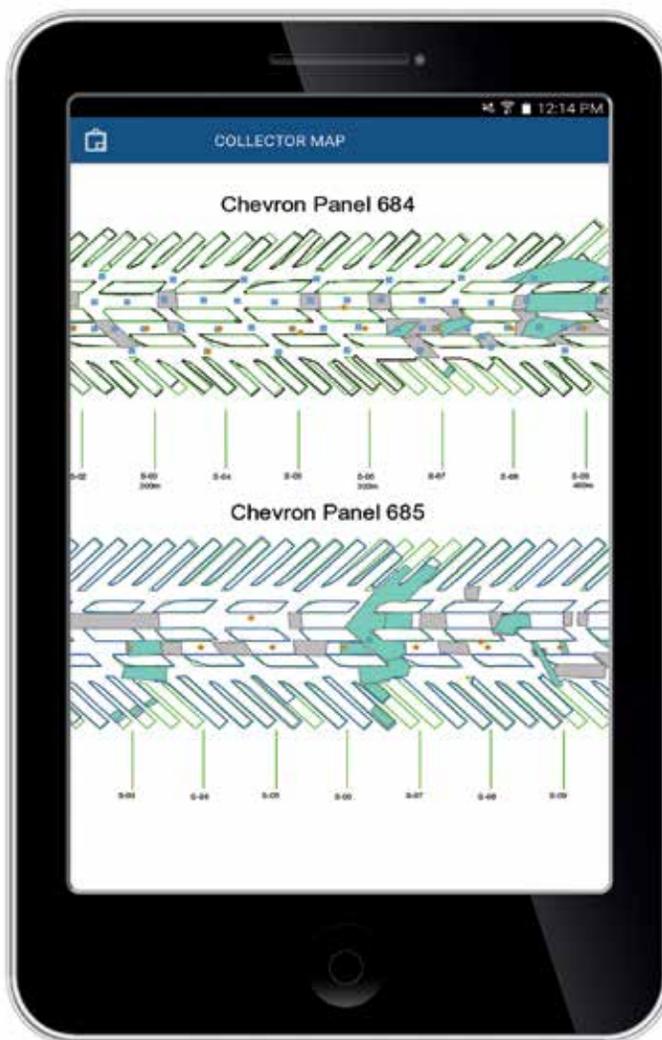


Since 2012, SRK has been working with a major North American producer of agricultural nutrients that owns and operates production facilities in Canada and the USA. SRK has been helping the company's mine engineering department to expand their rock mechanics program, with a focus on collecting data to aid daily operational and long-term mine planning decision making.

Because data management and collection methods are integral to this program, SRK is creating a centralized database to store the rock mechanics data collected by instruments installed around the mine. This centralized database will enable rock mechanics engineers to access the data more quickly and efficiently than if it was dispersed across the instruments that collected it. SRK has also developed a front-end application that queries the data and makes it easy to produce charts that support daily operational decision making.

To save time with data entry, SRK has implemented the Environmental Systems Research Institute's Collector for ArcGIS application. Running on a tablet, this app allows users to electronically record data from rock mechanics instrumentation while underground, therefore saving office time for data analysis and review. It also enables instrument locations to be represented spatially on a mine plan, making it easy for users to refer to the data collected for each area of the mine. Furthermore, SRK has set up the app to enable users to map geological features directly on a tablet while underground. By eliminating the need for geologists to convert hand-drawn maps into digital maps, they have more time for carefully interpreting the data in the office.

The large geographical extent of the Saskatchewan potash mines, typically more than 10 kilometres from north to south and east to



*Saving time with data entry, SRK has implemented the Environmental Systems Research Institute's Collector for ArcGIS application, which runs on a tablet.*

west, results in variations in depth, geology, and ground conditions across the mines. When these variations occur at a regional rather than a local scale, the changes in the ground conditions and regional stress regime can become substantial. This can pose challenges with the mining methods developed early on, when the mines were much smaller.

SRK has been working with the company's mine engineering teams to analyze different mining methods and to predict which would best accommodate the challenges faced with varying depth and geology. SRK analyzed the rock mechanics data collected around the mines and created and calibrated several numerical models to estimate the likely performance of each mining method. A final design

was developed for the chosen mining geometry and was implemented in a trial panel, mining of which was successfully completed in January 2016. The trial panel was instrumented heavily to collect data so that actual panel performance could be compared with modeled performance and the models calibrated appropriately. The resulting panel design has proved to be extremely resilient in handling difficult ground conditions when mining through leached and disturbed ground, and has enabled the recovery of resources that would otherwise have been sterilised. ♦

*For more information, please contact Tim Coleman, principal consultant, mining and rock mechanics, SRK Consulting (Vancouver),  
T: 1-604-681-4196, F: 1-604-687-5532,  
E: tcoleman@srk.com.*

# CMI & HCL expand to meet the needs of the Saskatchewan potash industry



At Continental Mine & Industrial Supply Ltd. (CMI) we collaborate to define and provide innovative solutions. What this really means is that CMI has a unique process to leverage on over 100 years of experience in all aspects of the mining industry, from underground production and maintenance to surface processing to major projects and expansions. Using the wisdom we have gained throughout the years allows us to ensure all of the right questions are asked at the start of a project to ensure that the right problem, scope or needs are defined. Once this has been done correctly it is then quite easy to provide the right solution by providing the equipment that is tailored to meet our customers' requirements. CMI delivers this by partnering with our sister company Howatt Consulting Ltd. (HCL), which is a full-service engineering firm specializing in equipment design, small project execution, and project close-out in our customers' maintenance systems. This allows us to tailor our OEM products to meet our customers' specific

project requirements. CMI also partners with other likeminded OEM's such as Arva Industries, Dux Machinery, Timberland Equipment, and Magnum Slurry where we utilize our processes to collaborate between the customers and the design engineers. All of these OEM's also specialize in tailoring their product to meet the specific needs of each customer. The combination of CMI's OEM and distributed equipment allow us to deliver solutions from the mining face to product storage.

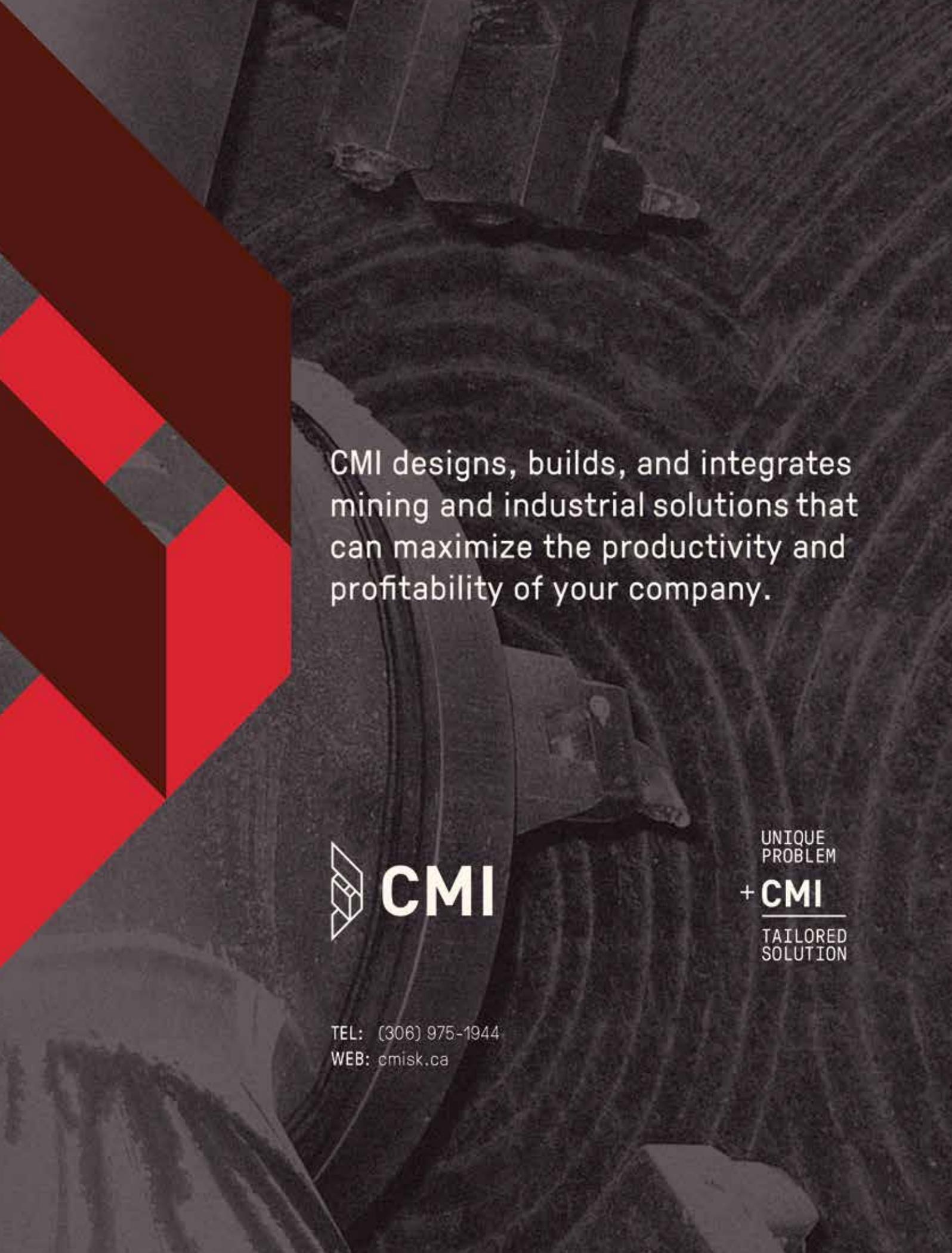
This has allowed CMI to have a significant quantity of our OEM conveyor systems and equipment throughout the mining industry in Saskatchewan. Due to our methodologies and aftermarket service, we also have some of the largest mobile equipment fleets in service with well over 100 pieces of underground mobile equipment put into service within the last five to 10 years.

CMI & HCL have recently moved into a larger facility to allow us to continue growing to meet our customers' needs.

Additional space is allowing CMI to continue to increase value to our customers by strategically increasing inventory for items like slurry pump parts, conveyor idlers, and crane and scaler parts. It also allows modular construction for conveyor galleries, pumping stations, compressor stations or any other modular strategies to be added to our project capabilities. We are presently developing our service side of the business. This will allow us to refurbish, repower and overhaul the equipment that we have supplied over the past 25 years since CMI was established.

The present downturn in the mining industry has put more focus on ensuring that the overall best value is being obtained at all times. Value is defined as the lowest lifecycle cost which includes a balance of capital cost, maintenance cost, reliability/availability, and overall service. CMI's processes and philosophies are a perfect fit to achieve this requirement for our customers. Our innovation is helping reduce operating costs by expanding automation in the mining process, reducing clean-up costs by developing dust collection and handling systems, and improving overall safety by providing the right equipment, including battery-powered options for the job. We look forward to working with you to help meet your unique requirements. ♦





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# Inproheat Industries blends communication and innovation in the potash industry

At Inproheat Industries, we are people helping people. This guiding philosophy has been reflected across three generations of company history through rich long-term client relationships and innovative project solutions.

It's common knowledge that strong business relationships are prime building blocks towards sustainable growth. In our current technological climate, communication happens at a rapid pace, which makes it essential to identify a client's needs and act on them quickly. At Inproheat, we take a "listen, understand, and act" approach to client communication, built on a shared foundation of trust, transparency, and efficiency to promote loyalty and repeat business.

The emphasis on understanding and efficiency is also present in Inproheat's project solutions, where we have long-recognized that continued system design improvements will provide our customers with industry-leading products that will exceed their expectations. The stream of constant quality comes from Inproheat's regular observations of industry trends, which help us determine the specific applications where our solutions can have the greatest impact at the most competitive investment.

Inproheat's recent export project for a respected Utah mineral company is a shining example of how communication and innovation can be applied to the potash industry. Having used Inproheat's proprietary SubCom technology for a 30 MM Btu/h process water heating system, the client commissioned Inproheat for an additional unit as part of an expanded system of Sulphate of Potash (SOP) and magnesium chloride pro-



*The emphasis on understanding and efficiency is also present in Inproheat's project solutions, where we have long-recognized that continued system design improvements will provide our customers with industry-leading products that will exceed their expectations.*





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*Inproheat constantly observes industry trends, which help them determine the specific applications where their solutions can have the greatest impact at the most competitive investment.*

duction from brine taken from Great Salt Lake. The new system required twice the capacity through two parallel SubCom tanks, four low-emissions burners of 15 MM Btu/h capacity each, along with heat-recovery units for high-thermal efficiency. To provide an operator-friendly environment and facilitate the transition, Inproheat integrated previous components and design specifications.

By project's end, Inproheat had delivered critical components of an expanded production platform - powered by energy-efficient technology - that could offer the client the lowest GHG emissions and a significant reduction in energy costs.

We identified the client's needs and delivered the appropriate solution with expert knowledge, precise implementation, and dedicated after-sales support. As a result of this project, our relationship continues to grow.

Inproheat's Saskatoon office offers dedicated service for the North American potash industry. We look forward to designing innovative energy solutions for your project - as people helping people. ♦

*For more information, contact Mahmoud Saleh, technical sales at Inproheat Industries - Saskatoon branch, (306) 934-3399, or msaleh@inproheat.com. Visit them online at inproheat.com.*

# Advancing in slow times

## *The safety-performance nexus*

By Collin Pullar, SCSA President

There are many ways companies can take advantage of an economic slowdown. This could be as basic as stocking up on discounted machinery and equipment, or as elaborate as planning for a merger or acquisition to better position your company in key markets. Having a close look at improving your safety management system is another consideration that may not be a top priority, but it should be. The nexus linking safety management to company performance is inextricable and well-worth the investment.

Protecting workers from injuries that can lead to work stoppages and project deficiencies is a major area of concern. Industry experts deem access to skilled labour as the number-one issue troubling industry in 2016 and beyond. Increasing attention is also being paid to safety violations and unsafe practices that are costing companies more than a blemish on their safety records. Serious injuries and fatalities can lead to shutting down worksites temporarily, or for good, causing major financial losses and reputational damage. Having adequate safety measures in place is a necessity for contractors looking to outshine competitors and land bids for high-profile projects.

When working to recruit and retain highly-skilled workers, take a good look at your company's safety culture and climate. Think of safety culture as a type of investment that ensures employees are valuing and promoting safe work practices on a daily basis. Your safety climate is the measurable product of these efforts that can be used to inform strategic decisions for improving safety performance, and in turn, company performance. Although safety climate typically refers to the level of employee awareness, attention, and perceptions to the role safety plays in the workplace from the bottom-up; implementation and maintenance of a strong safety culture is very much an ongoing effort driven from senior leadership, management, and supervisors to front-line workers and support staff.

Having a formal health and safety program in place is an effective way to show commitment

from leadership and encourage the same type of commitment among employees. At the management level, supervisors are especially important players in the system as they are the ones most frequently and extensively interacting with workers on a daily basis. As with any system, producing and regularly maintaining policies, plans, and the structure of the program is required. It may sound like a lot of work, but the long-term benefits have been shown to save companies costs by reducing risk of accidents, damage to equipment, losses in production, and of course, injuries to employees.

Safety programs, such as the Certificate of Recognition (COR®) program offered by the Saskatchewan Construction Safety Association, ensures construction companies have the tools they need to develop, implement, maintain, and continually improve their health and safety management systems. When you have management and employees both embracing and promoting the notion that doing a job properly means doing it safely; you know you have succeeded in safety management and are sure to realize the many benefits it can bring.

*Collin Pullar is the president of the Saskatchewan Construction Safety Association, an industry-driven and funded association serving over 9,000 commercial, industrial, and residential construction member companies in Saskatchewan. Its mission is to provide high-quality safety training and advice to construction employers and employees that will lead to reduced human and financial losses associated with injuries. ♦*



# The importance of potash companies adequately managing their risks

Potash companies, regardless of their size, stage of development or operations, are constantly exposed to internal and external conditions that can unexpectedly affect their ability to achieve their business plans and strategic objectives. Events and their consequences that result in aberrations from expectations, affecting the certainty of organizations meeting business plans and strategic objectives is what is considered here as “risk”.

What then is the biggest “risk” facing mining companies?

The biggest risk is their failure or inability to effectively manage the enterprise-wide risks that they face.

Why then is this the biggest risk that they face?

In not effectively managing enterprise-wide risks, mining companies will likely not meet critical business milestones, or worse, struggle to recover from risks for which they were not adequately prepared.

Companies that do proactively identify, analyze, and evaluate enterprise-wide risks, and develop and implement risk treatment and risk financing measures appropriate for their organization as part of their decision-making processes, will be more resilient and therefore more likely to be able to successfully manage any unplanned events, while still sustainably achieving their business plans and strategic objectives.

If a company is committed to managing its risks, it will be able to attract and retain high-quality people as directors, officers and managers. This will better enable the organization to identify and prepare for opportunities and threats through proactive management and effective governance. Other stakeholders, including employees, shareholders and other investors, communities, regulators, suppliers and contractors, will have confidence and trust in the company if they believe the organization is dedicated to managing risk. This can also help in establishing and maintaining stakeholder



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support and approval for the company's activities, as well as obtaining the ever-important financing needed for projects and operations.

What then is "risk management"?

Paraphrasing the definition in ISO 31000 Risk Management - Principles and Guidelines, a globally well-recognized and accepted international standard, risk management is a dynamic essential element of all organizational processes involving ongoing, adaptable systematic, structured and timely activities that direct and control an organization with respect to the risks it faces and helps facilitate continuous improvement, as well as creating and protecting value.

With commitment from the top of the organization, a framework of policies, plans, responsibilities, resource requirements and processes can be designed and entrenched within its tactical and operational functions that will help ensure that risk management is embedded in its culture and integrated within its decision-making processes. The end result of these efforts will be to increase the likelihood that a mining company achieves its business and strategic objectives, whether at the board table, C-suite, mine face or drill rig.

GeoResources Risk Solutions is a Canadian-based company with global reach providing expert and independent enterprise risk management to organizations of all sizes and operations. GeoResources adds value to organizations at any stage by using its wealth of international extractive industry-related experience and knowledge to help organizations to (1) design and execute dynamic enterprise risk management programs that foster risk-aware cultures; (2) ensure that organizations benefit from risk management as a core element of decision-making processes; (3) identify, evaluate, and measure enterprise-wide risks to facilitate achievement of business objectives; (4) assess, develop, employ and monitor practical risk treatment measures that can effectively manage risks in the most cost-efficient manner; (5) ensure risk profiles are properly managed for the benefit of the organization; and (6) impartially assess, design, and implement effective and cost-efficient risk-financing programs as part of the overall management of enterprise risk. ♦

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# Northern Strands

*Exceeding expectations for over 45 years*

By Tonya Lambert

For over 45 years, Northern Strands in Saskatoon has been helping mining and construction companies to grow their businesses, safely and efficiently.

Northern Strands' company motto is 'exceed their expectations' and they are constantly developing new ways to do just that. This past year alone, they have become the exclusive North American distributor of the world-renowned Becorit synthetic liners, have launched a new rigging testing program, established distributors across the province and have purchased the province's first under-bridge access hydra platform.

## **Quality questions**

Northern Strands' commitment to its clients begins the minute you walk in their door or contact their office. Every member of staff is trained in rigging so they can help you to find the right tool or piece of equipment to meet your unique needs.

Owner Garry Clarke explains, "If you were to phone us and ask for some rigging, basically we would start asking you questions and interviewing you. We would ask where you're working and what type of things you do. In some cases, we would even ask to come out and see the site so we could ensure you were getting exactly what you needed."

The Becorit synthetic liners are a good example of the quality for which Northern Strands is known. These sheave liners are a high-end dependable product that are easy to work with. The Mining Ropes & Attachments Division is continually searching for the highest quality products for their customers.

If the company doesn't have the equipment you need, they will find it. And if it doesn't exist, they will design and build it. Together with its affiliate companies, Fortis and Certified, Northern Strands employs a wide range of experts who embrace challenges and will brainstorm everything from customized rigging and lift plans to new types of equipment.

## **Safety first**

In keeping with the company's motto, 'exceed their expectations', Northern Strands offers an extensive variety of programs and services designed to keep your workers safe and your operation flowing smoothly.

Safety is everyone's responsibility at Northern Strands and is a key value across the Fall Protection Division as they work with customers to eliminate or manage the risks associated with working at heights.



*Sinking bucket.*

In addition, Northern Strands' Training Division has several courses that create better worker awareness on the jobsite. Some of the more popular courses include Fall Arrest, Crosby Rigging, Tugger Safety, Emergency Responder, Wirelock Socketing, and First Aid/CPR-C. Each course is offered regularly at Northern Strands, but companies also have the option of requesting on-site training for their employees. Such individualized sessions can be arranged for any time – days, evenings, nights, or weekends – anywhere in North America.

"If you want to do mine shaft training, we will go in your mine shaft," states Clarke. "If you want to go underground, we'll go underground. If you want to go in a grain elevator, we'll do that, too. This way the training really means something to your employees because we are in their own work environment."

### **Tested & true**

Well-maintained equipment goes hand-in-hand with worker awareness when it comes to safety. For several years now, Northern Strands has been running a chain and lever hoist exchange program whereby they will give you a discount on your purchase of a new chain or lever hoist when you bring in your used hoist.

"We don't care what kind of hoist it is," says Clarke. "What is important is getting that old equipment out of the mix because when those old mechanical devices [hoists] fail, it can be disastrous."

In addition, Northern Strands, a COR- and ISNET-certified company, now offers mobile rigging demonstrations. Using a mobile test bed built by their affiliate company Fortis, Northern Strands will conduct on-site testing demonstrations of your rigging equipment. Clarke says people are often surprised at just how much of a difference a seemingly small deficiency, such as a tiny tear, mineral coating or improper usage can make. The rope or sling can no longer handle anywhere close to the amount of weight or force that it was designed to manage. This testing really emphasizes the necessity of proper maintenance, correct usage, and when you should replace your rigging.

### **Access granted**

Northern Strands recently acquired a Hydra Platform HP 32. This under-bridge access platform makes construction work safer and swifter by reducing inspection, maintenance and repair down times, as well as decreasing the amount of lane shutdown on bridge traffic. Northern Strands will be using it to carry out its own inspections, as well as renting it out to other companies to use.

"Northern Strands has a suspended access division, which is like our limousine service," explains Clarke. "It gets you to where you want to go, whether it's to the top of a building, down in a mine shaft, or underneath a bridge. Where you need to get to, we provide the access to that, as well as providing the training if you want to do it on your own."



*Chase block and pins.*



*Suspended access hydra platform.*

### **Expanding availability**

Over the last five months, Northern Strands has established nine distributorship locations across the province. These distributors provide access to rigging products in geographical locations distant from the company's offices in Saskatoon and Regina. Northern Strands supports its distributors by offering the same technical expertise they would offer to a client purchasing direct. As Clarke states, "We support our distributors, who in turn, support their customers. It's a win-win for everyone."

Northern Strands' commitment to the safety and well-being of the people of this province and beyond encompasses much more than its training courses and test beds. The company was a major sponsor of the 2016 Saskatchewan Health & Safety Leadership Charter Event and Mission: Zero Awards, and is a charter member of the organization. Northern Strands also supports many local charities, events and sports teams, including the Children's Wish Foundation, the Agrium Delisle Rodeo, and the Vimy Dinner for wounded veterans.

Let Northern Strands help you to exceed your expectations. Their excellent sales, service and support are geared to ensure your safety and success. ♦

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# First Nations and First-in-Class

*JNE solidifies its position as a best value, western Canadian supplier*



L-R: Chief Peter A. Beatty, Peter Ballantyne Cree Nation; Jim Nowakowski, JNE Welding; Chief Lawrence McIntyre, English River First Nation

When JNE Welding announced its new First Nations ownership in January 2016, it was a moment of pride for the company's founder and CEO, Jim Nowakowski.

"We've never wanted to be a 'me-too' company," he says. "We've always tried to be a different kind of supplier to industry, from the skill of our craftspeople to the scale of fabrication we can handle in-shop. Our First Nations ownership is another key difference."

Nowakowski speaks with pride about JNE's new aboriginal partners – Eng-

lish River First Nation and Peter Ballantyne Cree Nation – and the plans they are making to train and hire aboriginal employees, build relationships with aboriginal suppliers and sub-contractors, and invest in aboriginal community and business development.

"We want to be the 'go-to' steel fabricator for companies looking to strengthen their aboriginal supply chains. Our track record, reputation for quality, and now First Nations ownership makes us an unbeatable partner."

JNE has been the mining industry's go-to steel fabricator for over 30 years.

A recent mega-fabrication project involved pressure vessels that made a three-day trek from JNE in Saskatoon to the K+S Potash mine site in southern Saskatchewan; the final leg of a journey that began in China. JNE took 17 truckloads of prefabricated pieces shipped from China and transformed them into the two truckloads of finished crystallizer pressure vessels delivered to the mine site.

The ability to handle all aspects of the project was a key factor in awarding the contract. "We saved K+S from the problems of taking delivery of the parts and assembling the units on site," says Nowakowski. "Instead, JNE did the work in a controlled shop environment. As well, these were very high nickel alloy materials that added complexity. Quality assurance was a major factor."

Ronald Kikkert, former senior manager procurement at K+S, said, "They have an open culture in doing business. I like their flexibility and understanding of our needs. They focus on getting things done. We've recently awarded another contract to JNE. I would strongly recommend them."

The delivery of the finished units also demanded sophisticated logistics. Bill Murray, project director of Veolia Water Technologies, HPD® Evaporation and Crystallization, says the contract was not awarded until the ability to transport the units to the final destination was confirmed. Planning the transport can take a year, including a route survey to identify all potential obstacles.

"The quality was excellent. Plus, they were very flexible and easy to work with," says Murray. "JNE was better



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*Pressure vessel en route to K+S site.*



*500,000 lb pressure vessel leaving JNE shop.*

*The Saskatchewan work ethic of JNE's employees, which now number over 130, is at the heart of the company's reputation.*

than many companies we have worked with, in both the U.S. and Canada."

JNE's experience, facilities, and certification prompted a similar call from Eta Process Plant in the UK, looking for a quote to build four 500,000 lb pressure vessels under tight timelines and stringent specifications.

"We ended up working around the clock. It was an incredible effort by our entire JNE team, including our shop superintendent and project planner," says Nowakowski.

Eta's John Morgan says, "They bought into the spirit of the project, completed the job within the required time frame, coped with the demands of visiting inspectors, and worked with us to ensure the vessel internals and packing media were installed prior to shipment. It was an excellent team effort."

The Saskatchewan work ethic of JNE's employees, which now number over 130, is at the heart of the company's reputation. In 2016, JNE was named one of Canada's best-managed companies, affirming its status as a best value, first-in-class supplier. ♦

# SRC processing services for potassium ores

By Jack Zhang, Saskatchewan Research Council

The Saskatchewan Research Council (SRC) provides comprehensive and robust mineral processing and metallurgical testing experience and technologies from lab scale to pilot scale for pre-feasibility, feasibility and engineering studies. These are critical services needed by the potash industry around the world.

All deposits require specialized processing to treat the different minerals. To help clients maximize the value of their deposits, SRC uses its extensive experience to continuously improve and develop processes and analyses for deposits. These deposits occur in various locations worldwide, such as Spain, Africa, including Congo, Ethiopia, and Eritrea, and South America, including Argentina, Chile, and Brazil.

Many deposits contain a variety of ore types that require specialized processing to treat the different minerals in the ore to produce products, such as Muriate of Potash (MOP), Sulphate of Potash (SOP) and Sulphate of Potash Magnesia (SOPM).

MOP, the most common form of potash is effective in the cultivation of crops, such as wheat, oats, and barley. SOP is effective in the cultivation of fruits, vegetables, tobacco and tree nuts. SOPM is a type of SOP applied to soils with magnesium deficiencies or on crops that heavily consume magnesium.

The table below illustrates examples of ores and the related products from deposits around the world.

SRC's expertise has enabled clients to maximize the value of their potassium deposits and create products such as SOP. SRC recently developed a process for clients to produce SOP from the deposits in East Africa. A high-purity SOP sample was produced through pilot plant campaigns for marketing purposes.

Technologies from SRC's Advanced Microanalysis Centre™ and Geoanalytical Laboratories are critical to analyzing these deposits. Quantitative evaluation of minerals by SCANNing electron microscopy (QEMSCAN®) can provide critical mineralogy information such as mineral identification, distribution and liberation size. X-ray diffraction is used to identify specific minerals, particularly clay minerals, which affect mineral recovery. ICP-OMS provides the precise chemical analyses of deposits. The information gained from this analysis is essential for designing mineral processing in the most effective way, to maximize recovery and minimize tailings and waste water.

SRC is Canada's leading provider of applied research, development, and demonstration and technology commercialization. ♦

*To learn more about how SRC supports the mining industry, visit [www.src.sk.ca](http://www.src.sk.ca), or email [info@src.sk.ca](mailto:info@src.sk.ca).*

Location	Mineral Deposits	Product
Saskatchewan	Sylvinite, Carnallite	MOP, Magnesium (Mg) byproducts
Europe & South America	Sylvinite	MOP
New Mexico	Sylvinite Langbeinite	MOP K-Mg
Mexico, Belarus, United Kingdom	Polyhalite	SOP, Mg by products
East Africa	Sylvinite, Kainite, Carnallite	MOP, SOP, SOPM, Mg byproducts
China, Australia	Salt Lakes	SOP, MOP

# Grinding it out



*Huwood before and after.*



With the market conditions that exist in 2016, phrases like “cost reduction”, “reliability improvements”, and “efficiency gains” have become part of the common vocabulary amongst the potash mining sector. Standard Machine has found a role where they can impact each of these factors.

Located in Saskatoon, Standard Machine operates one of the best-equipped open-gearing and mechanical power transmission facilities in North America, offering the highest-quality machine and gear works available, and setting the standards in world-class manufacturing using employee empowerment to guide a culture of continuous improvement.

## **Reliability improvements**

With precision gear grinders capable of producing aircraft-quality gearing, Standard Machine has the ability to improve gear ratings by improving the quality of the gear finish. Ground-quality gearing transmits power more efficiently, so not only does it increase the strength ratings, it also reduces the noise of the gear mesh and improves the vibration issues that exist in some gear drives.

## **Gearing regrinds/cost reduction**

Standard Machine has the experience and expertise where they have been able to regrind existing gearing and increase the life



*Open gearing.*

between rebuilds. This service includes non-destructive testing to ensure the gears have no cracking, then the gearing is ground to restore the gear tooth profile to like-new condition. Whether it may be gearing for an underground continuous borer or a conveyor drive gear reducer, having the benefit of regrinding the existing gearing instead of having to replace with new has proven to reduce the rebuild costs significantly.

### **Efficiency improvements**

Grinding does not only have to be restricted to gearing alone, Standard Machine also has the capability to provide ground-quality compactor rolls for the potash industry. With the ability to

grind any form of corrugation, it allows us to duplicate the wide range of styles utilized within the industry to meet our customers' specific preference. The improved surface finish has proven itself to reduce the effects of glazing, and therefore improving the production results of the compaction circuit.

### **Bearing repair services**

Since being acquired by Timken in 2013, the addition of a grinder to fully restore the useful life of your bearings is available at our Saskatoon facility. Backed by an industry-leading warranty, it creates an option to extend the service life of the bearings and improve the overall cost of operation, without sacrificing quality. ♦



*Potash compactor roll.*

*Located in Saskatoon, Standard Machine operates one of the best-equipped open-gearing and mechanical power transmission facilities in North America,*



*Timken Bearing Repair Centre in Saskatoon.*

# Why waste good pipe?

By D. E. Russell, PICA Corp.

Pipelines are routinely replaced well before their design life has been expended. The CAPEX for a new pipeline often runs into the millions of dollars, and yet at least half of this CAPEX can be deferred for many years if non-destructive inspection (NDT) techniques are used to identify areas thinned

by corrosion. These can be surgically repaired at a fraction of the replacement cost, and the pipeline can remain in service for many years.

Pipelines in oil, gas, water, wastewater and slurry service, running at pressures over 100 PSIG, are usually made

of steel, cast-iron or ductile-iron, i.e. metals that corrode. If the inside and outside of the metal pipes are not protected from corrosion by good-quality liners and coatings, it is likely that local areas of corrosion will result in premature failure of the pipes.

Many cities in North America, and in fact, the whole industrial world, live with water and sewer leakage rates of 30 per cent or more. Unmetered drinking water that leaks out of poorly coated pipes is a source of lost revenue for the water companies and a source of pollution for our waterways. Because drinking water is "clean", the penalties for allowing leakage are weak, and it is only now becoming a global warming issue as people realize that energy is being consumed to pump the chemically treated water into the soil.

Waste water pipes also leak; however, the EPA levies stricter fines for pollution of waterways by sewage, and can put water companies under consent decrees if they fail to reduce the leakage over time.

Oil and gas pipelines that leak cause much more pollution, and because they are flammable substances, the consequences of failure often include injuries, severe property damage, and loss of life. Consider the protests against new O&G pipelines that are occurring today ... mostly driven by the relatively poor record of pipeline failures. Yet, considering the amount of product that flows through these pipelines, they are still the safest and most cost-effective means of transport.

In the pulp, paper, and potash industries, pipelines are used to transport raw water for the plant feed, salty water from solution mining techniques, and effluent for disposal deep under-

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Like every NSC railcar built in Hamilton, Ontario, Canada, each order brings about new ideas allowing us to constantly refine our approach to continuously improve the end product. Our 4300 cf covered hopper car is no exception – it boasts the shortest car length, lowest light weight and highest carrying capacity in the industry.

With over 11,000 cars in-service NSC continues to carry the weight of the potash industry.



ground. These are all processes where leaky pipes are not an option, and many owners opt to replace pipes after they have leaked several times, even if that decision is mostly to save face from the bad press that results from a pollution event.

PICA (Pipeline Inspection and Condition Assessment) Corp., offers several NDT methods to detect weaknesses in metal pipelines. In our 20 years of experience inspecting pipelines in the applications mentioned above, there is one fact that we have found to be common to all: corrosion is usually highly localized and can be fixed cheaply if you know where it is. In fact, we have noted that the majority of pipelines have only one per cent to four per cent of their length that needs immediate attention (i.e. it is leaking or is about to leak). Figure 1 shows the results of an inspection of a pipeline that is 1,100 feet long. Note that there are three areas that have through-holes that need immediate attention to avert leaks. The rest of the pipeline is perfectly serviceable for many years with no need for any maintenance (although installing a cathodic protection system would further lengthen the life of the pipeline). In Figure 1, the Y-axis is remaining wall thickness, and the X-axis is distance down the length of the pipeline. The small dots are individual, localized pits that are progressing through the pipe. Note that there is a fair length of pipe with no pits at all!

PICA's in-line inspection tools provide high-resolution readings of the pipe's remaining wall thickness. Readings are taken every 0.100 inches along the length of the line, and in hundreds of locations around the circumference. This allows PICA to report the axial position, clock position, depth and length of defects exceeding 20 per cent in depth. Figure 2 shows a typical in-line inspection tool. These tools can be tethered for short lengths, or free-swimming for length of up to 30 miles, and are introduced into the pipeline through "pig launchers" and receivers.

If access to the pipeline is restricted, or if it cannot be shut down for a short time for the inspection, PICA offers an external technique that can be used to scan short lengths of pipeline. In some cases, this technique can be coupled with guided wave ultrasonics to interrogate up to 300 feet each way from an access point. Figure 3 shows PICA's bracelet probe being used to inspect a sewer line.

Now that inspection techniques like these are commonly available, it is important for asset managers to learn of what they offer, and consider the cost of running a survey. Usually the costs of the survey and the local repairs are less than 10 per cent of replacement costs.

In the past, asset managers had to infer pipeline condition from leak frequency, soil resistivity, pipe age and other indirect factors. Often, 90 per cent or more of the pipe could have been life-extended using simple repair techniques,

Figure 1

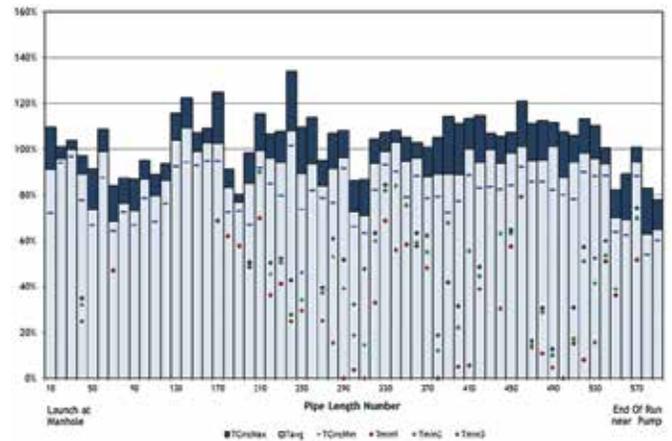


Figure 2



Figure 3



some of which do not require the pipeline to be taken out of service (e.g. clamps). One of PICA's customers reported over \$20 million of deferred CAPEX costs by using this suggested inspection and repair technique. The exceptionally detailed information delivered by PICA's in-line tools allowed the pipeline manager to make good decisions about repair, rehab, or replacement of the pipelines.

In summary, NDT techniques are now available for most industries that employ pipes and pipelines. Capital expenditures can be deferred for years by pro-actively investing in good-quality inspection techniques and focused maintenance. ♦

For more information, contact PICA at [info@picacorp.com](mailto:info@picacorp.com).

# DSI Saskatoon expands



**D**SI Saskatoon is expanding its operations by adding 10,000 square feet to the existing building. When finished, this facility will deliver a total of 30,000 square feet of manufacturing space under one roof. The larger footprint allows DSI Saskatoon to enhance equipment to manufacture forged head rock bolts, forged head rebar bolts, washer plates, as well as increase cable bolt production capacity for the Western Canadian market.

The expansion is well-timed as DSI has been awarded a three-year contract to

supply PotashCorp with ground support for all of their Canadian underground mines. DSI Saskatoon will have the ability to produce the majority of products for the local market from their Saskatoon plant. By heightening manufacturing capabilities, DSI furthers its goal of quickly responding to fluctuating customer requirements and delivering product on time. As DSI Saskatoon continually seeks efficient methods, the new space was designed to incorporate additional automation, improving processes in rebar, cable and mechanical bolt manufacturing.

Along with supplemental indoor warehouse space, new office suites will also be created, which includes an up-to-date training room. Before DSI Saskatoon employees are placed in a work cell, training is provided on manufacturing processes and quality control. The new training room is arranged to provide employees with the necessary exposure to a process and to review JSA's, allowing staff to understand hazards before being assigned to a station.

The expansion has not been limited to the structure. Concrete pads and asphalt are being added to the yard, enhancing overall inventory preservation and delivery performance.

Once complete, DSI will have two large manufacturing facilities in Canada with Saskatoon serving Western Canada and the Sturgeon Falls, Ontario location serving Eastern Canada. ♦

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# CanNorth: Stewards of the environment

In Saskatchewan, “green” is often associated with the province’s favourite football team; however, one environmental consulting company is ensuring that this colour is also connected to environmental health, growth, and sustainability.

Incorporated in 1997, Canada North Environmental Services Limited Partnership (CanNorth) provides high-quality environmental and heritage services to a diversity of clients for a wide range of project types. CanNorth is 100 per cent owned by Kitsaki Management Limited Partnership, the business arm of the Lac La Ronge Indian Band. Notably, CanNorth is the only First Nation-owned consulting company in North America to obtain ISO 9001 (quality management), ISO 14001 (environmental stewardship), and OHSAS 18001 (occupational health and safety) International Standard certifications. CanNorth is also a Certificate of Recognition (COR) program-certified company and is registered with ISNetworld. They also believe they are the only First Nation-owned company in the world with these credentials.

CanNorth offers the technical skills and knowledge to deliver solutions for managing environmental risk in ways that benefit the client, satisfy regulatory requirements, and offer First Nations people and local communities employment, training, experience, and economic benefits. As a First Nation-owned company, CanNorth maximizes indigenous community involvement in projects, including integrating traditional knowledge, engaging local people in environmental programs, and creating employment and education opportunities.

“We work hard to get indigenous communities involved in projects whenever we can,” said Peter Vanriel, general manager of CanNorth. “We also try to make contributions to the local economy by renting equipment from them,



*CanNorth provides high-quality environmental and heritage services to a diversity of clients for a wide range of project types.*



*CanNorth maximizes indigenous community involvement in projects, including integrating traditional knowledge, engaging local people in environmental programs, and creating employment and education opportunities.*

for example. In a typical year, we work with about 35 locals, many of whom have been working with us for 10 years or longer.” First Nations people appreciate that resource development must be environmentally responsible and sustainable to

ensure opportunities to future generations.

CanNorth’s corporate objectives are to provide high-quality, cost-effective environmental services to resource developers and government agencies, to involve

and train indigenous people in environmental monitoring programs, and to facilitate effective communication about environmental issues between government, industry, and indigenous people. CanNorth offers a wide variety of services from environmental project proposals, scoping, and study design to regulatory liaison services, specializing in the following areas: aquatic, terrestrial, hydrology, risk assessment, heritage/archaeology, environmental management support, community engagement, and geomatics.

Services that CanNorth often provides for their potash clients include targeted sensitive species surveys, avian risk assessments prior to planned works, and environmental monitoring services during project construction phases. Furthermore, they have recently assisted several potash clients with the development of their wetland compensation plans. The purpose of these reports is to document detailed summaries of wetlands that may be impacted by a



proposed development, such as an expansion at a mine site. They incorporate information collected during field surveys into the report to present a comprehensive picture as to the amount of wetland area lost and the reduced function of wetland habitat, when avoidance of wetlands is not possible. CanNorth has also assisted potash mines in determining the best water supply alternatives and has been involved with investigations related to other aspects that support potash mines, such as rail lines, gas pipelines, and electrical transmission lines, among others.

CanNorth has completed over 2,500 projects and has truly become an example of Canadian environmental stewardship. As part of its efforts to pursue new opportunities throughout Canada,

CanNorth recently opened up an office in Markham, Ontario. With its diverse skill-set, CanNorth has extended its clientele to include Crown corporations, governments, and some of the world's largest mining and oil and gas companies. Their clients include potash, uranium, gold, nickel, diamond, copper, graphite, and silica sand mines. CanNorth is engaged in multiple opportunities throughout the world and has worked on projects in Panama, Argentina, and Kyrgyzstan and is further exploring opportunities in Chile. CanNorth prides itself on scientific and professional integrity.

In this way, CanNorth works to keep the environment green within this province's borders and beyond. ♦



# CanNorth

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**Specializing in the mining industry**

# AAI's technical expertise in potash

The mission of Agapito Associates, Inc. is to provide innovative, cost-effective, and timely solutions to our clients in the mining, civil, and earth science industries. Our staff is committed to quality engineering and consulting services founded on experience, integrity, and technical excellence.

Agapito Associates, Inc. (AAI) provides consulting services in geo-engineering, mining engineering, and related disciplines and was founded in 1978 and operates out of offices in Grand Junction and Golden, Colorado. Members of the staff include mining, civil, and geological engineers, physicists, geologists, numerical analysts, computer specialists, instrumentation specialists, drillers, laboratory staff, plus administrative and technical support personnel. AAI has completed projects worldwide.

AAI's experience in potash mining and, in particular, in solution mining includes:

- Underground and solution mine planning
- Pilot test design and implementation
- Geology, including resource and reserve estimation
- Drilling program, design, and supervision
- Cavern, room-and-pillar and long-wall modeling
- Project feasibility, including capital and operating expenses
- Subsidence assessment
- Technical reports compliant with NI 43-101 standards

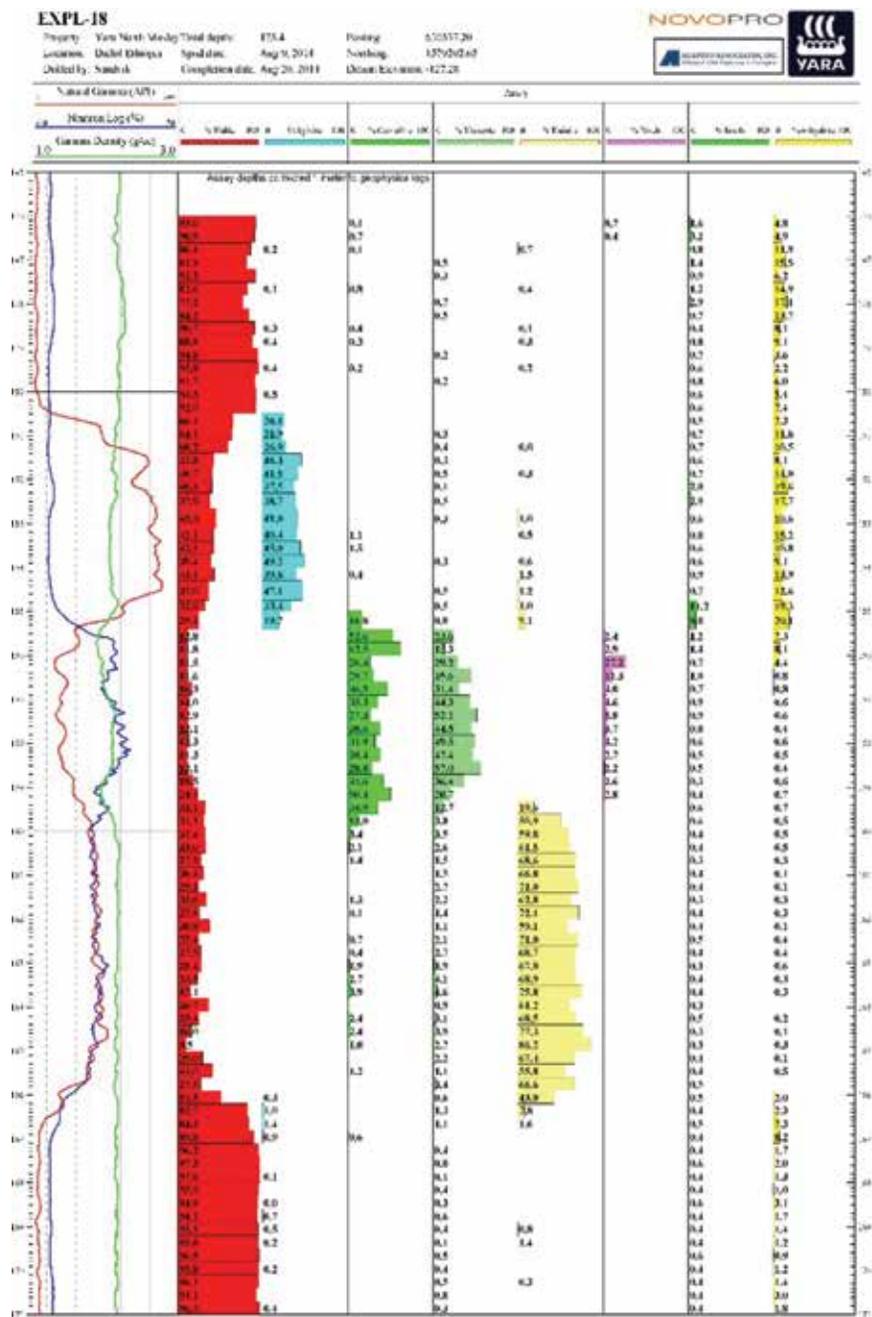
AAI has provided solution mining expertise worldwide since 1988. In particular, AAI potash experience includes major contributions to all the ongoing potash solution mining projects in Saskatchewan. Other potash solution mine projects have been completed for prospects in Ethiopia, Argentina, Brazil,

Egypt, and the Republic of the Congo.

AAI offers integrated capabilities for the design of solution mine plans for the recovery of soluble minerals, such as potash, trona, nahcolite, and salt.

Specific areas of AAI's expertise include:

- Selection of solution mining method
- Development of exploration plans
- Stress determinations
- Geomechanical data collection
- Solubility testing
- Cavern productivity determinations
- Design of cavern and pillar sizes, and cavern orientation
- Well casing selection and design
- Determination of optimum injection temperatures and heat losses in wells and caverns
- Estimates of brine grade based on solubility tests on core, in-situ grade, and



- experience from ongoing operations
- Permitting support
- Geologic characterization utilizing core, geophysical logs, and 3D seismic data
- Quality assurance/quality control (QA/QC) for core handling and core assay
- Wellfield layout design to accommodate surface structures and features, and subsurface geologic anomalies
- Solution mine wellfield drilling scheduling
- Optimization of wellfield scheduling to control impurities in plant feed
- Design of weak brine disposal wells
- Due diligence evaluations

### Geology

AAI has many diverse geologic capabilities from basic drilling and logging to detailed integration of field mapping and hazard analysis. All geologic programs are uniquely tailored to the client's specific needs associated with solution mining, site conditions and budgets. AAI geologists and engineers have access to the latest state-of-the-art resource modeling software that integrates geologic field data and mine plans, critical to defining reserves.

Specialties include:

- Sedimentary deposits including coal, trona, potash, copper, oil shale, phosphate, limestone, gold, molybdenum, and uranium
- Management of exploration programs
- Selection of drilling contractors, specifications, and cost analysis
- Core logging
- Management of downhole geophysical logging
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- Geologic modeling
- Resource/reserve calculations
- Core drilling for resource confirmation ♦



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# Shipping from the Great Lakes

## *Why it works for potash exports*

By Suzanne Bleau-Myrand



*Fednav has built 14 new ocean-going lakes-fitted ships (Lakers) since 2010, with four more on order for delivery in 2017 and 2018.*

**W**hy, given the propensity of ship sizes getting ever larger, does shipping from the Great Lakes with its inherent physical limitations continue to work?

There are many good explanations—the main one being that sailing directly to or from the Great Lakes is the most direct route to the Atlantic Ocean from the industrial and agricultural centre of North America. The St. Lawrence-Great Lakes system reaches 3,700 kilometres (2,340 miles) inland.

Every year, more than 230-million metric tons of raw materials, agricultural commodities, and manufactured products are moved on this marine highway through more than 100 ports and commercial docks of the eight surrounding American states and two Canadian provinces.

Ocean-going vessels are generally positioned close to export ports in the lakes by the transportation of steels, general cargoes, and other raw materials on the inbound voyage leg, reducing expensive positioning days for shippers.

Other factors that favour this system include reduced cargo

damage risks due to minimized transshipment, an experienced labour force that has been strike-free over the past 25 years, and finally, specialized terminal operators are both experienced and flexible with a dedication to continuously improve their performance.

The St. Lawrence Seaway offers both efficiency and reliability. Seaway authorities will have invested in excess of US\$900 million between 1999 and 2018 in modernizing the lock system, including the installation of new hands-free mooring devices for faster and more cost-efficient transiting of locks.

“The Great Lakes-Seaway marine system operates under a well-established safety framework and has coordinated bi-national response programs/procedures in place. Furthermore, over the past decade, its operators have demonstrated an exemplary safety record.”<sup>1</sup>

This marine highway is, without doubt, the greenest route—the shorter distance means less CO<sub>2</sub> emissions. Typically, ships consume 19 per cent less fuel than trains and 500 per cent less than trucks. The St. Lawrence and Great Lakes marine in-

dustry is taking further action to strengthen its environmental performance. For the first time in North America, all sectors of the marine industry have united to voluntarily adopt an environmental program designed to drive a process of continuous improvement along this major maritime corridor. The program, entitled Green Marine, is spearheaded by an alliance of the marine industry associations in Canada and the United States.

Of course, as in anything, there are always issues to contend with. In the case of the Seaway, these would include increasing costs that must be kept in check and the three-month winter closure of the Seaway. In spite of these challenges, Seaway management has worked very hard in minimizing this necessary downtime in order to maintain and improve the locks, and shippers have adapted to plan accordingly by stockpiling at reduced costs for winter months and finding other innovative solutions. To mitigate natural limitations resulting from the lock sizes, ocean fleet operators have invested massively in lakes-adapted vessels. As part of its fleet-renewal efforts, Fednav—the leading international operator in the St. Lawrence—the leading international operator in the St. Lawrence—has built 14 new ocean-going lakes-fitted ships (Lakers) since 2010. There are four more vessels on order for delivery in 2017 and 2018.

These third-generation (Gen 3) superior-quality vessels are constructed at Oshima Shipyard in Japan, and in addition to the standard requirements for loading bulk cargos, are also

adapted for efficiently transporting both bulk and breakbulk. They feature box-shaped holds for ease of stowing general cargo, reinforced decks for stowing heavy equipment and coils, and are each equipped with four cranes capable of lifting 35 metric tons.

These Lakers are the best in their class in terms of both efficiency and environmental protection. These Gen 3 Lakers have an EEDI (Energy-Efficiency Design Index) of 35 per cent less than the original Gen 1 Lakers, consume about 25 per cent less fuel, and are designed to meet the requirements of the CLEAN notation from DNV classification society. Finally, they are the first to be equipped with ballast water treatment systems (filtration and chlorine injection)—well before the IMO Ballast Water Management Convention enters into force.

These additions to the fleet clearly demonstrate the company's confidence and dedication to the future of shipping in the St. Lawrence Seaway and the Great Lakes, as well as a commitment and care for the future of this natural resource. ♦

### Footnote

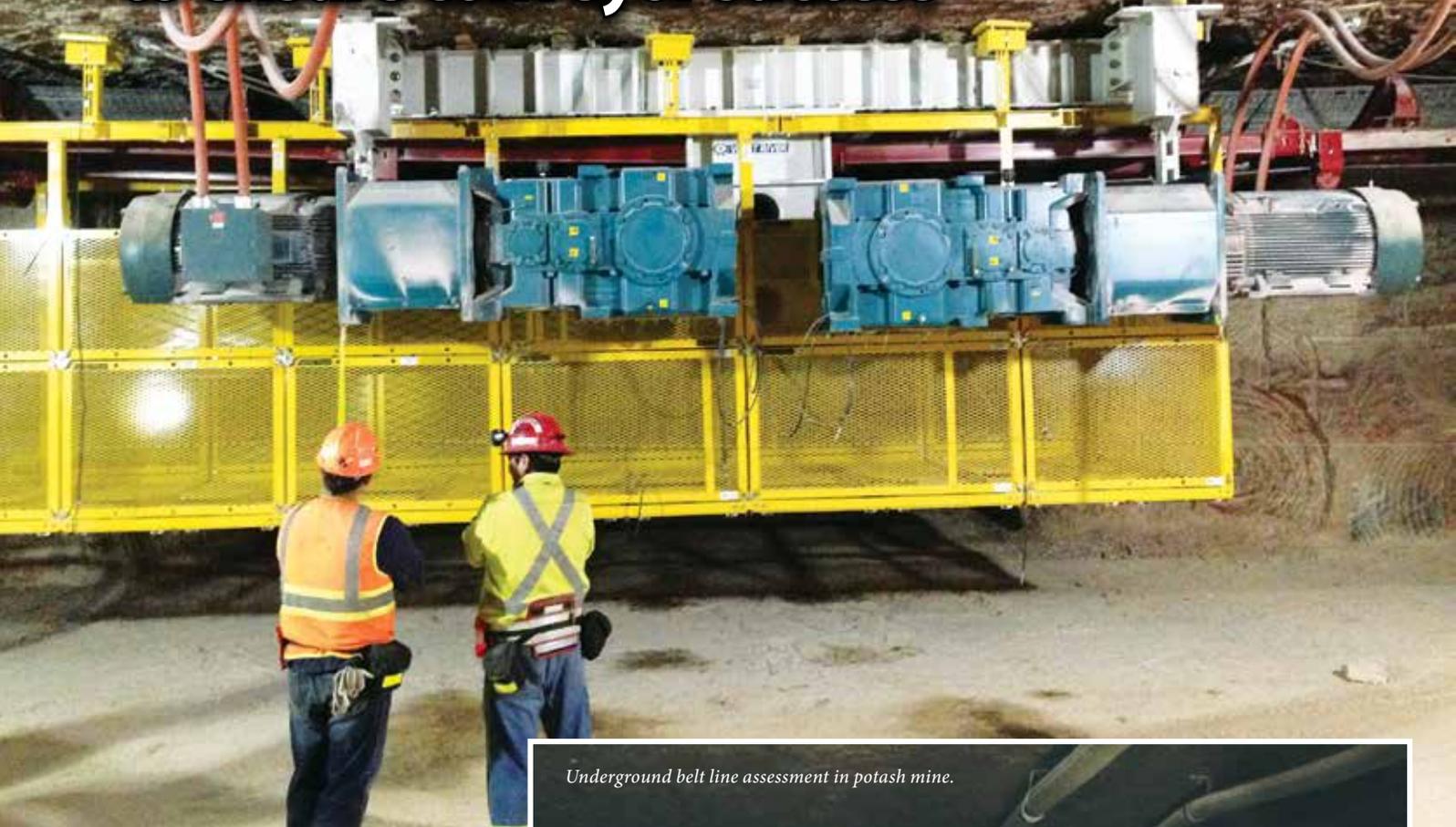
- <sup>1</sup> Great Lakes-St. Lawrence Seaway System. *Safety Profile of the Great Lakes-St. Lawrence Seaway System Executive Summary*. 2014.



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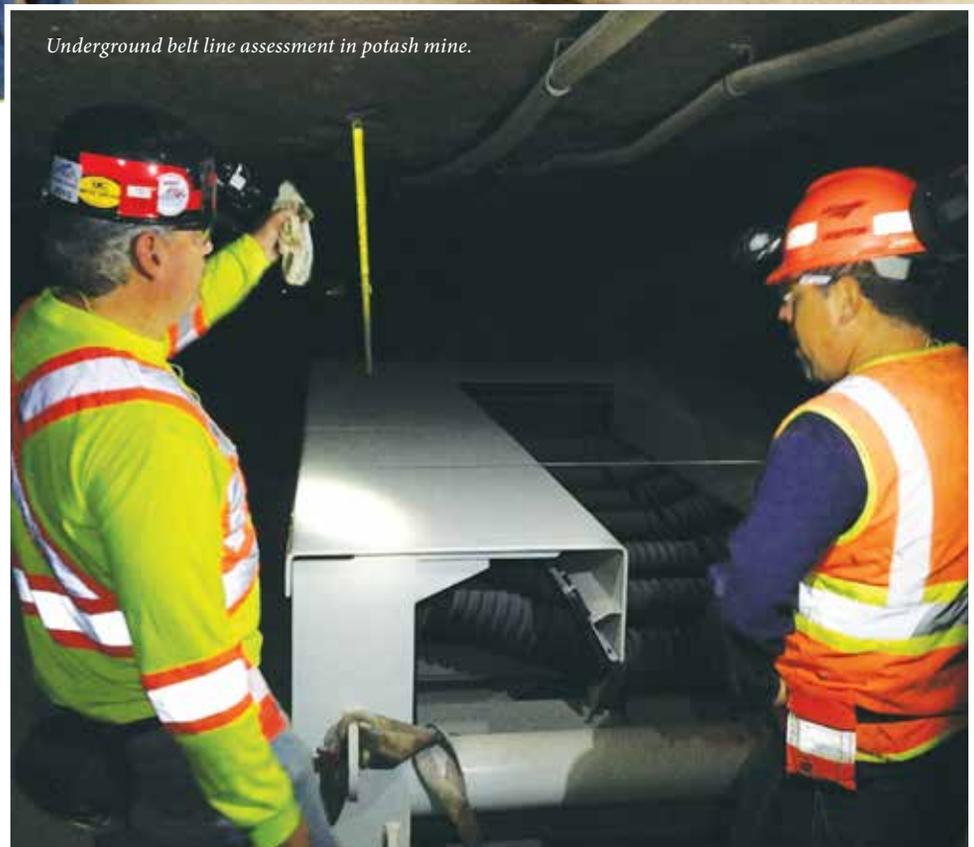
# West River provides belt assessments to ensure conveyor success



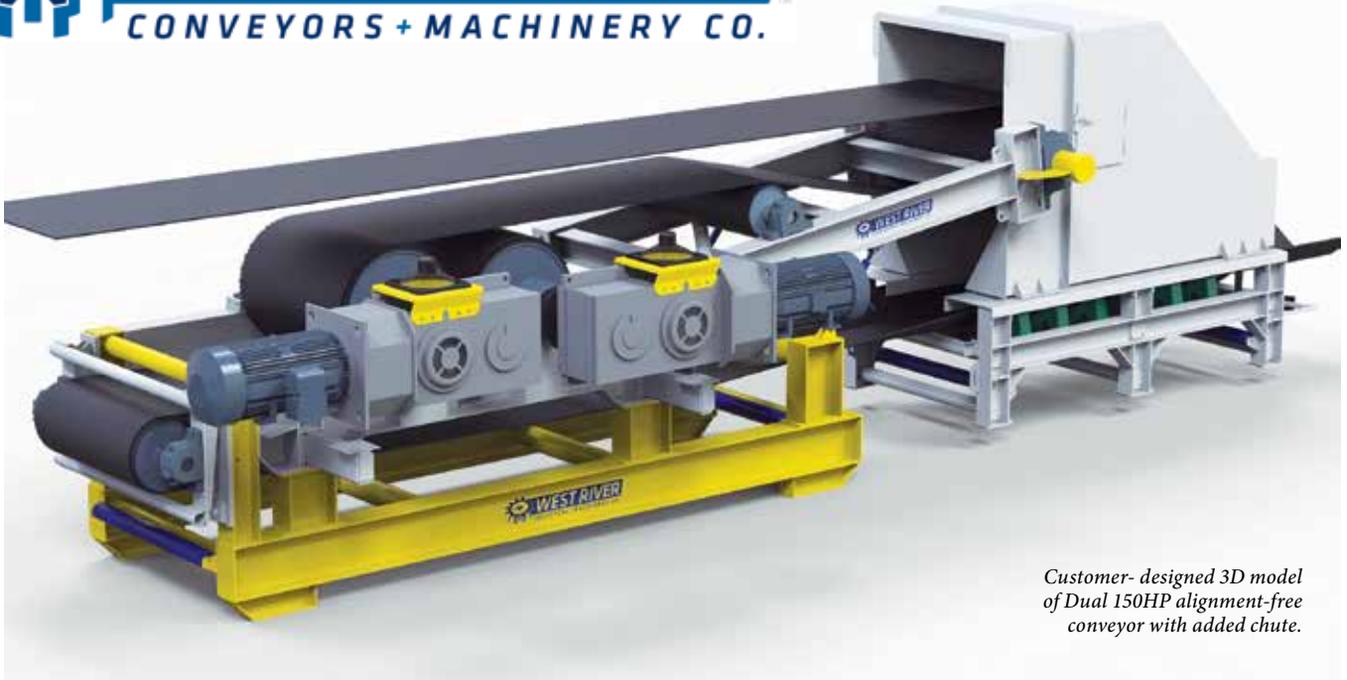
By Jessica Savage, Marketing Manager,  
West River Conveyors

**H**ave you ever been faced with a serious conveyor issue that has caused unexpected periods of downtime at your potash mine, costing a great deal of time and money? Was your conveyor maintenance reactive? Did you react to a situation that could've been prevented? West River Conveyors has developed a Belt Assessment program to evaluate companies' conveyor systems to help customers become aware of premature wear of components on their conveyor line.

West River's team of evaluators can help customers be proactive by finding issues before they become major catastrophes causing significant impact. West River's team looks for premature



*Underground belt line assessment in potash mine.*



*Customer- designed 3D model of Dual 150HP alignment-free conveyor with added chute.*

wear or accidental damage from loading improper sizes and volumes of conveyed material onto the belt. The team evaluates the conveyor from the head drive to the tail to assure that conveyor components are properly installed and sized, alignment is in order, and take-ups are keeping proper tension on the belt. The team checks bearings, motors, reducers, couplings, lanterns, alignment, structure, and belt to determine if the conveyor is running optimally. The point of the belt assessment is to not only identify issues, but offer professional, experienced opinions on how to correct underlying issues causing premature wear on the conveyor line.

There are many benefits of choosing West River to come onsite and evaluate your line and those include 40-plus years of experience in designing conveyor systems and offering solutions to some of the most hard-to-solve conveyor issues, assisting you in finding a long-term solution to a problem instead of a temporary fix, understanding if your conveyor components are undersized/under-designed, identifying problems before they become catastrophic, and also learning about the most modern

conveyor technology available for your material handling system.

West River's assessment team will come onsite to learn about your conveyor system or systems, perform the assessment, and put together a complete report on findings and suggestions for improvement.

According to JB Roulett, president of West River Conveyors, who has more than 40 years of experience with mechanical conveyors and components, "getting an early handle on conveyor issues you may be experiencing is key to preventing inevitable breakdown at the worst possible time." He went on to say that "in the almost 40 years that West River has been in business, we've seen some of the most interesting cases of under-design, conveyor misalignment, belt slippage, improper materials being conveyed, and the conveyor not being able to handle conveyed load. It happens often. Conveyors get moved to different locations and improper loads are added to the belt."

The Conveyor Equipment Manufacturers Association (CEMA) suggests that companies use a combination of pre-

ventive and predictive maintenance to achieve optimal conveyor consistency. West River can help you by being a part of your preventive maintenance program. In addition to analyzing how your line is running, West River will also inventory your entire belt line and provide an overview of spare parts needed and ways to improve/lessen spare parts inventory. West River's professional staff of designers, evaluators, engineers, and planners can help you learn more about your conveyor system and increase longevity.

### **About West River Conveyors**

West River Conveyors is a leader in custom-built, custom-designed conveyor systems for the mining industry, including belt drives, take-up units, tail sections, starters, power pack, discharge/transfer stations, and more. West River also supplies conveyor components to the mining industry. ♦

*For more information about West River Conveyors, call 800-332-2781, or visit [westriverconveyors.com](http://westriverconveyors.com).*

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# Looking to save money on your utilities? Comairco has the answer

By Reimund (Ray) Krohn

When your trailer maintenance facility in Swift Current needs power for lights, you don't go buy a generator. When your pharmaceutical plant in Brandon needs a soft water supply for production, you don't go build a water treatment plant. When it's time to turn on the furnaces to heat your shop in Thunder Bay, you don't drill for gas. No, you turn to your utility providers to answer your needs: electricity, water, and natural gas are sold on the grid, provided by your municipality through infrastructure owned by third parties. Those third parties provide you with what you need, so you don't need to worry about all the other pieces that you don't.

Compressed air is the fourth utility, and it's the lifeblood of your plant. Without compressed air you can't use your pneumatic tools or paint or transport media, or open pneumatically controlled valves, or operate your CNC machines, or aerate your acid baths, or do any of the hundreds of other processes that you need to do in manufacturing, mining, milling, or produc-



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*With a detailed Comairco Air Audit by one of our CAC-certified system specialists, we can measure your compressed air needs, and provide you an on-site All Weather Air (AWA) package to meet those needs.*

tion. In fact, when your compressor is down, you might as well send your staff home. But, what if you didn't have to worry about your compressors anymore? What if you could buy compressed air as a utility? From Comairco, now you can.

With a detailed Comairco Air Audit by one of our CAC-certified system specialists, we can measure your compressed air needs, and provide you an on-site All Weather Air (AWA) package to meet those needs. These AWA Airtility packages are brought to your site - you just need to supply level ground and a power source - and we'll take care of all the rest. After plumbing our station into your system, we provide all the compressed air you require, and you just pay for the CFM (cubic feet per minute). No more purchasing equipment that will become obsolete, no more worrying about scheduling maintenance, or what happens when your warranty period is over. We'll take care of the compressors so you can take care of business.

Groupe Savoie, a leader in the hardwood industry in Saint-Quentin, New Brunswick has been using the Airtility service from our Atlantic Division for the past six years.

"Since then, using compressed air has been as simple as using electricity for us. Service on our compressors has been set up on intervals that are suitable for our needs and applications; and the professionalism and technical knowledge from their maintenance team gives us peace of mind," says Marc-Andre Pineault, director of operations, Groupe Savoie.

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At last, a common sense approach to buying compressed air. Comairco's AWA Airtility. Pay for what you need; not for what you don't. ♦

*Reimund (Ray) Krohn is the general manager for Comairco in Central Canada (northwest Ontario, Manitoba, and Saskatchewan). He has served in the compressed air industry since 1999.*



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# From upstarts to experts

## *A 30-year journey in the Saskatchewan trucking industry*



*NRT now has specialized equipment for hauling over-dimensional and overweight freight.*



*Ice road contracts keep things busy in the winter time.*



*The NRT Training Centre provides training and employment opportunities to northern residents who want to drive commercially.*

Thirty years ago, Northern Resource Trucking was just a dream held by Dave McIlmoyl. At the time, McIlmoyl was working as the general manager for Kitsaki Development Corporation. Before that, he had been the executive director of the Lac La Ronge Indian Band. His primary concern some months was just how he was going to make payroll. In an effort to develop a model that would allow local First Nations groups more control of northern economic development, and which would be more profitable for the band, McIlmoyl began to draft an idea for a new kind of company—a partnership between KDC, Trimac and a number of other northern First Nations and Metis communities, who banded together to work for Cameco.

Thirty years later, Dave McIlmoyl, now the president of Northern Resource Trucking (NRT), can hardly believe the progress that the company has made.

“We never even had the first notion that this is where we would be in 30 years,” he says. “We went from being these northern Saskatchewan upstarts to being pioneers of the concept of limited partnerships to support First Nations economic development. It was an experiment. But now we’re the expert partner, working as consultants for similar programs across the country.”

On top of some prime contracts in Saskatchewan, McIlmoyl has been extending his knowledge and expertise of First Nations (FN) economic development across Canada. After more than a decade aggressively pursuing the expansion of the NRT/Kitsaki model to other First Nations groups, those efforts are starting to

come to fruition. In fact, in the last six months, McIlmoyl has made three separate trips to different reserves in order to consult in the development of NRT-style programs in other jurisdictions.

Gaetan Nolet, a Montreal businessman, envisions a partnership between Northern Resource Trucking, Trimac, and the Kahnawake First Nations to set up a transportation hub in the greater Montreal area that would be ready to serve any mining in northern Quebec that needs them once commodity prices recover and mining resumes.

Dale Eaid with Trimac Sales, is working with a company called Newgold in Ontario. He approached McIlmoyl with similar interest. Newgold and Trimac are hoping to develop a Kitsaki-like business model for their Rainy River project, in which the local Anishinabek FN groups would provide trucking, catering, and environmental analysis companies for the project.

First Nations Mining Economic Development Inc., a company made up of nine First Nations communities between the north end of Lake Winnipeg and the Churchill River, have also been in touch with McIlmoyl. After researching NRT and Kitsaki’s partnership with Cameco, they would like to recreate the model for their own FN communities and mining developments.

“Thirty years ago, we never had an inkling that this was possible. But I guess you put your head down and work hard enough and eventually people notice,” McIlmoyl says.

NRT is proud to be a part of this progress and the development of more Canadian First Nations businesses. ♦



# Partnership At Work

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**La Ronge Training Center**

**P: (306) 425-2148**

**F: (306) 425-5311**

**E: [nrttrainingcenter@sasktel.net](mailto:nrttrainingcenter@sasktel.net)**

# Local 555 delivers the boilermaker advantage

Contractors and owners who have worked in the potash industry with the members of Boilermakers Local 555 know that when they need skilled boilermakers and welders, the union is there to help them get the job done.

"We're proud of the way our members respond to the biggest challenges," says Ted Stark, Local 555 assistant business manager. "Our aim is to work with our contractors and owners."

Here's what makes the boilermakers union the best source for qualified boilermakers and welders:

- Our job-ready dispatch system sends you, the people, with the specialized skills you need and training in all the safety disciplines required.
- Our collective agreements are stable and secure. Your job will proceed without work stoppages caused by labour-relations issues.
- The boilermakers have developed standardized safety training for confined-space, fall-arrest, and respirator-fit testing, which eliminates the need for repetitive training and processing when a boilermaker hires on.
- Our national training programs keep our members at the top of their trade, with training and refresher programs that teach them the newest skills and techniques. That means your job will get done faster and better.
- We back our training programs with state-of-the-art fa-

cilities operated by our locals across Canada. Training of all kinds is available to our members in their home areas.

- Our health and safety programs, including our new initiative - Boilermakers Total Health - guarantee your work will be done with safety as a top priority. We're proud of our excellent safety record, which benefits our employers by ensuring the job gets done without accidents or safety concerns.
- Working with our contractors and Canada's educational institutions, we've designed a national curriculum for our apprenticeship program that guarantees our members are trained to the same high standard everywhere in Canada.
- As a union, we work hard to make sure there are enough boilermakers to meet your needs. When we don't have enough Canadians available, we bring in trained, qualified boilermakers from the United States, Britain, and Ireland so we can complete your job without delay.

When you work with the boilermakers union, you'll have a new and valuable partner in your project. We work as a team with our contractors to make sure their jobs are completed on time and without problems. Over the years, we've built and maintained some incredible facilities throughout Canada. Let us show you how we can bring our skills and experience to bear on your projects. ♦

*To learn more, please contact Boilermakers Local 555 at 204-987-9200, ext. 2, or by email at [tstark@local555.ca](mailto:tstark@local555.ca).*



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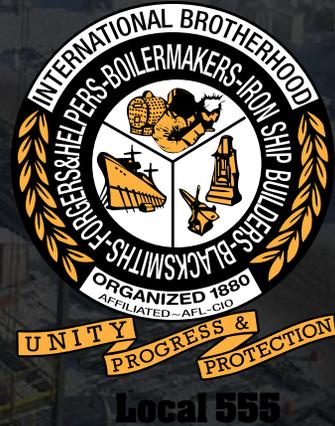
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# The evolution of occupational health and safety in Saskatchewan

The Saskatchewan potash industry began in the 1950's and '60s and continued to take a roller-coaster path throughout the next six decades. This development, combined with the establishment and growth of Canada's second-largest oil and gas industry, has evolved how Saskatchewan companies maintain and grow their most valuable resource: their people.

Occupational health and safety is something that every company is familiar with. Saskatchewan, along with the companies operating within it, has made great strides towards improving safety. This is indicated by the significant drop in the provincial time-loss injury rate, total injury rate and overall claims during the past decade. Not coincidentally, these reductions coincide with recent targeted activities such as Mission: Zero (of which we are a proud charter member), combined with a more prominent commitment from organizations to make this a priority.

Safety is as much about prevention as it is about compliance. In occupational health, there are a multitude of testing and surveillance services that help companies achieve their safety and compliance requirements, including hearing conservation programs, mask fitness to wear assessments, pre-access drug and alcohol screening, pre-employment medicals, and designated/hazardous substance testing.

Truthfully however, not that many years ago, safety and compliance were viewed very differently, and there was a clear

lack of resources available for companies to help them address these requirements. In 1992, HEALTHSERV (SASK) was created to address the need for an occupational testing clinic in the province. It provided the needed resource with respect to compliance testing and over time, developed an expertise in drug and alcohol testing. Now operating as Wellpoint Health, there are two directly owned Saskatchewan clinics, 10 other national locations, and a network of over 200 clinics to meet the ever-changing and expanding needs of Canadian businesses. Our national breadth has allowed us to draw upon clinical expertise and best practices from across the various provinces to best address the growing and more complex health needs of our clients.

As Canadian businesses evolve, occupational health services must become more sophisticated. As health care, lost time, and WCB costs rise, merely providing compliance-based testing for the employee base is not sufficient. More proactive occupational health services, such as disability case management, on-site nursing and physician services, substance abuse programs, and post-injury care services are needed to mitigate these increasing costs by returning people safely to productive work. The philosophy of these services is best summarized by American activist Richard Pimentel who said, "You do not get injured workers well to get them back to work. You get them back to work to get them well".

*As Canadian businesses evolve, occupational health services must become more sophisticated. As health care, lost time, and WCB costs rise, merely providing compliance-based testing for the employee base is not sufficient.*

*Saskatchewan, along with the companies operating within it, has made great strides towards improving safety.*

An excellent example of this evolution is Wellpoint's pilot of a new service directed at work-related post-injury care in Saskatoon. This new service offering has been derived from Wellpoint's extensive occupational injury services (OIS) experience in Alberta. OIS is an Alberta WCB program, unique in Canada, where injured workers are seen, diagnosed, and treated in an expedited format with physician to employer phone consultations regarding return to work options/recommendations. Wellpoint has replicated this service by creating a physician-based program to assess, treat and provide return-to-work plans for injured workers in an expedited format for Saskatoon employers. We are proud to have recently entered into a partnership with Loraas Disposal on this pilot program. Loraas is Saskatchewan's leader in waste transfer and recycling services and is a leader in health and safety within the waste management industry.

This is only one example of where organizations like Wellpoint help companies think more dynamically about the value of their internal health and safety programs. Understanding how difficult it is to navigate through medical and health challenges within the workforce, it is our ultimate goal to partner with organizations to challenge and improve current practices while achieving tangible results. ♦

*For more information on how Wellpoint can help your organization, please feel free to contact Annie Bell at (306) 986-1027, or visit [www.wellpoint.ca](http://www.wellpoint.ca).*

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# Potash process technology solutions for the project lifecycle

*Westpro Machinery Inc.*



*Westpro's 42-metre (138-foot) diameter-elevated high-capacity thickener during commissioning at PotashCorp of Saskatchewan's Rocanville site in Saskatchewan.*

Westpro Machinery Inc. is an innovative Canadian mineral processing technology company with specialized expertise in the design and manufacture of potash processing equipment and turnkey process systems. During a challenging year for the potash industry, Westpro has continued to support its partners in the sector by investing in new products, providing concept-to-production support for greenfield projects, and developing technologies for brownfield process optimization.

In the past year, Westpro's potash product line has grown to include drum conditioners, coating drums and hy-

droclassifiers. This builds on the company's core potash expertise in attrition scrubbers, flotation machines, rod mills, thickeners, and rotary dryers. The design of these new products has been optimized by Westpro's process and mechanical engineers through extensive R&D programs, including computational modelling. This has allowed the company to offer the new products at competitive prices and the shortest lead times in the industry, while maintaining the quality that is recognized as a hallmark of Westpro products.

Westpro has extensive experience in the delivery of high-quality process technology solutions to greenfield potash

projects. Rather than creating a transactional relationship, Westpro aims to establish a partnership with its customers by offering support from the project pre-feasibility phase through to the production phase. The company's talented engineering team has a strong track record of developing innovative solutions to the challenges that arise in the design of a new process plant (for both SOP and MOP production). Westpro's site services group facilitates the installation and smooth ramp-up of equipment at project sites worldwide and remains available to customers at short-notice for operations support throughout the project lifecycle.

*Representation of a Westpro W19 mechanism (left) retrofitted in an existing conventional flotation cell.*



*Three-metre (10-foot) diameter Westpro Coating Drum, designed for oil coating of GMOP particles.*



Aware of the importance of maximizing existing asset value in a low-commodity price environment, Westpro has developed a number of potash equipment retrofit solutions aimed at enhancing the performance of brownfield operations. A key example is the company's line of W19 rotor-stator flotation mechanisms, which can be configured to integrate easily into any existing flotation machines. The mechanisms have been designed to deliver superior flotation performance through improved bubble generation, slurry suspension, slurry-air contact, and energy efficiency. Westpro's high-capacity thickener mechanisms are another popular retrofit option, used by customers looking to increase the capacity of their conventional thickeners and upgrade to a robust drive with high-torque capabilities.

A customer-centric approach is key to the Westpro way of doing business and forms the basis for the high-quality products and services that the company offers its customers in the potash industry. Westpro has the flexibility to tailor its execution strategy for each project, accommodating requirements such as special equipment design features, short equipment lead times, and local fabrication considerations. This ability and willingness to customize ensures that customers are delivered a process technology solution that is optimized for their specific application.

The principles of quality, innovation, customization, and the application of mineral processing expertise form the

cornerstones of the company's philosophy and are reflected in the performance of every Westpro machine. With satisfied customers in over 20 countries around the globe and equipment installations in the potash producing centres of Canada, Russia and Chile, Westpro is

ideally positioned to assist you with your potash processing technology needs. ♦

*Contact Niraj Dave, Westpro's regional process technology manager today by email at [ndave@westpromachinery.com](mailto:ndave@westpromachinery.com), by phone at 1 (905) 795-8577, or visit us at [www.westpromachinery.com](http://www.westpromachinery.com).*



*Two of the largest attrition scrubbers in the world, Westpro AS108VBH-6 units during installation at Agrium Vanscoy.*



*1.8-metre (six-foot) diameter Westpro Grinding Mills during testing at the Westpro Production Facility.*

# 60 years of growth, leadership and diversity



*Spray foam for Potash storage buildings.*

**P**ark Derochie continues to lead the way as one of the top industrial coating contractors in North America, specializing in all types of industrial coatings, fireproofing, firestopping, blast cleaning, and scaffolding, as well as mechanical and spray foam insulation.

The company has experienced continued growth and diversification, expanding nationally with branches located in Surrey, British Columbia; Edmonton and Fort McMurray, Alberta; Saskatoon and Regina, Saskatchewan; and its latest expansion into Winnipeg, Manitoba.

## **ABORIGINAL ENGAGEMENT**

Despite being a non-aboriginally owned company, a significant focus is placed on aboriginal engagement, including local partnerships with First Nations, as well as working with various community educational groups and tribal councils throughout Saskatchewan.

Doug Barker, president of Park Derochie Coatings (Saskatchewan) Inc., says that “as an equal opportunity employer, we have taken the initiative to work in partnership with First Nations to train and facilitate career growth of aboriginal people

from various communities. As part of that partnership, we also contribute financial assistance to First Nations education and youth service programs. We need a good labour force with youth and energy, and we believe the aboriginal community can provide this.”

Barker went on to say that “Park Derochie has recently implemented a program to hire and train youth. With the current average age of our employees being 35, we offer the opportunity for young First Nations people to build synergies and work closely with other young workers.”

The company regularly sends various levels of management to aboriginal engagement initiative sessions to learn about the aboriginal culture, and is making significant effort to continue building partnerships with aboriginal companies with the goal for Park Derochie’s new shop facility in Regina to be operated solely by aboriginal employees.

Since it was established in 2010, Park Derochie Coatings (Saskatchewan) Inc. has built a workforce of more than 160 employees. Not only has aboriginal engagement created amicable working relationships with the First Nations groups, it has also provided Park Derochie with a workforce of young, enthusias-

tic workers that make up an average of 30 per cent of their employees. Park Derochie has employed cost control analysts, site superintendents, general foremen, foremen and general workers from various Saskatchewan aboriginal communities. The company is also proud to note that 50 per cent of Park Derochie Saskatchewan's operation is made up of aboriginals, women, and visible minorities.

### **NEW MARKET - SAME PRINCIPLES**

Park Derochie has now entered the Manitoba market providing all of the above mentioned services.

"By working closely with the large population of First Nations in Manitoba, we feel that our growth into this market will mirror what has been done in six short years in Saskatchewan," said Barker.

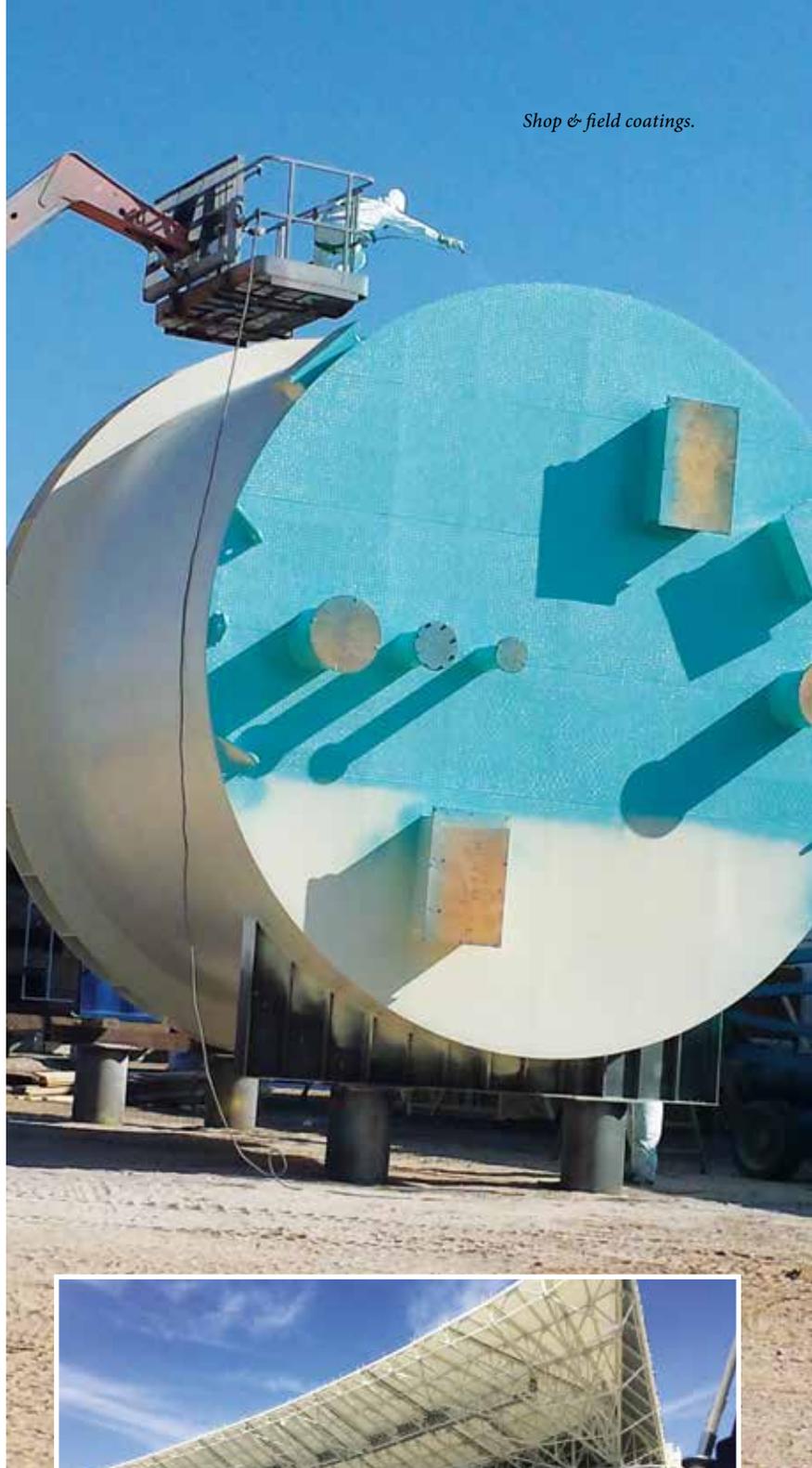
As one of Canada's largest union contractors, with operations in British Columbia, Alberta, Saskatchewan, and Manitoba, Park Derochie has the ability to transfer workers, who in many cases are already familiar with our standards and policies, to any area of Western Canada when there are labour shortages. And, with the local union head office based out of Winnipeg, access to training and skilled tradesman is assured. Aboriginal employees are also being registered in the painters' union training to become certified applicators through the Society of Protective Coatings (SSPC) along with our other tradesman.

### **HISTORY OF EXCELLENCE BODES WELL FOR THE FUTURE**

PD Group of Companies Inc. was named one of Canada's Best Managed Companies in 2015 for excellence in business performance and proudly celebrates the 60th anniversary of its flagship company Park Derochie Inc. in 2016.

Park Derochie was built on principles of strong work ethic, commitment to customer satisfaction, developing a skilled and dedicated workforce, and a belief that 'Loyalty begets Loyalty'. Making every effort to provide best-in-class services, this thriving company has developed a strong reputation for excellence in the areas of safety, quality, and production.

The Park Derochie difference is apparent . . . striving to provide well managed, turn-key, hassle-free services to clients, and dedicated to enrichment of the communities in which they operate, Park Derochie has proven to be an unparalleled sub-contractor when it comes to corporate social responsibility, innovation, and expertise. ♦



Complex, elevated steel connection touchups.

# Opening a second office means better service for industrial electrical customers



*Flyer Electric, a half-hour drive from Prince Albert, has opened their second location this year in Regina.*

Until recently, you could only find Flyer Electric outside the small town of Birch Hills, about a half-hour drive from Prince Albert. For many years, the company serviced clients across the province, and particularly in Northern Saskatchewan, from that location. But demand for their service is growing, and the company is expanding.

This year, Flyer Electric opened its doors to a second office location in Regina. The Regina office focuses on servicing clients in the Regina area, south-central Saskatchewan, oil and gas, and the mining industry, with the head office remaining in Birch Hills.

“For many years, our company has provided industrial and commercial electrical service to clients across Saskatchewan,” says Terry Tessier, CEO of Flyer Electric. “As demand for our

services grows, opening a second office was a natural step for us and allows us to provide stellar service to our clients by having a presence in both northern and southern Saskatchewan.”

As part of its expansion, the company also welcomed new staff this year, including a new operations manager, Doug Lutz, formerly from Shermco Industries (formerly known as Magna Electric); a new director of sales and business development, James Mesinchuk, who has an extensive background in the industry; and additional project managers and field personnel with many years of experience.

“Our team has a wealth of potash mining project experience that they bring to every project,” says Tessier. “A lot of our success stems from the depth of experience of our excellent team, and also because we not only aim to exceed our clients’ ex-



*Flyer Electric provides industrial and commercial electrical service to clients across Saskatchewan.*



Expectations in everything we do, but we also embrace and excel at the more challenging jobs. Remote work areas, congested sites, complex installations, and helping bring projects from an idea to reality - whatever the situation, we like the challenge of coming up with solutions."

Open since February, the new office has proven to be a win.

"With a physical presence in Southern Saskatchewan and with the addition of our new team members this year, we are able to be more available for our clients, which can make a huge difference," says Tessier. "It allows greater flexibility in meeting with the client whenever they need to, which is an important part of providing the level of service they know and expect from us."

The new Regina office is located at 290 Hodsman Road. "Visitors are always welcome," says Tessier. "Feel free to stop by for a cup of coffee if you're in the neighbourhood!"

Flyer Electric is proud to be 100 per cent Saskatchewan owned, based in Saskatchewan, and serving Saskatchewan. They are known for delivering time and time again, exactly what their clients need, from design to construction, and everything in between.

Some recent projects include underground expansion projects in PCS Cory, installing fire alarm and security systems at the K+S Potash Legacy site, and multiple projects at Mosaic Belle Plaine and Esterhazy sites. ♦

*Flyer Electric is proud to be part of the Saskatchewan Construction Safety Association (SCSA) and is COR certified and registered with ISNetworld. Visit them online at [www.flyerelectric.com](http://www.flyerelectric.com).*



An experienced industrial electrical services provider to numerous clients in the Potash industry



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# Superior Technologies Weighing and Controls Inc.

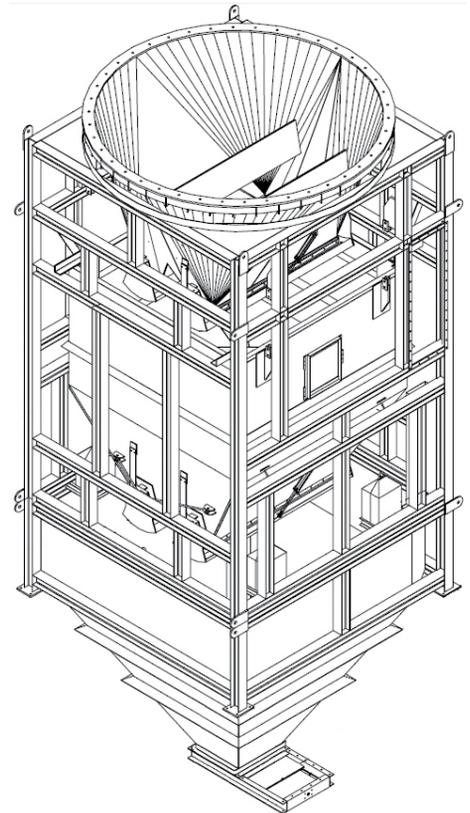
Superior Technologies Weighing and Controls Inc. was founded in 1976. Based in Winnipeg, Man. and privately owned, Superior Technologies has worked their way to being one of the most recognizable names in the scale and automation industry. Holding the ISO 9001:2008 certification and employing a fleet of Measurement Canada-certified technicians and inspectors, Superior Technologies has helped companies all over the globe. With customers all across Canada, the United States, Peru, Egypt, Australia, and China, they have a firm grip on the industry and continue to grow every year.

This Winnipeg company continues to be heavily involved in the potash industry by supplying, supporting, and delivering superior products and services to all scale and automation applications. With over 40+ years in the scale industry, Superior has redefined the word "accuracy" with the development of their bulk weigher systems, reducing to mere minutes the loading of an entire rail car, within 99.9 per cent accuracy. Prior to its arrival,

workers at potash mines could start the loading, leave for a coffee break, and still have time to wait upon their return. This is a thing of the past.

Superiors' bulk weigher itself is not the only key to the company's success. They also developed the necessary controls to operate the sophisticated systems. The controls are just as, or possibly even more important than the physical structure. From the actuation of the gates to the proper outflow of product, everything is timed to perfection. This precision was achieved by having some of the smartest and knowledgeable people in the industry. Superior has one of the largest in-house teams of engineers and technical staff among Canadian weighing/process control systems companies. Their personnel include an engineering staff, as well as highly experienced scale technologists and technicians.

Not only has Superior developed a system to control and manage bulk weigher products, they have done so for many other applications. A few examples of some of the process systems developed



by Superior are the WinCBS (a full-featured, easy-to-use PC/PLC-based automated concrete batching system developed for the Microsoft Windows™ operating system) and the QWICC™ (Quality Windowed Intelligent Commodity Controller) system, a multi-tasking real-time Windows-based HMI (human machine interface) controlling package for controlling grain elevator facilities with multiple bulk weighers and truck scales. Any number of QWICC™ workstations may be interfaced via a fast ethernet connection to a programmable logic controller (PLC) to handle all receiving, audit/transfer, shipping, blending, and cleaning tasks.

As the potash industry continues to evolve, with mergers and acquisitions being at the forefront, Superior Technologies is and will continue to be an important piece of the puzzle. Their expertise and experience along with a complete offering from analytical balances, truck scales, process systems, and bulk weighers makes Superior "superior" among scale and automation companies across Canada. ♦

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# Fighting corrosion at the International Union of Painters and Allied Trades, District Council 17 (Saskatchewan-Alberta-Manitoba)

By Chris Hooter, Director of Training,  
International Union of Painters and Allied Trades District Council 17



Corrosion! ... When we see rust on a discarded piece of scrap iron, we don't give it much thought. But when we, the target audience for *PotashWorks*, observe rust on steel at our facilities, alarms go off ... or, at least they should!

Steel is mostly iron "sprinkled" with various amounts of carbon and other alloys. A metallurgist could go on and on about the collage of alloy recipes that go into making various grades of steel. But the punchline is that lots of work and energy (e.g. blast furnaces) are required to refine the mined iron ore (an iron oxide) for the steel-making process. Over time,

this iron will naturally oxidize (i.e. rust) to revert back to its lower energy state.

Meanwhile, steel forms the structural backbone of modern life: transportation (e.g. roads, bridges, rail, vehicles), mining (e.g. potash, uranium, bitumen), pipelines (e.g. oil and gas), structural steel (e.g. buildings, stadiums), our nation's military (e.g. Royal Navy), etc. As you might expect, governments have run the numbers on the cost of corrosion to our economies.

In 2001, a National Association of Corrosion Engineers (now called NACE International)-inspired study tallied the total annual corrosion cost in the USA to

be a whopping 3.1 per cent of the GDP. Given our harsher weather conditions, Canada's per capita corrosion costs are likely higher. Consequently, handling the destructive effects of corrosion is critical. In Saskatchewan, our mining owners/engineers are very familiar with the costs of corrosion.

Corrosion comes in many forms (uniform, pitting, crevice, etc.) and there are a number of ways engineers address these problems, but in many cases the right answer to the corrosion problem is protective coatings and linings. However, in order for these products to perform as designed, owners and engi-

neers must ensure proper application by properly trained personnel using properly maintained equipment under the correct environmental conditions with appropriate quality controls and inspections, and of course, all done safely.

To meet this challenge, we at the International Union of Painters and Allied Trades, District Council 17 (IUPAT) have partnered with the two premier industry leaders in protective coatings - the aforementioned NACE and SSPC (formerly the Steel Structures Painting Council, now called "SSPC, the Society of Protective Coatings") - to incorporate cutting-edge certifications into our training pipelines.

With NACE, IUPAT District Council 17 sends qualified Saskatchewan industrial coatings applicators/contractors, both management and key labour supervision, for their NACE Coatings Inspector Program (CIP) training/certification. Inspection gives assurances to owners/engineers that coatings are applied correctly, and therefore corrosion protection will be achieved.

With SSPC, IUPAT District Council 17's training culminates in SSPC Coating Applicator Specialist (CAS) certification. The CAS evaluation includes both written and practical exams administered by SSPC. The practical consists of proper abrasive blasting and airless spray techniques on an appropriately designed ASTM steel test panel. IUPAT District Council 17 has seven of these test panels. The CAS evaluation has been incorporated into IUPAT District Council 17 crafts training programs.

Additionally, IUPAT District Council 17 offers several official SSPC courses - e.g., Fundamentals of Protective Coatings (C1), Planning and Specifying Industrial Coating Projects (C2), De-Leading Industrial Structures for Supervisors (C3), Abrasive Blasting (C7), Airless Spray (C12), Plural Spray and Thermal Spray - many incorporated into our ap-

prenticeship, in the cue, ready to deliver, for our partnered contractors, our member tradesmen, and owners/engineers.

To conclude, the IUPAT District Council 17 is on the engineering and trades forefront in the battle versus corrosion. IUPAT District Council 17 is confident that these partnerships with NACE and SSPC will ensure our success in fighting corrosion.

Be safe, and let's solve the corrosion problem together. ♦



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**For more information contact Trevor Mack, Industrial Field Services Division Manager**

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**For more information contact Scott Beattie, Pressure Piping Division Project Manager**

**Cell: 306.641.5294, scott.beattie@emw.ca, www.emw.ca**

**At EMW we strive to create value for our customers by consistently developing our knowledge and experience. Our unyielding commitment to safety and excellence is evident in every project.**

# Köppern

## Compaction made in Germany

As a company that develops and supplies high-performance compacting and granulating facilities throughout the world, Köppern is respected not only for its excellent technological competence, but also for the close cooperation and partnership we maintain with our clients.

Although the principles of the compacting process for fertilizers tend to remain constant, the development of each plant layout begins with an analysis of the clients' individual requirements. This applies particularly to the K+S Potash Canada Legacy project, which is the first potash greenfield project in Saskatchewan in around 40 years.

The project is located near the village of Bethune, Sask., which is about 200 kilometres north of the U.S. border.

Planning a greenfield plant is a rare occurrence. Most of Köppern's prospective customers are already engaged in some form of fertilizer production activities, so the planning process needs to take account of existing circumstances. Depending on the choice of the materials handling system, these may for example even influence the design of buildings in the sense of their being either horizontal or vertical. However, all modern plants have one thing in common, namely automatic operation from a control room with online monitoring of all process steps and documents affecting the quantity and quality of the end product.

*The project is located near the village of Bethune, Sask., which is about 200 kilometres north of the U.S. border.*

For the K+S Legacy project in Saskatchewan, Köppern has manufactured and supplied compactors for K60 compaction and for K99 compaction. Additionally, all the key equipment, including the materials handling system, was engineered and supplied by Köppern.

For the K+S Legacy compaction building, Köppern subcontracted the basic engineering and detailed design to March Consulting Associates Inc. (March). March is based out of Saskatoon, Canada, with the potash industry being one of their specialties. March provided complete engineering packages for all structural steel, chute work, piping, dust collection and HVAC, as well as all con-



Fig. 1: 3D model of K+S Legacy plant compaction building.

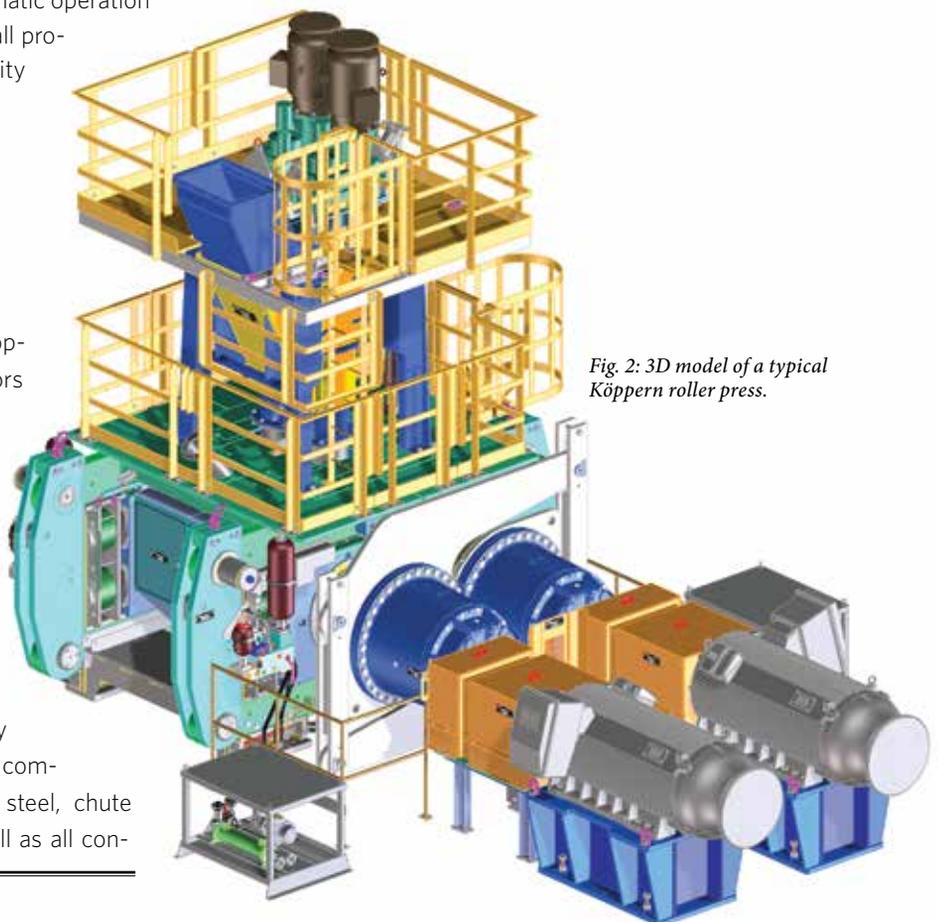


Fig. 2: 3D model of a typical Köppern roller press.

*All modern plants have one thing in common, namely automatic operation from a control room with online monitoring of all process steps and documents affecting the quantity and quality of the end product.*

trols, electrical, and instrumentation engineering associated with the compaction building.

The commissioning of the new plant is currently underway and the production of the first tonne of potash is scheduled for the second quarter of 2017. The plant will reach an annual production capacity of two million t/a of saleable potash at the end of next year.

### **Köppern Worldwide Services**

Roller presses form the key element of many agglomeration processes, not only for fertilizer compacting systems. Köppern, in fact, supplies a worldwide niche market with this technology. To defend a leading world market position, a company must not only offer superior technology, but ensure customer proximity. Köppern maintains service points at strategic locations throughout the world, thus ensuring a rapid supply of high-quality replacement parts. Highly trained specialists from the parent company in Germany and from regional subsidiaries are available to advise our customers at all times.

Our service point in Canada is Koeppern Service Canada KSC, located in Saskatoon, Sask.

Since 2014, Koeppern Service Canada has an agreement with a major distributor in the mining industry (Applied Industrial Technologies, LP) to further enhance our customer service and to facilitate the distribution of replacement parts for compactors across Canada and North America. ♦



Fig. 3: Koeppern Service Canada, Inc. facilities.

# Köppern



## Dry granulation of fertilizers

Our technology has been recognized around the world for dry granulation of MOP/SOP and NPKs. Our services cover pilot plant tests, basic engineering, equipment supply, start-up supervision, and commissioning. Typical flake capacities are in the range of 10–130 t/h or more.

We have received orders for more than 90 fertilizer compactors of latest Köppern technology since the year 2000. The total installed flake capacity of these plants is exceeding 77,000,000 tpa.

**Köppern – Quality made in Germany.**

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**Dakota Dunes Casino near Saskatoon, (306) 667-6400**

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December 16th and 17th

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Throughout the province of Saskatchewan are six unique gaming and entertainment destinations owned by the Saskatchewan Indian Gaming Authority (SIGA.) SIGA is a First Nations-owned-and-operated non-profit organization that gives 100 per cent of its revenue back into the community.

SIGA's vision is to deliver sustainable net income and employment opportunities to support First Nations development in Saskatchewan. Since starting in the 1990's, SIGA has grown to be the largest First Nations employer of First Nations people in Canada. Entertainment and gaming may be a primary focus of their operations, but they also provide state-of-the-art meeting rooms that can be utilized for any type of business gathering or event. ♦

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# Developing your on-site emergency response team

Development of an operational emergency plan is a must for any industrial site. The emergency response team (ERT) is vital to its overall operation. No matter the size of the operation, training will save lives.

Many companies start at the basic level

with first aid and fire extinguisher. After performing an audit of your operation and discussing the hazards, a decision to expand the team to include more advanced skills may occur.

Areas of concern may include:

- response for spills, on the hazardous

chemicals

- decontamination
- confined space entry, rescue
- elevated, technical rope rescue
- equipment entrapment, vehicle extrication
- water/ice rescue

Training in the incident command system for all incidents is vital to maintain a safe response, as well as maintaining a team capable of performing the services required, safely and effectively.

The employer must provide the time required to train and maintain the team to an operational level. It's important to have input from your team in the purchase of equipment that is best suited to your operation.

Members of the team must be committed to take and maintain the training that is required, along with keeping equipment operational, response ready. Documentation of all training that occurs is vital, along with documentation of equipment maintenance. This maintenance of the ERT requires a total buy-in from management, supervisors, and employees.

Training should be provided to cover any incident that could happen on your site and should be at regular intervals. Monthly is recommended. A training day agenda should be in place so team members can come prepared with no wasted time.

Yes, they are expensive in time and equipment, but ask anyone on your site who has been helped by the ERT, or ask the ERT member who has assisted in a real incident and they will tell you that it is worth every dollar and every training hour committed.

The emergency response team is a major asset to the health and safety program for any industrial sites, urban or rural. ♦

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# Sellick building a new manufacturing plant

On April 20, 2016, at the young age of 97 years old, Walter Sellick, along with sons Howard Sellick, president, and David Sellick, vice-president, as well as grandson Colin Sellick, systems manager, had a ground-breaking ceremony for a new multi-million dollar, 120,000-square-foot facility.

"In order to compete on a global scale, we needed to expand and build a state-of-the-art plant," said Howard Sellick.

Sellick Equipment has been manufacturing rough terrain and truck-mounted forklifts for over 47 years to a variety of industries, including building supply yards and engineered wood products, automotive recycling, oilfield services, and mining and military applications. In recent years, a new generation of forklifts was introduced featuring enhanced ergonomics, environmentally friendly diesel engines, and increased lift capacities.

Sellick products are supported by a nationwide dealer network providing superior parts and service needs. For more information, call toll-free 1-877-735-5425, or email [sales@sellickequipment.com](mailto:sales@sellickequipment.com). ♦



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Photo: Tourism Saskatchewan

# North Rim joins RESPEC to provide full spectrum of geological and engineering services

Based in Saskatoon, Saskatchewan, North Rim Exploration Ltd. (North Rim) is the only potash-focused geology consulting firm in Canada. Since 1984, North Rim has provided geological services to the

potash producers and exploration companies throughout the world. In April 2016, North Rim joined RESPEC as a wholly owned international subsidiary. The North Rim/RESPEC team aligns two successful organizations focused in

the natural resource industry who both have a long history of working in the Canadian mining marketplace.

Headquartered in Rapid City, S.D., RESPEC is a client-focused consulting and services company that specializes in developing innovative solutions to the mining and energy industry worldwide. Our 100 per cent employee-owned company has been advising clients for more than 45 years, with the majority of work performed for returning clients. Currently, RESPEC employs more than 250 professionals in 15 states and one Canadian province. Since RESPEC's founding in 1969, we have remained committed to serving our clients with the highest degree of integrity, honesty, and professionalism.

Our diverse group of technical professionals are focused on serving the market sectors that are critical to quality of life. No project is too large or too small. From water-quality initiatives throughout Minnesota, to information technology data management nationwide supporting Indian Health Services, to mine engineering design for global mining interests, we match the right team of specialists in energy, water, environment, technology, and mining to the uniqueness of each client and project to make a difference in the lives of others.

Though historically, RESPEC's principal area of business has been in the field of rock mechanics, we have extended our application of salt-mechanics principles to industrial projects that involve salt and potash mining, as well as hydrocarbon and hazardous waste storage in salt. Acquiring North Rim in 2016 has helped RESPEC develop and further establish these potash capabilities.



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**The North Rim/RESPEC team plans, executes, and completes the full spectrum of technical services, from exploration to reclamation.**

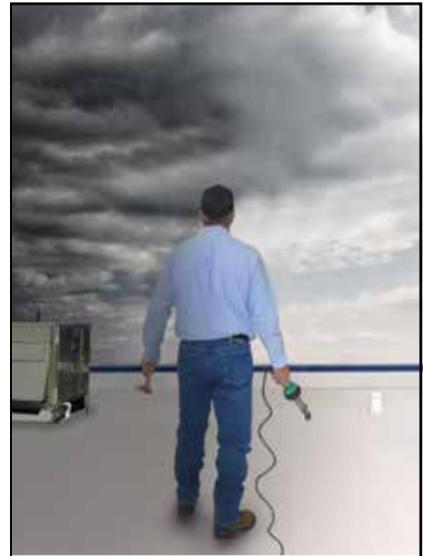
We provide geologic assessments, laboratory testing, mine planning and rock-mechanics design analyses, subsidence monitoring, instrumentation and field services, resource estimation, permitting support, financial evaluation, and due diligence reviews to many of the major salt and potash mining companies and hydrocarbon storage facilities around the world.



North Rim also enhances RESPEC's technical service offerings through expanded capability in the geoscience consulting market. North Rim's specialized capabilities in drilling management, mineral resource mapping, mining integrity studies, feasibility studies, and 43-101 report compilations enable RESPEC to provide turnkey services to the mining marketplace. North Rim's key management team of Karri Howlett, Lola Piche, Debbie Shewfelt, and Tabetha Stirrett continue to lead the operations of North Rim for RESPEC.

We plan, execute, and complete the full spectrum of technical services from exploration to reclamation. RESPEC has provided geologic assessments, laboratory testing, mine planning and rock-mechanics design analyses, subsidence monitoring, instrumentation and field services, resource estimation, permitting support, financial evaluation, and due diligence reviews to many of the major salt and potash mining companies and hydrocarbon storage facilities around the world. ♦

Please visit our websites at [www.northrim.ca](http://www.northrim.ca) and [www.RESPEC.com](http://www.RESPEC.com) for more information.



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Commercial Sand Blasting and Painting (Commercial), with offices in Saskatoon, Prince Albert, and Esterhazy, Sask., provides service throughout Western Canada.

At Commercial, safety is our number-one focus and we work daily with our customers to properly plan and execute work to ensure that it is done safely each and every day.

Our services include:

- Media blasting of all types
- Epoxy systems
- Latex systems
- 100 per cent solid-coating systems
- Installation of environmental containment systems
- Tank linings
- Fiberglass inspection and maintenance
- Carbon-fiber reinforced structural systems repair and insulation
- Abrasion-resistant linings, including ceramic tile and beaded systems, rubber, urethane and epoxy-based systems.
- Fire-proof coatings, both cement-based and epoxy/water-based intumescent

- Floor coatings
- Concrete surface repairs
- Industrial inspection services
- Lead and asbestos abatement and encapsulation
- Shotcrete application

Commercial supplies coated structural steel to every industry within Saskatchewan, from single, to multi-coat systems, as well as fireproofing. Commercial is certified for the application of fire-proofing materials from several material suppliers.

Our firm works with steel fabricators within the province, Canada and the United States, as well as European suppliers to abrasive blast, coat and line special service equipment. With on-site cranes and specialty lifting equipment for the handling of items up to 300 tons at our shop facilities in Saskatoon projects of all sizes can be handled easily.

The petrochemical industry in Saskatchewan, Manitoba, and Alberta require high-end coating and lining products to protect both their storage tanks and process equipment. Our firm both

coats and lines oil storage tanks, and oil and gas pipeline systems.

Commercial has provided industry with tiling and wear-resistant lining services since the early 1970's. From butted tile, to hex matt systems, to engineered tile placement, to high-end beaded epoxy mortars. Our firm has applied systems to every configuration of equipment and pipe spool system in the province.

Many operating facilities use fiberglass piping, tanks and process units for the delivery of liquid cargos throughout their plants. From the installation of new equipment to the maintenance of existing assets, our fiberglass technicians will help plan and execute your project.

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Our experienced staff is available for a complete list of inspection services for: structural steel, tanks and vessels, carbon and stainless steels, and structural fiberglass. We will assess the integrity of your coating and lining systems using both visual and destructive testing as required. Our NACE and SSPC trained staff, engineers, and technologists will provide inspections on industry standard practices.

You will find Commercial Sand Blasting and Painting headquarters and production facilities located just north of Saskatoon, in the Corman Industrial Park. ♦

Please visit the Commercial Sand Blasting and Painting website at [www.csbp.ca](http://www.csbp.ca).

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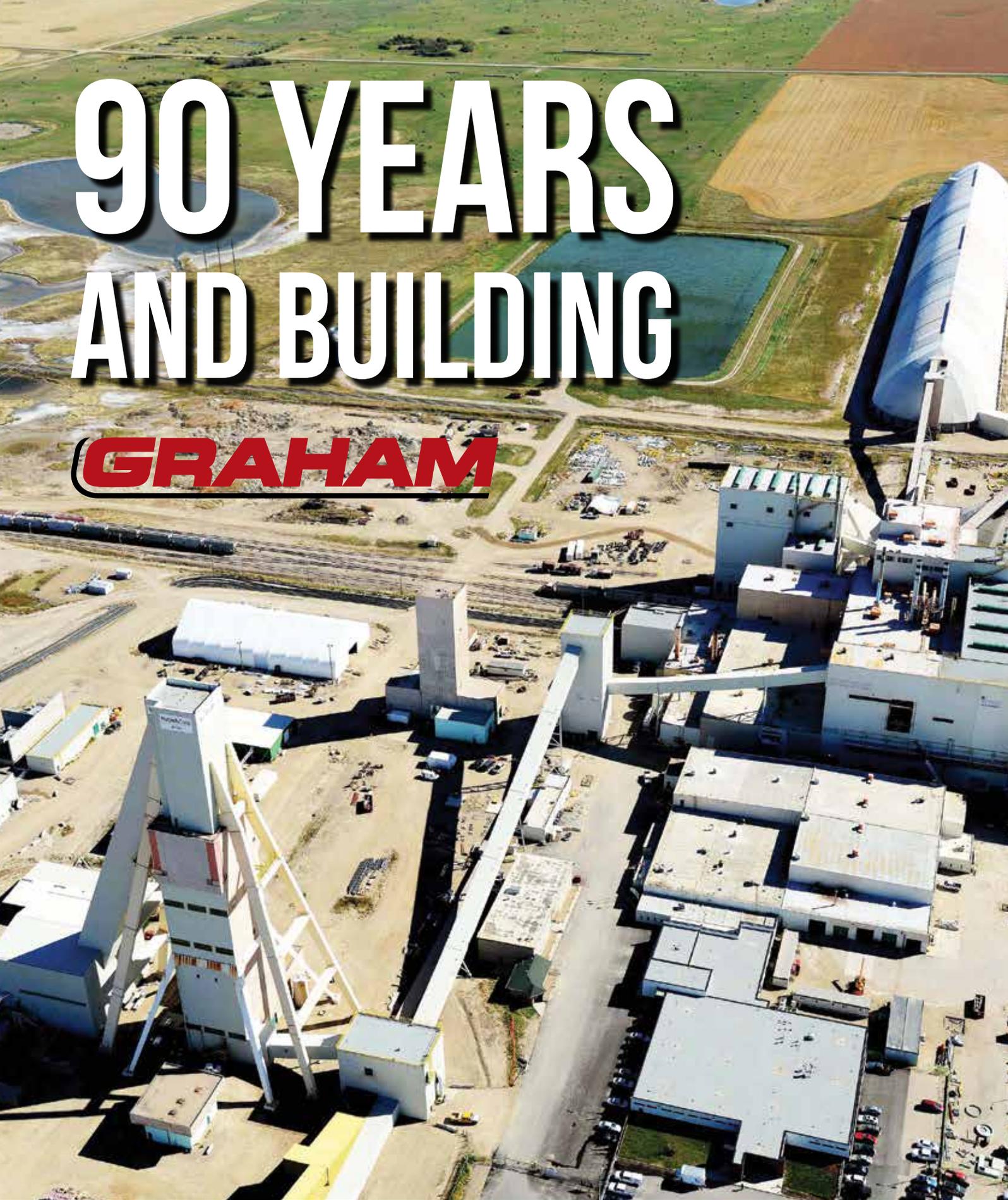
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