

# **4,000+** reasons

To grow our world from the ground up.

In Nutrien's first full year of operations, we generated \$750 million\* of new economic activity in Saskatchewan.

Candace Laing is one of more than 4,000 people in Saskatchewan employed by Nutrien. Our Vice President, Sustainability and Stakeholder Relations grew up on a farm near Swift Current and is building her career in Saskatoon as part of the world's largest provider of agricultural solutions.

In 2018, we increased the number of positions at our corporate office by almost 30 percent and we're the largest private-sector employer in Saskatchewan. And by investing more than \$50 million in Nutrien Tower, we're building a home for our future.

As Nutrien grows our global business, we're creating more opportunities in Saskatchewan.

To see the stories behind the numbers, go to Nutrien.com/Saskatchewan.

\* A research study by Ernst & Young (EY) measured the incremental impact of Nutrien's operations, capital expenditures and investments in Saskatchewan in 2018.







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#### **COVER PHOTO**

From supporting education to feeding the world to energizing power plants, Saskatchewan mining is a major economic and community social force in the province and beyond.

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Driving the economy, supporting the

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Minerals produced in Saskatchewan are improving the quality of life in global communities.

## A MESSAGE FROM SMA PRESIDENT, PAM SCHWANN

# SUPPORTING LOCAL AND GLOBAL COMMUNITIES

As well as providing the minerals and metals that are essential for modern society and our related quality of life, mining provides economic and social development opportunities locally and globally.

As you drive along the roadways of Saskatchewan, the direct benefits of mining to local communities are readily apparent, from the hundreds of employee vehicles parked in the shadows of the mining headframes, to the company names on the community rink, zamboni, football stadium, music festival or hospital.

However, there are other significant economic and social benefits for local and global communities that are not as easily recognized. It could be because the mining community is so geographically spread out in Saskatchewan. Perhaps it is because the minerals we produce are exported from Saskatchewan and we don't directly see how they are benefiting modern society; and possibly because in true Saskatchewan fashion, we just don't promote the good work that is done. We want the communities we live and work in to be successful, so we support local communities through our involvement.

In this issue of ORE, we are going to take the

time to tell our story. Through hard numbers and dollar figures, mining in Saskatchewan contributes to employment, payroll, procurement, and government programming through taxes; yet it also contributes through the diversity of community and social contributions of mining companies, their employees and their suppliers' support.

As the majority of our mined products are exported throughout the world, we don't readily see the global economic and social benefits that these products are making to the communities where the products are used. Whether it is cultivating food security in Africa through targeted use of fertilizer (potash) which enhances harvests and reduces poverty, to providing better air quality in China through electricity generation from nuclear power stations (uranium) rather than fossil fuels, minerals produced in Saskatchewan are improving the quality of life in global communities.

Providing food and energy security to the world is a big responsibility, but roles that all Saskatchewan residents can take pride in. As the stories in this edition of ORE show, virtually all Saskatchewan residents have a connection to the mining sector.



# Driving the ECONONY, supporting the CONNUNTY

New MNP survey shows the impact mining has on Saskatchewan, and beyond

The impact of Saskatchewan mining is wideranging, far more so than many people realize.

Consider the support to Regina's Mosaic Stadium, home of the Roughriders, or the Nutrien Wonderhub, a museum for children in Saskatoon. Include the employment of thousands of Saskatchewan people, and contributing taxes to three levels of government. Add to that volunteering for organizations, from food banks to schools to safety agencies.

How does one quantify the effect of these

efforts on our towns and cities, our province and our country? MNP took on the challenge in a study for the Saskatchewan Mining Association (SMA).

To prepare the study, MNP surveyed the mining company members of the SMA, conducted secondary research through publicly-available data and reports, conducted interviews and received assistance from Statistics Canada.

NRCan reports that the value of Saskatchewan's mineral sales in 2017 was approximately

**CONTINUED ON PAGE 7** 



The Mosaic Company (Mosaic) in Saskatchewan invests in the well-being of the communities in which it operates. Community building and local food security are among Mosaic's priorities, and it donates nearly \$900,000 per year to food-focused non-profit initiatives in Saskatchewan. In Regina, Mosaic has partnered with two local social organizations: Souls Harbour Rescue Mission and Carmichael Outreach.

#### SOULS HARBOUR RESCUE MISSION (SHRM)

SHRM is a mission located in Regina. For almost 30 years, it has been best known for operating as a food kitchen that provides meals to the homeless, although it also provides services such as addictions programming, daycare, clothing, youth programming, and affordable housing. Mosaic has partnered with SHRM for many years and will be providing \$150,000 to the mission over three years, starting in 2018. In addition to providing funding, Mosaic sponsors holiday meals and its employees participate in volunteer opportunities for SHRM events.

We look forward to seeing our partnership with Souls Harbour evolve over the years, as it continues to provide services to those in Regina who need them most.

SARAH FEDORCHUK, VICE-PRESIDENT, PUBLIC AFFAIRS AND GOVERNMENT RELATIONS, MOSAIC

#### CARMICHAEL OUTREACH (CARMICHAEL).

Carmichael is a Regina-based organization that tackles a wide range of social challenges in the city. It provides housing support, a food security and nutrition program, clothing, essential children's products and activities for children, city clean-up, harm reduction and health programs, among many other functions. Its recent partnership involves \$100,000 in funding from Mosaic over two years starting in 2018, along with support and items for fundraising events.

Mosaic's partnerships with SHRM and Carmichael have resulted in the following outcomes.

#### Support and development of communities

With Mosaic's support, both Carmichael and SHRM are undergoing major infrastructure developments. Carmichael acquired a new building with more space for a new commercial kitchen and food preparation area.

SHRM completed renovations and the purchase of a new building, which includes a dining hall. A grand opening of the new building will be held in late December 2019. This will allow the mission to safely take in more homeless people and increase its capacity as a men's emergency shelter from 12 to 24 men per night. In the evenings, the dining hall will serve as an emergency centre for people in need. The cumulative effect of these new developments will be a safer community. This will be achieved through the ability to assist more people in need and provide them with safe areas to go, away from the street.

#### **CONTINUED FROM PAGE 5**



Saskatchewan potash nourishes farmers' fields around the world.

Photo courtesy of Mosaic

According to the Fraser Institute,
Saskatchewan is the No. 3 jurisdiction for mining in the world.

STEVE MCLELLAN
CEO OF THE SASKATCHEWAN
CHAMBER OF COMMERCE

\$6.5 billion, about 13 per cent of the national value of mining sales. Potash led the way at \$4.7 billion, with uranium sales coming in at \$1.4 billion. Salt and other minerals, such as gold, accounted for the remainder.

Saskatchewan mining's output — the total value of goods and services produced — including direct, indirect and induced figures was \$9.7 billion in 2017, while its contribution to GDP was \$6.7 billion.

"It's a huge number," said Steve McLellan, CEO of the Saskatchewan Chamber of Commerce, of mining's contribution to GDP. "Without it as a province, we would have a significant challenge. We should all

be respectful of the fact the sector is critically important, along with its supply chain.

"According to the Fraser Institute, Saskatchewan is the No. 3 jurisdiction for mining in the world. Our supply chains are solid and we have the rules in place that make it a good place to work and obviously invest."

But the industry's effects on the economy and society reach much further than commodity sales. The industry sources products and services from a large supply chain of Saskatchewan companies, stretching from the northern tip to the southern border of the province. And, it contributes \$1.7 billion to the federal, provincial and municipal tax bases.

The industry directly or indirectly supports more than 27,000 jobs. While this is down from previous years, due the difficult market conditions for uranium, this number will again increase to above 30,000 when the market rebounds with the drawdown of uranium inventory. Mining companies surveyed employed just over 10,000 people, with a payroll of \$1.37 billion — much of it spent in employees' local communities.

Social and community contributions are also considerable. The companies, and their employees, give back to the communities they serve through donations, volunteerism and education. SMA members contributed \$160 million toward community and social activities and initiatives through the fiscal years 2013 to 2018. They have also made concerted efforts to include the Indigenous peoples of the province in their business activities, from employing northern people to a commitment to engaging Indigenous business interests in their supply chains.

Mining's contributions to society are not

**CONTINUED ON PAGE 9** 

#### **MINERAL SALES**

Table 1 shows Saskatchewan mineral sales by commodity for the years 2013 to 2017. For 2018 data was only available for the first eight months of the year (January to August).

Table 1: Saskatchewan Mineral Sales by Commodity in \$millions

	2013	2014	2015	2016	2017	2018 (January to August)
Potash	\$5,609.2	\$5,699.9	\$6,096.5	\$4,181.5	\$4,763.3	\$3,440.6
Uranium	n.a	n.a	\$1,789.2	\$1,880.8	\$1,413.1	\$499.9
Salt	\$24.7	\$26.9	\$26.4	\$25.5	\$26.3	\$17.8
Other Minerals	\$1,522.0	\$1,611.7	\$324.5	\$347.1	\$346.3	\$181.1
Total	\$7,155.8	\$7,338.5	\$8,236.6	\$6,435.0	\$6,549.1	\$4,139.3
Percent Change from Previous Year	3.7%	2.6%	12.2%	-21.9	1.8%	-2.5%

Note: Other minerals includes bentonite, coal, gold, copper, zinc, silver and sodium sulphate. Source: Saskatchewan Ministry of Energy and Resources.

## **NUTRIEN**

#### CASE STUDIES

# WANUSKEWIN HERITAGE PARK'S THUNDERING AHEAD CAMPAIGN

Nutrien is the world's largest provider of crop inputs and services, playing a critical role in helping growers increase food production in a sustainable manner. Nutrien operates with a long-term view and is committed to working with stakeholders to address economic, environmental and social priorities. In Saskatoon, it has focused on supporting inclusion and Indigenous communities. This has culminated in its support for Wanuskewin Heritage Park's Thundering Ahead campaign.

The Wanuskewin Heritage Park is a sacred Indigenous historical site that offers public educational programming. The site is Canada's longest-running archaeological research project and provides tourism and educational opportunities to visitors in the area. For six thousand years, it was a gathering and celebration site for the nomadic tribes of the Northern Plains who came there to hunt bison, seek shelter and gather food. Currently, there are several archaeological digs in the area, with resources such as tipi rings, stone cairns, pottery fragments, animal bones and other significant findings being uncovered. Wanuskewin is a not-for-profit organization and registered charity that is guided by a Board of Directors and council of Elders representing the local Indigenous communities. Wanuskewin exists as a stand-alone entity under provincial government legislation.

Nutrien has been a supporter of Wanuskewin Heritage Park's Thundering Ahead campaign. Thundering Ahead is a \$40 million initiative with an overarching goal to become Saskatchewan's first UNESCO-designated World Heritage Site. Originally, Thundering Ahead was intended to be a small, two-year campaign. Nutrien saw the opportunity to assist the organizers with expanding the campaign and finding funding. It provided a \$3 million contribution to Thundering Ahead and continues to



work with and support the organization today.

With Nutrien's support, Thundering Ahead is focused on achieving a number of positive outcomes for Wanuskewin, including:

#### INCREASING EDUCATIONAL OPPORTUNITIES

From Wanuskewin's affiliation with the University of Saskatchewan, the site already provides significant education and research opportunities. Thundering Ahead would transform the site from an archaeological dig and heritage park into a Centre of Excellence in education, interpretation and preservation of Indigenous art and culture. This vision would include a larger interpretive centre, an expanded gallery of Indigenous art and artifacts, and increased cultural and educational programming, among other site improvements.

#### CELEBRATION AND PROMOTION OF INDIGENOUS PEOPLE

Receiving over 10,000 international visitors from outside of Canada every year, the site is a popular place for people from all over the world to learn about early Plains First Nations cultures. The UNESCO designation, along with

enhanced cultural and educational programming, would turn the site into a global destination where visitors can celebrate pre-contact Indigenous history. This would include the creation of an institute for research and international collaboration and new initiatives, focused on cultural heritage and natural ecology.

#### PRESERVING AND RESTORING AN ECOLOGICAL ISLAND

Located near Saskatoon, one of Canada's fastest growing cities, and surrounded by agricultural land, the park rests in an ecologically significant but vulnerable area. A key outcome of Thundering Ahead will be to protect and restore the sensitive ecosystems that once flourished in this area. Bison used to roam the area in great numbers and served important roles in the ecosystem as well as in Indigenous culture. A crucial part of Thundering Ahead is the reintroduction of a herd of bison, descended from the last herd in North America, into the park

Thundering Ahead has the potential to turn Wanuskewin into a globally-recognized destination for research, education and tourism for pre-contact Indigenous life on the plains.

# COVER STO

#### **Community Contributions in \$millions**

	2013	2014	2015	2016	2017	2018
Community Contributions	\$32	\$29	\$33	\$24	\$21	\$22

Note: Information represented for 7operating mining companies and 4 exploration companies.

#### **CONTINUED FROM PAGE 7**

only impressive, but in some respects easier to relate to than the big numbers, said the Chamber's McLellan.

"When you start talking about hundreds of millions or billions, it's hard for people to get their heads around that, what it means to me," he said.

"The more important thing people can see every day and relate to, is the impact it has on kids playing hockey, for example. Their parents' livelihoods, directly or indirectly, are in the mining sector.

"It's the rink with the logo people walk by every day from a mining company that subsidizes those operations.

"Every mining company in the province from exploration to the mature ones like Cameco or Mosaic, they're writing cheques every day for community activities that make a difference to people's lives. Those are the contributions that are so much bigger than the billions. They're the life changers."

A more hidden aspect to mining's impact on communities comes through the generation of taxes, he added.

"You walk into our hospitals and our schools, and nobody has a sign up there. But they are heavily subsidized by the payroll taxes, income taxes and the companies paying their corporate taxes. If you take that out of the equation in terms of the provincial

government revenues, we're in big trouble. It would physically close hospitals, and not just those in those communities."

While mining is crucial to Saskatchewan, it also has a positive global impact, said Chris Dekker, President and CEO of the Saskatchewan Trade and Export Partnership (STEP).

When we go around the world, we let the markets know that Saskatchewan has what the world needs.

CHRIS DEKKER
PRESIDENT AND CEO OF THE
SASKATCHEWAN TRADE AND
EXPORT PARTNERSHIP (STEP)

"We have to put these discussions, and any discussion around economic development and the importance of industry, in the context of how important the export industry is to Saskatchewan," he said. "We're a small domestic market, at 1.2 million people. "We have to export what

we produce outside our borders, whether nationally or internationally, in order to grow and succeed."

Export Development Canada has calculated that one in five jobs in Canada relies on exports, he said. In Saskatchewan, based on further research, it's one in three.

"This is important. It's important to us all. Minerals and the mining industry is one of the key sectors in terms of our overall exports to markets around the world."

Data from 2017 showed that Saskatchewan exported \$5.9 billion worth of just potash and uranium outside Canada, or 20 to 21 per cent of our total export value.

"That does not count domestic consumption, such as shipping to other provinces," said Dekker. "And it's growing. In 2018, year-to-date to November, that's up to \$6.3 billion. That's largely because of the increase in potash, because of the ongoing flat sales of uranium, but it still represents a 16 per cent increase year to date. That is obviously critical to our economy."

In addition to the extractive industry, the mining industry's connection to suppliers has upped the impact.

"Not only does that expand domestic sales, but Saskatchewan suppliers gain experience, increase their capacity, and are able to export that product or service to

#### **Employment and Payroll for Operating Mining Companies in \$millions**

	2013	2014	2015	2016	2017	2018		
Wages and Salaries (\$ million)								
Total Payroll	\$1,425	\$1,270	\$1,559	\$1,281	\$1,371	n.a.		
Employment								
Direct FTE	9,731	9,152	9,243	9,008	8,649	8,503		
Contractual FTE	2,318	1,989	1,631	1,334	1,373	900		
Total FTE	12,049	11,141	10,874	10,342	10,022	9,403		
Average Payroll per FTE								
Average per FTE	\$118,267	\$113,993	\$143,370	\$123,864	\$136,799	n.a		

Note: Information represented for seven operating mining companies.

#### **Estimated Economic Impacts of Mining Operations in 2017**

	Output (\$ million)	GDP (\$ million)	Employment (FTEs)	Federal Tax (\$ million)	Provincial Tax (\$ million)	Municipal Tax (\$ million)
Direct	\$6,549	\$4,774	11,839	\$252	\$909	\$56
Indirect and Induced	\$3,151	\$1,947	15,462	\$226	\$230	\$58
Total	\$9,700	\$6,721	27,301	\$478	\$1,139	\$114

Note: Direct Employment includes both employees and contract staff on long term contracts. In 2017 full time employees with mining operations are estimated to constitute approximately 85 percent of direct employment.

mining markets around the world. That's the very definition of economic development — taking advantage of your extractive industries, your primary industries, and making sure your supply chain is provided by Saskatchewan."

There's also a considerable impact on other countries, particularly stemming from potash mining, he said.

"When we go around the world, we let the markets know that Saskatchewan has what the world needs. Not what the world wants; that's a different thing. They need our food, our fuel, our fertilizer.

"Fertilizer is key to a growing population and a growing middle class which is

demanding better quality and more food.

"When we go to international markets, like India and China for instance, what we provide is not only in big demand but we've seen it in action – the producers taking the potash and putting it on their fields which is feeding not just millions, but billions."

Similarly, uranium mined in Saskatchewan also has a strategic role in meeting clean energy needs in Canada and the world. The International Energy Agency indicates that globally, one billion people still live without electricity, and having access to reliable energy security is essential to reducing poverty.

"The uranium mined in northern Saskatchewan plays a significant role in providing people around the world with energy security, whether that means they have power to cook, keep warm or power industries, particularly in densely populated regions like China and India," says SMA President Pam Schwann. "We can also see the benefits of nuclear energy closer to home, where 60 per cent of Ontario's power is generated from nuclear power fed by uranium mined in Saskatchewan's Athabasca Basin."

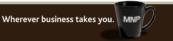
As Dekker concludes, "It's great seeing our products being used for the betterment of populations around the world."



#### **Extract More from Your Business**

Running a profitable business is a lot like running a successful mining operation – it requires grit, foresight and the ability to capitalize on opportunities. Whether you're looking to explore new strategies, increase your prospects or improve your bottom line, MNP has the insights and advice to advance your drift and keep you on pay dirt.

For more information, contact Craig Gates, MPA, Practice Leader, Consulting Services, at 306.790.7900 or craig.kutarnagates@mnp.ca





#### YA'THI NÉNÉ COLLABORATION AGREEMENT

Cameco and Orano have an interest in partnering and collaborating with communities close to its operations to advance the environmental, social, cultural and economic development of these communities.

In mid-2016, Cameco, Orano, and seven communities in the Athabasca Basin; Black Lake First Nation, Fond du Lac First Nation, Hatchet Lake First Nation, Stony Rapids, Wollaston Lake, Uranium City and Camsell Portage signed the Ya'Thi Néné Collaboration Agreement ("the Agreement"). The Agreement is an industry and regional partnership planned to improve the well-being of participating communities around four pillars: workforce development, business development, community engagement and environmental stewardship, and community investment.

The signing of the Agreement has resulted in many positive outcomes, including:

#### EMPLOYMENT OPPORTUNITIES AND WORKFORCE DEVELOPMENT

Through the agreement, Cameco and Orano provide employment opportunities to Athabasca Basin residents. As of late 2017, Cameco and Orano employed approximately 70 and 41 Athabasca Basin residents, respectively. To further support workforce development, a scholarship program for Athabasca Basin students has been developed.

#### SUPPORT OF EXISTING BUSINESSES

As part of the Agreement, significant funds have flowed from industry partners to businesses in the Athabasca Basin. Since 2016, Cameco and Orano have spent over \$200 million with eligible businesses. For example, Cameco and Orano have contracted Athabasca Basin Security to provide security to its mine sites.

### DEVELOPMENT OF LOCAL INFRASTRUCTURE AND AREA REVITALIZATION

Cameco and Orano have contributed over \$8 million for the development of community projects. Examples of these projects include the renovation of a community arena at Black Lake and the building of a fire hall at Fond Du Lac.

#### COMMUNITY ENGAGEMENT AND ENVIRONMENTAL STEWARDSHIP

As part of the Agreement, the Athabasca Joint Engagement and Environment Subcommittee ("AJES") was created to become a forum for Cameco, Orano and participating community members to share information on matters related to the environment, operations, and to address concerns raised by community members. Cameco, Orano, and the partnering communities have a shared interest in protecting the environment and recognize that long-term collaboration is the best way to ensure this.

The Agreement is one of five agreements that Cameco has established together with communities and industry partners. Each agreement is designed so that communities benefit from the investment and employment opportunities associated with Northern Saskatchewan's mining industry.

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# Mining suppliers contribute to economic, social well-being



The team at Xtended Hydraulics

# Giving back to the community means employment, volunteering and financial support

When Rob and Katherine Tebb acquired Xtended Hydraulics in 2013, they weren't just looking for a business to run. They were also looking for a way to give back.

At the time, the Regina company employed about six people, including Rob Tebb. Today, 20 people are on the payroll and Xtended has moved to White City to accommodate its growth.

The Tebbs have a particular approach to training and retaining employees, and it's clearly working.

"When we got the opportunity to purchase the company we thought we really wanted to do something to give back. The way we thought we could do it was through apprenticeship and training for those who didn't have the opportunity," Rob Tebb said.

"People say Saskatchewan is full of resources, but to me people are the greatest resource."

Tebb is Métis; his people have lived in Saskatchewan for eight generations, and he is fully aware of the employment difficulties Indigenous people have struggled to overcome.

"There's a misconception they don't want to work. They do. They want to put food on the table for their family and have a better life for their kids," he said.

"When we started, we thought this is the best way to give back by focusing on Aboriginal and Métis youth.

"What we have found in the last five years is we have the best, hardest-working, most loyal staff in the industry. We have no trouble retaining our employees. I think I've had one leave in the last five years.



#### ROB TEBB XTENDED HYDRAULICS

"What we thought was giving back has actually benefited us."

Tebb remembers the story of a young man he hired in the first year he was in business. He knew the man's grandfather, who told Tebb the youngster was wearing an ankle bracelet and was on parole.

"I told him, 'If I have trouble with you,

I'm not going to call your parole officer, I'm going to call your grandpa.'"

Tebb hired him. He is still with the company, and a father of three.

"Not only have we changed his life, we've changed his kids' life too. We've altered that family a little bit."

Xtended is one of many companies to supply the mining industry with a wide variety of services and products. Xtended manufactures and repairs heavy duty cylinders, using a special system to protect the product from the dusty, hot and salty air in underground potash mines.

It's also one of many companies to pay forward economic and social benefits to the communities of Saskatchewan. Suppliers are crucial to mining, and also represent a large proportion of mining company spending in the province.

A study conducted by Praxis in 2016 for the Saskatchewan Mining Association (SMA), Ministry of the Economy and Saskatchewan Industrial Mining Suppliers Association (SIMSA), estimated that mining companies purchased goods and services from Saskatchewan suppliers worth \$1.7 billion in 2014, \$1.8 billion in 2015, and between \$1.65 and \$1.4 billion from 2016 and 2019. A significant

proportion of the expenses go to payroll.

Kelly Panteluk Construction Ltd. (KPCL) is another supplier contributing to Indigenous employment and to causes in its community.

KPCL is one of the largest privately-owned heavy civil earthworks and underground services company in Saskatchewan, but it helps build Saskatchewan in other ways, as well.

Some of the company's recent notable investments include a \$450,000 donation to construct the Pediatric Outpatient Assessment Room in the Jim Pattison Children's Hospital and \$250,000 to reconstruct the running track for the Saskatchewan Summer Games in Estevan.

KPCL describes itself as an equal opportunity employer, with an emphasis on workforce diversity and inclusion that dates back to the early 1990s on large infrastructure projects including the Alameda and Rafferty Dams.

In 2016, KPCL formalized a diversity and inclusion strategy to focus on the direct employment and training of unrepresented persons (Indigenous, women, and visible minorities) in heavy construction, as well as engagement with Indigenous-owned companies and Indigenous communities.

"While still a work in progress, our greatest success has been with the direct employment of Aboriginal persons at this time," said Mary Panteluk. "In 2018, we exceeded our five-year target of 18 per cent to employ 23 per cent of newly and rehired employees that self-declared as Aboriginal. As we look toward the future, we will continue to work with our clients, partners and suppliers to support the people and communities of our province."

STC Industrial Contracting is a new company — just two years old — but it has

already paid \$1 million to its Indigenous workforce through 25,000 hours of employment. More than 70 per cent of those hours have gone towards Indigenous apprenticeships.

In addition, they have engaged significant downstream Indigenous suppliers such as First Nations Bank, Victory Safety, Micisotan Catering, Indigenous youth clubs, First Nations Legal support, Saskatoon Fast Print, and they have contributed over \$75,000 in sponsorships and donations through direct cash and in kind support so far.

In another example, STC Industrial was joined by several other companies, including IMM, Prairie Machine, AGI Tanks, Croatia Industries and Deca Industries in supplying and installing the second lift at Optimist Hill in Saskatoon.

Contributing to the community can also contribute to fun. M



# PROVIDING THE WORLD WITH CLEAN

#### Provided by the Ministry of Energy and Resources, Government of Saskatchewan

**POWER** 

Saskatchewan has been producing uranium continuously since 1953 and is recognized as a long-term, stable source of uranium. Saskatchewan is the world's second largest producer of uranium and the only producer of uranium in Canada.

#### WHAT IS URANIUM USED FOR?

Uranium is primarily used as fuel for the generation of nuclear power (more than 99 per cent of total use). Other uses of uranium include the production of radioisotopes, used in medicine, consumer products, food and agriculture, and science



and industry.

Nuclear power generation typically accounts for 15 per cent of Canada's electricity and provides reliable supplies of electricity with very low carbon emissions and relatively small amounts of waste that can be safely stored and disposed of.

In 2017, 88 per cent of Saskatchewan's uranium production was exported for use

Uranium Processing - Refining, Conversion, and
Fuel Fabrication

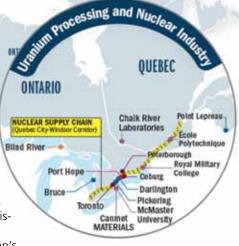
Nuclear Power Generation and Nuclear Science &
Technology

Waste Management & Long-term Management

Shutdown or Decommissioned Sites

Inactive or Decommissioned Uranium Mines and
Tailings Sites

Uranium Mining & Willing



Northern Resources Trucking is one of the major haulers for Saskatchewan's uranium mining companies.



in nuclear power through the world. Saskatchewan uranium is sold only to countries where Canada has a Nuclear Cooperation Agreement to ensure it is used only for peaceful purposes.

#### WHERE IS SASKATCHEWAN URANIUM SHIPPED?

Saskatchewan uranium is produced in the Athabasca Basin in northern Saskatchewan. It is primarily transported by truck to a refinery and/or conversion plant in Ontario, most of which is transported to the United States, or shipped overseas to be enriched for use as fuel in nuclear power plants.

The United States is Saskatchewan's largest customer where Saskatchewan uranium is responsible for powering approximately one in 20 homes. Saskatch-

ewan uranium is responsible for safe power generation throughout the world, including major markets in France and the United Kingdom.

#### HOW DO THINGS LOOK FOR THE FUTURE?

Currently, approximately 11 per cent of the world's electricity is generated from approximately 450 nuclear reactors, operating in over 30 countries. Nearly 60 more reactors are under construction in 15 countries and another 139 are planned. China, India, and Russia continue to have ambitious nuclear power programs accounting for over 90 per cent of planned nuclear growth.

Saskatchewan uranium producers have a long history of being strong corporate citizens, emphasizing environmental and worker safety, and providing economic and employment opportunities to First Nations and local communities.

### HOW IS SASKATCHEWAN POSITIONED TO TAKE PART IN KEEPING UP WITH WORLD DEMAND?

Despite current low prices and the recent suspension of McArthur River/Key Lake operations, market conditions are slowly improving and a substantial amount of excess supply has been removed from the market compared to a year ago.

Saskatchewan's known uranium reserves and resources, including new exploration discoveries, will ensure that Saskatchewan will remain a reliable, safe and secure supplier to the world's growing nuclear industry.





When Cameco Corp. and Orano Canada want or need to connect with employees and potential employees across Northern Saskatchewan, they turn to Missinipi Broadcasting Corporation (MBC Radio).

The Missinipi Broadcasting Corporation serves the Indigenous people of Saskatchewan through a dedicated radio communications network, with services in Dene, Cree, Michif and English.

Its remarkable reach has contributed to making MBC a crucial communications tool. MBC has 60 rebroadcast sites responsible for reaching 70 communities, and it can also be heard provincially via SaskTel Max on Channel 821, on Access Communications Channel 929 or online worldwide at www.mbcradio.com.

An audience survey conducted in 2016 indicated that MBC attracted 139,180 listeners in both northern and southern centres, according to Independent Research Survey. Those listeners hear a wide variety of programming.

"We offer information and news in Indigenous languages as well as educational programming and invite audience participation through the promotion of public forums," said MBC CEO Deborah Charles.

"MBC is also a source of entertainment through music and commentary that serves the needs of Indigenous people."

A powerful mission and mandate directs MBC and its 30 employees every day, she

"MBC strives to uphold the dignity, respect and cultural pride of Indigenous people by reflecting these attributes in the corporation's working operations and the day-to-day conduct and deportment of its management and staff," said Charles. "MBC helps protect, preserve, and enhance traditional Indigenous cultures and languages for the aboriginal

people of Saskatchewan through the provision of radio and other communications services."

MBC's mission and audience make it the perfect outreach tool for the mining companies. Glenn Lafleur, Manager, Northern Affairs for Orano Group, says the uranium mining company uses MBC for advertising messages, such as promoting its mill operator training program.

"The station provides radio service all across the north — and south to Saskatoon and P.A.," he said. "We have a responsibility to hire from the north, and everybody listens to it. That's why we utilize it. It's really a good tool to get the word out across the north really quickly.

"We also utilize it for any messaging about meetings and things like that. The good thing about them, too, is they have a scroll system where they put the message right on the TV.

"We find we get really good feedback."

Lafleur points to mill operator program advertising as an example of how effective MBC is at getting Orano's messages out there.

"We get 200 applicants for eight positions," he said. "I can't say enough about the success we've had. Any information that needs to get out there, it gets out there quickly."

Cameco Corp. also has worked with MBC for decades to keep northerners informed about the company's operations and activ-

"We often use their advertising services and website to spread the word about events and meetings, and we hire their talented "Our minesite employees rely on MBC Radio to inform them about the news of the day, and MBC reporters are well versed in the Saskatchewan mining industry. It's a convenient and quick way to reach a wide audience and it's been a great partnership for Cameco."

"Everyone" listens to MBC's North at Noon program, added Lafleur, and younger people tune in evenings to listen to rock music.

In his view, MBC is "the great northern secret of communication."

The benefits of the relationship works both ways.

"Absolutely, we benefit from the partnership with all mining companies," said Charles. "We play an important role in reaching out to their respective communities and their employees and any new potential employees."

#### **HUMBLE BEGINNINGS**

Missinipi Broadcasting Corporation was founded after the establishment of the Northern Native Broadcast Access Program (NNBAP) in 1983. An independent non-profit corporation, MBC is wholly owned, oper-

ated and controlled by the Saskatchewan's Indigenous people.

Originally incorporated as a non-profit in 1984 as Saskatchewan Northern Native Communications Incorporated (SNNC), initial studio construction and installation began the same year in a leased space on La Ronge Avenue in La Ronge. SNNC made an application under NNBAP and received funding to prepare a radio and television broadcast program for Northern Saskatchewan. A radio skills training program was the next step, starting up in November, 1984, through the La Ronge Community College.

Its first broadcast came on Feb. 4, 1985, when well-known broadcaster Tom Roberts hosted a half-hour show disseminated via CBC transmitters throughout Northern Saskatchewan. MBC had negotiated a one-half hour per week day show on the Northern Saskatchewan CBC-FM network.

MBC has come a long way since then.

"As the longest serving employee of Missinipi Broadcasting Corporation, I have seen this Indigenous Communications Society grow in leaps and bounds over the last 30 years," said Charles. "I thank you all for providing me the opportunity to open up the pride that we should all have through the history of MBC."

### MBC was organized and structured to realize the following goals (as provided by MBC).

- **1.** To provide and improve Indigenous radio throughout Saskatchewan.
- **2.** To provide Indigenous programming which will include the spoken languages in Saskatchewan Cree and Dene dialects.
- **3.** To support and maintain the language, culture and lifestyles of Saskatchewan Indigenous people through communications.
- **4.** To encourage the younger people to improve their language ability and practice their traditions.
- **5.** To inform Indigenous people about local Indian and Métis government, and local Indian and Métis issues concerning social and economic development.
- **6.** To provide up to date news and information about Provincial and National Indian and Métis organizations
- **7.** To facilitate the development of a network or community owned and operated radio and television stations in Northern Saskatchewan.



#### **DEEPLY ROOTED**

Our commitment to Saskatchewan runs deep. Through ongoing employment, local business partnerships and community investment, we'll make sure opportunity continues to take root in our province for generations to come.



K+S Potash Canada

In each edition of ORE, we go beyond the official bios to give our readers insight into the leaders of Saskatchewan's mining and exploration companies.

# Beyond the Bio

# TAMMY VAN LAMBALGEN

VICE-PRESIDENT, **CORPORATE AFFAIRS** AND GENERAL COUNSEL ORANO CANADA INC.

When Tammy Van Lambalgen joined Orano Canada, she was delighted to join the company — and thrilled to come home.

She was in the right place at the right time when the offer came up. After graduating with her law degree from the University of Saskatchewan, she was working for Shell Canada in Calgary when she made a trip to Saskatoon for her ten year law school reunion.

"I went with my Dad for breakfast on the day we were leaving," she recalled in an interview. "Sitting at the table next to us was the head of HR for Orano, which was Cogema at the time. My Dad was joking with the other table saying that somebody should give me a job so I could move back to Saskatoon. The head of HR said "actually, we are looking." The next day, he called my Dad and asked him to get me to send my resume, and the rest is history.

"I had a young daughter, and I was interested in moving back to a smaller centre. I loved Calgary, but I couldn't pass up the opportunity to move back to Saskatoon where there's a great balance, where you're not commuting 40 minutes each way to work. I wanted the lifestyle of living in a smaller city.

"It turned out really great."

Today, Van Lambalgen is Vice-President, Corporate Affairs and General Counsel with Orano Canada overseeing legal, corporate social responsibility, human resources and management systems/organizational excellence.

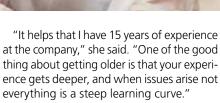
"I have just passed my 15 year anniversary," she said. "I've had a really interesting career at Orano. I started as manager, legal; and they added the responsibility of regulatory affairs promoting me to VP regulatory affairs and licensing in 2007."

Every role you take expands your understanding and makes you look at things from a different perspective.

#### TAMMY VAN LAMBALGEN

In 2012, she also took on corporate social responsibility and in 2015, management systems and operational excellence. Last summer, she added HR to her responsibilities.

With such a diverse portfolio of responsibilities, Van Lambalgen is very busy; but she takes it in stride.



She said she has really interesting days, that absolutely fly by, with a good variety of executive management-type issues. There are legal issues that arise and on the corporate social responsibility file, with no new immediate new projects the focus is more on strategic direction.

"We're well established but there's obviously still a need to manage the relationship with Indigenous communities, the government and mining companies."

HR matters arise as well, and in her new role, Van Lambalgen is realizing what a crucial role HR plays in the strategic direction of the company.

"HR plays a strong role in setting the culture and the performance of the organization because people are the most important component of that," she said. "I'm very fortunate my company has given me the opportunity to do different things. Every role you take expands your understanding and makes you look at things from a different perspective."

She noted that the uranium market has been in a sustained low with no immediate change on the horizon, "so it's a real



challenge for all of us to work together to ensure our sustainability.

"What we do today is not just for today, but to drive the opportunities of tomorrow. I like challenges; I like thinking about the future. Saskatchewan is a great place to do business and the challenges are positioning us to remain cost competitive and invite investment here in the future."

As busy as she is, Van Lambalgen strives to achieve work-life balance — focused on her two daughters, Taylor aged 17 and Ruby six, and partner Kevin Black. "Outside my office life, my life really revolves around my family."

"I love to watch my kids' activities. My oldest plays volleyball and that takes us around and out of the province, which contributes to mother-daughter quality time."

She has served on the Saskatchewan Mining Association's board for 11 years and was recently elected Chair on March 1 this year. Tammy also sits on the Sask-Power board, and has taken on the board chair responsibility for the Nutrien Wonderhub (formerly the Children's Discovery Museum.)

"It's a privilege to be able to give back to the larger community of Saskatchewan by being on these boards," she said. "It's been



Tammy Van Lambalgen, second from left, with her daughters Taylor and Ruby and partner Kevin Black.

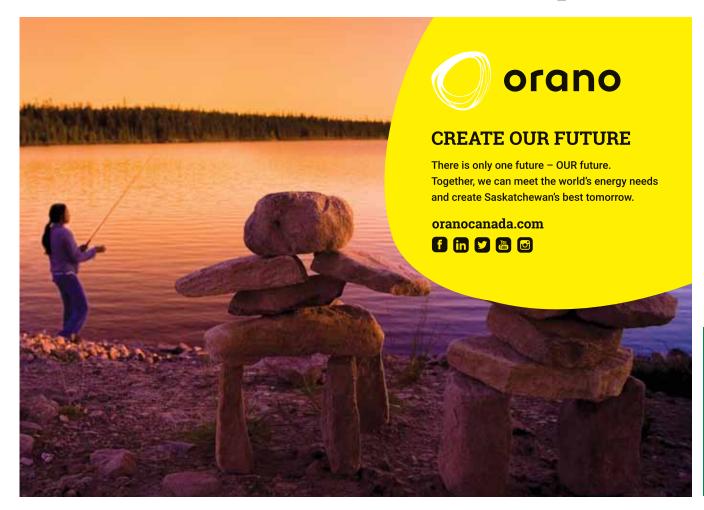
great for perspective and I have gained valuable experience, which I have been able apply at Orano.

She added that she is very fortunate to have a supportive spouse in her life.

"He deserves a shoutout because we're definitely equal partners in the home," she said. "I talk to women about that. It's so important especially in the early years of the children's lives.

"I couldn't have the volume of work without the support at home. Kevin really is an essential part of my ability to do all the things I want and need to do.

"We're pet lovers too. We have a cat and a dog, Baxter and Dougall, both boys to have gender balance in our home. They're great additions to the family. It's a busy life. I'm so fortunate. My life is rewarding and complete."





#### Mining employees volunteer, with company support, around the province

When Fred Drew volunteers, he really kids around.

The Maintenance Superintendent at K+S Potash Canada's Bethune mine has been donning Santa suits for 21 years, ten as a member of Santas Anonymous in Alberta. He's probably lost track of how many children have sat on his knee.

When he was invited to join the Santa Claus brotherhood, someone handed him a costume.

"I put it on and it fit," said Drew in an interview. Apparently, it fit both physically and personally. "I became Santa. I have done a lot of different gigs as Santa for the last 21 years (largely in Alberta), and I'm trying to get my name out here now. I definitely want to do more than I am.

"I did that for about 10 years and then I became a Shrine clown (with the Wa Wa Temple). I've done circuses, helped raise money for the Shrine hospitals of which we have 22 in North America. We raise funds for the different disabilities the Shriners look after, and the burn units."

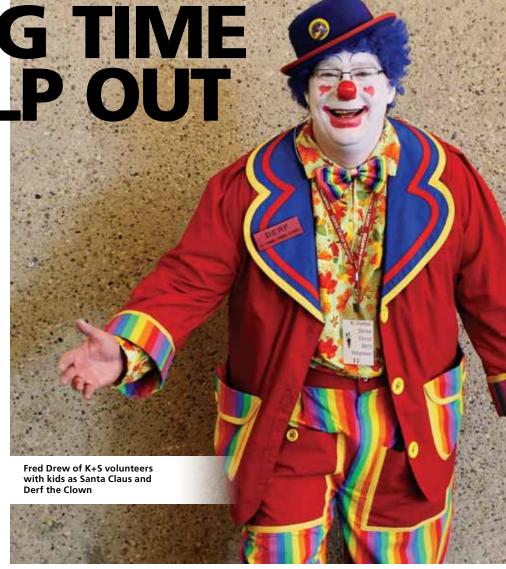
His persona is "Derf the Clown," a smiling, bright-blue-haired entity.

"I've done stuff with different agencies - Kids With Cancer, Junior Diabetes, MS - and help them raise funds or just be a morale boost."

He jumped into volunteering all those years ago in Alberta, and brought his Santa and clown act to Saskatchewan when he joined K+S about two and a half years ago. Now, he wants to dive in and take advantage of K+S's Volunteer Plus+ program.

"I've done a couple of events for K+S. They give you volunteer time, and they'll give money to your charity when you're volunteering. I want to get involved with that."

Maeghan Dubois, Manager, Communications and Corporate Affairs for K+S Potash Canada, said the company launched the program in 2017 with a \$300 benefit that employees can donate to causes close to



I'm inspired by the smiles on faces, the biggest reward you'll ever get.

FRED DREW MAINTENANCE SUPERINTENDENT. **K+S POTASH CANADA** 

their hearts once they complete the eight hours of paid volunteer time.

"We wanted to highlight some of the meaningful work our employees were doing as volunteers," she said. "We knew our employees were spending a lot of time in the community doing great things, whether it be coaching or volunteering at a fundraising event. K+S has always given employees eight hours of paid volunteer-time but providing employees with \$300 to donate to the cause they volunteered for was new with the program.

"What we wanted to do was connect the volunteer efforts to the \$300 to create a more meaningful volunteer experience."

Since then, K+S has had approximately 20 per cent uptake on the program each year, or 86 employees, accounting for about \$50,000 that has gone back into communities with the advent of the Volunteer+ program.

"We're always looking at ways to enhance the program," added Dubois. "It's one of the benefits of working for K+S."

Drew goes above and beyond with his volunteering. And while he tries to spread happiness everywhere he goes, with balloons and magic and fun, it's not always easy. Once, sadly, he attended a funeral for a seven-yearold child, trying to help her little friends cope with her loss.

"I do some gigs for money, because quite honestly it gets expensive with the makeup, balloons and magic, so I do some corporate gigs to cover some of the costs," he said. "But my passion is to do it for the different charities.

"I've gone anywhere and everywhere, and I'll continue to do that. I live in Moose Jaw,



Orano Canada employees volunteer their time at Caroline Robins Community School in Saskatoon.

but I'll go anywhere to entertain.

"I'm inspired by the smiles on faces, the biggest reward you'll ever get. It's pretty powerful when you have kids smiling and laughing and you're being silly."

Most Saskatchewan mining companies support their employees' volunteerism.

Candace Laing, Nutrien's Vice-President, Sustainability and Stakeholder Relations, has, for example, volunteered at an inner-city school food program, while Nutrien executives have packed Food Bank hampers.

"It's not just a corporate commitment," she said. "We also have a company-wide volunteer program. Any employee is released on work time to volunteer in their community in a way that's meaningful to them.

"An important part of it, especially for

Nutrien, is we support the communities we operate in. That social part, partnering and supporting the community, is an important part of our strategy. We work with communities to learn what their biggest needs are."

Nutrien doesn't specify what kind of volunteerism employees can engage in.

"Maybe they volunteer through a boys and girls club, pack hampers at a food bank or clean up a park – whatever that looks like. The goal is for employees to find their own way to bring Nutrien's purpose to life, which is to grow our world from the ground up."

Mining companies are also always seeking new ways to support employee volunteerism. At Cameco Corp., a new volunteer venture is springing up on May 11.

Step Up for Mental Health is a signature community event with the simple goal of raising money for mental health in Saskatoon and the province, said Jonathan Huntington, Vice-President Sustainability and Stakeholder Relations, Cameco.

"We know mental health affects so many people in our community, and it's a cause that really resonates with our employees. We set out to find and create an event that could help in this space.

"It will feature a lot of Cameco volunteers. We frankly couldn't do this without our Cameco volunteers."

Step Up for Mental Health is a 5K or 10K walk or run, and an entirely fun event for

people of all abilities and all ages. The inaugural run-walk will take place in downtown Saskatoon, and Huntington hopes to see "hundreds and hundreds" of people come out.

"Every dime of every entry fee goes directly to funding mental health in the province and Cameco will match every dime of every entry fee," he said. "We knew the culture inside Cameco is so much about volunteerism, and we knew they would step up – pun intended there – and make it happen.

"I would estimate at least 100 Cameco employees will step up to make it happen."

Employees and families will take part but also volunteer as course marshals, help with handing out water bottles and ensure the safety of the participants. Brainsport is also



a contributing partner to the event.

All the money raised will be held by the Saskatoon Community Foundation (SCF). This summer, Cameco and SCF will put out a call to non-profit groups to apply for mental health project funding.

"Every single dollar will be paid out in 2019," said Huntington. "This is a significant new revenue stream coming into our city and our province."

An adjudication panel made up of mental health professionals, an SCF representative and Cameco employees will decide which projects will receive funding.

"We wanted a foundation to hold the money, because that also allows for charitable receipts for those who want to donate on top of that," said Huntington.

"We've been thinking about it inside Cameco for almost a year. We went to our executive and then to the management committee, and they 100 per cent endorsed it. Then we went to our employees and they were 100 per cent behind it as well.

"We very much want to have those conversations around mental health," he added. "It's a win-win for the community and our employees."

At Orano Canada, one of the many vol-

We work with communities to learn what their biggest needs are.

CANDACE LAING
VICE-PRESIDENT, SUSTAINABILITY AND
STAKEHOLDER RELATIONS, NUTRIEN

unteer commitments comes at an inner city school in Saskatoon.

For 10 years, Orano employees have been spending time at Caroline Robins Community School every month. The partnership started when Orano helped relocate the playground structure it had built for the children living near the office and who attended that school. It was no longer needed when the families were relocated to allow for a new development to be built.

Seeing the joy the playground brought to the children, Orano decided to find a way for its employees to continue to contribute to the schoolchildren's education and opportunities for fun. And so, the Orano mentorship program was started. Since then, about 15 to 20 employees spend a couple hours a month each month with their partner kids at the school. Each employee is paired with a child and does specific activities during their visit. Some days it's as simple as reading a book or doing puzzles or building with blocks. Other times, they may be baking a cake, making slime or working on a science projects.

They find fun and educational ways to share and practice some of the skills that will be useful to the children through life.

"It's always fun to go spend time with my little buddy. We really learn from each other. I learn to be patient," said Orano employee Jennifer Heppner, Human Resources Advisor. "And, I get to share about my work and why school is so important, and the kinds of jobs that exist, and some of the cool things we get to do at work."

"I really like playing games with my little guy," added geologist in training Daniel Hrabok. "Orano also organizes a couple events with the children throughout the year such as a celebration of the end of the school year, which generally involves an outing at a fun place such as the Saskatoon Zoo and Forestry Farm or a trampoline location or park."



**NUTRIEN** 

VICE-PRESIDENT,



When Nutrien's Candace Laing first took on a position with "sustainability" in the title, she excitedly called her father at the family farm to tell him all about it.

It took a little while to explain. Then there was a short pause on the other end of the

"So you're going to help the world understand what I do," he said.

Exactly.

Managing sustainability, as a profession, is a complex and fascinating job that takes Laing into the global halls of power where food and fertilizer come together.

"I have global responsibility for our sustainability strategy," explained Laing in an interview. "Often when people think sustainability, they think about being really mindful of the potential negative impacts of business on the environment and future generations in the way we conduct business today.

"At Nutrien, what I'm focused on is making a positive global difference with our sustainability strategy. In the simplest form, our sustainability strategy helps us deliver on Nutrien's purpose - to grow our world from the ground up."

The statement of purpose doesn't just refer to the environment; it also applies to social impact, and everything related to both.

"Generally, there's a lot of collaboration and alignment work with internal, external and international partners to make sure we can deliver on our targets and goals," said Laing. "(Recently) I was in Rome for international fertilizer meetings, making sure we're collaborating with partners so that global decisions on agriculture can be successfully implemented.

"Food is going to be the defining issue of our time. It's not a small challenge. We need to find a way to sustainably feed 10 billion people by 2050. Potash mining and fertilizer in general play such a critical role in a sustainable and productive agriculture system."

Laing, who was promoted to Vice-President, Sustainability and Stakeholder Relations last fall, hails from a farm near Swift Current, Sask. The road to her present position included milestone jobs at the Saskatoon Health Region, SIAST (now Sask. Polytechnic), and sessional lecturing at the University of Saskatchewan before arriving at PotashCorp in 2013.

"When I graduated from the Edwards School of Business, I set my career goals. I wanted to take my skills across, and experience many different sectors. I wasn't sure where I'd best fit, but I had that drive and ambition."

Laing, armed with a Human Resources major as part of her Commerce degree, moved seamlessly into organizational development, the strategy side of HR. Then, several years later, came the merger of PotashCorp and Agrium Inc. to form Nutrien.

"I was offered the opportunity to work on the integration team that brought the two companies together. When we finished that, we put a whole new organizational structure in place, which included the opportunity for me to take my skill set and move it into sustainability.

"There are a lot of sustainability pressures globally on the agriculture sector, second only to the energy sector. Policy is being made by people who may not entirely understand agriculture. Since so many people are removed from the farm, we need to make sure we're at the table, shaping the decisions that come out of those discussions to make sure we have a sustainable and productive agriculture sector."

Tackling the sustainability challenge, as an important leading element of corporate responsibility, is rather new as a specific portfolio — keeping up with the times, so to speak. When Laing went to university, it wasn't an option.

"Now it is. There are a lot of people interested in sustainability. I would say that's even going to grow. Sustainability, especially with younger generations, has been a big focus; now the whole world is catching up. It's becoming a mainstream part of business.

"Sustainability has evolved from corporate philanthropy. We now need to add

Environmental Social Governance, or ESG. Investors are increasingly asking companies to disclose risk factors for ESG. You know that when investors are talking about it, it's mainstream and it's going to be a game changer."

Considering all aspects of her job, she says, "There's nowhere else I'd rather be. It's the most fascinating place to be in business."

In addition to a global priorities, there is a local focus for sustainability that goes right down to the roots of the community, here at home. Laing, for example, recently spent a day in a school nutrition program providing healthy meals to kids in an inner city school. "I was serving meals and being inspired by some seven year olds," she said.

Laing's job has also brought her, and kept her, at home.

"I'm a proud U of S grad, now working for this huge agriculture company which makes me feel more connected to my family's farm than ever before. It is incredibly awesome to work for a global entity like Nutrien and still live at home right here in Saskatchewan."

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# CAPTURING SHAND'S POTENTIAL CCS retrofit would make plant an eco-powerhouse, study shows

As Mark Twain — whose death was rumoured well before the actual event — might have said, the imminent demise of fossil fuelpowered electrical plants has been greatly exaggerated.

New environmental regulations may now surround the coal-fired generation of electricity, but as the Saskatchewan experience has shown, carbon capture and storage (CCS) has not only extended coal's usefulness, but also the life of power plants.

The province's electrical utility, SaskPower, began the movement toward retrofitting

power plants many years ago, culminating in the reinvigoration of Boundary Dam 3 CCS Facility (BD3) four years ago. Now, a new study prepared by the International CCS Knowledge Centre shows that the Shand Power Plant has potential to be next, although with higher levels of capture and much lower capital costs.

SaskPower decided not to retrofit Boundary Dam's fourth and fifth units; but Shand, with a potential lifespan of another two decades or more, is a different story.

"We don't see a fossil-free future for a

considerable period of time," said Corwyn Bruce, Head of Technical Services for the Knowledge Centre.

"In North America, these plants are 30 and 40 year old ... (but) I don't think they're at the end of life. These coal-fired power plants are getting to be like refineries, where they have an infinite life if you replace a small number of key components.

"A lot of coal-fired thermal plants have emissions that need to be mitigated," he said. "And CCS is the only way to do that."

Dustin Duncan, Minister Responsible for



SaskPower, said the Shand study is positive news for CCS not just in Saskatchewan, but globally.

"We know around the globe, conventional, unabated coal-fired generation is going to be continued to be used well into the future," Duncan said in an interview.

"SaskPower is waiting for a more detailed report from the International CCS Knowledge Centre which will provide additional information for the analysis that needs to

take place on whether or not to retrofit Shand or any of the other coal fleet's units with CCS," added Duncan.

"Certainly, from a very high level, it's positive news that looks like the capital costs will be significantly lower than on Boundary Dam 3."

Not long after the BD3 plant's retrofit came online, SaskPower and the mining giant BHP formed a partnership to support CCS investigation. BHP agreed to provide \$20 million over five years, with the goal of leveraging what had been learned at BD3 to push forward CCS as a greenhouse gas (GHG) reduction tool. The outcome was the creation of the Knowledge Centre.

"We provide advocacy and outreach for CCS, as well as technical expertise to those who are pursuing CCS in their facilities at locations around the world," said Bruce. "As per our articles of incorporation we're a not-for-profit, non-partisan company with an independent board which includes representation form Sask-Power, BHP as well as independent board members

from the global community working on climate change."

Looking for the next CCS potential in Saskatchewan was an obvious next step, and the Shand Power Station was the obvious choice for a study. So, the Knowledge Centre with support from SaskPower dove in. They joined forces with Mitsubishi Heavy Industries-MHI, who focused on the economic benefits of scaling up a power unit from the knowledge of construction on BD3.

The study showed that not only could Shand's carbon dioxide (CO2) output be reduced by more than 90 per cent, the capital cost of its retrofit could be significantly reduced from the outlay on BD3. And why?

"The first thing is that scale matters," said Bruce. "When you build a mine or industrial facility or power facility, the reason these things get bigger over time is that it's cheaper to build it as big as you can.

"BD3 is a 150 megawatt unit and Shand is 300 megawatts. That is a major driver of cost improvements.

we, and the regulator, weren't sure what a regulation may even look like. Now that we know the regulations, and have experience with operating the facility, a lot of that functionality isn't required.

"We looked at Shand, and we determined what we could do in the power plant is minimize the changes to maximize efficiency."

Briefly, here's how CCS works. The flue gas that would go up the stack is cooled

and sprayed with amine liquid, which absorbs the CO2 gas. When heat is taken from the steam turbine and applied to the amine, pure CO2 bubbles out of the liquid and is removed. The amine liquid, now CO2-free, is recycled to capture more CO2 from the flue gas; and the pure CO2 is compressed, dried and put in a pipeline.

"The basic process is literally that simple," said Bruce.

The Shand study is based on 90 per cent carbon capture, the same as BD3, but "we believe that 90 per cent capture is an artificial limit," he added. "We asked ourselves things like, what about 95 per cent capture?"

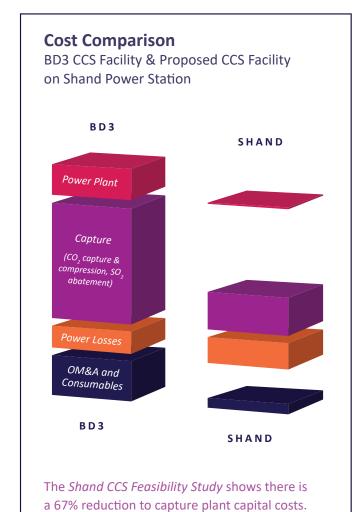
The engineers found that 97 per cent of CO2 could be captured when the power plant was running at 62 per cent capacity. That lower capacity can occur when renewables, particularly wind, kick in to pick up some of the generating power. As Shand reduces its coal-fired output, the CCS system continues to run at a high rate, still removing carbon from the stack. Even at the base case of 90 per cent, CCS is much cleaner than using natural gas, Bruce pointed out.

For the Knowledge Centre's wider purposes, the study has been "great" for outreach, Bruce added.

"Through the publication of this study, we've shown some great cost savings that helps us get in touch with others pioneering CCS on industrial sources such as waste energy plants, cement and steel plants," he said. "This flue gas process has pretty good applicability to those facilities as well. We're collaborating with people around the world on future CCS projects."

There are further CCS benefits as well — for example, selling fly ash off the back of the coal-fired power plant.

"Fly ash is actually used in the concrete business as a replacement or a supplement



"The next big driver of cost improvements is the lessons learned at BD3. When it was put together there were a number of unknowns on how it would work and how reliable it would be. We put a lot of flexible and multiple features that would address these 'unknowns'. Now we know which of these are required and which are not."

BD3 was designed to run at full output whether or not the CCS system was in service, he explained, which required significant modifications to the power plant.

"That was a good idea and it made sense in 2010 when there were no regulations and



instead of using as much concrete, which is a high emission product," he said.

"We actually looked at that for the Shand system, what would net emissions be (if we included fly ash)? And we determined emissions would be, just below zero or what industry calls 'negative emissions."

"We paused for a second, went back and made sure we were right. If you include the GHG reduction potential for cement, it basically has no net emissions of CO2."

#### THE BUSINESS CASE FOR SASKPOWER

The study is a first step toward SaskPower determining whether installing CCS at Shand is an economic option.

Cost is an important factor, Duncan noted; but when SaskPower needs to make a decision on Shand or any of the other units, there will be others that must be considered.

Technology risks associated with the next generation of CCS, the market conditions for alternatives such as natural gas and even the potential CO2 sales will come into the decision.

"Boundary Dam 3 currently produces CO2 that is used in enhanced oil recovery, so that's part of the business model for CCS," Duncan said. "We'll need to make a determination on what the demand will be for CO2, because that is part of the analysis that will take place when it comes to whether or not to proceed with CCS on Shand or any of the other units."

The study was prepared on Shand because it is the newest unit in SaskPower's fleet, and because of its larger 300 MW capacity, he

"It just made sense to look at the bigger units that we have from an efficiency perspective," Duncan said.

There are two other reasons. One is that the Shand site design originally included two 300 MW units, but one was built.

"The Shand site has space in the event that we need to build CCS. That was one of the challenges with BD3," Duncan said. "The Boundary Dam power station footprint is very congested to begin with. That did have an impact on the capital costs. Shand essentially has a large enough footprint that that won't be a problem."

Perhaps most importantly, under the new federal regulations, a coal-fired power unit must be shut down by its retirement date or 2030, whichever comes first. Under the former regulations, it was whichever date came second.

"All our other units have a retirement date prior to 2030, except for Shand," Duncan said. "Shand has a retirement date of 2042, so under the former regulations we would have been able to run Shand out to 2042. Under the new regulations, we have to shut it down if it doesn't have CCS before 2030.

"What that means for SaskPower and all the ratepayers and the owners of Saskatchewan, without CCS under these regulations we will potentially have a stranded asset. We will basically be forgoing the last 12 years of the Shand unit that we are paying for and have already paid for. In terms of ensuring that we are optimizing the lifecycle of the Shand unit, the only way to do it would be CCS under these regulations. That adds a little more urgency as to why we would look at Shand."

The new report will provide more specific cost estimates that will help make a comparison with proceeding with Shand over other options. Duncan said SaskPower

will have to make a decision by 2024, in order to accomplish a CCS retrofit by 2029, the year before a potential 2030 shutdown. SaskPower is still considering next steps for the rest of the coal-fired fleet.

"It's not that much time. One of the challenges SaskPower will have and the government will have, is that the alternative for us for baseload is really natural gas. Five years from now, what's the price of gas? Nobody really knows.

"We'll have a firmer idea not only on costs of capital and operations through the work the Knowledge Centre is doing ... but by the next decade we'll have a better outlook on renewable energy, gas costs and hopefully some of the learnings of the other CCS projects around the world."

The study shows that compared to the BD3, a CCS system at Shand could see capital cost reductions of 67 per cent per tonne of carbon dioxide (CO2) captured as well as 92 per cent in potential savings to power plant integration capital cost.

Based on the model, the levelized cost of captured CO2 is calculated at \$45US/tonne.

The Shand CCS system would be designed without the requirement of additional water, mitigating a key constraint for thermal plant operation retrofits and expansions.

At this site, up to 140,000 tonnes per year of fly ash would be saleable to the concrete market (subject to demand), which could offset emissions in concrete production. This equates to a potential net reduction of 125,000 tonnes of CO2 each year resulting in a facility with net-negative CO2 emissions.

The Shand CCS project design capacity is nominally 2 million tonnes of CO2 captured per year – twice the initial design capacity of BD3.



When we talk about the spin-off benefits of the mining industry in Saskatchewan, discussion is usually economic—jobs, investment, tax revenue, spending. But the mining industry has another important benefit and that is an enhanced level of safety in communities around the province.

Saskatchewan's mining industry has one of the best safety records of any mining jurisdiction in Canada. Mining companies have teams of safety professionals dedicated to developing and delivering workplace safety programs, as well as emergency response teams (ERTs) trained to respond to local incidents.

Mining company investment in safety extends well beyond operational settings into local communities. Nowhere is the impact more powerfully evident than with STARS air ambulance.



#### MINING COMPANIES HELP PUT STARS IN THE SKY

STARS, which stands for Shock Trauma Air Rescue Service, flew its first rescue flight in 2012. Since then, STARS has flown more than 5,500 missions to more than 500 communities across the province.

"That's thousands of lives saved, and countless more lives touched," says Mark Oddan, STARS Senior Communications Advisor. "STARS is driven by the goal of providing people the vital emergency medical care they need when they need it the most. Whether it's offering hands-on training to rural medical professionals or providing rapid, emergency medical transportation and care for the critically ill and injured, our crew works with community allies to fight for the life of every patient who needs us."

While the Saskatchewan government provides roughly half of STARS' operational funding, the rest comes from donations from individuals, service clubs, municipalities and the business community—notably, Saskatchewan's potash mining companies.

Nutrien's support of STARS began in 2011 with a commitment of up to \$27 million. In 2018, Nutrien renewed its support by committing funding towards a new H145 helicopter.

"Nutrien is proud to support STARS and ensure this vital service can be enhanced for the people of Saskatchewan," Nutrien Vice-

FETY

President of Sustainability and Stakeholder Relations Candace Laing says. "We know the importance of having access to emergency care for our communities."

Mosaic's partnership with STARS also began in 2011, when the company made a \$5.5 million grant to help build the Regina hangar and purchase a helicopter. Mosaic is currently in a 5-year, \$2.5 million commitment to help with operational costs to run STARS bases in Regina and Saskatoon, making a total commitment of \$8 million since 2011.

"K+S Potash Canada committed \$1 million to STARS air-ambulance in Saskatchewan in 2017. This is the single largest gift that the company has made to date and we announced this partnership at the grand opening of our Bethune mine," says Maeghan Dubois, manager of Communications and Corporate Affairs at K+S Potash Canada. The company subsequently donated \$50,000 to STARS in 2018 in honour of the Humboldt Broncos.

"KSPC is comforted knowing that STARS is available to our employees across the province, including the Bethune mine, which is located in a rural location far away from the nearest hospital. STARS is an invaluable lifesaving service in our province, and we are so grateful for the work that they do," Dubois says.

"Without guestion, STARS would not exist in Saskatchewan without the generous support of the mining companies in this province. Their financial commitments of more than \$40 million since we established operations in the province have given us life-saving helicopters and equipment - and the hangars in which to house them. They've also been great partners in promoting safety to their employees, their mine sites, and their communities. STARS was built by the community for the community, and the people of the Saskatchewan mining industry have been shining examples of that. They are incredible allies in our fight for life," Oddan says.



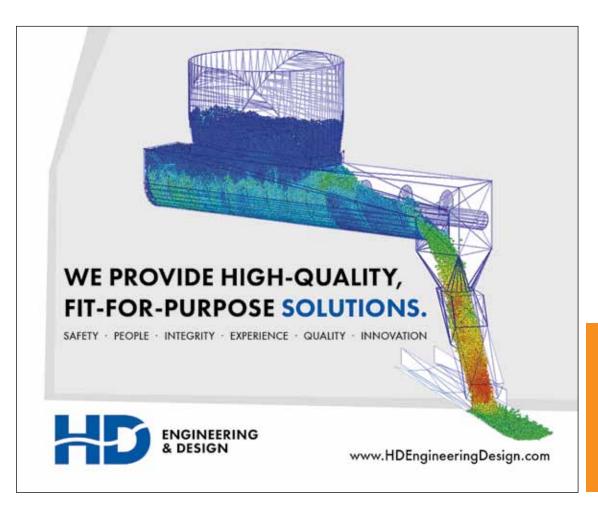
Cameco and Orano worked together to stage Operation Black Cat, a safety exercise, in La Ronge.

#### INVESTING IN COMMUNITY SAFETY

Mining companies also support, and often lead, safety initiatives in local communities. Orano Canada and Cameco Corporation, for example, have been building safety capacity in communities across the north for decades.

"Safety is the number one priority at Orano, so we do as much as we can to help promote safety in our communities," says Glenn Lafleur, Orano's manager of Northern Affairs. "Last year, we partnered with the La Ronge Regional Fire Department, which delivered a community safety program in La Ronge, Air Ronge and Lac La Ronge Indian Band. The fire chief said the program was very well received.

"In other years, we've made donations to help buy safety equipment, like the new fire truck in Isle-a-la-Crosse and a Jaws of Life for Beauval; we also helped fund a new



fire hall in Wollaston and Hatchet Lake. A couple years ago, we partnered with West Wind Aviation to have Curtis Weber, a young man with a very personal safety message, visit schools in the north giving safety presentations."

#### **INVESTING IN PREPAREDNESS**

Cameco and Orano worked together to stage Operation Black Cat in La Ronge, a full-scale mock exercise to give first responders practical experience dealing with a possible uranium spill. Emergency Response Teams (ERTs) from Cameco and Orano participated, along with members of the local fire, police and EMT services.

"We do a boots-on-the-ground mock exercise every few years as part of our Emer-

gency Response Assistance Plan (ERAP)," says Wade Petrishen, Superintendent Logistics at Orano, adding, "it's pretty extensive."

Creating a mock scenario, in this case a vehicle collision between passenger vehicle and a truck carrying uranium, enables responders to identify and resolve potential problems in a practice setting.

"Doing the exercise with teams from both companies as well as contractors and local first responders gives everyone a chance to develop their skills," Petrishen says.

"Outreach exercises like this are always good," says John Zaidan, Cameco's Program Manager, Emergency Preparedness and Security. "It's good for everybody to be on scene at the same time, working toward the same goal. The people in the exercise

are the same people who would be there on a real call, so it helps reinforce who's in what role."

Cameco and Orano take turns taking the lead on organizing the exercises, but Zaidan also points out the value of community input and participation. "We have a lot of help staging these exercises. The La Ronge Fire Department was great; very helpful and enthusiastic. Northern Resource Trucking let us stage the exercise in their yard and helped transport equipment to the site."

In the end, the exercises not only build local safety capacity, they assure the community that in the event of an incident, emergency response teams from the mining companies, contractors and local fire departments all know what to do. **M** 



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# Since 2010, mining companies in northern Saskatchewan have awarded more than 1,100 scholarships worth over \$1.5 million to northern students.

Despite challenging times in the uranium industry, mining companies in northern Saskatchewan continue to promote education and skills development. It is part of an ongoing human resource development agreement that, over the past 30 years, has directly impacted education levels and skill development in the North. This, in turn, has helped build a trained labour force and increase the competitiveness of local suppliers.

Cameco and Orano have both made long-term investments in northern education and community health and wellness. The Six Rivers Trust Fund is one example. Established in 2016 by Cameco, Orano and community leaders from northern Saskatchewan communities, the fund is an independent, non-profit corporation that provides funding for community projects across the northern administration district (NAD).

The Six Rivers Fund supports projects that focus on youth, education, sports and recreation and health and wellness. In 2017, for example, the fund supported eight projects, including the Minahik Waskahikan School in Pinehouse, Youth Winter Camp

in Fond du Lac, Youth Cultural Camp in Pelican Narrows, Under Wing Pre-school in Uranium City, Sokatswin Culture Camp in Sandy Bay, Community Safety Conference & Friendship Centre in Ile à la Crosse, Northern Spirits Workshop Northern Sports, Culture & Recreation, Pan Northern and the beach front clean up in Black Lake.

Mining companies also provide work placement and summer job opportunities. According to the provincial government, in 2017 this included 17 positions for students in tri-trades, industrial mechanics, power engineering and radiation/environmental technician programs.

Perhaps one of the most important, and lasting, impacts of the mining industry's commitment to education are programs that encourage young people to stay in school and pursue higher levels of education and training. In 2017, the mining industry awarded 23 post-secondary scholarships and 84 achievement awards to students in grades 7 to 12 across the Athabasca region.

Cameco partners with other organizations to support the University of Saskatchewan's Science Ambassador

Program, which connects northern Indigenous communities with the university by pairing senior undergraduate and graduate students with schools across northern Saskatchewan and Manitoba. In Beauval, Pinehouse, Wollaston, Ile a la Crosse, Green Lake, Cumberland House, Buffalo Narrows, Stony Rapids, Black Lake and Fond du Lac, students had opportunities to explore culturally relevant science activities, while the student ambassadors discovered new perspectives on learning and knowledge.

Every year, mining companies send representatives to northern schools, career fairs and science camps to help encourage youth to stay in school and increase awareness of the many exciting career opportunities in mining.

Education is the key to sustainable growth in Saskatchewan's mining industry. According to a recent Mining Association of Canada report, STEM-related occupations in mining are on the rise. Technological change means new technologies will take over many tasks, while at the same time opening up new opportunities for skilled technicians, technologists and engineers in other areas.

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# SAVING HISTORY, CREATING A LEGACY

#### White City woodworker transforms Mosaic Stadium seats into art

Potash. Football. Work ethic. It doesn't get more Saskatchewan than that.

Those elements came together after the former Mosaic Stadium, long-time home to the Roughriders, made way for a new facility in 2017. Mosaic Company, the title sponsor of the stadium, sought a way to remember and honour the stadium's history.

They found Brad Sukarukoff.

Their approach came at a time of reflection for the owner of Worth Doing Well, a custom furniture, woodworking and artwork company in White City,

Mosaic felt it was important to preserve pieces of history that mean so much to the people of Saskatchewan

SARAH FEDORCHUK, MOSAIC, VICE PRESIDENT OF PUBLIC AFFAIRS AND GOVERNMENT RELATIONS, POTASH

"I'm shifting a little bit to taking on less run-of-the-mill projects. I want to focus on the really extraordinary stuff," said Sukarukoff.

Extraordinary certainly describes, for example, his work-of-art table entitled Grace: it's made of black walnut with a blue river fashioned from ecopoxy running through it.

The seats from Mosaic Stadium presented a unique opportunity, as well. How often do you have historic items like that to reimagine?

"Mosaic felt it was important to preserve pieces of history that mean so much to the people of Saskatchewan, and to us as a company," said Sarah Fedorchuk, Mosaic's Vice President of Public Affairs and Government Relations, Potash.

"The Old Mosaic Stadium sponsorship



Brad Sukarukoff created this work of art from the former Mosaic Stadium's bleachers

was one of Mosaic's first partnerships in the province and is one of the most significant to this day."

And so, Mosaic contacted Sukarukoff last year after the company purchased some of the bench pieces through McDougall Auctions.

"They commissioned me to take those pieces and create artwork out of them," said Sukarukoff. "I did one piece as a retirement gift for one of their people, and a large piece that was for their main boardroom. And I did another six pieces for their various minesite offices."

The eight works are similar; all are wall-hung pieces using the bench backs, still emblazoned with seat numbers.

"The frame is actually pieces of the seat bottoms," said Sukarukoff of the boardroom work. "I made a shadow box and inset the other bench pieces inside and coated it in epoxy, so it's nice and glossy. It'll keep its colour for the duration of time; it's UV stable, so it won't allow the paint to fade anymore.

"It still has some of the bolts from the actual seats, and every little dint and scratch and scuffmark."

It certainly wasn't lost on the artist that his project held historic meaning.

"It was quite nice to do something with the historic pieces. I like to do things with meaning. My biggest thing is to leave a legacy," he said.

"I was in advertising before this, and

RTh

always worked with my hands before getting into advertising. When I left the advertising world, I wanted to do something that kept me up on my feet. I found everything in advertising had an expiration date. I would put hours and hours into projects that would expire in X amount of months. It became less fulfilling.

"I wanted to make something that would have more of a legacy for my clients."

Sukarukoff named his company for that ethic: if it's worth doing, it's "Worth Doing Well." Largely for that reason, he focuses on making one significant piece per month, and is particularly known for his unique gaming and dining tables.

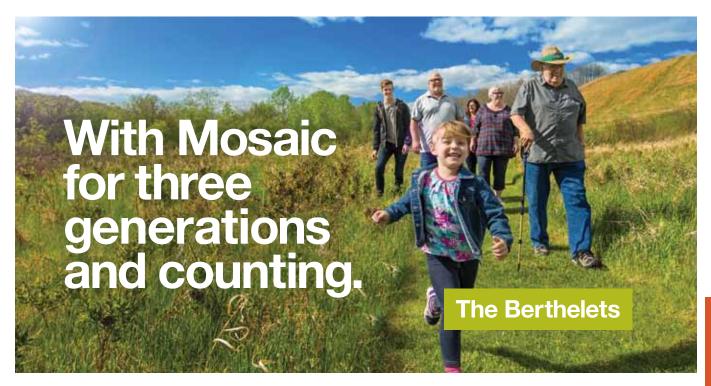
"When someone comes in and commissions a piece, I want to make sure the fit is correct between what they want and what I can do for them," he said. "I want to make sure my clients are over the moon.

"The dining and gaming tables are rewarding. Usually the budget is there to do something amazing. People are going to play games around it with their family and friends and have those important meals and interactions around them. They appreciate those projects the most."

Sukarukoff can be found at www.worth-doingwell.ca. He also sells finishes, such as the ecopoxy, at www.woodworkfinishes.com.



Brad Sukarukoff creates art and artistic furniture from wood.



At Mosaic, we believe our success is rooted in our people. Generation after generation, we've built a company and community where they can grow. Through innovation, sustainability and strength – our commitment reflects their efforts to create a legacy we can all share. Together, we can see tomorrow from here.



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**ALX Uranium Corporation** 

**BHP** 

**Boart Longyear** 

Cameco Corporation

Cameco Corporation - Cigar Lake Operation

Cameco Corporation – Key Lake Operation

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Cameco Corporation – Rabbit Lake Operation

CanAlaska Uranium Ltd.

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Fathom Minerals

Fission 3.0 Corp.

Fission Uranium Corp.

Foran Mining Corporation

Fortis Mining Engineering Manufacturing

Forum Energy Metals Corp.

**HCC Mining & Demolition** 

**HudBay Minerals** 

ISO Energy

JCU (Canada) Exploration Company Ltd.

K+S Potash Canada

K+S Potash Canada GP - Bethune

K+S Windsor Salt

Mosaic Company

Mosaic Belle Plaine

Mosaic Colonsay

Mosaic Esterhazy, K1, K2, K3

NexGen Energy Ltd.

North Arrow Minerals Inc.

North Atlantic Potash Inc.

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**Nutrien Cory** 

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**UEX** Corporation

Western Potash Corp.

Westmoreland Coal Company – Estevan Mine

Westmoreland Coal Company - Poplar River Mine

Yancoal Canada Resources Co., Ltd.



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