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**SMA**  
*Saskatchewan  
Mining Association*

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# ORE

MAGAZINE

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# ORE

MAGAZINE

**The Official Publication of  
The Saskatchewan Mining  
Association**

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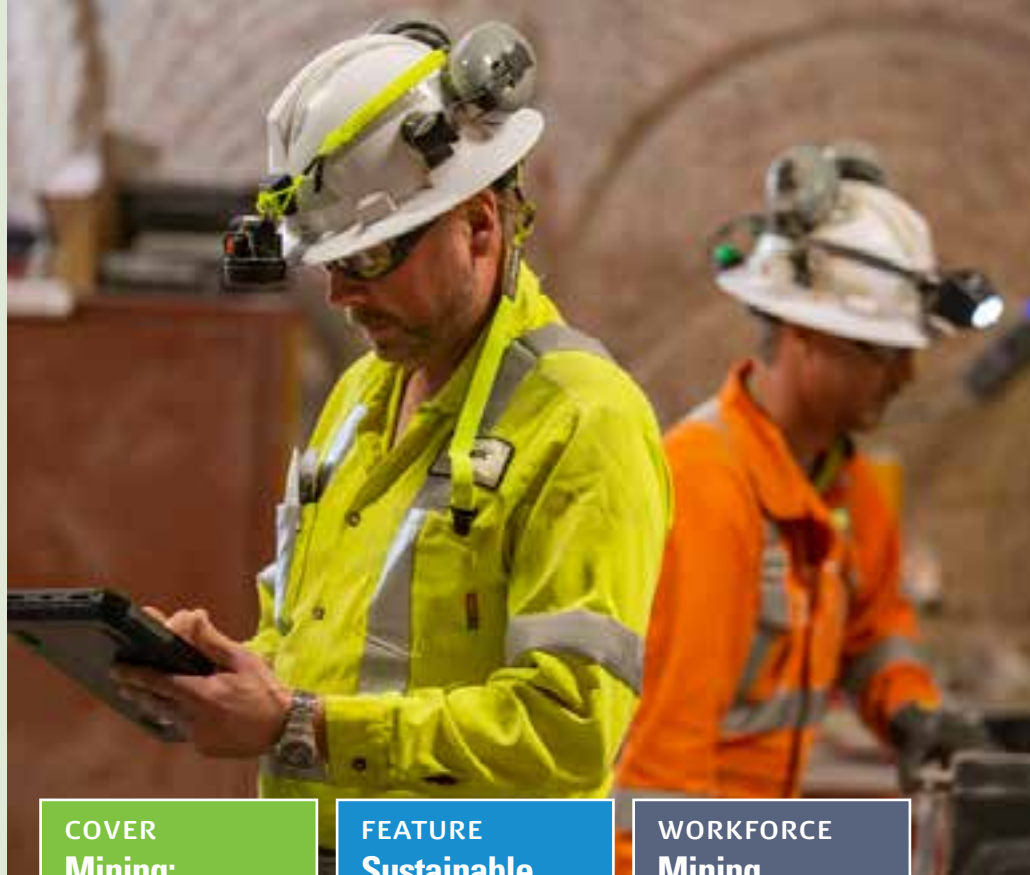
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## Cover

As Canada shut down under the  
weight of the COVID-19 pandemic,  
Saskatchewan's mining industry, a  
pillar of our province and Canada's  
economy played a critical role  
in sustaining jobs, community  
organizations and delivering  
essential products that the world  
needs to grow food, produce clean  
energy and more.



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figure prominently  
in critical minerals  
strategies

# Mining: Essential to Local and Global communities – now more so than ever



**The strengthened relationships among our members and communities has been a positive outcome**

– PAM SCHWANN

“By failing to prepare, you are preparing to fail” This quote by Benjamin Franklin reflects how the mining companies in Saskatchewan were already prepared to address the COVID-19 pandemic in the early days of March 2020.

Using the game plans developed to address the SARS pandemic in 2003, companies had existing frameworks to draw upon to protect the health and safety of their employees, contractors and the communities in and around which they operate. While there will be challenges ahead, the resiliency and leadership of the mining sector – particularly in terms of health and safety, environmental protection and operational innovation – will continue to be an anchor in our province and country’s recovery.

As reflected in the cover article, mining and its supply chain was declared an “essential business.” As long as mines are able to safely operate, they can provide their necessary products to local and global communities, continue employing thousands of Saskatchewan residents and businesses, and generate revenues for governments.

During this time, many businesses have suffered punishing financial and emotional losses. The mining supply chain was no exception. The way in which mining companies adjusted to assist these important business partners with their cash flow is reflected in this edition of ORE.

On the environmental scoreboard, mining operations in Saskatchewan produce more sustainability than their global, not-so-green, competitors. The benefits of increased mineral production from Saskatchewan operations and their ability to lead global greenhouse gas emissions reductions in their industry is something that needs to be recognized and incentivized by governments, as addressed in our feature article.

How the acceleration of digital and remote mining applications during COVID enabled companies to quickly pivot and keep operations running safely and employ-

ees connected is covered in the Technology article. Another key pivot saw nurses becoming the quarterbacks of the game plan against the COVID adversary, as told in our “Tagging Along” feature.

Recognizing that COVID-19 would disproportionately affect some communities and organizations, SMA member companies huddled up and were in constant communication with their neighbours to understand and deliver what they needed – whether that was PPE, sanitizer, food or other essentials, like, yes... toilet paper. While there are many aspects of this pandemic that have been devastating, the strengthened relationships among our members and communities has been a positive outcome.

As an industry association, what and how we communicated information related to COVID-19 to our members and the public was important. We created and posted a variety of resources on our website home page, and developed safety infographics to assist our members. We were innovative in hosting virtual events like Mining Week to demonstrate that, in some instances, it was possible to carry on. We recognized our friend, Mark Sterner, as the 2019 Emergency Response Person of the Year in a virtual ceremony that allowed Mark and so many of his peers to partake. For the upcoming 12th Annual Mining Supply Chain Forum, COVID meant postponement at first and then a shift to a virtual format. Other events, including the flagship Emergency Response Mines Rescue Skills Competition and GeoVenture Teachers Program, didn’t make it across the goal line this year due to necessary safety precautions.

You may have noticed a few football references in this commentary. Like many of you, I am also missing our Saskatchewan Roughriders football, and look forward to game day next year. So, keep your mask on, your hands clean, and your Rider jersey ready. 🏈



# It's Essential to Work Together

Around the globe, crops are grown using potash mined right here in Saskatchewan. Potash ensures global food security and economic success for our province. During these unprecedented times, we are proud that our operations at the K+S Potash Canada Bethune mine have provided stability and peace of mind not only for our customers, but for our most important resource - our employees. Our organization continues to support and contribute to local communities and businesses, ensuring a brighter future for all.

Read more about the work we do at [www.ks-potashcanada.com](http://www.ks-potashcanada.com)



K+S Potash Canada

As Canada shut down under the weight of the COVID-19 pandemic, Saskatchewan's mining industry, a pillar of our province and Canada's economy played a critical role in sustaining jobs, community organizations and delivering essential products that the world needs to grow food, produce energy and more.

# MINING: AN ESSENTIAL INDUSTRY

Nutrien employees around the world proudly continued working as an essential service to help farmers feed a growing world. Photo Courtesy of Nutrien.

## ESSENTIAL PRODUCTS

The government of Saskatchewan declared resource sector production, processing and supply chains essential business services within days of enacting the provincial State of Emergency in March. Indeed, our province's mining operations provide fertilizer to grow food, fuel for energy, and other minerals for the production of household, industrial, and luxury products. The mining companies consider their status as essential services as both a responsibility and a privilege.

"We know we were fortunate to be able to continue to operate safely when so many others were so adversely affected by the economic impact of the COVID-19 pandemic. Our Westmoreland mines in Poplar River and Estevan supply lignite coal to Saskatchewan's coal-fired power plants, activated carbon for environmental applications and charcoal for people's barbecues; shutting down would have been disastrous," says Nathaniel Huckabay, General Manager at Westmoreland Mining LLC's Poplar River Mine.

Bruce Bodine, Senior Vice President, North America at The Mosaic Company, says "it quickly became clear just how important our role is in providing crop nutrients for local and global farmers to grow the food all of us depend on. Fertilizer contributes to the start of the food supply chain, and without our 'essential products,' keeping food on shelves and tables along with the overall recovery efforts would have been that much harder."

Being declared an essential service did not have the same result for all mining operations. Over 50 per cent of the uranium and gold mining operations' workforce lives in remote northern communities without easy access to healthcare services. Although these operations could technically remain open, the companies decided to temporarily stop production. Protecting the health of their employees and the surrounding communities was more important, so the majority of employees were sent home with pay. A small team maintained essential circuits during this care and maintenance period.

"At the Seabee Gold Operation, we voluntarily suspended production and only kept 22 employees onsite. As the circumstances of the pandemic improved, and the remote communities had protocols in place to help keep residents healthy and safe, we incrementally brought employees back to work until full production activities resumed in August," says Amanda Smith, Community Relations Liaison for SSR Mining.

Production resumed at the uranium mines at the beginning of September. Despite suspending production for nearly six months at its Cigar Lake uranium mine, Cameco Corporation did not miss a single delivery to any of its nuclear fuel customers. "Maintaining business continuity in our commercial relationships is essential in today's highly competitive global nuclear energy market," remarks Jeff Hryhoriw, Director of Government Relations and Communications for Cameco Corp.

"Whatever successes our company may have experienced in our performance during this crisis, we owe them directly to our employees. Their professionalism,

— “ —

"It reminded us all at Cameco, and in the entire mining industry, why we place health and safety at the very top of our values. It's the right thing to do."

- JEFF HRYHORIW,  
DIRECTOR OF GOVERNMENT RELATIONS  
AND COMMUNICATIONS  
CAMECO CORP.



Orano employees physically distanced early in the pandemic while on the plane taking them 850km north from Saskatoon to the McClean Lake operation to work. Photo Courtesy of Orano Canada

expertise, perseverance, adaptability, understanding and support for one another and the company have been outstanding through every obstacle and complication we faced during this pandemic.”

### ESSENTIAL HEALTH AND SAFETY

The pandemic has highlighted for everyone the importance of healthy people, families and communities. Jeff says, “It reminded us all at Cameco, and in the entire mining industry, why we place health and safety at the very top of our values. It’s the right thing to do.”

In central and southern Saskatchewan, continuing to operate as an essential service meant mining companies had to quickly implement health and safety measures mandated by Saskatchewan Health Authority.

“Aside from asking employees to work from home, for those who could effectively do so, we implemented enhanced disinfection and cleaning procedures, deployed physical distancing measures, a health questionnaire and contact tracing protocols. We have also made masks mandatory for all employees and contractors at our site and offices to help decrease the potential of transmission,” says Colin Braithwaite, in charge of health, safety, security, environ-

ment and quality at K+S Potash Canada.

“The mental health of all our employees is also a priority. We frequently check-in with employees to make sure they maintain social connections. We provide resources for counselling, promote fitness and equip our leaders with tools so they can support their employees. Being an essential service also means recognizing that our employees’ wellbeing is crucial,” Colin says.

### ESSENTIAL SUPPLY CHAIN

“Besides the fact that the Poplar River Mine could continue to produce so people could have baseload power, we were able to supply the increased demand for charcoal while people stayed home and barbecued more this spring and summer,” Nathaniel says. “We also supported many different vendors and contractors supplying all kinds of things, from janitorial services to pest control, HVAC support, mining equipment parts and more.”

In fact, the mining companies purchase billions (\$2.9 billion in 2017) in goods and services from Saskatchewan suppliers, including several millions from Indigenous-owned business (\$649 million in 2017). Maintaining production during the pandemic allowed many of those involved

in the supply chain to continue to operate.

“In 2019, K+S Potash Canada utilized 162 different companies, including Indigenous-owned, to provide services. Time spent at our mine site varied, but some service providers were there for the entire



Seabee Gold Mine nurse performing the mandatory COVID-19 screening with an employee. Photo Courtesy of SSR Mining.

“At the Seabee Gold Operation, we voluntarily suspended production and only kept 22 employees onsite.”

- AMANDA SMITH,  
COMMUNITY RELATIONS LIAISON  
SSR MINING

year and accumulated more than 100,000 person hours of work,” states Ryan Martens, K+S Potash Canada’s Superintendent of Contracts. “Our reach is extensive. Our business fuels many other businesses large and small. Our numbers for 2020 have not been finalized to date, but being able to produce during the pandemic has allowed us to carry on working with and supporting many local businesses during this difficult time.”

## ESSENTIAL COMMUNITY SUPPORT

In Saskatchewan, the mining companies have a well-established tradition of being good corporate citizens. Every year, they donate abundantly to local charities and support a wide variety of community programs. During the pandemic, they once again demonstrated their commitment by donating nearly \$4 million in combined cash support and in-kind donations of personal protective equipment to Indigenous and local community organizations.

“In the early days of the pandemic, Mosaic quickly responded to the immediate needs in the community by providing over \$1.5 million dollars in pandemic relief funds globally for things like emergency food programs and medical supplies,” Bruce says. “We haven’t forgotten who we are – a company that believes in helping those in the communities where our employees live and work – no matter what challenges we face as a company.”

## ESSENTIAL INNOVATION

Digital innovation is a constant in the mining industry. The mining companies rose to the challenge of working remotely by quickly implementing new software programs for employees and customers.

Nutrien also took the opportunity to enhance the design and development of digital tools aimed at helping employees and customers manage agronomic product needs. Their new customer portal connects Nutrien Ag Solutions’ representatives with farmers, allows customers to purchase products and services efficiently, and facilitates timely delivery.

“We hadn’t started the design of the digital platform with a pandemic in mind, but we’re seeing the unique opportunities to connect remotely and enhance convenience for growers and other customers,” says Cameron Holbrook, Nutrien Ag Solutions Vice President, Digital.

“Since the start of 2020 we processed more than \$1 billion in transactions on the digital platform for growers planting and caring for their crops,” Cameron adds. “It shows that growers who were used to doing business face-to-face, but couldn’t do so due to the pandemic, have discovered how efficiently they can access what they need from us remotely, through the platform.”

## ESSENTIAL FOR SASKATCHEWAN AND CANADA’S RECOVERY

Set in motion at the beginning of the pandemic, the Task Force for Real Jobs, Real Recovery gathers representatives and support from over 40 organizations across Canada, including mining, oil and

gas, pipelines, chemistry, manufacturers, trucking, construction and forestry associations, labour unions, chambers of commerce, municipalities coalitions, educational institutions, economists, and Indigenous organizations and leaders.

“It is truly a pan-Canadian effort,” says Stewart Muir, Media Representative for the task force. “The first order of business of our coalition was to learn about the real opportunities required to bring back millions of jobs lost during the pandemic. We conducted an extensive study throughout this summer, which concluded that Canada’s natural resources sector can play a critical role in ensuring a competitive, prosperous economy while accelerating innovation and environmental competitiveness.”

The study indicated that, with the right conditions in place to promote natural resources and manufacturing, up to 2.6 million new jobs could be created, bumping up Canada’s economy by 17 per cent in real GDP.

From the study, the Task Force published a report outlining achievable goals in three main categories: First, infrastructure, public policy and regulatory goals; the next category focuses on building meaningful employment for all, including Indigenous

people and training the workforce; and the last category encompasses the acceleration of innovation and environmental competitiveness.

For Pam Schwann, President of the Saskatchewan Mining Association (SMA), a member of the Task Force, it is a good opportunity to raise awareness on the national stage, particularly in jurisdictions that have little contact with the resource sector. The SMA wanted to be part of the conversation. “Our Saskatchewan mining companies are global players,” she says. “We felt it was important to talk about the global opportunities for Canada if we have the right policies, regulations and infrastructure in place.”



An employee from the Walters Alberici Joint Venture works on a construction project at K+S's Bethune Mine. Photo Courtesy of K+S Potash Canada.



New employees physically distanced as they await their initial orientation at the Seabee Gold operation. Photo Courtesy of SSR Mining.

“Our Saskatchewan mining companies are global players,’ she says. “We felt it was important to talk about the global opportunities for Canada if we have the right policies, regulations and infrastructure in place.”

- PAM SCHWANN, SASKATCHEWAN MINING ASSOCIATION



The Mosaic Company provided COVID Community Support in the Yorkton, Esterhazy and Regina areas. Photo Courtesy of the Mosaic Company.

“As we get into pandemic recovery mode, we need to build on our strengths. The task force can help address common interests across the resource sector and its supply chain across the country. The coalition’s common denominator is the desire to see sustainable growth in the sector,” Pam says.

“The resource industry has a well-educated and innovative workforce and provides skilled, good paying jobs. Under one of the world’s most stringent environmental and regulatory system, it is reducing greenhouse gases that contribute to the country’s climate change strategy. Our provinces’ mining companies are producing more sustainably than others across the world,” Pam says. And the mining sector continues to be at the forefront of Reconciliation efforts and establishing

partnerships with Indigenous nations that support self-governance. So, when it comes to Canadian economic prosperity and our presence on the world stage, how can we talk about economic recovery without talking about the resource sector?”

Sean Willy, CEO of Des Nedhe Development, an Indigenous business development company headquartered in Saskatoon and one of the advisors on the task force, explains why he joined the task force. “If we want our province and our country to be successful and have a strong economy, we need to invest in infrastructure, in education, and in innovation.”

“We have to be proud of the resources we have

and of the First Nations’ contributions to the mining industry. We need to help change the narrative, we’re too humble,” Sean says. “We need to look at Indigenous businesses like other businesses. Our companies are able to deliver goods and services

just as well as any other businesses, competitive on quality and cost. But we need to understand the Indigenous employment requirement that goes with that.”

In northern Saskatchewan, the uranium mining industry has made great strides helping develop and support Indigenous and community-owned businesses and others in the mining industry are quickly catching up. These companies hire as many local people as they can and ask their contractors to do the same.

“We need to be proud of these accomplishments, of the mining history we’ve built together and the excellent track record we have,” Sean says. “By showcasing what has already been accomplished by the mining industry in terms of rural and remote Indigenous people employment, we can expand the markets for Indigenous businesses in mining and all the other sectors.”

Talking about the final recommendation of the task force, Sean points to Small Nuclear Reactors (SMRs) as one of the ways to help address climate change and foster innovation. “Saskatchewan has a long history in the nuclear industry, with uranium mining, research and healthcare applications. We have an opportunity to get involved right from the start with SMRs development. We need to help guide that conversation,” he says.

“We have to educate people, Indigenous people, about the benefits that can flow from this technology. If our people get engaged in the conversation now, it gives time for the youth to get an education so they are ready for the professional and technical jobs that will be created. And it gives times to our businesses to prepare to be part of the supply chains for that industry. The same goes for everyone in Canada. We don’t have much time, as the race to meet future global demand for this technology is already on. People need to get onboard.”

Chris Ryder, BHP Canada’s Head of Corporate Affairs, summarizes the essential nature of mining and its importance for the recovery, saying “the mining industry provides a steady baseload of employment

**Learn more  
about the Task  
Force and Read  
its report at**

**[https://  
realrecovery.ca/](https://realrecovery.ca/)**



Reliable rail infrastructure is essential for moving potash to market. Photo courtesy of Canpotex.

in Saskatchewan, and for many companies around the globe. Our products are essential.”


Saskatchewan’s mining operations have helped feed and fuel the world’s growing population for decades. The sector provides business opportunities for diverse supply chain and transportation industries, employs over 12,400 (as of 2017) individuals across the province, and contributes an additional 25,000 indirect jobs.

The mining companies implement stringent measures to ensure employee and contractor health and safety and to protect the environment. They are committed to producing sustainably and continuing to innovate to reduce CO2 emissions. They support a wide array of non-profit and community organizations, both near their operations and where their employees live.

Cameco’s Jeff Hryhoriw says, “If we don’t

set the right conditions to allow employers like the mining industry and their supply chain to emerge successfully from this pandemic, the recovery is going to be that much more challenging for the province and the country. Hopefully, this message is resonating with decision-makers.”

Given Saskatchewan mining companies’ high performance in terms of Environmental, Social and Governance (ESG) standards in comparison to many of their competitors around the world, their mineral production is more essential than ever – they lead the way. The actions of local mining companies before and during the pandemic demonstrate their dedication to working with local, provincial and federal governments, Indigenous and labour leaders, and the business community to strategize and implement a recovery plan that will set the stage for Canada’s socioeconomic wellbeing, now and in the future.

“Our mining industry’s responsibility as an essential service now, through the recovery and beyond, is to continue to demonstrate our important social value – particularly helping grow quality food and supplying clean energy to the world’s growing population of 8.5 billion by 2030. It’s no longer about mining having a social licence, it’s about mining adding its social value,” Chris says. 

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Saskatchewan at the heart of the world's

# SUSTAINABLE MINING INNOVATION

**As the world's population increases and incomes improve, Saskatchewan's mining industry is leading the way in helping meet the need for food, energy, and goods—all while practicing some of the world's most sustainable practices to help protect vulnerable environments.**

Canadian potash accounts for a third of the world market. About 95 per cent is exported to 40 countries worldwide, including the major markets of the United States, China, Brazil and India.

The industry in Saskatchewan is the most sustainable in the world, a point made in Mosaic's Time to Dig Deeper public information campaign ([timetodigdeeper.com](http://timetodigdeeper.com)). A Cheminfo Services analysis commissioned by the company reveals that domestic potash products are made with 70 per cent fewer greenhouse gas emissions than global competitors in places such as Belarus, Russia, and China.

Mosaic has also set a comprehensive set of goals with its 2025 Environmental, Social and Governance (ESG) Performance Targets. These include specific goals, such as reducing freshwater used by 20 per cent and greenhouse gas emissions by 20 per cent per tonne of potash product produced. Reduced

energy use is also part of this strategy, to be achieved by investments in efficiency, behavioural changes, and expanded use of renewables.

Specific examples of how this is done can also be seen at Nutrien, the world's largest producer of potash. The company is pioneering sustainability initiatives in energy efficiency and environmental protection. To protect soils and groundwater from clay and salt tailings, for example, the company employs a sophisticated management system that to date enjoys a 100 per cent containment record.

At its Cory location near Saskatoon, Nutrien has partnered with SaskPower, using waste heat from their nearby co-generation power plant to produce steam for mine operations. This reduces the need to run gas-fired boilers for steam, significantly reducing greenhouse gas emissions.

Energy efficiency is both good for the

environment and the bottom line. For Nutrien, this means looking at ways to reduce energy consumption throughout its potash network. Electricity to power equipment represents about 15 per cent of potash production costs, and the company is evaluating lower carbon sources to supply this energy.

As the first greenfield potash mine in Canada in more than 40 years, K+S Potash Canada has built sustainability into its processes. Having a clean slate to work with, the company used technological advancements to mitigate potash mining's inherent need for energy and water.

Measures include selective mining, which the company calls secondary mining. This process uses saturated sodium chloride (NaCl) brine and waste heat to preferentially dissolve potassium chloride (KCl) while leaving insoluble mineral like clay in the ground. The potassium rich brine is then pumped into the process plant where the potassium is produced. The volume of surface tailings piles is reduced as the clay solids remain in the ground, and the selective mining process re-deposits some of the NaCl underground.

K+S aims to achieve and exceed its own sustainability targets as well as those set by government. An example is the Saskatchewan government's mandate to reduce overall greenhouse gas emissions intensity by five per cent by 2030. The company's own target for emissions intensity from electricity generation, in partnership with its parent company, K+S Group, is four times this amount – 20 per cent.

The company is also working with the International Minerals Innovation Institute

Conveyor belt system from Mosaic Esterhazy K3 mine offers reduced environmental impacts.

based in Saskatoon to explore less carbon-intensive energy sources. These include co-generation, renewable energy, and small modular nuclear reactors (SMRs).

SMRs have enjoyed renewed attention as a tool to help reduce carbon emissions to provide baseload power while reducing carbon emissions. More immediately, they could play a role in Saskatchewan's commitment with the federal government to eliminate coal-fired power generation by 2030 while ensuring residents and industry have availability to power 24-7-365.

These reactors require fuel, and Saskatchewan is home to the world's richest deposits of uranium, with ore grades up to 100 times the global average. Because of this unique characteristic, the province's uranium mines are an energy power pack, capable of producing far more uranium with far less surface disturbance than almost anywhere on the planet.

The deposits underlie the Canadian Shield and boreal forest of the northern half of the province, on the traditional lands of Indigenous peoples. For uranium mining company Cameco, this means working with local communities to develop the resource sustainably, providing jobs and economic development while drawing upon local

Indigenous knowledge to protect the lands that provide clean water and traditionally harvested foods.

The Community-Based Environmental Monitoring Program, for example, relies on local residents for sample collection, providing opportunities for employment, training, and business development. The program garnered a Towards Sustainable Mining Excellence Award in 2020 from the Mining Association of Canada. A similar program, the Eastern Athabasca Regional Monitoring Program also provides Indigenous-led oversight of local country foods such as berries, fish and moose.

From a carbon standpoint, Cameco asserts that the picture gets even better when looked at within the context of energy production. Electricity generated by nuclear power produces zero carbon or greenhouse gas emissions. Last year, Cameco estimates that the uranium it sold will generate clean energy equal to taking 92 million gas-fueled cars off the road.

Recycling is also an important pillar of Cameco's sustainability practices, whether it is using non-radioactive waste rock to build roads or realizing a 30 per cent reduction of waste going to site landfills by recycling, repurposing, incineration, or reprocessing.



Photo courtesy of Cameco Corporation.

The Community-Based Environmental Monitoring Program, established collaboratively between Athabasca communities, Cameco and Orano in 2016, collects and scientifically studies traditional food samples provided by community members themselves.

Mining remains an essential industry for a world hungry for food, clean energy, and products. And Saskatchewan's mining companies are continuing to innovate to lead the world in sustainable mineral resource development. 🌱

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## Resourceful

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# Have you heard of Saskatchewan's Lithium?

Saskatchewan's established petroleum industry may be getting a spin-off thanks to new research that supports the possibility of recovering lithium from brines.

Gavin Jensen, a senior research petroleum geologist with the Saskatchewan Geological Survey (SGS) at the Ministry of Energy and Resources, explains that it has long been known that there is lithium among the elements dissolved in deep subsurface brines. These are waters that exist in deep geological formations and are encountered in the oil and gas wells in the province. A 2002 SGS paper characterized this, but lithium prices were low at the time.

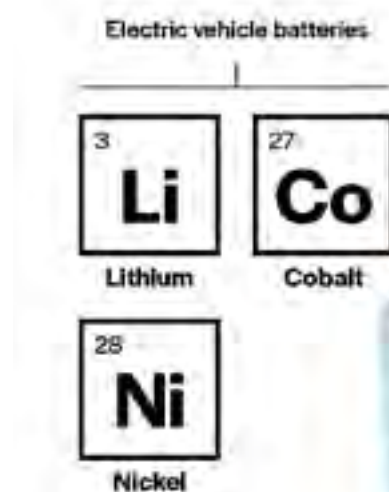
As climate change has become an ever more urgent issue, demand for lithium has increased. While the COVID-19 pandemic has flattened demand, the overall long-term trend is up.

"It's believed that the current worldwide demand for lithium is near 280,000 tonnes of lithium carbonate equivalent," Jensen says. "It is projected by Bloomberg that the demand could reach 700,000 tonnes by 2026."

## WHAT IS LITHIUM USED FOR?

Lithium-ion batteries are used in cell phones, and while each only uses a few grams, there are billions in use around the world. It's also used in ceramics, glass, greases, air conditioning, casting, and aluminum products.

Perhaps most significant are electric vehicles, which by some estimates will account for up to a quarter of cars on the road within the next decade, up from about three per cent now. The high-capacity battery packs on each one of these vehicles can use more than 63 kilograms of lithium.

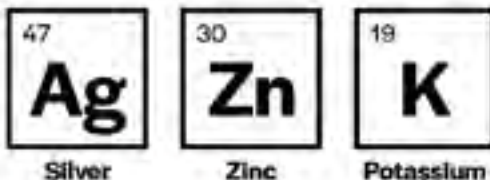


The advancements in batteries, technology and various industries have made lithium mineral lepidolite a sought-after commodity.



Oilfield operator takes samples of brined in southeastern Saskatchewan near Estevan. Rising prices for lithium have spurred renewed interest in this resource in the province. Photo Courtesy of Gavin Jensen, Saskatchewan Geological Survey.

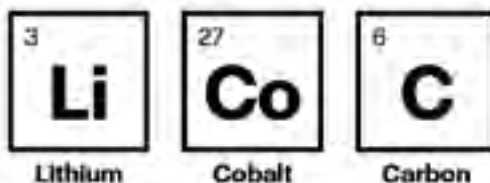
Silver-oxide batteries e.g. watches, calculators



Alkaline batteries e.g. toys and electronics



Lithium-ion batteries i.e. mobile phones



**95% of cobalt, lithium and graphite in batteries can be reused.**

### Driving towards a low-carbon future

Canada's mining industry is providing the responsibly-sourced minerals and metals that power electric vehicles, including metallurgical coal, nickel, copper, iron ore, zinc, cobalt and many more.



Image courtesy of Mining Association of Canada

### WHERE IS LITHIUM FOUND IN SASKATCHEWAN?

In 2011, Jensen decided to have another look at the element. He worked with petroleum companies to collect brine samples from nearly 80 producing wells in Saskatchewan. Geochemical analysis showed varying lithium concentrations by region and geological formation, with some wells near Estevan and Kindersley looking particularly promising.

The new data on the resource in Saskatchewan, coupled with the increased world demand for lithium, encouraged initiatives by the Ministry of Energy and Resources to foster development of the resource. This includes in-depth evaluation of well-licensing, tenure, and royalty systems for brine minerals. The Ministry

of Energy and Resources also administers the Saskatchewan Petroleum Innovation Incentive (SPII), which can be used to support innovative use of oilfield brines.


### HOW IS LITHIUM RECOVERED?

In June, the provincial government announced an SPII-backed joint venture by Prairie Lithium Corp. and LiEP Energy Ltd. to develop the resource in Saskatchewan. The two-stage pilot project of the Prairie-LiEP Critical Mineral (PLCM) Joint Venture also has a value-added aspect, where the project will efficiently refine raw oil field brine water into lithium hydroxide.

The first stage is expected to be underway this year in Regina, with the second stage planned for the second half of 2021 in southern Saskatchewan.



Collecting oilfield brine sample in southeastern Saskatchewan to assess lithium hydroxide production capacity. Photo Courtesy of Gavin Jensen, Saskatchewan Geological Survey.

Initial targets are to produce 1.75 kilograms of lithium hydroxide a day, ramping up to one tonne per day as the extraction process is refined and improved. This production would be worth about \$17,000 per day at 2019 prices. 

# Operations and safety training during COVID times

At Orano's McClean Lake operation in northern Saskatchewan, the gym became the new training room to allow employees to be physically distanced during safety training and COVID-19 information sessions. Photo Courtesy of Orano Canada.



Saskatchewan's industry response to keeping mine workers safe during the COVID-19 pandemic might be summed up in a few points: Keep your distance. Wear your mask. Leverage technology. And clean, clean, clean.

By now, everyone has heard variations on the two-metre rule, but of course this is a minimum. When the pandemic arrived, companies marshalled their safety and human resources experts to design programs to help workers keep their distance. The Saskatchewan Mining Association (SMA) has created a series of infographics to help this along as well.

"Those infographics provide a very quick and visual way of understanding the important safety measures that they can take to reduce the risk of spreading the coronavirus," says Brad Sigurdson, the SMA's Vice President of Environment, Safety, and Regulatory Affairs.

One of the obvious measures to keep workers safe was to identify which employees could work from home and equip them to do so.

Katie Breeze is Nutrien's Senior Manager for Safety and Health, currently based at their Allan potash mine. She explains that employees with desk jobs have been



working from home since the pandemic restrictions began in March. Others, such as engineering staff, have to be on site sometimes, so schedules have been adjusted so they can get all on-site work done all at once, then go home for the desk work. This allows for fewer days on-site and reduced exposure time for themselves and colleagues.

Those that must work on-site are screened on the way in for a range of COVID-19 symptoms and their temperatures are checked. If someone fails the check, they are sent home, with the reassurance that the company has their back.

Masks are mandatory, with management taking the lead, working with the union to model compliance and supplying each employee with a pack of 50 masks to take home. Cleaning protocols have been stepped up particularly with all touch points.

"We've got hand sanitizer and cleaning products available to everyone," she says, adding the Nutrien lab was pressed into service in this regard. "We even made hand sanitizer, in the early stages, when it was hard to get."

The pandemic has also had a profound impact on how mining companies handle training and information sharing, whether it be safety training, professional development. It also includes "toolbox talks" held by immediate supervisors at the start of a shift to brief workers on the day's tasks, any incident reports, messages from management, and working conditions such as weather.

James Ferstl is Mosaic's Senior Manager of Health and Safety services for North America. Based in Regina, he has been involved with the company's training programs, emergency response, and health services. He explains that Mosaic's training programs and events such as monthly safety meetings have changed substantially to help keep employees safe during the pandemic.

Pre-COVID, on-boarding of new employees and contractors was done face-to-face. A typical training session might put 30 or more people seated side-by-side in a room with an instructor presenting videos and presentations. Toolbox talks at mine facilities were also held in fairly close quarters, with information shared on

paper handouts.

This has drastically changed. The demands of physical distancing impelled Mosaic to move a lot of training programs online, both for on-site employees and those working from home.

"They're instructor-led, but led via video," Ferstl says. "We have also been utilizing CBT – computer-based training – throughout our learning management systems so we could have employees taking that training from home."

Likewise, limiting face-to-face contact with contractors means moving information rather than people.

"We're sending that information across to their site offices so we're limiting the risk of close contact," Ferstl says.

Virtual training has been made more effective due to high-quality, entertaining training videos and informal interaction with the instructors. There's also less tendency for class discussions to wander off track.

"What we've found what works is keeping



Virtual Reality (VR) forklift training. Photo courtesy of Nutrien/White Rabbit VR.

it fresh, having a little bit of interaction with the instructor before the videos start up, really focusing on the quality and getting to the point.”

In those instances where there must be face-to-face interaction, group sizes have been greatly reduced to allow for the minimum two-metre distance between people. Masks, of course, are mandatory.

It’s led to some logistical challenges. A finite number of conference rooms and instructors mean smaller groups – and more of them.

“For an example, our Belle Plaine site

is in maintenance shutdown right now, so in order for us to on-board the 200 plus people we’re bringing on site, we had to do numerous sessions,” he says. “We had to bring in various groups, at varying times, we had to make sure that we had the instructors available. We had to have many more sessions than we normally would have.”

The efforts have been both effective and appreciated. Breeze point to there being zero cases of COVID at Nutrien’s sites, and Ferstl reports that employees have spontaneously praised Mosaic for its efforts during the pandemic.

COVID-19 has brought with it

opportunity to advance mine safety training into virtual space. Sigurdson says, “the association is working on the development and implementation of a virtual reality training module, and that this module is going to help support physical distancing for emergency response personnel while they’re conducting emergency response and mine rescue training.”

As some SMA members have experience with virtual reality (VR) training, Sigurdson says the association will be drawing heavily on this expertise. A small working group, led by Breeze, has been formed to engage with the members.

“Katie’s fantastic. She’s energetic, and she’s got experience with helping get Nutrien’s VR system process developed,” Sigurdson says, adding that Ferstl is also contributing his experience with VR training at Mosaic.

Member engagement is essential to the VR training module project to ensure the final product is realistic and relevant. This means finding and evaluating on-site locations to be digitally mapped to create virtual environments. It also means tapping the expertise of actual emergency response personnel with on-site experience.

Sigurdson explains the VR project is underway and is expected to be complete by March 31. While the timeline is tight, the working group has a deep pool of SMA member experience to draw upon. ▲



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# Mining from Home

**WHEN THE GOVERNMENT ISSUED A STATE OF EMERGENCY ORDER TELLING EVERYONE TO STAY HOME UNLESS THEY PROVIDED AN "ESSENTIAL SERVICE," SASKATCHEWAN'S MINING COMPANIES MOBILIZED QUICKLY TO ENSURE THE SAFETY OF THEIR WORKFORCE.**

Saskatchewan's mining industry was declared an "essential service" as it produces products our world needs to grow food, generate power, heat homes and more. For most operations, such as the Westmoreland coal mines near Estevan and Coronach, promptly implementing all required health and safety measures meant they could continue to operate.

That was not the case for northern mining operations, however, where a majority of the workforce lives in remote northern communities with limited capacity to handle a potential COVID-19 outbreak. SSR Mining's Seabee Gold mine, Orano Canada's McClean Lake uranium operation, and Cameco's Cigar Lake uranium mine decided, in consultation with neighbouring community leaders, to suspend production and place operations in a safe state of care and maintenance, only keeping a minimal crew on site until protective measures could be put in place to safely restart. Recognizing the

uncertainty and hardship that employees would be faced with during the suspension, companies opted to keep them on payroll, albeit in a reduced capacity. "We were able to provide our employees with full pay for the month of April, and from May until they were brought back to the site, they received 75% of their pay," explains Sharon Wiens, Human Resources Business Partner at SSR Mining.

Nor was the situation easy for the employees who were able to keep working at the mines.

"It was a stressful time having to balance family needs and fears, childcare when schools and daycare facilities were closed, and the new health and safety protocols on site, while working hard to maintain production levels and meet the needs of customers and communities," says Aaron Fornwald, Nutrien's Senior Director, Human Resources, Potash Business Unit.

"And although we had encouraged car-pooling before, as an environmentally friendly

— “ —  
“The government allowed us to remain open, and with that came great responsibility, not only to help keep our part of the economy going, but most importantly to our employees and the community.”  
—



Liam Mooney,  
Vice President, Cameco

measure, with the pandemic we had to discourage it because of the potential health risk. So many things changed so quickly.” Although the pandemic has created many challenges, it has also provided an opportunity to try new and different work arrangements. “WFH” (work from home) became a well-known acronym overnight. Administrative workers, in particular, were asked to embrace WFH.

While mining companies had the IT infrastructure and tools needed to work remotely before the pandemic, remote work was mostly limited to those who had to travel for work—very few employees worked remotely full-time. WFH meant that about a quarter of Mosaic’s workforce, several hundred employees, had to quickly transition to the new work arrangements. At Nutrien, nearly 500 employees started working from home; that’s all Saskatoon office employees and about 20% of site employees.







“It was a big change for most employees,” Aaron says. “We trusted them to take what they needed from the office to set themselves up at home to work efficiently. We provided the essential equipment required and helped assess people’s ergonomic needs. We want to make sure employees pay attention to their physical

needs while at their home desk for long periods. And mental health is always on our radar. We encourage people to stay connected to and communicate regularly with their teams.”

Many now agree that working from home and allowing more flexibility has not affected productivity, which was definitely a worry at the beginning. For some employees, WFH has allowed them to set their schedule to meet family commitments while still being efficient at work. But that does not mean WFH is here to stay—mining executives agree it is something that will need to be assessed on a case-by-case basis, where it makes sense.

Mining companies are also evaluating other options. Earlier this fall, for example, both Mosaic and K+S Potash Canada surveyed employees on WFH. The K+S Potash Canada survey was open to all 261 employees working remotely, and designed to examine the current state of equity and inclusion in WFH and modified work arrangements during the pandemic. The survey results would then be used to inform the gradual return-to-work (to the office) planning.

***The survey, was voluntary and confidential and indicated:***

-  **almost half (47%) of those respondents have children in school or daycare, while 12% live alone.**
-  **78% of the respondents feel the company has accommodated their family-related and personal matters during this time.**
-  **84% of them feel they have the tools and space to work effectively from home, meaning a computer, headphones, second screen, quiet room, comfortable chair, and desk.**
-  **52% of these employees spoke with their leaders at least once a day**
-  **64% of the employees said that videoconferencing was now their preferred method of communication while working from home, followed by email (14%) and phone (12%).**
-  **The majority (89%) feel that they are supported by their leader while working from home.**

As much as employees have embraced WFH, many say they miss in-person connections, such as quick pop-ins to someone’s office, the potluck lunches, and casual conversations in the hallways. To address these concerns, many of the mining

companies have instituted chat or text capabilities within their IT network, virtual town hall meetings with question and answer sessions, regular newsletters with fun contests to involve family members, virtual in-house podcasts, or lunch and learn series.

Similarly, while much of the mining companies’ employee training was already delivered with some video or digital simulation elements, most is now offered online. For example, Mosaic’s former in-person Indigenous Cultural Awareness training sessions are now all virtual.

Although the situation remains fluid, some mining companies have fully reopened their corporate offices to administrative staff, however they are treading with caution, allowing flexible work schedules to limit the number of people present in the facility, and providing flexibility in the event people develop illness symptoms.

Others are taking their time bringing employees back to the office, using a rotational schedule and only allowing a third to half of the workforce to be present at one time. Some have even pushed back a full return to offices to the New Year, as long as pandemic conditions allow it.

At Orano Canada the company was in the midst of a move to a new Saskatoon office building this spring. By June there was a group of employees who were requesting that they be the first to come back to the office as their work was much more time consuming from their home offices, due to the need for specialized equipment or programs. With a strong cleaning protocol in place, pre-screening questionnaire, reduced occupancy for meeting rooms and the routine use of masks, most Orano employees are now back in the office at least a couple of days a week.

“The government allowed us to remain open, and with that came great responsibility, not only to help keep our part of the economy going, but most importantly to our employees and the community. We have the responsibility to do everything we can to keep our employees and communities safe,” says Chris Ryder, BHP Canada’s Head of Corporate Affairs.

“Reducing our workforce temporarily, working remotely from home, and implementing health monitoring, protection and sanitation measures all have the same goal: making sure employees go home safely at the end of their work day,” Chris says. “It is as strong a commitment during the pandemic as it has always been for our industry.” 🌱

For the mining industry, which often has operations in rural or remote areas, engaging with neighbours is not just something companies do to gain acceptance and the proverbial “social licence”; it is part of the values they continuously grow.

# Neighbours Helping Neighbours



As part of Cameco's COVID-19 Relief fund, employees and community volunteers gathered essential food supplies for distribution to vulnerable people during the pandemic. Photo Courtesy of Cameco Corporation.

Contributing to the communities closest to their operations, the places many of their employees and contractors call home, is a priority for Saskatchewan's mining operations. Finding ways to communicate, learn, and share knowledge is also vital. With the rise of the COVID-19 pandemic worldwide, and the ensuing confinement and gradual reopening of the economy, mining companies' values and the ways they live by them have become very public.

In the early days of the pandemic, some of the hardest hit communities were Indigenous communities. Mining companies with operations in northern Saskatchewan demonstrated their commitment to ensuring the health and safety of employees, contractors and neighboring communities by making the decision to halt production and place their operations in a safe state of care and maintenance. Stopping production is a significant response with substantial economic and social consequences. As many mine site employees and contractors come from remote northern communities, with families living in crowded conditions or without the health infrastructure necessary to respond to an outbreak, the decision helped protect many people from potential exposure to the COVID-19 virus. It was a decision they made in consultation with their neighbours.

While halting production and limiting the number of employees on site to the safe minimum required to protect the infrastructure, mining companies continued to pay employees on temporary layoff. Similarly, they sought to assist northern and/or Indigenous businesses in weathering the period of uncertainty.

“Many of our contractors and services providers are northern and Indigenous businesses that have employees living in northern Saskatchewan and that contribute to the socio-economic well-being of these remote communities,” explains Carey Hyndman, Manager Communications and Stakeholder Engagement at Orano Canada. “With the temporary state of care and maintenance at the northern mining operations, we heard from many of these vendors that it would be difficult for them to cope. We understood and set out to help. We immediately set-up a process to fast-track payments of their invoices.”

For other mining companies, engaging with communities in time of pandemic meant reaching out to nearby Indigenous nations to find out how to assist most effectively. At SSR Mining, it meant collaborating with the Lac La Ronge Indian Band and Peter Ballantyne Cree Nation and together deciding to prepare and deliver food and essential goods hampers

for those in precarious situations, particularly Elders.

“We ordered additional supplies and non-perishable food items for the food hamper delivery program and also provided funding to help ensure that the hamper campaign could continue throughout the state of emergency,” says Amanda Smith, SSR Mining's Community Relations Liaison. “And given that many of our employees live in communities affected by the northern travel ban at the height of confinement, the frequent dialogue with health authorities, employees and community leaders allowed us to make informed decisions when making plans to start production and bring employees back to work.”

For Tyler Hopson, Public Affairs Manager at The Mosaic Company, the pandemic meant increasing ongoing communication and community support. “We conducted ourselves in the same way as we usually do, by reaching out, listening to the concerns and challenges that the communities faced, and doing our best to offer support and address the issues,” he explains.

“In many cases, we proactively provided some financial support to communities as we recognized that many would not have the time or resources to follow our usual donations request process, nor could they wait for the typical grant process timeline,” Hopson adds. “To help them navigate the pandemic health crisis as quickly and effectively as possible, we had to simplify and fast track our process.”

In keeping with their respective community investment programs, mining companies found ways to secure charitable financial assistance for local organizations and community groups delivering pandemic support to residents. For example, K+S Potash Canada's employees were provided each with \$300 to donate to the organization of their choice in support of COVID-19 relief initiatives. In the end, the company supported over 70 charitable organizations and gave more than 45 thousand dollars in and around Bethune, Saskatoon, Moose Jaw, Regina and Port Moody, BC – the areas in which the company operates. In addition to the employee campaign, K+S also supported local and provincial food banks due to the significant increase of families requiring food bank assistance during the pandemic. Similarly, Cameco Corporation quickly set aside a \$1 million COVID-19 relief fund and assisted 67 support projects from 40 different Saskatchewan communities, including 31 northern communities. Every single mining company in the province opened their purses to support their communities.

“The fact that we were able to get mobilized and grant funding to those in need quickly was truly a team effort,” says Jonathan Huntington, Cameco's Vice-President, Sustainability & Stakeholder Relations. “COVID-19 is teaching us new ways of doing business and increasing the closeness of our

relationships, particularly with our Indigenous neighbours. We had big decisions to make relating to operations, our northern employees and contractors, and the financial assistance we wanted to contribute. We didn't make these decisions unilaterally. We had, and continue to have, lots of discussions with northern and Indigenous leaders."

With mining operations declared essential services, many mines in central and southern Saskatchewan remained open, in full compliance with mandated health protocols. These operations continued to hire employees as required and maintained their summer student employment programs, even if it meant a different experience for some students, such as having to work from home like other office employees.

Understanding that the pandemic might last for months, and recognizing that even more people than usual might be looking for work, Nutrien adapted in order to continue its business employment diversity and inclusion efforts.

"We worked with our Indigenous community partners to provide virtual career presentations for job seekers. Internships remained a high priority as an employment opportunity for post-secondary students. And we found new ways to engage with the communities virtually; for example, we offered IT support to those that needed it," says Julie Ann Wriston, Nutrien's Senior Advisor, Strategic Inclusion, Sustainability & Stakeholder Relations.

Julie Ann continues, "the pandemic has provided an opportunity to reassess important and real priorities for our community partners. Through our closely connected relationships, it has allowed us to respond in meaningful ways. So, as part of Nutrien's global \$1 million COVID-19 support fund, we had a multipronged approach. We quickly provided 200 garden boxes to 18 First Nation communities across the province. We engaged kids in online programming focused on sustainability, and using innovative and safe strategies we outfitted 1,500 kids with backpacks to start the new school year."

Others, like BHP Canada, also sought input from nearby Indigenous community to better understand what their need was early in the pandemic in terms of digital communication and help them address any shortcomings. "Community leaders told us they lacked the hardware and software to be able to remain connected virtually during the pandemic. So, we are working with them to purchase and install video conference capability within their communities," recounts Chris Ryder, Head of Corporate Affairs at BHP Canada.

While the pandemic has highlighted the existing relationships that mining companies maintain with their Indigenous neighbours, it has also provided an opportunity to deepen and expand these relations. Indeed, the pandemic did not stop K+S from going forward with its previously planned inaugural



Nutrien supports Saskatoon Tribal Council's Backpack Program that outfitted 1500 kids this year. Photo courtesy of Nutrien.

Kinookimaw Symposium. While taking all necessary health and safety precautions, the all-day event on September 11, 2020 offered the opportunity for K+S' senior leadership team and Chief and Councillors as well as other community representatives from George Gordon, Muscowpetung, Piapot, Pasqua, Day Star, Kawacatoose, and Muskowekwan First Nations to gather.

"It was an opportunity for everyone to get to know one another," says Terry Bird, Manager of Indigenous Relations with K+S. "It allowed us to share some of our inclusion successes, particularly in terms of employment, procurement and community investment. It also provided a forum to discuss our new Indigenous relations policy and engage Indigenous leaders in its continued development and implementation."

It was also an important opportunity for K+S to talk about its commitment to environmental and social responsibility. "Really, the intent was to build on our past successes to further strengthen these relationships," Bird says. "We hope this will become an annual symposium so we can continue to build upon these successes and conversations."

During the pandemic, Saskatchewan's mining companies have stepped up to help

their communities as well as their employees, contractors and suppliers. They have demonstrated that their "essential business" status is not only because they produce what the world needs, but also because they are pillars of their communities.

As Chief Louie Mercredi of the Fond du Lac Denesuline First Nation says, "Our community was the first Indigenous community to isolate. We took steps to protect our people, and the mining companies understood and helped us. They took the time to do their due diligence, and they did what was necessary to help keep our Athabasca Basin communities safe."

Chief Mercredi talked with mining company people almost everyday. "Some were difficult conversations," he says, "but they were always respectful and the mining companies came through. They used their planes to deliver essential materials we didn't have and couldn't get up to the North – things like PPE, hand sanitizer, and non-perishables. We appreciate the mining companies being transparent and keeping us informed quickly of things that can impact our people. With their help, we're in a better position now to deal with the pandemic. We are all in this together." 🏔️



Orano's community support during the COVID-19 pandemic helped many local organizations in northern and central Saskatchewan, including the Saskatoon Friendship Inn – helping them continue to deliver their much-needed services. Photo Courtesy of Orano Canada.

Saskatchewan resources  
figure prominently in

# critical minerals

## strategies



Image courtesy of the  
Mining Association of Canada

What minerals are critical for technology, industry, the health of economies, and even geopolitical stability? Well, it depends on who you ask.

"There is no single definition of what constitutes critical minerals," says Shawn Tupper, Associate Deputy Minister for Natural Resources Canada (NRCan). "What the US sees as critical does not necessarily mirror the EU or Japan."

Whether a mineral is considered critical depends on several factors. Are substitutes available? Are deposits concentrated in a specific region, and is that region and its supply chains vulnerable to political instability? Is there a domestic supply, or must a country rely on imports?

"While the COVID-19 pandemic has clearly presented incredible challenges for Canadians, a silver lining for our work on critical minerals is that the pandemic has helped shine a light on the issue of supply chain security for key sectors of Canada's national and regional economies," Tupper says.

For Saskatchewan's economy, the two obvious examples of critical minerals are potash and uranium, in which the province is the first and second largest producer in the world, respectively. Other materials, such as lithium, rare earth elements, and even helium are in play.

Gary Delaney is Chief Geologist with the Saskatchewan Geological Survey (SGS) at the provincial Ministry of Energy and Resources. He explains that a growing world population and incomes in developing countries will continue to drive demand for the province's flagship minerals, both for fertilizer (potash) and clean energy (uranium). This includes both conventional nuclear power and small modular nuclear reactors.

"Saskatchewan has exceptional resources in both minerals and, with several projects under development, is well-positioned to benefit from the growth in these markets," he says.

Countries around the world are developing critical mineral strategies, including Japan, Australia, the European Union, and the United States.

"Canada already represents a secure and resilient source of minerals and metals imports to the U.S. and is currently an important supplier of 13 of the 35 minerals deemed critical by the Americans, with the potential to supply many more," Tupper says.

NRCan is working with other federal departments, provinces and territories to develop a Canadian list. It will be a component of a pan-Canadian Action Plan on Critical Minerals. In this vein, Energy and Mines Ministers agreed in September to the creation of a federal-provincial-territorial task team to jointly develop critical mineral value chains in Canada.

Uneasiness about China's dominance in certain areas such as rare earth elements (REEs) has also sparked world-wide

interest in securing domestic sources and supply chains. These elements are critical in technology, energy generation, and storage. A typical smart phone, for example, can contain 60 to 70 elements. Other home electronics use rare earths as well. Flat screen televisions, for example, use cerium in their displays. In the renewable energy sector, a single two-megawatt wind turbine can use about 800 pounds of neodymium and 130 pounds of dysprosium.

“Global demand for REEs and other high-tech minerals will increase significantly in the coming decade as demand for electric vehicles, renewable power generation and all forms of electronics increases,” Delaney says.

Saskatchewan has potential for economic occurrences of a variety of REEs and other critical minerals, and the SGS will be profiling this potential in upcoming technical reports and conference presentations.

Further along the value chain, the Saskatchewan Research Council (SRC)

is building a \$35 million Rare Earth Processing Facility in Saskatoon. Slated for completion in the fall of 2022, it is the first of its kind in Canada and is intended to establish a REE technology hub in the province.

The facility will process ores such as monazite sands into cerium, lanthanum, praseodymium, and neodymium for sale. The SRC will be working with the mining industry to secure ore supplies both from within the province and elsewhere.

Developing and managing critical mineral resources will demand pooling knowledge and collaborating across the country. The federal government is working with its provincial and territorial counterparts on developing and implementing the Pan-Canadian Geoscience Strategy.

“Accessible, high-quality public geoscience creates a fair and globally competitive exploration environment, lowers risks associated with exploration,

supports informed land-use decisions, and helps identify and build understanding of natural hazards,” Tupper says.

For Saskatchewan industry players, exploration and development are supported by specific programs. The Targeted Mineral Exploration Initiative provides financial help for exploration of base metals, precious metals, and diamonds. The Saskatchewan Mineral Exploration Tax Credit provides a 10 per cent credit to provincial taxpayers who invest in flow-through shares of eligible mineral exploration companies, in addition to a 15 per cent federal mineral exploration tax credit. Delaney explains the regulatory framework is aimed at mitigating industry risk and encouraging growth.

“Saskatchewan has a clear, predictable, and affordable tenure system that supports industry exploration and development,” he says. “Once industry advances far enough, the province also offers new growth incentive programs for eligible innovation and processing projects.” 🏔️

 <b>Uranium</b>	 <b>Rare earths</b>	 <b>Potassium</b>	 <b>Lithium</b>	 <b>Gold</b>	 <b>Diamond</b>
 Submarine	 Speakers	 Fertilizer	 Armour plate	 Award	 Jewellery
 Medical research	 Wind turbine	 Gettings	 Lubricant	 Flowerpot	 Mining exploration
 Clean energy	 Telescope	 Soft substrate	 Batteries	 Electronics	 Drill bits
 Industrial water	 MRI scanning	 Glass	 Nerve tissue	 Jewellery	 Polishing powder
 Cancer treatment	 Hybrid cars	 Match leach	 Inductive drying	 Hatch hatch	 Cement cutting
 Aerospace	 Magnets	 Isaiah chip	 Pacemaker	 Aerospace	 Nuclei separator

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.

## Ken Seitz,

Executive Vice-President  
& CEO Potash  
Nutrien

Finding solutions to complex matters is Ken Seitz's idea of fun in both his personal and professional life. The Executive Vice-President and CEO Potash at Canadian fertilizer giant Nutrien is not one to back away from a challenge. "For me, the correlation between work and play is that I like to be challenged in some way, whether I'm out fishing or evaluating risk within our organization," Ken says. "I have a passion for solving complex development, production and commercial challenges in a way that keeps people safe and, ultimately, produces essential goods."

Growing up on a dairy farm northeast of Regina, Ken could not have imagined that some day he would be leading a multinational organization right here in his home province. After completing a Bachelor of Science in Agriculture followed by a Bachelor of Mechanical Engineering at the University of Saskatchewan (USask), he had his first experience in mining working at Cameco Corporation's northern mines as a mechanical engineer in the late 1990s.

Complementing his technical education with a USask Master's Degree of Business Administration and a Certificate in Management at New York University, Ken ascended to senior leadership roles over his 25 years in the oil and gas and mining industries. "I love the mining industry. It feels like it is part of my DNA now. There is no better feeling than putting on my steel toe boots, my hard hat, my miner's lamp and other PPE and heading underground," says Ken happily.

"I feel the mining industry brings prosperity to its employees, customers and the communities where it operates, and does it in a responsible manner. Really,

we bring to the world many products that are vital for human prosperity," Ken adds, "that's something to be proud of."

When he's not solving mining challenges, Ken enjoys spending time fishing on Cree Lake near the northern cabin he owns with a friend. "It is truly peaceful up there. The landscapes are breathtaking and frankly take me back to the time I was working at the northern mines, where I had my first exposure to this part of the province. And there's always something that needs fixing, building or improvement at the cabin. I enjoy doing that just as much as fishing."

Taking holidays with his family is also high on Ken's priority list. A family of six makes for a busy household. "My wife, Alana, is a physician here in the city, my daughter Adia is studying at the Edwards School of Business, my daughters Fraya and Eve are in eleventh and sixth grades, respectively, and my son Leo is in grade 8. Between work, the kids' activities – basketball, music, soccer – there isn't much time for us to be all together."



“Elevate safety in your  
consciousness so that  
you apply that lens  
to everything you do.  
That’s how you keep  
yourself, your family,  
friends, colleagues and  
communities safe.”

# Feeding the Future

With our significant reach and influence, Nutrien can help find solutions to challenging global issues. Our efforts around the world help improve sustainable agriculture practices.

Nutrien is undertaking a transformative initiative to bring our potash business into the next generation by developing proprietary means to increase productivity, reduce costs, and create a safer work environment for our people.

Our efforts here at home will improve sustainable agriculture practices around the world and help feed a growing population.



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Ken Seitz, his wife Alana, and their children Adia, Fraya, Eve and Leo.

"Our vacations are truly important to me. We try to go on a couple of vacations together each year, and we spend as much time together as we can at our Candle Lake cabin, boating, fishing, golfing, swimming and barbequing – it all brings a true sense of connection," says Ken. "Unfortunately, this year with the pandemic, things have been a bit different in terms of vacation."

These days, it doesn't take long for any conversation to come around to COVID-19 and how it has affected every part of life. It is no different for Ken. He acknowledges

that what he does for fun these days revolves a lot more around local activities. "I suspect we will be staying a lot closer to home for a while longer. It's not necessarily a bad thing, and we get to support the local economy."

On the work front, Ken says the pandemic means people are having to adapt

to working across a computer screen rather than in close proximity across work stations. "I would say that the absence of informal interactions and discussions that people normally have at work has been difficult. Now, we book meetings for everything. I find there is definitely something lost in working remotely, and it actually adds to the workloads," Ken says.

Nutrien has had the added challenge of keeping its operations running during the pandemic and everything that goes along with that in terms of health and safety. Safety is a constant in the mining industry. Although the pandemic has put a spotlight on that aspect, it is evident when speaking with Ken that safety is always top of mind.

"Working in the mining industry has changed my views about safety and how I approach life outside of work," Ken says. "I am much more safety conscious, and I put a lot more effort on identifying hazards and putting controls in place. It has made my life outside of work safer – no question."

Ken is also quick to encourage others to be safe: "Elevate safety in your consciousness so that you apply that lens to everything you do. That's how you keep yourself, your family, friends, colleagues and communities safe."

When asked what other life lessons have crossed over between work and home life, Ken points to his core values. "Whether at work or outside the workplace, we need to show up as the best version of ourselves and stay true to our values. I try to approach my role at Nutrien and my interactions with

my colleagues with that fundamental belief. And I'm fortunate to have been able to work with organizations that invested in my leadership development under that premise," he explains. "Respect, trust, honesty, humility, listening to others and having an appreciative inquiry mindset are values and learning opportunities that I have been able to nurture throughout my life and as part of my leadership growth." 🌱



# Jody Kopp,

Sr. Coordinator,  
Nursing Services  
Cameco Corporation

When she graduated from Saskatchewan Polytechnic's nursing program in 1994, Jody Kopp, Senior Coordinator, Nursing Services for Cameco Corporation, had no idea her career as a nurse would take her to northern Saskatchewan's uranium mines.

"I joined Cameco in 2008 after having worked mostly in long-term and acute care. I had a variety of roles as a nurse, including providing some temporary relief at the northern mine site, so moving into occupational health full-time seemed like an interesting progression to my career," Jody says.

"Most people who don't work in the mining industry don't even know that we have nurses on staff. And those who do, don't quite realize what we do," she continues.

Traditionally, occupational health nurses at remote mine sites wear many hats.



Thermography camera scans employee for increased temperature. Photo courtesy of Cameco Corporation.

They help with medical surveillance of employees, perform the work of a small clinic tending to minor injuries and medical emergencies, and also provide preventative health information. They are also ready to assist the mine's Emergency Response Team if needed. For many Cameco employees and contractors who live in remote northern Saskatchewan communities, they are also the primary or most frequently seen healthcare providers.

Jody moved to her current nursing services' senior coordinator role at Cameco's Saskatoon head office in 2018, after 10 years working as an occupational health nurse at the Cigar Lake mine site.

She is responsible for coordination of the nurses' schedule, their ongoing training and professional development, and

assists with the administration of the occupational health and safety, disability, and injury management programs.

"I work closely with our Human Resources and Safety Health Environment and Quality departments to ensure our policies and the various health regulations are implemented appropriately. And I make regular trips to the mine sites to consult with the nursing staff to make sure everything is running smoothly, that they have the equipment and information they need. I have the best of both worlds, I get to work on the administrative side but still interact with the nurses and their patients," Jody says with a smile.

The COVID-19 pandemic has put a spotlight on Jody and her team of 10 nurses. "All of the sudden, our role as nurses got broader and more visible. As the person responsible for our team, I had a seat at the health emergency preparedness table with our senior management."

“

I have the best of both worlds, I get to work on the administrative side but still interact with the nurses and their patients," Jody says with a smile.

"I became responsible for coordinating our pandemic response and prevention efforts in coordination with the provincial and local population health office. I had to quickly understand what we needed to do to keep our people safe, to provide the personal protective equipment, sanitation, and screening supplies we needed, and to educate staff on their use and on the new procedures we were implementing."

Within weeks of the pandemic's arrival in the province, Cameco placed its Cigar Lake mine in a safe state of care and maintenance. "During the suspension of production, we refined our processes to make sure we were following best practices in sanitation, protection, and screening processes at the various pick-up points before employees

are flown to the remote operations and back home. We also limited access to our Saskatoon office," Jody says. "We coordinated our efforts with other mining operations, including our partner Orano Canada's McClean Lake mill and the potash mines, and with remote community leaders."

Cameco has continued its focus on mental health during the pandemic. "Mental wellness is something we always keep in mind. Our company offers programs to help people, such as our Employee Family Assistance Program and through our insurance provider. It's part of our nursing role to help people access these programs."

Today, Jody works mostly from home. She also spends many hours at the airport helping her staff screen employees before they are flown North. Although the

pandemic is not yet over, Jody hopes some of the valuable lessons learned will "stick."

"The increased awareness of personal hygiene with frequent hand washing and sanitizing, cleaning of high touch surfaces, fewer handshakes – all contribute to the prevention of the spread of communicable diseases. Also, it's no longer acceptable to come to work sick. We're building a new culture."

As a nurse, a wife and mother of four, Jody has one last piece of health advice. "For those of us working from home without our usual office patterns and designated work spaces, it's easy to forget to take physical and mental breaks from work. Remember to get up, stretch, move around, and get some fresh air as there's a fine line between 'working at home and living at work.'" 🌲

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# IT Fit For a Pandemic

Information technology (IT) and systems (IS) have been part of the mining industry for decades. When the COVID-19 pandemic closed businesses, Saskatchewan's mining companies were in a good position to quickly move to a virtual office setting.

"We have always had the ability to work remotely and have been making that easier and more efficient over the years," says Mark Leach, Cameco Corporation's Vice President, Business Technology Services. "We learned from the SARS pandemic scare and have been working to ensure we can fully support the company by making sure our technology works as expected."

As the world moved from physical office locations to working remotely, we all became familiar with virtual collaboration platforms, such as Zoom, Teams, WebEx and the like. "We had Skype for Business available for years and already had a project to move to Office 365 and Teams, so we executed that this year and are in the final stages of the transition to these platforms," Mark says. "Similarly, we fast tracked the roll-out of e-signatures for contracts, agreements and engineering drawings. These items were always on our roadmap, but we shifted some priorities to address immediate business needs."

Cameco is not alone in this good fortune. At Mosaic's operations, maximizing technology to bring more efficiency and increased productivity was already a growing trend. Tablets and mobile devices, for example, were already being used to stay connected prior to the pandemic.

"Embracing and quickly learning how the digital collaborative work spaces and virtual live video meeting components work happened at hyper-speed and made the transition to working virtually much easier," says Sarah Fedorchuk, Vice President Government and Public Affairs, North America for The Mosaic Company.

As a global company with employees in many different environments and parts of the world, Mosaic has always focused on creating a sense of team and leadership visibility.

"By moving to hosting virtual town halls, we now see how easy and effective using technology can be to bring people together. Of course, it doesn't erase the value of getting together in-person and the benefits of having human connections and casual social interactions to build stronger relationships with our colleagues, but it's a pretty effective tool when in-person collaboration is not feasible," Sarah says.

With the increase in virtual offices and employees using various Wi-Fi networks and internet providers, cybersecurity is another area of focus for mining companies' IT teams.

“We managed the work-from-home arrangement under the strategic premise that ‘we trust our people,’ so we didn’t implement major policy changes,” explains Todd Antill, Nutrien’s Senior Director, Nitrogen/Phosphate/Potash IT. “Our focus was on ensuring that everyone had the right technology tools at their fingertips to enable them to perform their tasks easily and proficiently. Our existing cyber security and authentication tools and policies were already well suited for this type of arrangement.”

According to Todd, Nutrien leveraged its existing digital innovation culture within IT to provide additional support to its workforce where required. “For example, with the rapid deployment of mobile digital solutions, we were able to eliminate human contact where we could,” he says. “Based on our initial successes, we’re now working on delivering dozens more of these rapid solutions to support other productivity improvements.”

At Nutrien, voice-activated, hands-free headsets that easily enable video conference collaboration and put “eyes in the field” all help support real-time collaboration between operations and people working remotely from home.

The recurring theme among Saskatchewan’s mining companies is

“We believe that many of the tools adopted in response to the pandemic have proven to be productivity-enhancing across our operations and have helped our workforce recognize how technology can support safe and reliable production,” Todd says.

that the forced work-from-home and the need to limit human touch points have accelerated the adoption of existing technologies, reduced people’s resistance to using new technology and changed the way people perform certain tasks. The use of video for collaboration, for example, also helps teams remain connected, while the implementation of extended-reality tools and digital whiteboards allows people to collaborate in real-time.

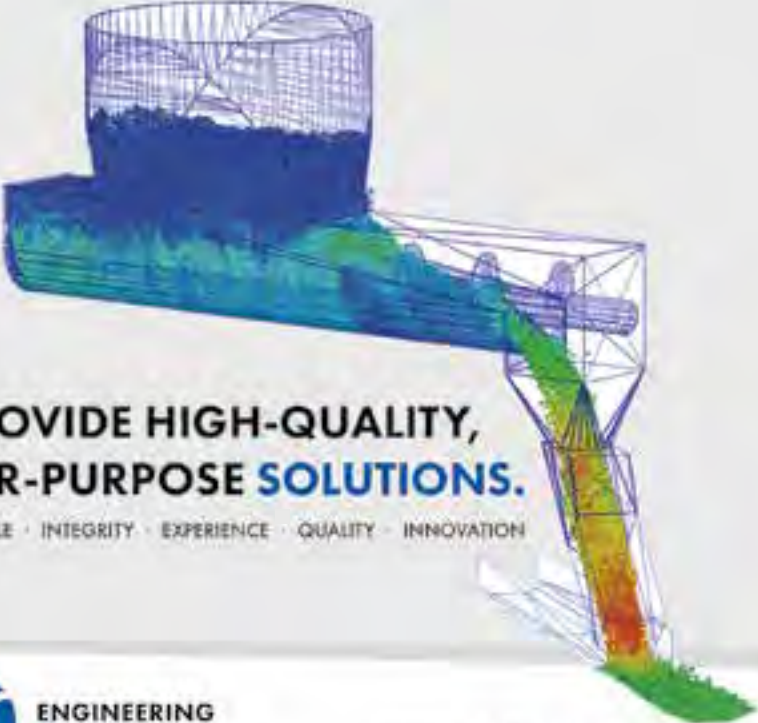
The biggest hurdle has been to find effective ways to address technology training needs so more employees quickly get comfortable and competent using new platforms. Again, mining companies found a way.

Cameco created a “Power Bar” experience with a local Saskatoon company, WBM, to allow its teams to book time with WBM representatives or join open sessions to ask questions and get answers. The contents are recorded and available on Cameco’s Teams channel for anytime access at the employee’s convenience. Satisfaction scores are monitored weekly, so services can be adjusted as needed.

The general consensus among the mining companies’ IT teams is that many of the digital gains made in recent months will most likely remain post-pandemic.

“We believe that many of the tools adopted in response to the pandemic have proven to be productivity-enhancing across our operations and have helped our workforce recognize how technology can support safe and reliable production,” Todd says.

In short, recent IT gains will probably mean the end of the mighty conference call. 📺



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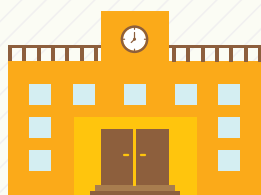
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# BUILDING BLOCKS



## SMA Education Outreach 2019: Interaction by the Numbers



Connected with  
**>2500**  
teachers and students



**450**  
Potash Kits  
distributed to 135+  
schools in 25 school  
districts



**20**  
Career Fairs  
and Workshops  
for teachers

I found the experiential learning about mines, their diversity and the reclamation process very valuable. I previously only had an abstract idea of what mines are really like.

— James A., Masinahikana Online School, La Ronge  
GeoVenture 2019

GeoVenture program  
participants travelled

**2700+ km**

touring SK mines and other sites  
of geological interest



# Mining Matters Adapts to Education-at-a-distance

As schools welcome students to this new pandemic-restricted year, Mining Matters is ready with a suite of online programs and activities.

For more than 25 years, the Toronto-based charitable organization has been dedicated to developing knowledge and awareness of earth sciences, mining, and their role in society. When pandemic lockdowns forced suspension of the in-person program, Mining Matters turned to educators and earth science experts to expand and adapt their educational resources.

During the summer, for example, the organization developed more than 25 do-it-yourself activities under its GEMS framework (geology, engineering, mining, sustainability). These include everything from building and testing a scale-model mine headframe, to making jewelry from metals and minerals, to designing water filtration systems, and modelling subsurface strata online or with building blocks and modelling clay.

The organization also offers its Mining Matters Activity Book for ages nine to 13, in English, French, Spanish, and Inuktitut. It features puzzles and games aimed at teaching about mining, safety, and sustainability. Topics include mining processes, typical safety work wear, mining-specific vocabulary, and how mineral resources are located, evaluated, developed, run, closed, and the land reclaimed.

Resources such as classroom posters, videos, activities and support materials are available to introduce students to rocks and minerals, their importance, and how to identify them. Elementary and secondary teachers can also download or subscribe to the annual groundWORK newsletter for more ideas, subsidy programs, professional development opportunities, ready-to-use activities, and more

Unsure of a subject area? Teachers can sign up to watch video tutorials for presenting activities on topics such as erosion, reclamation, and the physical properties of minerals.



## Subjects for our Careers

There are many subjects that we study in school which can lead us to a career in mining. These subjects and their applications can be found in every stage of the mining cycle.

Answer on page 34.

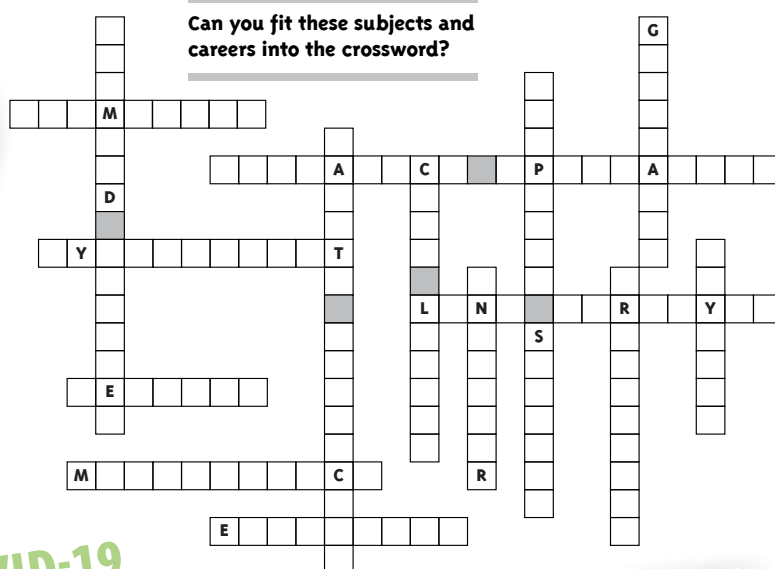
### WORD BANK:

Chemistry  
Computer Science  
Core Logger

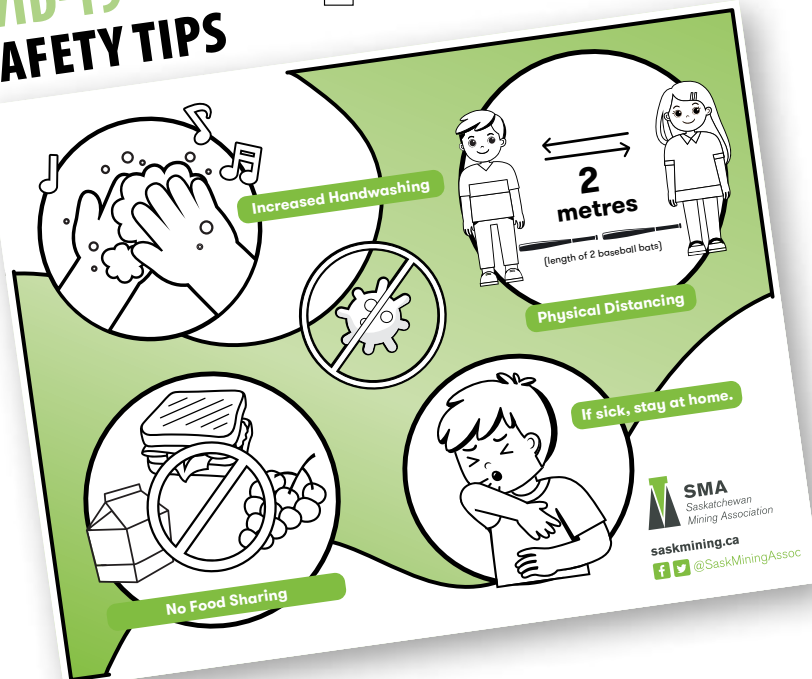
Diamond Driller  
Economics  
Engineer  
Geography

Geology  
Geomatics Specialist  
Hydrologist  
Land Surveyor

Mathematics  
Physics  
Prospector  
Safety Inspector

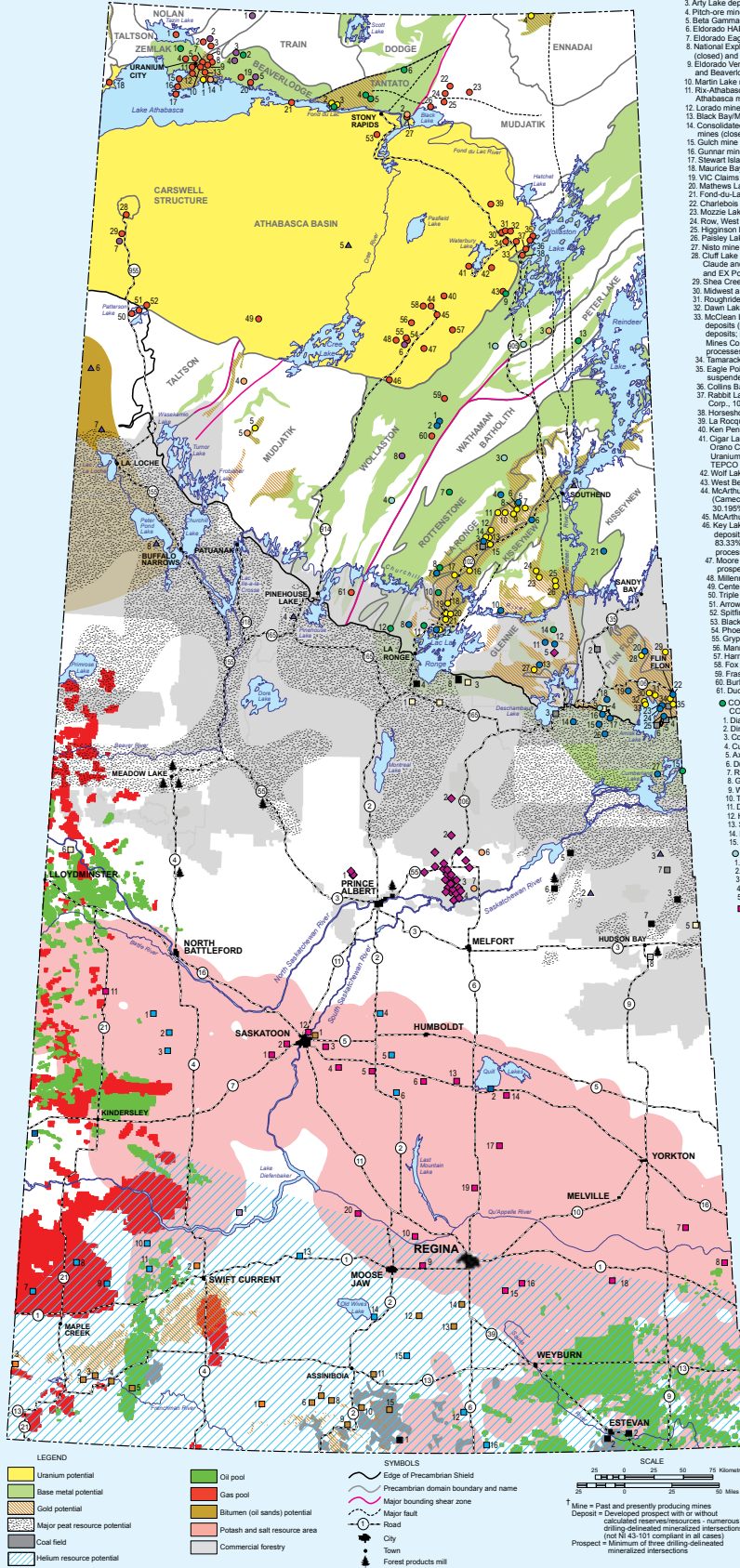


## COVID-19 SAFETY TIPS



# RESOURCE MAP OF SASKATCHEWAN

Saskatchewan Geological Survey Miscellaneous Report 2020-1



## KEY TO NUMBERED MINERAL DEPOSITS<sup>†</sup>

- URANIUM
  1. Laird Island prospect
  2. Nesbitt Lake prospect
  3. Arty Lake deposit
  4. Pitch-on mine (closed)
  5. Beta Gamma mine (closed)
  6. Eldorado H&B mine (closed) and Baska prospect
  7. Eldorado Eagle mine (closed) and ABC deposit
  8. National Exploration and Eldorado Dubina mines (closed) and Strike deposit
  9. Eldorado Verrill, Ace-Fay, Nesbitt Latrine (Eagle-Ace) and Beaverbrook mines and Bolger open pit (closed)
  10. Martin Lake mine (closed)
  11. Rick-Atabasca, Smiley, Leonard, Onch and Cayzor Atabasca mines (closed); St. Michael prospect
  12. Lonsdale (closed)
  13. Black Bay/Murmac Bay mine (closed)
  14. Consolidated Nicholson Bay and Fish Hook Bay mines (closed)
  15. Gulch mine (closed)
  16. Gunnar mine (closed)
  17. Stewart Island prospect
  18. Maurice Bay deposit
  19. Vic. Claims prospect
  20. Mathews Lake prospect
  21. Fond-du-Lac deposit
  22. Charlebois Lake and David deposits
  23. Mazza Lake deposit
  24. Row, West Row and ART prospects
  25. Hoggins Lake and Corrigan Lake prospects
  26. Paisley Lake prospect
  27. Nito mine (closed)
  28. Calf Lake mine (closed); D. Dominique-Peter, Claude and Dominique-Janine (North, EX OP, UG and EX Pods) deposits
  29. Shear Creek - Anne, Kiana and Colette deposits
  30. Midwest and Midwest A deposits
  31. Roughrider and J Zone deposits and Huske zone
  32. Dawn Lake deposit
  33. McClean Lake mine - JEB, Sue A, B, C and E deposits (mined out); McClean, Caribou, Sue D deposits; mill (Orano Canada Inc., 70%, Denison Mines Corp., 22.5%, URGD, 7.5%) processes Cigar Lake mine ore
  34. Tamarack deposit
  35. Eagle Point mine (Cameco Corp., 100%; suspended)
  36. Collins Bay 'A' and 'B' Zone deposits (mined out)
  37. Rabbit Lake mine (mined out); mill (Cameco Corp., 100%) processes Eagle Point mine ore
  38. Horseshoe and Raven deposits
  39. La Rocque Lake deposit and Hurricane zone
  40. Ken Pen, Paul Bay, and Orose deposits
  41. Cigar Lake mine (Cameco Corp., 50.025%; Orano Canada Inc., 37.1%; Identifu Uranium Exploration Canada Ltd., 7.875%; TEPCO Resources Inc., 5%)
  42. Wolf Lake and Sand Lake deposits
  43. West Bear deposit
  44. McArthur River mine - McArthur River deposit (Cameco Corp., 69.805%; Orano Canada Inc., 30.195%; suspended)
  45. McArthur River - B1 zone deposit
  46. Key Lake mine - Gartner and Delmann deposits (mined out); mill (Cameco Corp., 83.33%; Orano Canada Inc., 16.67%) processes McArthur River mine ore (suspended)
  47. Moore Lake - Maverick deposit; S25 and S27 prospects
  48. Millennium deposit
  49. Centennial deposit
  50. Triple R deposit
  51. Arrow deposit
  52. Spillville deposit
  53. Black Lake prospect
  54. Phoenix deposit
  55. Gryphon deposit
  56. Mann Lake prospect
  57. Harigan zone prospect
  58. Fox Lake deposit
  59. Fraser Lakes B Zone deposit
  60. Burridge Lake (BURD) prospect
  61. Duddridge Lake (Thor) deposit
- COPPER-NICKEL-(PGE) AND COPPER-COBALT
  1. Dianne Lake deposit
  2. Dirty Lake deposit
  3. Cole Lake prospect
  4. Currie Lake deposit
  5. Ains Lake and Rice Lake deposits
  6. Dumas Lake deposit
  7. Rottenstone mine (closed)
  8. Gochager Lake deposit
  9. West Bear (Co-N) deposit
  10. Triangle Lake deposit
  11. Dunlop (International N) deposit
  12. Howard (Little Claim) Lake deposit
  13. Swan Lake prospect
  14. Hidden Lake deposit
  15. Narness Lake mine (closed) (in Manitoba)
- LEAD-ZINC
  1. Johnson Lake (Marina) prospect
  2. George (Brakewell) Lake deposit
  3. Deception Lake prospect
  4. Sino Lake deposit
  5. Western Nuclear mine (closed)
- POTASH AND SALT
  1. Vancor potash mine (Nutrien) and salt plant (NSC Minerals)
  2. Cory Division potash mine (Nutrien) (byproduct CaCl<sub>2</sub> brine)
  3. Patience Lake Division potash mine (Nutrien)
  4. Allan Division potash mine (Nutrien)
  5. Colomay potash mine (The Mosaic Company)
  6. Langdon Division potash mine (Nutrien)
  7. Esterhazy potash operation (K-1, K-2 and K-3; The Mosaic Company)
  8. Rocanville Division potash mine (Nutrien) and salt plant (NSC Minerals)
  9. Belle Plaine potash solution mine (The Mosaic Company) and fine salt plant (processes waste salt from potash mine) (K+S Windsor Salt Ltd.)
  10. Bethune mine (K+S Potash Canada)
  11. Unity solution salt mine and plant (Compass Minerals)
  12. Saskatoon chloride-based chemical plant (EPCO Worldwide)
  13. Jansen project
  14. Wynyard project
  15. Milestone project
  16. Albany project
- SODIUM SULFATE
  1. Arona Lake deposit
  2. Whiteshore Lake (Palo) deposit
  3. Lynden Lake deposit
  4. Muskrat Lake deposit
  5. Berry Lake deposit
  6. Little Manitou Lake deposit
  7. Titter Lake deposit
  8. Ingerbrig Lake plant (closed)
- POTASSIUM SULFATE
  1. Alask Lake plant (closed)
  2. Big Quill Lake plant (Compass Minerals)
- MAGNESIUM SULFATE
  1. Beechy plant (Touchwood Resources)
- CLAY RESOURCES
  1. Saskatoon clay quarry and plant (Cindercrete Products Ltd.)
  2. Ravenscrag clay quarry (brick) (I-XL Industries Ltd.)
  3. PR-1 and PR-3 clay quarries (stoneware) (Plainsman Clays Ltd.)
  4. Eastland clay deposit
  5. Frenchman clay prospect
  6. Wood Mountain - Fir Mountain kaolin prospect
  7. Flintoft clay pit (refractory and ball clay) (closed)
  8. Collier Creek kaolin quarry (Whitemud Resources Ltd.)
  9. Roodigan clay pit (brick clay)
  10. St. Victor bentonite deposit (swelling bentonite)
  11. Reayton ball clay deposit and Willows clay pit (refractory and ball clay)
  12. A. P. Green Claybrick plant (closed)
  13. Truax bentonite quarry (closed)
  14. Wilcox bentonite plant (closed)
  15. Willow Bunch clinker quarry (Colored Shale Products Inc.)
- COAL AND PEAT
  1. Poplar River coal mine (Westmoreland Coal Company)
  2. Estevan coal mine (Westmoreland Coal Company)
  3. Hudson Bay area coal deposits
  4. Lac La Ronge lignite (sub-bituminous) deposit
  5. Carrot River peat moss mine (Premier Tech Horticulture)
  6. Carrot River peat moss plant (Premier Tech Horticulture)
  7. Smoky Ridge peat bog (Premier Tech Horticulture)
  8. Wapag River peat bog (Wapag Bay Humates)
- BUILDING MATERIALS
  1. Neyrick Lake black and grey granite (diorite) building stone
  2. Sathi green granite building stone
  3. Deschambault marble (dolomite) quarry (Graham Construction)
  4. Mystic Lake "Vende Antiqu" marble (various amphibole) building stone
  5. McNally Lake buckskin marble (dolomite) building stone
  6. Amisk Lake red marble (dolomite) building stone
  7. Wapag River cement rock deposit
  8. Hudson Bay cement rock deposit
- SILICA SAND
  1. Bow River silica sand deposit
  2. Nipkemaw River silica sand deposit
  3. Wapagewick Lake silica sand deposit
  4. Hanson Lake silica sand deposit
  5. Red Deer River silica sand quarry (Red Deer Silica Inc.)
  6. Canfrac silica sand quarry
- GOLD
  1. Box mine (closed), Athona deposit and Frontier Adit prospect
  2. ELA prospect
  3. Pine Channel prospects
  4. Nidac Creek prospect
  5. Thingo Lake deposit
  6. Twin Zone and Wedge Lake deposits
  7. Golden Heart deposit
  8. EP and Komis mines (closed)
  9. Corner Lake deposit
  10. Tower East and Memorial deposits
  11. Birch Crossing deposits
  12. Jolly deposit
  13. Star Lake mine (closed)
  14. Joli and Decade mines (closed)
  15. Jasper mine (closed)
  16. Wapagewick deposit
  17. Roy Loyal mine - Bingo deposit (suspended)
  18. North Lake deposit
  19. Contact Lake mine (closed)
  20. Preview North and South, P.A.P. A, B and C and P.A.P./Preview SW deposits
  21. Sulphide Lake deposits
  22. Ando-Rouy tailings
  23. Seabee mine (closed) and mill
  24. Pony Main West deposit
  25. Santory B/Santory Gap mines (SSR Mining Inc.) Santory 7 deposit
  26. Mac 2 zone prospect
  27. Brownell Lake occurrences
  28. Manson Bay (Scotts Lake) deposit
  29. Eccles Lake (Dolly) prospect
  30. Graham mine (closed)
  31. Robinson Creek deposit
  32. Prince Albert (Monarch) mine (closed)
  33. Laurel Lake (Arush) deposit
  34. Newcor, Boileig (Rio), and Henning-McMahon prospects
  35. McMillan prospect
- COPPER-ZINC
  1. Janice Lake prospect
  2. Janice prospect
  3. Frog Lake prospect
  4. Reed Lake prospect
  5. Brant-McKenzie deposit
  6. Borys (Watts) Lake deposit
  7. Elizabeth Lake deposit
  8. Ando-Rouy mine (closed)
  9. Pitching Lake deposit
  10. Bigstone Lake deposit
  11. Hook Lake (Gee Lake) deposit
  12. Brownell Lake deposit
  13. Bigstone Lake deposit
  14. Miskat Lake prospect
  15. McVernon Bay deposit
  16. McMillan Lake (Balsam Zone) prospect
  17. Remray (QuandRapid) deposit
  18. FCM and Abbott Lake deposits
  19. Schott's Lake deposit
  20. Kofky (Mokomon) Lake deposit
  21. Fin Flon and Callinan mines (closed)
  22. Birch Lake and "Fleur" mines (closed)
  23. Konito Lake mine (closed)
  24. Concoron mine (closed)
  25. Grassberry deposit
  26. Archibald Lake deposit
- IRON FORMATION
  1. Fish Hook Bay deposit
  2. Triana deposit
  3. Spence Lake deposit
  4. Nyberg Lake (VH) deposit
  5. Thingo Lake deposit
  6. Kelsey Lake deposit
  7. Choiceland deposit
- RARE EARTH ELEMENTS
  1. Hoidas Lake - Neikatch Lake deposit (+U and Th)
  2. Bear Lake occurrence (+U and Th)
  3. Aches Lake occurrence (+U and Th)
  4. Oldman Lake (U) occurrence
  5. Arch Lake (+Th) prospect
  6. Maw REE Zone prospect
  7. Douglas River occurrence
  8. Kufy Lake occurrence (+U and Th)
- KIMBERLITE
  1. Sturgeon Lake refined kimberlite blocks
  2. Canale Lake kimberlites
  3. Fort à la Corne kimberlite field
  4. Star-Orion South kimberlites
  5. Piko kimberlites
- MISCELLANEOUS
  1. Deep Bay graphite
  2. Pasquia Hills oil shale
  3. Bainbridge nodular manganese
  4. Pinehouse limestone
  5. Wolverson Point phosphate
  6. Simonson Lake bitumen resource
  7. Clearwater River bitumen show
  8. Peter Pond Lake bitumen show
  9. Helium
  10. Markota plant (Well Group)
  11. Wilhelm (Canadian Helium)
  12. Battie Creek (North American Helium)

Although the Saskatchewan Ministry of Energy and Resources has exercised all reasonable care in the compilation, interpretation, and production of this map, it is not possible to ensure total accuracy, and all persons who rely on the information contained herein do so at their own risk. The Ministry of Energy and Resources and the Government of Saskatchewan do not accept liability for any errors, omissions, or inaccuracies that may be included in, or derived from, this map.

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Sask. Ministry of Energy and Resources, Saskatchewan Geological Survey.  
Miscellaneous Report 2020-1.



# Our Members

Abasca Resources Inc.  
 AL X Resources Corp.  
 BHP  
 Boart Longyear  
 Cameco Corporation  
 Cameco Corporation – Cigar Lake Operation  
 Cameco Corporation – Key Lake Operation  
 Cameco Corporation – McArthur River Operation  
 Cameco Corporation – Rabbit Lake Operation  
 CanAlaska Uranium Ltd.  
 Compass Minerals Corp.  
 Denison Mines Corp.  
 Eagle Plains Resources Ltd  
 Fathom Minerals Ltd.  
 Fission 3.0 Corp.  
 Fission Uranium Corp.  
 Fortis Mining Engineering Manufacturing  
 Fortune Bay Corp.  
 Forum Energy Metals Corp.  
 HCC Mining & Demolition  
 HudBay Minerals  
 ISO Energy Ltd.  
 JCU (Canada) Exploration Company Ltd.  
 Kobold Metals Company  
 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  
 Murchison Minerals Ltd.  
 NexGen Energy Ltd.  
 North Arrow Minerals Inc.  
 North Atlantic Potash Inc.  
 NSC Minerals Ltd.  
 Nutrien  
 Nutrien Allan  
 Nutrien Cory  
 Nutrien Lanigan  
 Nutrien Patience Lake  
 Nutrien Rocanville  
 Nutrien Vanscoy  
 Orano Canada  
 Orano Canada — McClean Lake  
 Procon  
 Purepoint Uranium Group Inc.  
 Rio Tinto  
 Skyharbour Resources Ltd.  
 SSR Mining Inc.  
 Standard Uranium Ltd.  
 Star Diamond Corp.  
 Thyssen Mining Construction of Canada  
 UE X Corporation  
 Western Potash Corp.  
 Westmoreland Mining Holdings LLC — Estevan Mine  
 Westmoreland Mining Holdings LLC – Poplar River Mine  
 Yancoal Canada Resources Co., Ltd.

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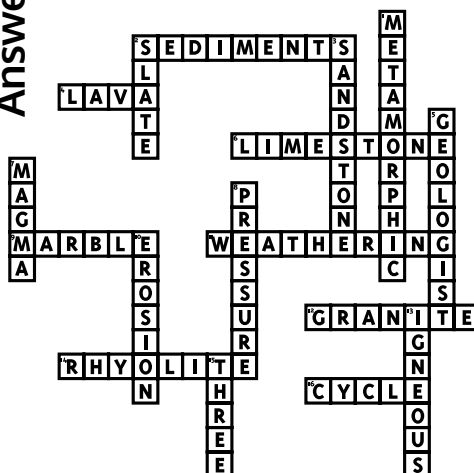
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## Answers

## Rock Cycle Crossword



## Careers

Geologist  
 Mine Engineer  
 Electrician  
 Diamond Driller  
 Accountant  
 Safety Inspector  
 Environmental Scientist  
 Geophysicist  
 Prospector  
 Blaster  
 Lawyer  
 Metallurgist  
 Equipment Operator  
 Heavy Duty Mechanic  
 Computer Specialist  
 Chemist  
 Minerals Surveyor



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