



A P E G S

*Association of Professional Engineers
& Geoscientists of Saskatchewan*

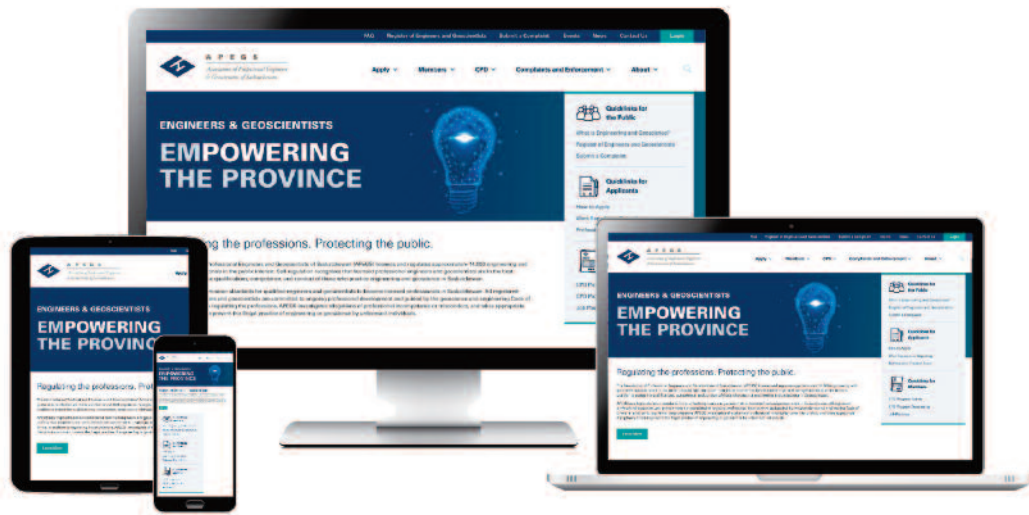
THE PROFESSIONAL

EDGE

ISSUE 193 • JULY/AUGUST 2021

**2021
SALARY
SURVEY**

TRANSFORMATIVE PROJECTS



APEGGS' website is being redesigned

The APEGGS website is an essential information source for the public, applicants, and members. APEGGS is introducing a redesigned website in October 2021 with improvements in three areas:

Design and User Experience

The new website will feature a streamlined navigation and user process, reducing the amount of visual clutter and allowing for a more intuitive and user-friendly navigation experience. Using current best practices, the refreshed site will move users seamlessly through the site, ensuring relevant information is easy to find. In addition, the overall design of the refreshed site will be more dynamic and visually appealing, encouraging visitors to browse longer.

Content Optimization

A complete content overhaul of the existing site will ensure that information is concise, relevant, easy to understand, and consistent in terms of tone, voice, and reading level. Revising all existing content provides the opportunity to better align it with the needs of the user and allows for the incorporation of critical keywords for improved search engine optimization.

Functionality/Development

The refreshed site will be more accessible with an emphasis on performance and speed, reducing page load and execution time for the user. A modern, semantics-driven HTML and structure, combined with a greater focus on search engine optimization, will enhance usability and visibility. The redesign also incorporates better mobile and tap-based device support, as well as improved readability and usability for high-resolution monitors and devices. In addition, the refreshed site will feature an easy-to-use content management system for quicker, more simplified updates.



A P E G S

Association of Professional Engineers
& Geoscientists of Saskatchewan

Regulating the professions.
Protecting the public.

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Deadlines:

Issue: September/October 2021
Submit to APEGS by: August 6, 2021
Publication Distributed Week of: Oct. 4, 2021

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Subscription Rates:

Members and Licensees - Free. Others in Saskatchewan - \$12/year. Elsewhere - \$20/year.

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Remediation Project Rounds Out Members' Experience

CORRECTION: In issue 192 of *The Professional Edge*, Faisal Sayeed was referred to as a P.Ge. when he is actually a Geoscientist-In-Training.

President's Message



Kristen Darr, P.Geol.

The progress Saskatchewan engineers and geoscientists make never stops, even during a pandemic, and that is a testimony to the commitment of those in the professions.

Major projects are still moving forward this year, such as the Lake Diefenbaker Irrigation Projects. It was announced last year and described in more detail this June during Saskatchewan Mining Week.

This project is the epitome of Saskatchewan and the impact it will have on the province's economy is significant. The work that will be done will involve numerous members of APEGS who I recognize will make important contributions towards the advancement and success of this project. The benefits of this project to Saskatchewan are consequential and it is refreshing to have such an investment in our province's infrastructure.

Saskatchewan is fortunate to have someone of the calibre of Wayne Clifton, P.Eng., serving as a leader on the project. It should also be highlighted that Wayne is receiving an acclaimed medal of achievement recognizing his contribution towards developing Canada.

Wayne has given so much back to the professions, including having served as president of APEGS. I encourage you to check out page 7 to read about Wayne's recognition.

Engineers can work on projects that expand what is possible for humanity. Starting a business that intends to sell water on the moon is a venture I would not personally have expected would be set up in Saskatchewan, but I am excited to learn more about what our members Jared Peterson, P.Eng, and Brandon Harris, P.Eng. are developing with the Lunar Water Supply Company. It is very important to see that our members are collaborating to seek out and develop expertise and technology that is out of this world.

Closer to home, we have work being done in northern Saskatchewan that highlights the value of engineers and geoscientists in mining and the environment.

Project CLEANS by the Saskatchewan Research Council is an example of what our profession can do for local communities and their residents, including fostering an interest in the STEM disciplines among young people as well as restoring land for traditional purposes.

But its importance goes beyond that geographic area of the province. It serves to develop younger engineers and geoscientists and their expertise in this province so there is more knowledge and experience available to ensure continued due diligence in end-of-life mining to reduce impacts on the environment.

Highlighting the interesting work being done by our members in articles such as those published in this issue helps others recognize the value of engineers' and geoscientists' contributions. Just like our members, APEGS continues to make progress on ensuring our effectiveness as a regulator.

It is the hard work and commitment made by staff and those who volunteer that have moved APEGS forward into modern governance. A lot of work has been done by Council over the last year and I look forward to sharing that work with our members.

Water for All It's Worth

BY MARTIN CHARLTON COMMUNICATIONS



Water has long been of vital importance to those interested in the prosperity of Saskatchewan.

An ambitious infrastructure project has been launched to ensure that water is readily available into the next century to support agriculture, mining and other industries. It is to create jobs, grow Saskatchewan's rural population, generate private investment, support the province's ability to mitigate a changing climate and enhance its leadership in food security.

The Lake Diefenbaker Irrigation Projects is considered Saskatchewan's largest infrastructure project ever, allowing for twice as much farmland in the province to be irrigated. The Saskatchewan government announced it in July 2020. It was explained by Clinton Molde, P.Eng., executive director of the Water Security Agency, and Wayne Clifton, P.Eng., CEO of Clifton Engineering Group, during a virtual event in June for Saskatchewan Mining Week.

"It is truly a Saskatchewan project that benefits all of Saskatchewan, when you look at the engineering and environmental activities that will take place over many years on these projects," said Molde.

Three projects make up the Lake Diefenbaker Irrigation Projects, which Molde and Clifton said will take years to complete. It is in the conceptual desktop phase.

To better understand the project's significance, it is worth looking at what occurred in the decades leading up to this \$4-billion announcement. (For comparison, the four-year Regina Bypass project cost \$1.8 billion.)

Water's Role in Saskatchewan's Development

Over the last three centuries, water moving through the southern part of the province has drawn the attention of those focused on Saskatchewan's future. The South Saskatchewan River is fed by three Alberta rivers bringing water from the Rocky Mountains to this province. Then, there is the Qu'Appelle River, which explorers of the province in the mid-1800s saw could be connected to the South Saskatchewan River by constructing a dam.

Before settlers arrived, these major water routes were eyed for transportation, bringing those who mapped and reported scientifically about Saskatchewan. Captain John Palliser reported in the 1850s about the dryness of southern Saskatchewan, deeming it too arid for agriculture.

Despite Palliser's declaration, agriculture became one of Saskatchewan's major industries. Those who would farm the land were transported to Saskatchewan, not by water, but by train. Tens of thousands of people migrated in the early 1900s so they could own and farm the land and develop rapidly growing communities, such as Regina and Moose Jaw. Water was needed to grow crops, to support livestock and to sustain the population and the economy.

Reliable Water for Agriculture

Damming the South Saskatchewan River to provide a substantial and reliable source of water was discussed by federal politicians before Saskatchewan became a province in 1905, but it took decades for that idea to be realized. The dams that created Lake Diefenbaker were not in place ahead of the 1930s, an era known as the Dirty Thirties. But that experience made their necessity evident.



University of Saskatchewan

Not all farmers who arrived earlier that century were prepared for the conditions they found in southern Saskatchewan.

“It turned into an environmental and human disaster,” said Clifton.

“Adopting the disk and the plough to the prairie soils ended in erosion that was aided and aggravated by severe drought.”

It was a devastating development no one wants repeated in Saskatchewan. The federal government’s response at the time was to establish the Prairie Farm Rehabilitation Administration (or PFRA as it was commonly known), which first addressed the crisis with dugouts and small dams. Once the drought eased, it could work on larger-scale projects.

The South Saskatchewan River Project

The South Saskatchewan River Project, which created Lake Diefenbaker, came about through an agreement between the federal and provincial governments in the late 1950s. Ottawa agreed to fund three-quarters of the PFRA’s design and construction of the Qu’Appelle River Dam, which controls flows in the Qu’Appelle River, and the Gardiner Dam, which controls flows in the South Saskatchewan River. The provincial government paid the other quarter and took responsibility for developing irrigation, hydroelectricity and recreational opportunities.

The dams were constructed and ownership of them as well as the reservoir they created, which is Lake Diefenbaker, was transferred to the province in the late 1960s. Today, they are owned and operated by the Water Security Agency.

Untapped Potential

“The initial vision for Lake Diefenbaker was 500,000 acres of irrigation,” said Molde during his portion of the presentation.

Developing Canada From Saskatchewan

Saskatchewan engineer Wayne Clifton, P.Eng., has won a senior engineering award from the Engineering Institute of Canada for his exceptional achievement in the development of Canada.

Clifton is one of two recipients of the Julian C. Smith Medal for 2021. The medal is among the Institute’s highest distinctions. It has been awarded to two recipients each year since 1939. The 2021 recipients are to be awarded their medals at a gala event in Ottawa scheduled for the spring of 2022.

Clifton has been working as a professional engineer since 1966. He is the CEO of Clifton Engineering Group, the largest independent specialist consulting engineering firm headquartered in Saskatchewan. It was founded in 1978 and now has six offices and 250 staff throughout Saskatchewan and Alberta.

The firm has an extensive client list across Canada and around the world. Clifton himself has consulted on more than 5,000 projects related to geotechnical and environmental issues throughout his career. He has also authored several hundred technical reports that have been published in journals and conference proceedings.

He served on the Prime Minister’s Scientific Advisory Committee, as a member of the National Research Council, and on the Standards Council of Canada Advisory Committee on Trade.

Numerous industry associations have benefited from his activity at a senior level, including ACEC-Saskatchewan, APEGS and the Canadian Council of Professional Engineers (now Engineers Canada.)

So too has Saskatchewan. He provided leadership through his contributions to revisions to key environmental legislation and the Environmental Code being implemented as the basis for environmental regulation in the province. His contributions to the profession of engineering were recognized by ACEC-SK when he was presented with the Lieutenant Governor of Saskatchewan Meritorious Achievement Award among other awards during his career.

He has also served as an adjunct professor at both the University of Saskatchewan and the University of Regina and has mentored more than 50 young engineers through post-graduate degrees at Saskatchewan universities. In recognition of contributions to engineering teaching and research, he has also received an honorary Doctor of Science degree from the University of Saskatchewan.



Water Security Agency

M1 Canal, a 22.5 km long water supply canal extending from Lake Diefenbaker. Built in the 1960s, the canal provides water for 56,000 acres of irrigation in the area. The Westside Rehabilitation Project will look similar to this.

“Currently, there is only 20 per cent of that vision implemented – about 110,000 acres of irrigation with water sourced out of Lake Diefenbaker.”

“The lake is one of the largest untapped sources of water in our country,” said Molde, who explained it provides water to 60 per cent of Saskatchewan’s population.

Molde said there is sufficient data to know there is enough water for this project to be undertaken. Based on flow data from the past 88 years – and without significant changes to the operation of Lake Diefenbaker – there is 900,000 acre-feet/year of water available for irrigation. (An acre-foot represents one foot of water on an acre of land.) These three projects would use anywhere from 500,000 to 700,000 acre-feet of water per year for irrigation. Immediate annual inflow is 4.5 million acre-feet, which is more than half the storage volume of the lake. The lake is 225 km long with a surface area of 110,000 acres.

“When you look at 500,000 acres of irrigation on that surface area, that means five to seven feet of water off the top of a full reservoir to supply irrigation,” said Molde.

“When you look at the many analyses and studies done over the years, there is more than enough water to supply these three irrigation projects.”

Three Projects to Complete

The first is the Westside Rehabilitation Project, which uses an existing partially constructed irrigation canal system between Lake Diefenbaker and the Conquest reservoir that, when fully developed, could irrigate up to 80,000 acres.

The second is the Westside Expansion Project, which will add on to the existing infrastructure to irrigate up to 260,00 acres in the Asquith/Rosetown area. Fulfilling the project could mean expanding the capacity of the canal system up to six or seven times its current size.

“It means possibly up to 400 kilometres of canals and

many pump stations and pipelines coming from the canals to the edge of the farmers’ fields and potentially up to three balancing reservoirs,” said Molde.

Right now, some portions of the canal have never seen water. The vegetation is overgrown, there is seepage and areas where water ponds, which all needs to be addressed in the design.

Construction on the west side took place in the late 1960s but was not completed as the project was abandoned in 1973 when there was a change in government.

“At that time, 95 per cent of the canal was constructed.

A portion of the balancing reservoir near Conquest was completed. At the lake, at the pump station, only the concrete work was done — the pump station floor, the wet well and the intake out into the lake,” said Molde.

From there, local farmers installed pumps and operate a pumping station, irrigating about 3,000 acres currently.

“What to expect in the future, when we look at the full build out of the westside irrigation project – we’re talking 30, 40 years until we’ve maximized the development of the westside project – (is) potentially 340,000 acres (being irrigated),” said Molde.

The third project is the Qu’Appelle South Water Conveyance project, which would take water from Lake Diefenbaker on the Qu’Appelle side. The concept for this is that at least one pump station would deliver water through a 100-km canal running along Highway 42, a balancing reservoir and possibly a spillway to Buffalo Pound Lake to irrigate approximately 120,000 acres towards Moose Jaw.

“The canals themselves are the main conveyance for the project. Along the canal, there would be numerous pump stations that would pressurize water and deliver it by pipeline to the edge of the farmers’ fields,” said Molde.

An engineering pre-design for the Westside portion is being done by Clifton with Stantec and Associated Engineering as well as other subcontractors. Their work this year and into the next includes geotechnical, soil suitability and geographic mapping, environmental consulting services and supporting government consultations with stakeholders, including stakeholders, and First Nations and Metis communities. The Saskatchewan government is committing nearly \$20 million to preliminary engineering.

“Right now, part of our pre-design requirement is we need to do field work that allows us to refine the overall design,” said Molde.

That includes soil testing to confirm that area is suitable for irrigation with about 40,000 acres being tested in 2021. Geotechnical testing is being done around the existing infrastructure, including the pump station, canal, reservoir and future locations.

Far Reaching Benefits

Clifton explained that investing into this infrastructure will generate private investment in the billions, benefit secondary industries and increase the GDP by billions a year once the project matures.

High-paying jobs dedicated to operating and maintaining this project for decades will attract people to the communities and areas around Lake Diefenbaker. This increase in rural Saskatchewan's population and preparing for a changing climate are additional benefits.

“Climate-change adaptation really requires an infrastructure response, particularly for sustainable food production,” said Clifton, which means applying climate change models to the project design. It could also involve renewable energy sources.

For the project to succeed, Clifton says the jurisdictions must be clear on their authority and regulatory approvals and land acquisition for right-of-ways must be done in a timely manner. Also, there must be sufficient engineering and construction resources available.

“These are big projects and they are complex projects that require significant skills,” said Clifton, who believes that with consistent investment and policy support, the project can be completed.





Mining Moon Water

BY MARTIN CHARLTON COMMUNICATIONS

Humanity is at the edge of understanding how people can live on the moon using resources found on that celestial body.

Three engineers – two from Saskatchewan and one from Alberta – are right on that edge, pushing it forward through a network they are establishing that connects energy and mining expertise in Saskatchewan and Canada with space exploration specialists in the U.S. The resource they are focused on is water. It is vital to life, wherever life finds itself. When life moves off this planet – whether to visit the moon or circle the Earth in a satellite – those beings need water. Bringing water with them is what many Earth-bound humans would expect the travellers would do.

Finding and using water available at their destination in space is what Jared Peterson, P.Eng., Brandon Harris, P.Eng., and Zac Trolley, P.Eng., want to make possible through the Lunar Water Supply Company. Peterson and Harris met at the University of Saskatchewan when they were both studying civil engineering.

Starting the Lunar Water Supply Company was a step forward in a progression that had been underway for

around 10 years. Peterson and Harris had been using their geotechnical and civil engineering experience at their existing group of companies in the resource industry with Peter Lucas Project Management being one of those companies. It provides remote and on-site project services to North America’s industrial, mining and technological sectors.

“It’s an area we feel confident in and we were looking five, 10, 15 years into the future on how we can use our existing skill sets, passions and areas of expertise and be able to be involved with that future mining economy,” said Peterson, P.Eng in Geotechnical Engineering who is also a Project Management Professional (PMP).

“That’s where this idea of space resources, or mining water on the moon, comes from.”

A recent confirmation by NASA has made that possibility more probable. The first humans to visit the moon came back in 1969 saying the moon was dry. But missions over the last 20 years confirmed ice in shadowed craters at the



Brandon Harris, P.Eng.



Jared Peterson, P.Eng.



Zac Trolley, P.Eng.

“We just want customers to be able to hook up their equipment to our pipe and we provide them clean, pure reliable water – just like when you turn on a tap in your house.”

poles of the moon and more recently identified hydration on the sunnier parts of the moon.

Last year, NASA’s Stratospheric Observatory for Infrared Astronomy (SOFIA) used a telescope with an infrared camera that can detect a wavelength specific to water molecules. In October, molecules of H₂O were confirmed in a crater in the moon’s southern hemisphere at a concentration of 100 to 412 parts per million in a cubic metre of lunar soil. That amount of water is about what you would find in a 12-ounce bottle.

“Most of the industry is in this prospecting stage ... trying to find it in high enough volumes to extract economically and be able to utilize, which is very similar to how mining and resource exploration is done on Earth,” said Peterson.

We have lift-off

In the same month that NASA confirmed water on the moon, Peterson, Harris and Trolley launched their company.

“At the end of the day, we want to be a water utility,” said Harris, P.Eng.

“Your municipal water service didn’t invent the technology. It integrated all the technologies into a system that provides water.”

The need to use water and other resources on the moon is not some distant goal to someday be accomplished, but one that will need solutions in the next few years. The Artemis program will land the first woman and the next man on the moon’s surface to further explore it. Science instruments and technology demonstrations are being sent to the moon this year ahead of the humans arriving in 2024. Those humans, along with robots, will explore the south pole of the moon to find and use water and other resources needed

for long-term exploration. What is learned on the moon will be used to one day send humans to Mars.

Using Water in Space

“Water in space wears many hats,” said Harris. “It’s not quite the same as here on Earth when you think of water as something you drink and wash with.

“Water is critical for fuel in space. You can actually derive rocket fuel and other types of fuel from molecules in water – the hydrogen and oxygen are both components of fuel.”

Water is also an effective radiation shield, offering protection from the sun that humans on Earth take for granted because of the magnetosphere.

“We don’t have that luxury on the moon of that magnetosphere and so we have to create our own protection systems for our bone bags, so they don’t get fried by radiation,” said Harris.

Joining Forces

Getting to the point of being able to sell water sourced on the moon requires scientific and technical expertise Harris and Peterson recognize they don’t have.

“A big part of the first phase of the company is bringing smart people with the right skill sets into the fold. We are really the integrator. We are working with educational institutions, companies and specific individuals to fill out all those skill sets,” said Harris.

“We plan to build this ecosystem of companies that have the widgets that we’ll need to buy the technology to modify them or develop them for use in space,” Peterson added.

“That’s kind of where our backgrounds come into alignment with this type of an initiative being on the project management side of it. You understand enough to know how all these pieces fit together.”

The initiative started in early 2020 with Peterson, Harris and Trolley talking with those who shared their enthusiasm for the idea of mining space resources.

“Every time we talked to someone, it led to another conversation, and it was this rapidly increasing circle of influences and contacts, people who wanted to be part of this undertaking and could see how it positively influences the present and the future for, not just people in Canada and Saskatchewan, but the whole planet potentially,” said Harris.

Meeting in person to have those conversations was not possible during the COVID-19 pandemic. The team pivoted to spreading the idea that space resource mining is nearly here through a six-episode series of podcasts called “Unearthed: Demystifying Space Mining.”

“It’s not a Star Trek® , thousand years out, kind of idea. It’s on our doorstep,” said Harris.

First the Moon, then Mars

The cost of overcoming gravity to ship water from Earth to space will put pressure on space agencies like NASA to use water resources on the moon to make progress towards getting humans to Mars.

“Realistically, for a company like ours to be on the moon to go through prospecting, exploration, technology developing, launching, commissioning ... The absolute earliest would be 2030.”

Between now and then, the company is aiming to make money through a platform it has developed that can use various data sets to establish where to explore for water. The team at Lunar Water Supply Company is also becoming more specific about its next stages and where to find those people they need in their network.

“We’re talking to companies in California that could take our mining equipment (from Canada) and land it on the moon,” said Harris, who explained that Canadians have traditionally developed space technology and then relied on American institutions to take it into space.

“When we talk to planetary scientists, geologists, mine design experts, that’s where we really want to be using that Saskatchewan and Canadian talent.”

Technology being developed and improved to support remote extraction, energy efficient mining and water security can benefit endeavours on the moon as well as on earth to further Saskatchewan’s reputation as a global leader in those areas.

“We are in the best place in the world to drive that innovation and then those same people can take it and use it in applications here on earth. It’s a win-win for Saskatchewan,” said Harris.

While their experience in business has given them the confidence to launch an ambitious venture such as the Lunar Water Supply Company, so too has their engineering experience.

“It is just like any other problem. There are solutions to it and if you take the same kind of methodical approach. Keep solving problems and reiterating on your solutions, you are able to solve it,” said Peterson.

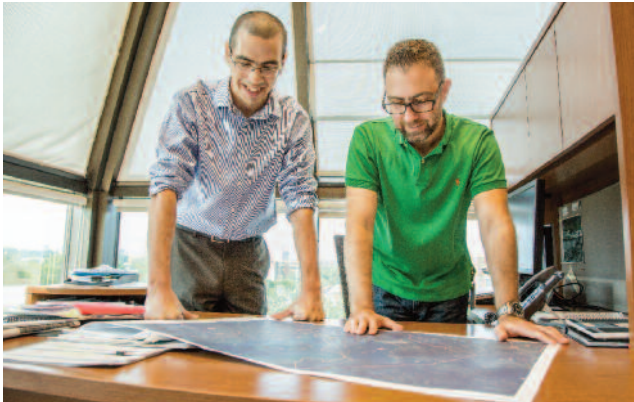
“The demand for water on the surface of the moon will explode in 2028 if that schedule (for the Artemis program) stays on track,” said Peterson.



NASA

Remediation Project Rounds Out Members' Experience

BY MARTIN CHARLTON COMMUNICATIONS



Saskatchewan Research Council

Thomas Lavergne (left), Engineer-in-Training and Ian Wilson in the office.

The opportunity to work on a remediation project and gain the type of experience that helps a geoscientist or an engineer develop a broader perspective is one Mike Menzies and Thomas Lavergne do not take for granted.

Both are part of the team working on Project CLEANS (Cleanup of Abandoned Northern Sites), which is remediating the land where Gunnar mine and mill site, Lorado mill and 35 satellite mine sites are located near Lake Athabasca in northern Saskatchewan. They work for the Saskatchewan Research Council (SRC) on the project, which has a core team of about 20 scientists, engineers, project managers and support staff.

Building a Team Ready to Clean

The uranium mining and mill sites being remediated through Project CLEANS were developed and operated up to the 1960s by companies that later abandoned them as there were not the legislative requirements of companies that exist now. When a site's owner no longer exists, can't be located, or is unable to carry out remediation, the responsibility reverts to government.

A memorandum of agreement was signed by the governments of Saskatchewan and Canada in 2006 to decommission and reclaim the mine and mill sites now covered by Project CLEANS. SRC was contracted to manage the project, handling all the environmental assessment and rehabilitation activities.

Ian Wilson leads the Project CLEANS team for SRC, having brought together qualified people to oversee and complete the work necessary to turn abandoned mine sites into areas that can once again be used for traditional purposes.

“A remediation cycle is starting with assessment, going to engineering and design, going to operations and then going to post closure and monitoring,” said Wilson, manager of environmental remediation for SRC's Environment and Biotech Division.

“We built our team in and around the requirements of managing a project of this complexity ... I have a great staff of world-class experts and many APEGSS members on Project CLEANS.”

He was looking for people who could work in isolation and think on their feet to apply their engineering and geological knowledge to manage problems and people. Many on the team are Saskatchewan-based people while others are from various parts of the world who all bring the knowledge and attributes required for this project.

From Mentored to Mentor

Finding Saskatchewan people for these roles was possible, in part, because Saskatchewan's experience with mining uranium has produced some of the best expertise to be found in the world.

It is also because of the academics offered at the universities in the province. That is where Wilson met Lavergne, who was studying environmental engineering at the University of Saskatchewan.

Wilson became Lavergne's mentor through the Aboriginal Mentorship Program, which was initiated in 2015 to develop Indigenous students in their third or fourth year of studies in a STEM discipline at the University of Regina or the University of Saskatchewan.

Lavergne was the first one in that program, which offered students one-on-one coaching and mentoring, paid summer employment and opportunities for them to develop skills and experience to further their studies and careers.

“It's been really interesting to see all stages of the remediation project, from being involved in the assessment work, defining what the problems and issues are and then moving into that engineering design phase and being full scale in the trenches with the contractors trying to fix up our sites,” said Lavergne, who is an environmental Engineer-in-Training.



Saskatchewan Research Council

Mike Menzies, P.Geo., in the field at a satellite site.

In the six years he worked on Project CLEANS, Lavergne has developed significantly to be able to handle greater oversight of his area of the project. During his first summer, he was mainly involved in environmental monitoring, taking water samples and doing some rudimentary site assessment work at the satellite sites as well as the Gunnar mine site. A year later, he took over as the lead of environmental monitoring across the projects. Now, he's moving into project management, providing oversight to contractors to ensure they are meeting their commitments and obligations.

He has also been responsible for the student environmental monitoring program, which introduces young adults from communities in the Lake Athabasca area to the world of site remediation by bringing them to the Gunnar site.

All this experience has been beneficial to Lavergne, who is working on achieving his engineering designation. He is able to use that experience to demonstrate his competency, including the social and economic areas.

"Being the lead in developing the student environmental monitoring program was an awesome way to share what an environmental engineer might do on a remediation project," said Lavergne, whose job title is Associate Engineer.

"Along with that, I've been engaged in a lot of environmental compliance and regulatory items on our project.

"One of the competencies is demonstrating the importance of regulations and regulators. I accompany our project officers on site and explain what we do to remain in compliance with our permits and our licences and environmental regulations."

"I follow up on any action items or requests for additional information that comes out of those. I have had a good chance to work on a lot of those competencies so far."

Seeing the Big Picture

Menzies, P.Geo., agrees with Lavergne that the experience of working on Project CLEANS has helped him develop as a professional beyond what he expected when he was a university student. At that time, he thought he'd work in mining, which he did for a few years following his convocation until the mine that employed him was put into care and maintenance.

Now at SRC, Menzies has a broader perspective on geoscience due to his experience.

"I'm learning so much more. It's good to have the full-scale picture of everything," said Menzies, who has been employed by SRC since May 2017.

"I went from a core logging and junior mine geologist, to being involved with regulatory objectives, working with the ministry of environment, labour relations and worker safety, dealing with all the permits and contractor oversight.

"So, it was really, really beneficial because I saw a limited scope of work at my previous jobs, whereas this job allows me to see the big picture with so many moving parts, so that was very helpful."

Menzies is the Remediation Field Specialist. He oversees the 35 satellite sites, of which 13 have been remediated so far. He is now the subject matter expert for the underground workings at satellite sites and works with sampling programs as well as contractors and consultants

on implementing gamma covers or other remediation structures to close openings.

“As I’ve been here longer, the scope has gotten bigger and I’ve just been involved in more things as I gained experience on the job,” said Menzies, whose responsibilities take him to the isolated satellite locations for about two weeks at a time between May to October.

Learning Never Stops

Wilson provides opportunities to employees like Lavergne and Menzies by assessing who on the team can move laterally and vertically to take on certain aspects of the project needing attention. He also maintains a professional development budget that provides for employees to participate in conferences and training courses, such as a boating safety course. They also grow through mentorship, which has developed organically rather than through a formal program.

Then, there is the knowledge from local residents who Lavergne and Menzies depend upon.

“We inherited legacy sites,” said Wilson.

“Unlike a working mine site that has closure plans, we don’t have any of that, so, we have to gather a lot of knowledge at the front end during the assessment process and working towards a closure plan.

Accessing Traditional Knowledge

Traditional knowledge from local Indigenous and northern community members helps Team CLEANs build risk assessments, for example. The team must build trust so that people are comfortable to share details about how they live, such as the type of fish they eat and the plants they use for medicine. In areas where the hazards are more physical, such as the satellite sites that have openings in the ground, people explain how likely they are to visit the site, how they would travel to it and when they might be there.

“Traditional knowledge is incredibly important ... That type of information is extremely important in being able to frame the problem and frame a solution,” said Wilson.

For Lavergne, returning to a site to see the outcome of their work is rewarding.

“One of the most satisfying things for me has been the post-remediation monitoring at the Lorado mill site,” he said.

“Last year, we just submitted our five-year post remediation performance report. All signs point to that being quite a success. It is performing as we hoped.”

“It was super satisfying to be a part of and seeing that we are actually making a difference up there.”



Thomas Lavergne, Engineer-in-Training, at the Gunnar Mine Site.

Professional Misconduct

APEGS Member Disciplined

A Professional Engineer member of the Association of Professional Engineers and Geoscientists of Saskatchewan (APEGS) plead guilty to two counts of professional misconduct before a hearing panel of the Discipline Committee on March 15, 2021.

Counsel for the Investigation Committee and for the member filed an Agreed Statement of Conduct with the panel, which was accepted as an admission of Professional Misconduct by the member. The submission contained the following admissions:

- The member did not hold paramount the safety, health and welfare of the public, and did not promote health and safety within the workplace contrary to subsection 20(2)(a) of The Bylaws in his response when approached by a worker with concerns about public safety and the safety of their working conditions at a research site adjacent to a divided highway; and
- The member did not conduct himself in an honourable and ethical manner contrary to subsection 20(1) of The Bylaws while monitoring and supervising workers on the job site.

The Panel determined that these actions by the member were in breach of Sections 20(1) and 20(2)(a) of The Regulatory Bylaws and that this breach constituted Professional Misconduct as defined in subsection 30(c) of *The Engineering and Geoscience Professions Act*.

In the Submission as to Disposition, the Investigation Committee cited Casey, Regulation of Professions, 2005 – Release 1, Section 14.2, Purposes of Sentencing, pages 14-5 to 14-9 and Salte, The Law of Professional Regulation, 2015 – Chapter 8.2, Penalty – Principles, 23-246.

The Hearing Panel acknowledged that the fundamental principles of sentencing for Professional Misconduct is the protection of the public.

The Hearing Panel also considered the following factors when determining its sentence:

- nature and gravity of conduct proven;
- risk to public safety;
- need to ensure the public's confidence in the integrity of the profession;
- advantage gained or to be gained by the member;
- effect on the victim;
- the number of times the offending conduct occurred;

- specific deterrence of the member from engaging in further misconduct;
- general deterrence of other members of the profession;
- the possibility of remediating or rehabilitating the member;
- punishment of the offender;
- denunciation by society of the conduct; and
- range of sentences in other cases.

The Hearing Panel also considered mitigating circumstances:

- age and experience of the member;
- previous character of the member;
- family and personal circumstances;
- history of the member's professional conduct;
- member's acknowledgement of responsibility and steps taken to disclose and redress the wrong;
- effect on the member of criminal or other sanctions or penalties; and
- effect of the proposed penalty on the member.

Having considered all the above, the Hearing Panel ordered as follows:

1. That the member is hereby reprimanded for Professional Misconduct;
2. That Member, P.Eng., pay a fine of \$2,000.00;
3. That Member, P.Eng. complete counselling and medical treatments undertaken;
4. That the Decision and Order shall be published on the APEGS website and in *The Professional Edge*, without names;
5. That Member, P.Eng., shall pay costs of the investigation and hearing into the member's conduct and related costs, including the expenses of the investigation committee and the discipline committee and costs of legal services. Costs shall be assessed to a maximum of \$5,000; and
6. That Member, P.Eng. shall have six months from the date of this Decision and Order to pay the amount of the fine and costs, and in default, he shall receive an Administrative Suspension until the fine and costs are paid in full.

Notes from APEGS Council

The APEGS Council held an online Microsoft TEAMS meeting on June 17, 2021. The meeting was attended by all councillors and the directors to Engineers Canada and Geoscientists Canada. Council will meet next on September 24, 2021 with the Past-Presidents Meeting scheduled for September 23, 2021. It is not yet determined whether this will be via Microsoft TEAMS or inperson in Saskatoon.

Council received the following presentations and information items:

- The Communications Manager provided a status update on the 2021 Strategic Communications Plan.
- The Executive Director and Registrar provided an update on staff reorganization and succession planning that is expected to result from the new strategic approach.
- Report from Engineers Canada – Holmes
- Report from Geoscientists Canada – Ansdell
- Enforcement / Compliance Statistics work from January 2021 to present.
- Regina Engineering Society – Lemieux
- Saskatchewan Geological Society – Jansen
- CIM/Geology Saskatoon – Cruikshank

Council approved the following motions:

- That the Regulatory Board establish a task group to research options regarding designations for licensee titles and provide a recommendation to Council through the Regulatory Board.
- That the strategic objectives be adopted and that the reference to sustain the professions focus area be removed from the APEGS Value Proposition and the statutory objects from section 5(d) of *The Engineering and Geoscience Professions Act* be added.
- That an APEGS awareness campaign based on the provided billboard concept be adopted.
- That the new concept of a member survey platform through Inshgtrix be adopted.
- That the following people be appointed to the Corporate Registrant Task Group: Bert Munro, P.Eng., (Chair), Deb Shewfelt, P.Eng., Brett LaRoche, P.Eng., Mark Simpson, P.Eng., John Fahlman, P.Eng., P.Eng., Nancy Grainger, P.Eng., Ryan Gritzfelt, P.Eng. and Carolyn Emperingham, P.Eng. as liaison councillor. Shawna Argue, P.Eng., is the support to this group.
- That the Professionalism Board terms of reference be adopted.
- That the common terms of reference be adopted and that other boards', committees' and task groups' terms

of reference be revised to reflect the new standard.

- That the APEGS representatives on the university senates report to the Regulatory Board.
- That the updated council terms of reference be adopted.
- That the Governance Change Project Steering Group be stood down.
- That the following people be appointed to the new Nominating Committee: Andrew Lockwood, P.Eng., (Chair), John Desjarlais, P.Eng., Peter Jackson, P.Eng., Margaret Kuzyk, P.Eng. and Nicole Barber, Engineer-in-Training.
- That the Nominating Criteria Task Group be stood down.
- That the updated Nominating Procedure be adopted.
- That the guideline for the funding of external parties be adopted.
- That the following policies be adopted: Sponsorship, Volunteer Eligibility, CPD Review Action, CPD Registrar's Action.
- That the law and ethics seminar be offered online in the Fall 2021.
- That the updated Guide for Engineering and Geoscience Licensee Applicants be adopted.
- That members who did not comply with the Registrar's assigned remediation plans be administratively suspended until such time that they fully comply with APEGS' Continuing Professional Development program requirements for the 2020 reporting year and the conditions of the reinstatement application.
- That applications for life membership be approved.
- That Darcy Hirsekorn, P.Eng., be appointed as Chair of the Environment & Sustainability Committee for a two-year term.
- That Jeremy Thomas, P.Eng., be appointed as a member of the Investigation Committee for a three-year term.
- That the updated Discipline Committee Terms of Reference be adopted.
- That the updated APEGS signing authorities be approved.

Council noted and received the following reports:

- Registrar's reports for March and April 2021.
- The unaudited financial statements for March and April 2021.
- Executive Committee minutes, board minutes and the reports from the committees and task groups, Investigation Committee minutes, Discipline Committee minutes, Governance Change Steering Group minutes (final) and Nominating Criteria Task Group minutes (final).

Governance Change Project

Final Update

APEGS undertook a review of its governance and regulatory frameworks and practices in 2019 in response to the growth in membership, the addition of geoscientists, changes in the regulatory environment, and other significant changes since the last governance review about 30 years ago. The purpose was to review if the governance structure and the association’s activities aligned with modern governance and regulatory best practices.

As of June 30, council sunset the Governance Change Project Steering Group in acknowledgement that work associated with the recommendations is either complete or has transitioned to council, boards, committees, task groups or staff. See the table below for a summary of recommendations, outcomes and some additional work being done.

“Over two years of work to realign APEGS’ governance structure and activities has come to an end with the close of the Governance Change Project,” said President Kristen Darr, P.Ge.

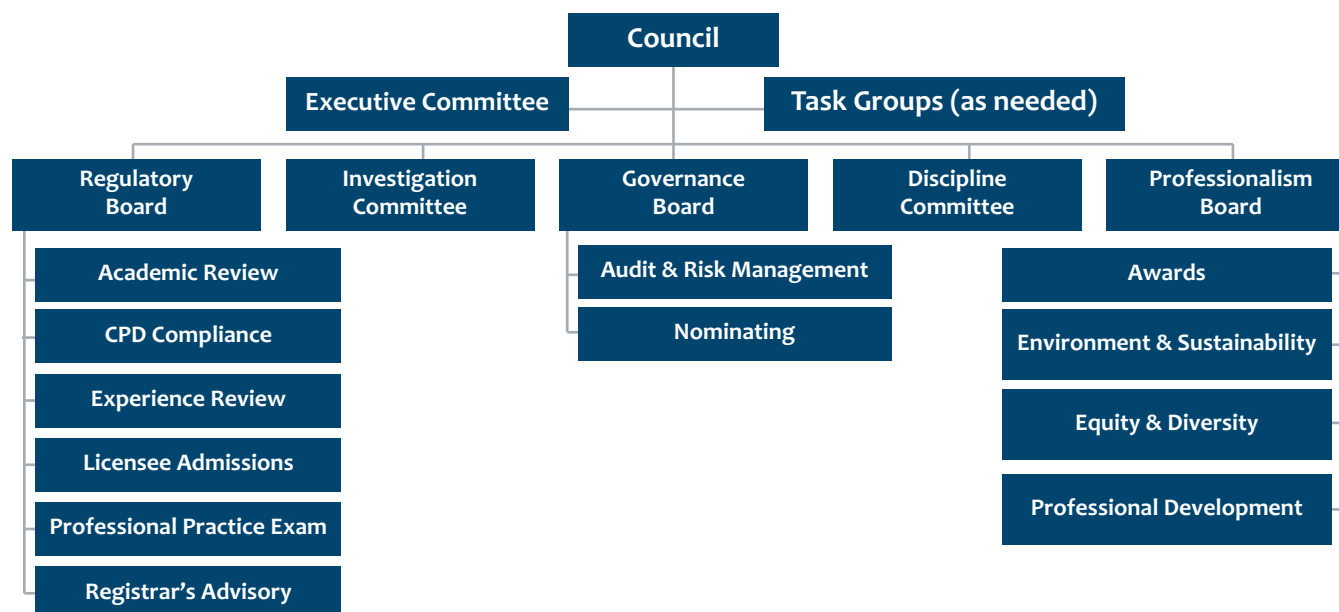
“Council did a great deal of heavy lifting, and I am grateful for the extra time each council member dedicated to address the 33 recommendations from the governance review by participating in additional council meetings, reading numerous proposals, and serving on task groups. I would also like to thank the APEGS staff for the significant amount of work and extra effort they have given throughout this project,” said Darr.

Executive Director & Registrar Bob McDonald noted that it has been a busy time for staff and volunteers, especially during the COVID pandemic. “Council, committee volunteers, the steering group and staff have worked exceptionally hard to ensure the alignment of APEGS’ activities with its regulatory mandate. The work also included strategic planning incorporating the governance changes. The fact that the work was done with everyone working remotely further tested the team.”

AREA	OUTCOME / STATUS
Council Size and Composition	<p>On May 1, 2021, members approved bylaw changes to bring into effect the following changes, beginning with the 2022 council elections:</p> <ul style="list-style-type: none"> • Council size will be reduced from 19 to 13 members through a process of attrition over the next three years. Staggered terms will be maintained by electing a minimum of two member-at-large councillors each year. Note: <i>The Engineering and Geoscience Professions Act</i> requires a minimum of four professional engineers, two professional geoscientists and two public appointees on council. • Councillors will be elected as members-at-large instead of based on discipline, geography or member-in-training status. Only members who are compliant with the requirements of the CPD program are eligible for nomination. • The Nominating Committee has been assigned the responsibility to attract and vet candidates using criteria to ensure council is made up of individuals with the knowledge, competency, character and diversity to regulate in the public interest. The criteria include: <ul style="list-style-type: none"> • a provision for members to self-apply to be considered for nomination to run for council, in addition to the Nominating Committee identifying potential candidates. • a process for candidates to be vetted in a consistent manner, which requires them to: <ul style="list-style-type: none"> • complete an application form to be assessed against a competency matrix and a gap analysis of council. • if short-listed, take part in an interview process to select final candidates.
Risk Management	<ul style="list-style-type: none"> • An annual self-evaluation has been introduced for council, boards and committees. The evaluation tools and procedures have been approved by council. • Risk management has been enhanced by expanding the Audit Committee’s terms of reference to include assisting council, boards and committees with risk assessment. The expanded scope of the committee also resulted in a name change to the Audit and Risk Management Committee. The committee has engaged a consultant to assist with developing and implementing an enterprise risk management program.
Public Transparency	<ul style="list-style-type: none"> • The complaint process was made more transparent to the public by making content more evident on the APEGS website. Public transparency will be examined as part of the enterprise risk management project and enhanced where opportunities are identified.
Management of Sponsorships	<ul style="list-style-type: none"> • Council will monitor sponsorships in keeping with a new sponsorship policy and provide strategic direction to fund external parties, including providing grants and sponsorships in a manner that aligns with the objects of the association.

Organizational Structure	<ul style="list-style-type: none"> The former Governance Board has been appropriately renamed to Regulatory Board to better reflect its focus on regulatory matters. There is no change in the committees that report to it. A new Professionalism Board has been created by merging the former Education Board and Image and identity Board. The new board's focus is promoting professional development and professionalism of members and licensees, including both the conduct and competence necessary to practice in the public interest. Over the coming months, the purpose and objectives of the following two committees will be examined and clarified within the context of the regulatory role and responsibilities of APEGS and how best to achieve those objectives: Environment and Sustainability, Equity and Diversity. Staff, and in some cases, other committees have been given the responsibilities of the following committees and they have been sunset: <i>Professional Edge</i>, Communications and Public Relations, Connection and Involvement, Kindergarten to Grade 12, Legislative Liaison, Student Development. The APEGS representative on the Saskatchewan Construction Panel is now a staff member instead of a volunteer.
Roles of Committees and Staff	<ul style="list-style-type: none"> Role descriptions were added to the appropriate terms of reference for executive members of council, liaison councillors, board/committee/task group chairs and vice-chairs, and board/committee/ task group members.
Training for Committees	<ul style="list-style-type: none"> Volunteer orientation training will be developed and reinstated for new committee members and chairs. Returning volunteers will have the option to attend. Training volunteers on committee-specific responsibilities has been formally assigned to the staff support for those committees.
Relationship with Constituent Societies	<ul style="list-style-type: none"> A task group will be created in September 2021 to assess improvements to the relationship with constituent societies and clarify the role of APEGS as the regulator.
Other	<ul style="list-style-type: none"> A task group was created to evaluate corporate regulation. The focus area of "sustain the professions" in the APEGS Value Proposition has been replaced with guiding principles to support council in setting strategic direction in "fostering the practice of professional engineering and the practice of professional geoscience by members in a manner that is in the public interest." (<i>The Engineering and Geoscience Professions Act</i> sub-section 5(d)). Staff is reviewing current government relations practices and will propose any changes to council for consideration.

Interim Organization Chart for Boards and Committees



Interested in Volunteering?

APEGS is introducing an online platform in fall 2021 called APEGS Connect for members to provide feedback.

- Questions will be posed through surveys, quick polls and responses to a specific question through a moderated discussion.
- Responses will provide APEGS with a breadth of member input on a variety of topics to guide considerations in planning and operations.
- The platform monitors participation and volunteers receive Continuing Professional Development credits, like any other APEGS committee volunteer.
- It's flexible and convenient.
 - The platform adapts to the device used.
 - Participants can reflect and go back or add to their responses.
 - Participants can answer with text, video, pictures or weblinks.
- Responses are anonymous.

Insightrix Research Inc. is customizing the platform recruiting about 1,000 members to join APEGS Connect this summer. If you have selected in your online profile that you wish to volunteer with APEGS, you may be contacted to participate using the platform for a one-, two-, or three-year term as part of a representative sample of APEGS members. Some ideas on the kinds of questions you may receive are:

- Your preferred types of PD opportunities and preferences.
- Ideas on how APEGS can improve CPD reporting
- Suggestions about how APEGS can help improve the proficiency and competency of members.
- Your preferred method for receiving communications from APEGS.
- Ideas for content for *The Professional Edge* magazine and for APEGS' awareness campaign.

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COMMUNITIES

ANNOUNCEMENT



Bob McDonald, P.Eng., Executive Director and Registrar, is pleased to announce the appointment of Gina McGinn as Corporate Secretary.

Gina has a strong background in government relations, policy development at both the provincial and federal levels, strategic planning, risk management and has served as an ombudsman responsible for adjudicating complaints. She recently served on the City of Regina Development Appeals Board and is currently Co-Chair of the South Saskatchewan Community Foundation.

She holds a master's degree in Political Science from the University of Regina and is a member of the Rotman School of Management Institute of Corporate Directors ICD.D. As a dedicated life-long learner, she is currently enrolled with Royal Roads University - Executive Values Based Leadership.

Prior to joining APEGS, Gina was the Vice President, Governance with Conexus Credit Union and has been part of the financial services sector for 25 years. For 19 of those years, she was dedicated to the credit union system. She was a leader in corporate governance at Conexus and worked closely with the board and committees to deliver the strategy, advance work plan objectives, evolve new regulatory requirements, and lead transformational change. Gina also led all governance initiatives associated with board development and succession as well as the director elections process and annual meetings.

APEGS Strategic Plan

Throughout 2021, APEGS' council has been working toward establishing its strategic priorities.

This work led to establishing objectives focused on appropriate governance oversight and best practices in regulating the professions.

Council and committee chairs met in June to further determine action plans for 2022 that align with the objectives. The action plans are expected to be completed in the fall.

Council will review the actions and provide direction to committees regarding the plan and budget for 2022 to ensure that APEGS continues to regulate the professions in the public interest.

APEGS Staff Changes

Bob McDonald, P.Eng., Executive Director and Registrar, announced several staff changes in June further to the reorganization of APEGS' boards and committees as a result of the Governance Change Project and as a result of the recent retirement of Director of Registration, Shawna Argue, P.Eng.

- **Shawna Argue** P.Eng. retired as of May 31, 2021; however, she has agreed to provide services on contract for several projects. Argue, a career-long volunteer of APEGS, served as President in 2010-11, before chasing her “passion” and joining APEGS staff in September 2015. Argue served in a variety of capacities including staff support to the Education Board and Discipline Committee, Director of Registration and providing governance support to APEGS Council.
- **Kate MacLachlan**, P.Geo., has replaced Argue as Director of Registration effective May 1, 2021. She will provide staff support to the Experience Review Committee in its role of assessing work experience and competencies, replacing Tina Maki, P.Eng., and Fergus Earnshaw, P.Eng., who shared that responsibility. MacLachlan joined APEGS staff as Director of Academic Review in September 2010 providing support to the Academic Review Committee in its role assessing the academic qualifications of applicants.
- **Delee Silvius**, P.Eng. is Assistant Director of Registration and has assumed responsibility for providing staff support to the Academic Review Committee. She will also provide staff support to the Licensee Admissions Committee and the Professional Practice Exam Committee, as well as review notices of intent for permission to consult and applications for certificates of authorization. Since joining APEGS in September 2017, Silvius provided staff support to the Education Board and its committees and supported the Academic Review Committee.
- **Gina McGinn**, ICD.D, joined APEGS staff as Corporate Secretary on June 1, 2021. She takes over from Argue in providing staff support to APEGS Council, the (new and real) Governance Board and its committees (Nominating Committee and Audit and Risk Management Committee), APEGS Council election process and other governance related activities such as strategic planning.
- **Chris Wimmer**, P.Eng., joined APEGS staff as Director of Professional Standards in August 2005 and provided primary staff support to the Investigation Committee and Image & Identity Board. As of June 15, 2021, he will be Director of Professional Standards and Compliance, continuing to provide staff support to the Investigation

Committee but taking on the responsibilities for registration compliance (unlicensed practice and misuse of protected titles) and Continuing Professional Development (CPD) compliance, which were previously undertaken by Earnshaw and Argue, respectively.

- **Tina Maki**, P.Eng., joined APEGS staff as Director of Registration in July 2004, providing staff support to the Academic Review Committee, Experience Review Committee, Professional Practice Exam Committee and Licensee Admissions Committee to the (old and not very descriptively titled) Governance Board and the Discipline Committee. She provided project management support to two database projects, implementation of the competency-based assessment system for work experience reporting as well as the Governance Change Project. As the Governance Change Project winds down, Maki taken on the role of staff support to the new Professionalism Board (an amalgam of remaining committees from the former Education Board and Image & Identity Board). She is also supporting the Discipline Committee. Effective June 15, 2021, Maki's title will change from Director of Special Projects to Deputy Registrar.
- **Ferguson Earnshaw**, P.Eng., joined APEGS staff October 2016 as Director of Corporate Practice and Compliance and provided staff support to the Experience Review Committee and reviewed notices of intent for permission to consult and applications for certificates of authorization. As a result of his computer engineering and software engineering background, he gravitated towards supporting APEGS information technology needs, which proved invaluable with the onset of the COVID pandemic. To note his change in responsibilities. Earnshaw's title has been changed to Director of Information Technology.
- **Bob McDonald**, P.Eng., joined APEGS as Director of Membership Services in January 1999 and later served as Director of Membership & Legal Services and Deputy Registrar. He was named as Executive Director & Registrar in June 2016. At its meeting on June 2, 2021, McDonald advised Executive Committee that he would be retiring from his position of Executive Director and Registrar in December 2021 or January 2022. Executive Committee and Council will undertake a search process to replace McDonald.

As the implementation of the Governance Change Project proceeds and the new strategic plan is implemented, it is anticipated that there will be additional adjustments to the staff responsibilities.

Member Profile



Mark Getzlaf, P.Eng.

Tell us about your personal background - where you are from, where you went to university and your first job (or first few jobs)?

I grew up on farms at Avonlea and Briercrest, Saskatchewan. I studied civil engineering at the University of Saskatchewan, graduating in 1985. My first job straight out of university was to open an office and manage it for BBT Geotechnical Consultants Limited in Bonnyville, Alta.

My next position was as an industrial effluent works engineer with the Saskatchewan Ministry of Environment in Regina. While with the ministry, I became a manager dealing primarily with mining (uranium and other hard rock mining, potash, salt, sodium sulphate, etc.) while living in La Ronge and Saskatoon.

I was later the Canadian Director of Environment for PotashCorp and Nutrien for 16 years. Then, in 2019, I started ClearView Environmental Consulting Ltd., to service the mining industry.

Why did you choose engineering?

My parents were both schoolteachers. Prior to raising 12 kids on a farm, my dad was also a pilot instructor during World War II.

It was expected in our household that we would further our education. I have three older brothers who are engineers. With a keen interest in math and science, a farming background and older siblings and parents setting the example, engineering was a natural fit for me.

Tell us about the other engineers in your family (and extended family)?

The most recent person in our family to become an engineer is my youngest son, Ben, who graduated this spring after studying mechanical engineering. Our oldest son, Nicholas, and his spouse, Cristy, are also engineers in Calgary.

The number of engineers in our family has grown over the years. In total, between my boys, my brothers, my brothers' and sisters' children and their spouses, we have 12 engineers in our family.

The engineering family members are in the United Kingdom, Manitoba, Saskatchewan, Alberta and British Columbia. Eight graduated from either the University of Saskatchewan or the University of Regina. All are currently employed as engineers or worked as engineers until retiring.

We have a tradition in our family of the engineers getting together on the day of The Ritual of the Calling of an Engineer to pass on best wishes and advice to the young engineering graduates receiving their iron ring.

Of course, this year was different for Ben due to the pandemic. Several family engineers attended the virtual event held for the ritual. Then, all the family engineers, along with a few other senior family members, joined a Zoom call immediately following the ceremony to send Ben on his way with a lot of career advice. It was a great event with notes gathered for future reference!

What do you do for professional development?

I have spent a great deal of time during my career dealing with mine tailings and mine waste management. My favourite professional development activity is attending mine dam/tailings safety conferences and associated courses.

What are your interests outside of work?

I enjoy spending time at our cabin at Candle Lake with my wife of 35 years, Brenda, and our three boys and two daughters-in-law as well as our new grandson. We have a lot of fun boating, fishing, biking and snowmobiling, as well as sitting around campfires and watching the sunsets from our dock.

We also enjoy camping, hiking and biking in the mountains with the family. I enjoy welding and fabricating in my garage, working on cars and small engines, cooking, gardening, and travelling with my wife.

What are your favourite books and/or TV shows and movies?

I enjoy books written by Michael Crichton and earlier Stephen King. During the pandemic, I have enjoyed some excellent mini-series, including "Chernobyl", "The Crown", and "The Queen's Gambit".

If you could tell the public one thing about engineering, in one sentence, what would it be?

Engineering is a great career choice, however, no one engineer can fix everything. It requires true teamwork and collaboration for successful outcomes.

Gems Of Geoscience



A wall of Pamela Schwann's, P.Geo., stone house

I stumbled into geoscience inadvertently, you could say. I took my sciences in high school, but going into the University of Regina, I really didn't know what to take.

I took a Geology 101 class with Dr. Geoff Parslow. I was fully enamored by it. I liked to collect rocks and pebbles when I was little and I always enjoyed being outside, but this gave me a better appreciation for that science.

I just kept taking more and more classes because I found it really interesting. After my second year, I became more purposeful that this is what I wanted to do.

I got my B.Sc. Honours at the University of Regina. Then, I went to Ottawa to work for the Geological Survey of Canada, and I did my M.Sc. at Carleton University while I was there.

After that, I moved to La Ronge for a position as a resident geologist – the first female resident geologist in Canada – for the Ministry of Energy and Mines. That was a multifaceted role. I was facilitating exploration activity, while also handling small field projects in the summer. Rather than bedrock geology mapping, I would look at smaller areas of known mineral potential to find those parameters. I would also conduct claim inspections.

Working in that office, I got to meet everyone from CEOs of companies to local prospectors. Everybody came through that office to do work and that gave me insight into the industry across Canada that I would not have gotten had I been working in an office in Regina.

I stayed up in La Ronge for 10 years. Eight of those years were as the resident geologist and two years were working with northern communities and government in the uranium mining sector.

While I was there, during my holidays, I also taught Geology 102 courses to NORTEP/NORPAC (Northern Teacher Education Program and the Northern Professional Access College) students from across northern Saskatchewan. Living there and having those experiences gave me a better appreciation for how northern communities work and operate and their concerns and interests.

Then, I moved back to Regina to become the Director of the Mines Branch of the Ministry of Energy and Mines doing regulatory work and exploration policy rather than field work and mapping. Twelve years ago, I began working for the Saskatchewan Mining Association. I serve as President.

I found my favourite rock during my first field season as a summer student over 35 years ago when I was west of Flin Flon, Man on the Saskatchewan side of the border.

It is a finely laminated tuffaceous sediment, but terminologies change, so I'm not certain that is still what it is called.

It's a very pretty rock that catches the eye. It's very finely laminated, and it's folded so it's got very neat characteristics to it, and because the layers are different composition, it weathered differently, so it's got ridges and depressions. Also, to know the type of environment it came from, that we had active volcanoes up in northern Saskatchewan 1.8 billion years ago, just like Japan does now, is fascinating for people to know.

Before I moved to La Ronge, I had never been north of Prince Albert. I really had no idea about the Precambrian shield and the different landscape I would see.

My first field season as a summer student was at a very small camp. I was traipsing off into the field with just one other person. My mom was probably a little worried. We weren't in complete isolation though. We were still available by road, so she came up part way through summer and saw how much I enjoyed what I was doing and what was so fascinating about it. I think that helped to alleviate some of her concerns about my career choice.

When I came home, I brought this rock that I had thought was so fascinating and she kept it in her planter for decades. It's now in my rock garden, so it has a lot of meaning other than just being a nice rock to look at. It brings back a lot of good memories of my first field season. There was so much of that season that was good.

Today, I live in a field stone house, so I am surrounded by rocks from all over northern Saskatchewan that were transported down from northeastern Saskatchewan during the last glaciation. I can recognize some of these rocks from places I've worked as a geologist, whether it's the Athabasca Basin or by Deschambault Lake. It's very meaningful house for me to live in and raise a family.



2021 APEGS Salary Survey Summary Results

The Association of Professional Engineers and Geoscientists of Saskatchewan (APEGS) contacted 6,389 Professional Engineers, Professional Geoscientists, Engineers-in-Training, Geoscientists-in-Training and Licensees living in Saskatchewan. A total of 1,295 members completed the survey representing a 20.3 per cent response rate. Surveys were completed in March and April 2021, and salaries reported were as of December 31, 2020. Insightrix Research Inc. compiled and tabulated all results. The detailed report, which includes analysis by gender, can be found on the APEGS website under the Public menu.

information for engineers and geoscientists is to help ensure that the province retains proficient and competent services in engineering and geoscience. Making this information available provides guidance to both employers and employees to assess current compensation for professionals at various levels of education, experience and responsibility. The salary survey also has the additional benefit of providing students, career counsellors and other interested persons with information on employment in the engineering and geoscience professions in Saskatchewan.

The work of engineering and geoscience professionals contributes to the public well-being and economic stability of Saskatchewan. The goal of providing current market salary



Annual Salary by Final Year of Graduation (B.Sc.)

	COUNT	COLUMN N %	MEAN	PERCENTILE 05	PERCENTILE 25	MEDIAN	PERCENTILE 75	PERCENTILE 95
1985	13	1.1%	\$126,435	\$16,000	\$84,000	\$110,000	\$149,915	\$350,000
1986†								
1987†								
1988	11	0.9%	\$151,265	\$110,000	\$135,000	\$146,500	\$174,270	\$199,000
1989†								
1990	10	0.8%	\$136,741	\$74,000	\$94,485	\$151,000	\$175,000	\$192,590
1991	10	0.8%	\$155,439	\$113,000	\$135,000	\$140,235	\$193,000	\$210,000
1992†								
1993†								
1994	18	1.5%	\$146,957	\$15,800	\$100,000	\$142,000	\$180,000	\$303,000
1995	12	1.0%	\$123,029	\$45,000	\$96,757	\$106,500	\$151,750	\$225,000
1996	13	1.1%	\$170,554	\$98,022	\$155,000	\$176,769	\$195,000	\$220,000
1997	18	1.5%	\$132,586	\$76,000	\$105,000	\$122,411	\$155,000	\$208,000
1998	11	0.9%	\$135,826	\$20,000	\$103,000	\$132,000	\$180,000	\$270,000
1999	23	1.9%	\$158,010	\$85,000	\$122,000	\$142,800	\$208,000	\$250,000
2000	20	1.6%	\$133,091	\$63,740	\$100,500	\$123,500	\$170,746	\$214,165
2001	26	2.1%	\$134,567	\$70,000	\$109,000	\$133,500	\$164,718	\$211,650
2002	38	3.1%	\$132,649	\$22,000	\$110,000	\$131,366	\$155,000	\$219,000
2003	35	2.8%	\$129,565	\$55,000	\$100,000	\$130,000	\$155,000	\$200,000
2004	35	2.8%	\$126,804	\$57,600	\$92,000	\$130,000	\$157,000	\$206,000
2005	48	3.9%	\$118,004	\$60,000	\$97,000	\$114,827	\$146,500	\$160,000
2006	28	2.3%	\$113,799	\$33,000	\$100,625	\$116,000	\$134,468	\$157,123
2007	61	5.0%	\$115,859	\$68,500	\$97,578	\$116,000	\$135,000	\$164,800
2008	51	4.1%	\$113,502	\$51,648	\$94,000	\$115,000	\$134,280	\$160,000

	COUNT	COLUMN N %	MEAN	PERCENTILE 05	PERCENTILE 25	MEDIAN	PERCENTILE 75	PERCENTILE 95
2009	46	3.7%	\$108,751	\$72,000	\$95,000	\$109,313	\$125,000	\$150,000
2010	51	4.1%	\$107,277	\$62,000	\$79,000	\$103,189	\$130,000	\$175,000
2011	60	4.9%	\$101,855	\$65,100	\$88,558	\$100,000	\$114,625	\$145,000
2012	59	4.8%	\$92,470	\$51,801	\$77,000	\$92,000	\$103,000	\$140,000
2013	67	5.4%	\$93,215	\$54,365	\$82,000	\$94,490	\$107,000	\$130,000
2014	57	4.6%	\$86,514	\$58,000	\$75,000	\$85,000	\$96,500	\$124,000
2015	87	7.1%	\$81,146	\$60,000	\$70,000	\$80,000	\$90,000	\$109,000
2016	52	4.2%	\$77,457	\$58,000	\$68,221	\$75,000	\$87,625	\$100,000
2017	52	4.2%	\$72,824	\$48,000	\$64,250	\$71,722	\$84,550	\$100,000
2018	55	4.5%	\$72,381	\$55,000	\$63,509	\$70,000	\$78,300	\$96,000
2019	55	4.5%	\$69,808	\$55,000	\$63,000	\$68,000	\$74,500	\$92,000
2020	41	3.3%	\$67,250	\$57,000	\$60,320	\$66,365	\$74,000	\$80,600

*Not available due to reporting rules (insufficient data)

Annual Salary by Designation

	COUNT	COLUMN N %	MEAN	PERCENTILE 05	PERCENTILE 25	MEDIAN	PERCENTILE 75	PERCENTILE 95
P.Eng.	792	63.6%	\$123,348	\$74,000	\$95,000	\$114,000	\$143,000	792
P.Geo.	45	3.6%	\$122,198	\$78,000	\$95,000	\$117,620	\$143,000	45
P.Eng. and P.Geo	8	0.6%	\$119,655	\$84,240	\$105,500	\$115,000	\$138,250	8
Engineering License	10	0.8%	\$117,331	\$78,267	\$97,043	\$123,500	\$138,000	10
Engineer-in-Training	364	29.2%	\$74,064	\$52,000	\$64,292	\$70,050	\$81,975	364
Geoscientist-in-Training	26	2.1%	\$84,227	\$48,000	\$74,000	\$84,000	\$96,000	26
Geo Licensee†								

*Not available due to reporting rules (insufficient data)

Annual Salary by Discipline

	COUNT	COLUMN N %	MEAN	PERCENTILE 05	PERCENTILE 25	MEDIAN	PERCENTILE 75	PERCENTILE 95
Agriculture/Forestry	32	2.6%	\$85,709	\$52,000	\$66,250	\$73,000	\$99,125	\$150,000
Biological/Biomedical†								
Chem./Cer./Metallurgical	56	4.5%	\$112,299	\$60,000	\$75,150	\$95,000	\$137,000	\$220,000
Civil	248	19.9%	\$105,830	\$60,000	\$75,000	\$94,800	\$130,000	\$185,000
Electrica/Eng. Physics	166	13.3%	\$119,928	\$65,000	\$91,000	\$111,970	\$141,900	\$193,000
Environmental	97	7.8%	\$93,646	\$57,000	\$70,255	\$89,884	\$105,000	\$160,000
Geo., Mining, Petro. Eng.	108	8.7%	\$122,810	\$67,000	\$90,000	\$115,000	\$143,882	\$202,000
Mechanical/Industrial	331	26.6%	\$108,936	\$58,781	\$75,000	\$102,000	\$132,000	\$190,260
Software Engineering	35	2.8%	\$98,930	\$57,100	\$80,600	\$97,578	\$110,500	\$170,000
Other	115	9.2%	\$96,240	\$50,000	\$70,000	\$88,000	\$112,200	\$176,500

*Not available due to reporting rules (insufficient data)

Annual Salary by Function

	COUNT	COLUMN N %	MEAN	PERCENTILE 05	PERCENTILE 25	MEDIAN	PERCENTILE 75	PERCENTILE 95
Corporate Mgmt.	148	8.8%	\$158,954	\$88,000	\$127,958	\$150,000	\$180,000	\$247,500
Project/Ops. Mgmt.	608	36.2%	\$112,844	\$66,000	\$86,425	\$105,000	\$135,000	\$185,200
Project Admin.	33	2.0%	\$87,558	\$54,000	\$66,000	\$80,000	\$110,400	\$134,000
Design	386	23.0%	\$89,803	\$56,000	\$66,839	\$85,000	\$104,000	\$144,500
Research/Planning	99	5.9%	\$102,604	\$48,000	\$70,000	\$97,000	\$123,600	\$190,000
Inspection/Quality Control	41	2.4%	\$92,610	\$52,000	\$62,000	\$73,250	\$100,000	\$142,060
Operating/Maintenance	153	9.1%	\$108,821	\$64,400	\$85,000	\$103,000	\$128,679	\$178,000
Teaching	30	1.8%	\$124,560	\$80,616	\$93,363	\$101,000	\$168,000	\$191,000
Marketing/Sales	30	1.8%	\$83,990	\$40,000	\$65,100	\$85,620	\$98,480	\$134,600
Approvals/Enforcement	55	3.3%	\$89,698	\$56,550	\$77,000	\$88,800	\$100,000	\$120,000
Exploration	37	2.2%	\$105,770	\$48,000	\$81,373	\$102,000	\$115,748	\$240,000
Other	60	3.6%	\$81,094	\$10,850	\$60,625	\$71,750	\$106,250	\$149,405

Annual Salary by Industry

	COUNT	COLUMN N %	MEAN	PERCENTILE 05	PERCENTILE 25	MEDIAN	PERCENTILE 75	PERCENTILE 95
Consulting Service	253	20.3%	\$102,259	\$58,000	\$72,900	\$94,000	\$125,000	\$180,000
Resource Ind. Oil & Gas	70	5.6%	\$113,900	\$60,000	\$85,000	\$107,000	\$135,200	\$185,400
Resource Industry	192	15.4%	\$124,411	\$70,000	\$96,000	\$119,450	\$147,857	\$197,000
Procurement/Construc.	112	9.0%	\$99,818	\$60,000	\$72,000	\$89,500	\$116,004	\$180,000
Mfg. Durables	150	12.0%	\$90,543	\$55,000	\$66,000	\$78,000	\$100,000	\$150,000
Mfg. Non-Durables	58	4.7%	\$126,059	\$72,000	\$92,000	\$109,635	\$151,000	\$220,000
Service For Profit	27	2.2%	\$90,817	\$42,000	\$70,000	\$92,000	\$103,000	\$159,564
Service Not For Profit	114	9.2%	\$97,518	\$63,000	\$78,267	\$94,001	\$114,500	\$140,688
Utilities	167	13.4%	\$122,992	\$70,000	\$86,840	\$115,729	\$143,000	\$208,000
Educational Services	38	3.1%	\$127,808	\$49,950	\$96,000	\$107,724	\$180,000	\$199,690
Agriculture/Forestry	23	1.8%	\$89,601	\$52,000	\$65,000	\$73,000	\$107,000	\$193,000
Other	41	3.3%	\$88,787	\$50,000	\$70,000	\$90,000	\$105,000	\$144,000

Annual Salary by Degree

	COUNT	COLUMN N %	MEAN	PERCENTILE 05	PERCENTILE 25	MEDIAN	PERCENTILE 75	PERCENTILE 95
Public Sector	395	100.0%	\$109,040	\$66,000	\$80,511	\$100,000	\$128,000	\$185,000
Private Sector	840	100.0%	\$107,712	\$58,000	\$75,000	\$97,730	\$131,150	\$190,391

Total Salary (full-time positions)

	COUNT	COLUMN N %	MEAN	PERCENTILE 05	PERCENTILE 25	MEDIAN	PERCENTILE 75	PERCENTILE 95
Base Salary	1,245	96.3%	\$108,008	\$60,000	\$77,000	\$98,022	\$130,000	\$187,000
Salary incl. bonus			\$131,743	\$62,500	\$82,000	\$111,692	\$159,200	\$270,000

Salary Changes (full-time positions)

	MEDIAN SALARY	% INCREASE	MEAN SALARY	% INCREASE
1995	\$56,400	3.52%	\$59,142	4.30%
1997	\$60,000	6.38%	\$62,266	5.28%
1999	\$62,500	4.17%	\$65,401	5.03%
2001	\$66,000	5.60%	\$68,877	5.31%
2003	\$68,800	4.24%	\$71,210	3.39%
2005	\$71,008	3.21%	\$73,607	3.37%
2007	\$74,000	4.21%	\$77,374	5.12%
2008	\$76,352	3.18%	\$83,025	7.30%
2009	\$80,000	4.78%	\$86,908	4.68%
2010	\$82,950	3.69%	\$91,548	5.34%
2011	\$84,224	1.54%	\$91,154	-0.43%
2012	\$89,472	6.23%	\$96,219	5.56%
2013	\$90,000	0.59%	\$98,030	1.88%
2014	\$94,500	5.00%	\$102,475	4.53%
2015	\$97,000	2.65%	\$105,111	2.57%
2016	\$96,000	-1.03%	\$104,628	-0.46%
2017	\$97,000	1.04%	\$107,130	2.39%
2018	\$96,485	-0.53%	\$104,743	-2.23%
2019	\$97,500	1.05%	\$107,287	2.43
2020	\$99,265	1.81%	\$107,298	0.
2020	\$98,022	-1.25%	\$108,000	0.65%

Regression Analysis

A lasso regression model was used to establish a framework for predicting salaries for engineers and geoscientists working in different industries.

This process was used to:

- Identify how closely factors are associated with salaries
- Identify Boolean components (such as receipt of professional designation) influencing salary
- Create a linear formula that effectively predicts salaries while minimizing model overfitting

The model explains about 57 per cent (57.2%) of variance in salary. A formula was produced which members of APEGS can easily use to estimate their salary.

FACTOR	COEFFICIENT
(Constant)	\$38,669.09
Duties (A)	\$81.88
Education (B)	\$8.57
Experience (C)	\$289.46
Recommendations (D)	\$109.94
Supervision Received (E)	\$90.93
Leadership (F)	\$119.62
Supervision Scope (G)	\$934.95
Professional Designation(s)	\$12,604.65

Formula for expected salary (SE) without bonus:

To calculate the approximate projected salary, input the points for each variable in the following formula:

$$SE = 38,669 + 82*A + 9*B + 289*C + 110*D + 91*E + 120*F + 935*G$$

Add 12,605 if you have acquired professional status within your field (P.Eng. or P.Geo.)

Continuing Professional Development

The Continuing Professional Development (CPD) Program requires APEGS members to complete ongoing professional development activities to maintain and improve their competence. It encourages members to engage in lifelong learning to protect public health, safety, and welfare. The program provides tools for members to assess their current skills, knowledge, and abilities, determine activities to maintain or enhance them and report completed activities online to APEGS as professional development credits. For more information, navigate to the CPD menu at apegs.ca.

Professional Development Opportunities

Get to the Point!

A Technical Writing Course for Professionals

Six online courses to begin Sept. 13, 2021.

Writing Proposals and RFPs Course

Four online courses to begin Nov. 15, 2021.

2021 Fall Professional Development Days

A variety of courses will be offered. Stay tuned for more details. For additional professional development opportunities, refer to the back cover of this magazine or visit apegs.ca.

Online Ethics Modules Available

APEGS has free one-hour online ethics modules available to assist members in obtaining their ethics credit for the year.

The modules are optional, not mandatory.

Topics are:

Module 1 - Professionalism and Ethics

Module 2 - Conflict of Interest

Module 3 - Investigation and Discipline

For more information and to access the modules, visit the CPD menu at apegs.ca.

Indigenous Awareness Training



This fall, APEGS is introducing 4 Seasons of Reconciliation in partnership with the First Nations University of Canada. This online course provides an education in line with the Truth and Reconciliation Commission's 94 Calls to Action. The intent is to promote a renewed relationship between Indigenous Peoples and Canadian settlers through transformative multimedia learning.

More information is forthcoming.



4 Seasons of Reconciliation

Unable to Meet CPD Requirements?

If extenuating circumstances make it difficult for you to obtain your CPD requirements for the year, you can apply to have your requirements reduced through a CPD variation application.

Just download and complete a CPD variation application from the CPD section of apegs.ca and email it to cpd@apegs.ca on or before Sept. 30, 2021.

Applications received after this date will not be accepted.

For more information, refer to Section 5 of the CPD program document at apegs.ca under the CPD menu.

If you are unable to meet your 2021 CPD requirements and have missed the variation application deadline, you must submit a CPD remediation plan.

For more information, refer to Section 6 of the CPD program document at apegs.ca under the CPD menu.

Update: 2020 CPD Reporting Compliance Review Results

At the completion of the 2020 CPD reporting compliance review, 429 members received an administrative suspension of their licence from the Registrar. As of June 4, 2021, 51 of those members have had their licences reinstated.

As a reminder, an APEGS member who has received an administrative suspension is not licensed to take

professional engineering or professional geoscience responsibility for any projects located in Saskatchewan. To determine if a member is under an administrative suspension, refer to the online register at apegs.ca.

Reminder: CPD Program Changes

Council approved amendments to the Continuing Professional Development (CPD) Program at its March 26, 2021 meeting. These changes and updates were made based on feedback received from members and lessons learned from the past year to make requirements clearer for the benefit of the members. Visit the CPD tab at apegs.ca for the current document. Below is a summary of the changes.

SECTION	CHANGE
Section 1.2 – Applicability	Temporary Licensees are not required to participate in the CPD Program.
Section 2.3 – CPD Plan	CPD Plans are required to contain the following information, at a minimum: Member name, Job title, Scope of Practice description and a list of learning activities planned for the year.
Section 3.2.4 – Presentations (CPD Activity Category)	Completion of Presentation activities must be verifiable.
Section 3.2.6 – Contribution to Knowledge (CPD Activity Category)	Verifiable evidence may be requested for activities claimed under this category. See Section 3.2.6 for a complete list.
Section 3.3 – Annual Ethics Component	Once the annual ethics training has been completed, members must check the “Ethics Training” checkbox online and then record the hours spent on ethics training under the Formal Activity category.
Table 5: Annual Reporting Requirements	Members are only able to report to APEGS using the “Reporting Elsewhere” option if they are also reporting their CPD information to another Canadian engineering or geoscience regulator. Members must also disclose their member ID number from that regulator to APEGS.
Section 4.6 – Credit Requirements for Waiver Holders	<div style="display: flex; align-items: center;"> <div style="background-color: #004a7c; color: white; padding: 2px 5px; font-size: 0.8em; margin-right: 5px;">Attention: licence waiver holders</div> <div>Members who hold a licence waiver for the entire year require a minimum of 30 credits annually obtained outside of professional practice including one hour of verifiable ethics training, which shall be claimed under Formal Activity as part of the 30 credits.</div> </div>
Table 6:	CPD credit requirements for new members have been adjusted. Please refer to Table 6 in the CPD Program Document for full details.
Section 5.2 – Application for a Variation	Logic for calculating how many credits are required for a CPD Variation application has been added.
Section 5.3 – Approval of a CPD Variation	If the CPDCC assigns an alternate variation or contract and requires the member to provide written acknowledgment of the new conditions, the member must return the agreement letter to APEGS within 30 days or the variation expires, and the original program requirements are reassigned. The member must submit a new variation request if they require their file to be reassessed.
Section 6.2 – Remediation Plan Initiation	If the member is the initiator of the Remediation Plan, the Plan and the member’s detailed record of their CPD activities for the deficient year must be submitted to the CPDCC for consideration.
Section 7.3.1 – Annual CPD Assurance Review Process	At a minimum, the Assurance Review will require members to submit the following: <ul style="list-style-type: none"> • CPD Plans for the requested period; • Detailed CPD activity records; • Verification records for Formal Activity, Presentations and Contribution to Knowledge activities claimed; and • Verification records for the annual ethics training.



Grants for Members

Through the University of Saskatchewan and University of Regina, APEGS offers six merit-based grants of \$7,500 each to encourage existing APEGS members to further their education.

This year, there were three applications. The following APEGS members received grants:

Dustin Unger, P.Eng.

Hadi Ramin, Engineer-in-Training

Shahab Minaei, Engineer-in-Training

Eligibility Requirements

Members returning to post-graduation studies at either university in the field of engineering or geoscience or for an MBA program are eligible to apply. Applicants are evaluated in the following areas:

- Accomplishments in the practice of professional engineering or professional geoscience that indicates exceptional potential.

- Demonstration of leadership, volunteerism and community involvement.
- Service to the professions in public education, understanding the role of professionals in society and/or active participation in engineering/geoscience associations, societies and institutes.
- Reasons for pursuing the post-graduate degree, goals, personal statement and how their studies will contribute to the professions.

How to Apply

Applications may be sent to APEGS any time throughout the year. Applications received by Dec. 31 of each year are considered and awarded early the following year with presentations made at APEGS' annual awards banquet, typically in early May of each year. Visit apegs.ca for the application form and more information.

APEGS Scholarships and Bursaries

2021 Recipients

Annually, APEGS offers a total of 18 scholarships and entrance bursaries awarded at the University of Regina and University of Saskatchewan. APEGS congratulates the recipients for this year:

	AWARD TYPE	FIELD	RECIPIENT	
University of Regina	Scholarship	Engineering	Bailey Armstrong	
			Avery Cameron	
			Chiagoziem Imegwu	
			Tegan Flegg	
	Not awarded	Geoscience	Not awarded	
			Not awarded	
	Bursary	Engineering	Not awarded	
			Not awarded	
		Not awarded	Geoscience	Not awarded
				Not awarded
University of Saskatchewan	Scholarship	Engineering	Ivy Lei	
			Isaac Walsh	
			Husna Rahman Audhora	
		Libby Epoch		
		Not awarded	Geoscience	Not awarded
				Kira Ralene Gross
	Not awarded			
	Bursary	Engineering	Veronica Mason	
			Derek Beaubien	
		Not awarded	Geoscience	Not awarded
Not awarded				

Applicants Wanted

Do you know a student who is thinking about entering or already enrolled in engineering or geoscience in Saskatchewan? Encourage them to apply for an applicable APEGS scholarship or bursary noted in the table below. Refer to each university's website for more information. Cut off dates to apply vary by university, award type and field.

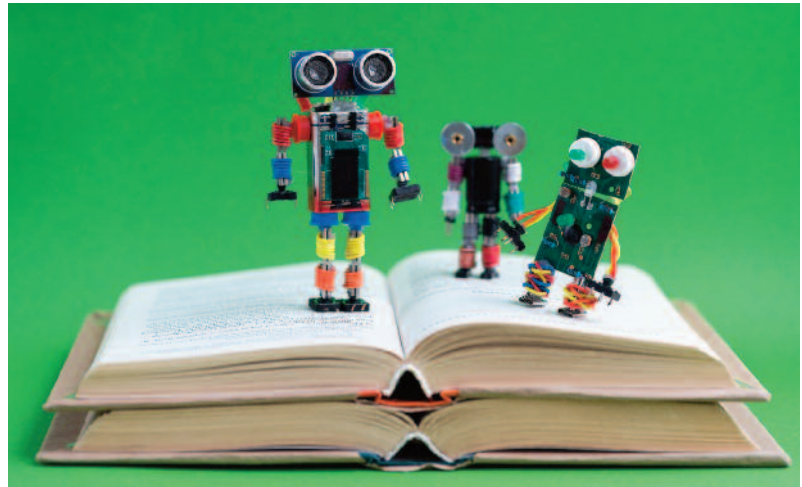
- Scholarships recognizing leadership and volunteerism among university students currently enrolled. **Six scholarships of \$1,875** (three for each university) for current students of any field of engineering. **Two scholarships of \$1,875** (one for each university) for current students of any field of geoscience.
- Scholarships aimed at female university students who are transferring their field of study to engineering or geoscience. **Two scholarships of \$3,200** (one for each university) for women in engineering. **Two scholarships of \$3,200** (one for each university) for women in geoscience.
- Bursaries aimed at encouraging and assisting high school graduates entering the study of engineering or geoscience. **Two bursaries of \$4,000** (one for each university) to be applied towards first-year tuition in any field of engineering for a self-identified indigenous student. **Two bursaries of \$4,000** (one for each university) to be applied towards first-year tuition in any field of engineering for a student of any background. **Two bursaries of \$3,000** (one for each university) to be applied towards first-year tuition in any field of geoscience for a self-identified indigenous student.

Celebrate Student Achievements

Book Prize Winners

APEGS provides gift certificates of \$300 to students with the highest academic achievement at specific points in their education to purchase books of their choice at their university bookstore.

Congratulations to the following students:



UNIVERSITY OF REGINA

FIELD	ACHIEVEMENT	RECIPIENT
Engineering	Student with the highest Grade 12 average registered in first year	Brydon Herauf
Engineering	Students with the highest average for semester 6 and 7	Electronic Systems – Ammar Alvi Environmental Systems – Quinn Legare Industrial Systems – Emily Albano Petroleum Systems – Mitchell Bentley Software Systems – Raymond Knorr
Geoscience	Most distinguished student	Steven Kisil

UNIVERSITY OF SASKATCHEWAN

FIELD	ACHIEVEMENT	RECIPIENT
Engineering	Student with the highest Grade 12 marks registered in first year	Grayden Bedford
Engineering	Students with the highest average in third year	Chemical – Louisa Selby Civil – Kathleen Morton Computer – Mackenzie Stanger Electrical – Samia Sami Engineering Physics – Remington Rohel Environmental – Taylor Szuba Geological – Emily Plews Mechanical – Evan Banadyga
Geoscience	Most distinguished student at the end of third year	Jaiden Christopher



Every year, APEGS recognizes the top graduating students in engineering and geoscience at both universities for outstanding academic achievements and leadership with a gold-plated medal and pin. Congratulations, 2021 Gold Medal recipients!

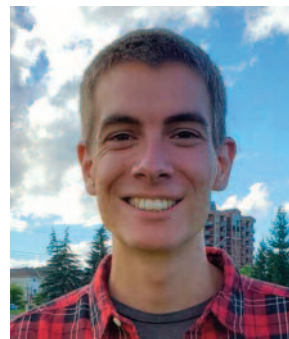
APEGS Gold Medal Recipients



FIELD	RECIPIENT
Engineering	Avery Cameron
Geoscience	Steven Kisil



FIELD	RECIPIENT
Engineering	Remington Rohel
Geoscience	Oliver Horner



APEGS Gold Medal

Spring 2021 Convocation, University of Regina

Avery Cameron

Avery is graduating with a Bachelor of Applied Science in Software Systems Engineering with Great

Distinction from the University of Regina.

Throughout university, Avery participated in extracurricular activities, such as the Baja SAE team, Cougar Racing, the Institute of Electrical and Electronic Engineering (IEEE) student branch, and in the Regina Engineering Competition. Avery also worked on Cougar Racing’s software team and helped with the creation of a telemetry software system as well as other programs in increase efficiency.

Avery completed the Co-operative Education Program and worked at SaskEnergy, SaskPower and Ciena. He currently works at Prairie Robotics, continuing the work of his Capstone project. Avery is helping to identify contaminants in recycling and hopes to contribute meaningfully to our community and help our environment.

Avery is passionate about software, learning new things and applying himself. In his spare time, Avery works on 3D modelling and various software projects and also paints and reads. He spends lots of time outside and loves photography and hiking.

Celebrate Student Achievements



APEGS Gold Medal

Spring 2021 Convocation, University of Regina

Steven Kasil

Steven Kasil graduated from the University of Regina with a degree in Geology.

From the time he was a young child, he was intrigued by the different landscapes and would collect rocks that piqued his interest. While in high school, he had the opportunity to tour Mount Vesuvius in Pompeii with a volcanologist. After this tour, he decided he wanted to pursue a degree in Geology.

He has taken many classes in Geology that he found interesting with his favourites being Igneous Petrology and Geochemistry.

He feels fortunate to have had the opportunity to work with a few professional geologists on prospecting, core logging, and data management. He helped them with their professional projects, all while receiving hands-on experience he could apply to his future classes. He can now describe and explain geologic processes and is very eager to start his career as a geologist.



APEGS Gold Medal

Spring 2021 Convocation, University of Saskatchewan

Remington Rohel

Remington Rohel grew up on a farm near Annaheim, Sask. He had an aptitude for

math and physics, which led him to the engineering physics program. In university, he discovered computer science and decided to pursue a degree in it as well.

Remington graduated from the University of Saskatchewan with a B.Sc. in Engineering Physics and a dual degree in Computer Science.

Remington joined the University of Saskatchewan Space Team and was a member and lead of the software team for the RADSAT-SK project.

In the summer of 2020, he worked as a research assistant in the Institute of Space and Atmospheric Studies (ISAS) in the Physics department studying ozone profiles in the atmosphere.

Remington now works for the SuperDARN group in ISAS, assisting in the operations and development of radars used to study the ionosphere.



APEGS Gold Medal

Spring 2021 Convocation, University of Saskatchewan

Oliver Horner

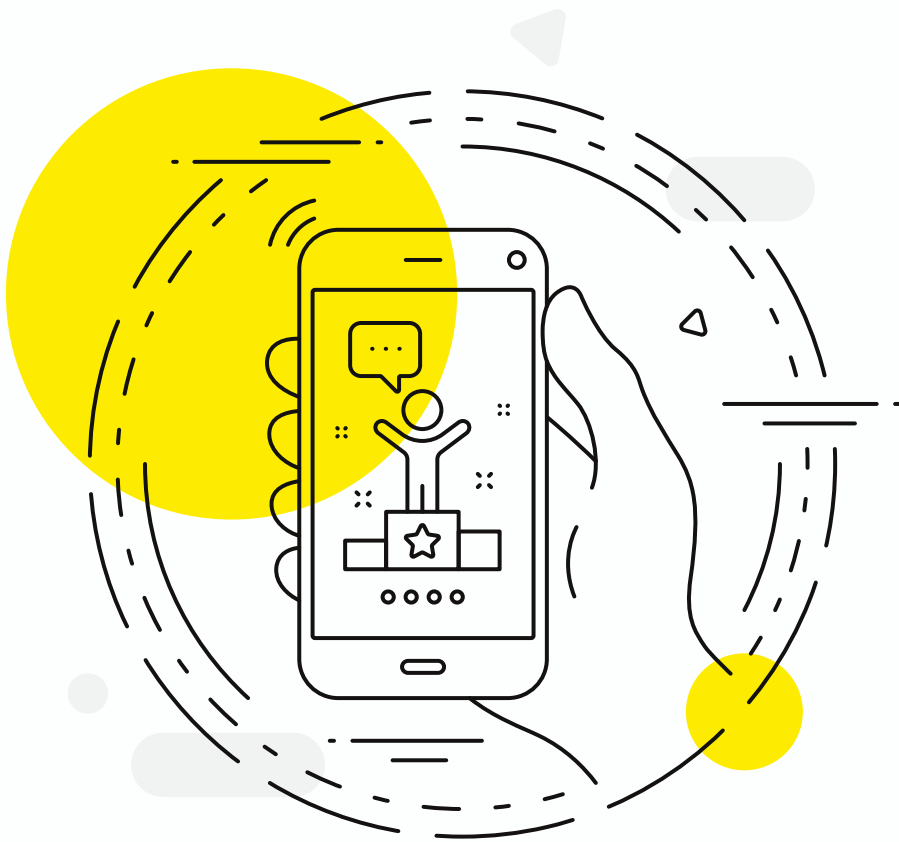
Oliver Horner studied Geoscience at the University of Saskatchewan.

He has worked to develop his network while promoting the reputation of the U of S. He did this by participating in field schools, holding leadership roles in student-run organizations and gaining experience in research, mining and oil and gas during a 24-month internship. He also did conference trips.

The lifelong friends he made through his academic career surpass all those experiences. Thanks to the University of Saskatchewan, Oliver is committed to continually reimagining the way we look at the world.

After graduation, Oliver plans on completing his Chartered Financial Analyst designation and developing his Professional Geoscientist standing with APEGS at a company that will effectively complement his skills and aspiration.

Call for Award Nominations



APEGS members do great work that benefits everyone in the province.

Let's celebrate what we do!

The Awards Committee is seeking nominations for the APEGS Awards as well as other provincial and national awards. If you have a friend, colleague, employee or client who has done something outstanding, this year or over the course of their career, please make sure we hear about it.

You can even nominate yourself!

Our awards recognize both APEGS members and non-members who have made special contributions to the professions.

There are seven APEGS awards:

- Brian Eckel Distinguished Service Award
- Outstanding Achievement Award
- McCannel Award
- Exceptional Engineering/Geoscience Project Award
- Environmental Excellence Award
- Promising Member Award
- Friend of the Professions Service Award

The nomination process is quick and easy!

You can do it online at apegs.ca under Members/APEGS Awards.

You can also send nominations to:

APEGS Awards Committee
Email: apegs@apegs.ca

The due date for nominations for 2021 is Nov. 30, 2021.

CONSTRUCTION MONITORING SYSTEMS

SALES, RENTALS, SERVICE AND TRAINING



GEOTECHNICAL INSTRUMENTATION

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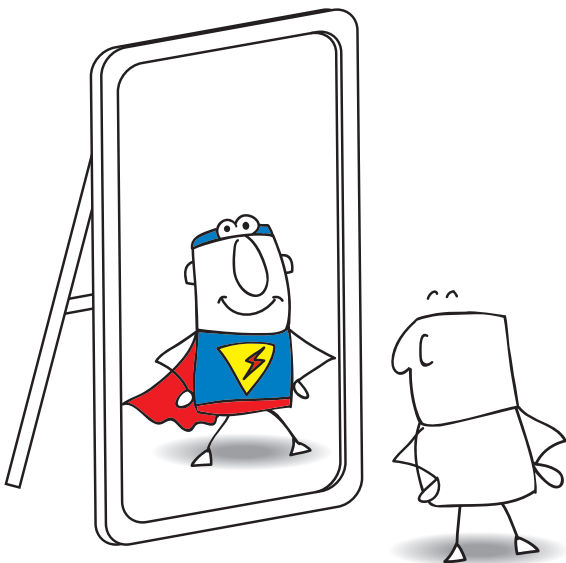
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Something worthy of acknowledgment?

The January-February issue of *The Professional Edge* is all about you!



Our annual Profiles in Achievement issue will profile Saskatchewan-based engineering and geoscience companies and projects.

If you want your company or project profiled or would like to recommend one, let us know.

Please contact: Sheena August, APEGS
Manager of Communications:
saugust@apegs.ca.

Celebrating Our Own



Photo: David Stobbe

City of Saskatoon wastewater treatment plant manager Mike Sadowski, P.Eng., (right), with USask toxicologist Markus Brinkmann (left), holds up a wastewater sampling device in February 2020.

Saskatoon honoured for wastewater projects

Yorkton This Week with additional information from *CBC Saskatchewan - The University of Saskatchewan (USask)* and the City of Saskatoon have been honoured for their collaborative wastewater monitoring project that advances environmental and human health - one of 50 international projects named to the 2021 Smart 50 list.

Smart 50 Awards recognize global “smart cities” projects, honouring “the most innovative and influential work.”

The award will be presented at the Smart 50 Awards gala in Washington, D.C., in October.

The award highlights the work of a joint project, funded by the Research Junction partnership between the City and USask, that measured levels of human pharmaceuticals such as antibiotics in Saskatoon’s wastewater to assess potential risks these chemicals might pose to the downstream environment.

When the COVID-19 pandemic hit in 2020, the partnership took an unexpected turn: USask researchers, together with the City of Saskatoon and the Saskatchewan Health Authority, began measuring traces of SARS-CoV-2, the virus causing COVID-19, in Saskatoon’s wastewater.

Trace amounts of virus in wastewater is a leading indicator of impending surges in case numbers. By gathering this information, the team and its partners have been able to alert authorities to upcoming trends in COVID-19 cases.

This project, initially funded by the Global Water Futures program and later awarded funding by the Public Health Agency of Canada, was also part of the award application.

“Working directly with City staff ensures that our wastewater research tackles some of the most immediate needs of municipalities today - from predicting virus trends to understanding potential environmental risks associated with trace contaminants such as pharmaceuticals in wastewater,” said toxicologist Markus Brinkmann, USask principal investigator on the Research Junction project and a faculty member in the School of Environment and Sustainability.

“This partnership is in line with our aspiration to become the university the world needs.”

Brinkmann said the public’s response to information from wastewater testing is just as important as the testing itself.

When his group puts out information to warn the public, “we did actually see the community responding.”

He says he got about 20 emails from families making changes, such as pulling their kids out of hockey practice.

“One of the biggest advantages is that the community gets a feel for what is happening and they can respond to it. Oftentimes COVID-19 is one of those risks that is really hard to comprehend, especially if case numbers are low. The raw data can provide another source of information there.”

“I really think the [territorial] response to this new information is spot on.”

Mike Sadowski, P.Eng., manager of the City of Saskatoon’s Wastewater Treatment Plant, is the city’s principal investigator on the project.

The awards are sponsored by Smart Cities Connect, Smart Cities Connect Foundation, and US Ignite – organizations committed to seeing technology used to improve the quality of life for residents at the municipal level.

The list includes honourees from around the globe, including two others from Canada: Vaughn and Kitchener, Ont.

News Beyond Our Borders



Forbes

Six trends driving AEC industry

Forbes - Here are six trends driving the architecture, engineering and construction industries (AEC).

1. Digital twins

A digital twin is a digital representation of a physical asset, process or system, as well as the engineering information that allows us to understand and model its performance.

Digital twins help stakeholders to visualize what a project will look like before it is built.

2. Artificial intelligence

Artificial intelligence (AI) is being used in engineering software for generative design, material selection and robotic process automation (RPA).

AI is also being applied to materials selection and code compliance, even traffic and pedestrian flows. Additionally, RPA software enables bots to automate administrative tasks, such as verifying change orders or managing bills of materials.

3. Sustainability

There are green rooftops and green alleys which are paved with permeable concrete made from recycled materials that allow stormwater to soak into the ground.

Other new materials are biometric concrete — concrete with bacteria mixed into it. The bacteria is activated by water and produces calcite, a component of limestone, that completely fills the crack and acts as a self-healing concrete.

Engineers are also experimenting with sidewalks that generate power based on the pressure of foot traffic and much more.

4. Resilient systems

Climate change has also driven a requirement for resilient or redundant systems. Climate change makes severe weather events much more likely, which increases the risk of flooding and wind damage. People now understand they need a backup plan: systems that will still work in the event of a major weather event.

5. Big data

The use of Internet of Things (IoT) sensors is producing massive amounts of data. Coupled with the growth of 5G networks, collecting data from the sensors has become much easier.

Owners of infrastructure and government municipalities will soon be able collect information from assets in near-real time, compare them with digital twins and flag when things are off.

6. The changing nature of engineering

As projects and systems become more complicated, engineers work on multidisciplinary teams where members are geographically dispersed and in different time zones.

Therefore, they have to be familiar with collaboration tools, working in a virtual environment and reviewing design and construction remotely.

Engineering organizations adopting these technologies are seeing improved results while lowering costs, increasing safety and increasing their return on investment.



<https://sustainabilityreport.com/>

Suncor, Atco partner

Canadian Mining Journal - Suncor Energy and Atco Ltd. are partnering on what could be world-scale, clean hydrogen production near Fort Saskatchewan, Alta.

The project has the potential to reduce carbon dioxide emissions in the province by more than two million tonnes per year.

The plant would produce more than 300,000 tonnes of clean hydrogen per year and have a carbon dioxide capture component. It would generate economic activity and jobs, and make a sizable contribution toward Canada's net zero ambitions by 2050.

The project is currently in the early stage and engineering phase.

Suncor says the use of advanced technology will capture more than 90 per cent of the emissions generated in the hydrogen production process.

About 65 per cent of the hydrogen would be used at the company's Edmonton oil refinery in the refining process and cogeneration of steam and electricity. Its use will cut refinery emissions by up to 60 per cent.

Twenty per cent of the clean hydrogen could be used in the Alberta natural gas grid to further reduce emissions. The balance would be available to other industrial, municipal and commercial transport users in the province. The hydrogen plant could be operational as early as 2028, provided it has the required regulatory and fiscal support to make it economic. Suncor would most likely build and operate the plant.



Canada invests in mining literacy for young

Philippine Canadian Inquirer - The federal government recently announced \$22,500 for the Canadian Institute of Mining, Metallurgy and Petroleum (CIM).

CIM is working with Science North to create an educational digital game to promote mineral literacy among young Canadians and encourage future participation in the industry.

The second phase of the project will design and develop a pan-Canadian, multi-media mining exhibit called Our Earth's Riches. CIM and Science North are each contributing an additional \$500,000.

Closing the STEM gender gap

West Virginia News - The number of women entering the professional fields of science, technology, engineering, and mathematics (STEM) is slowly growing around the world, but there is still a sizable gender gap in these professions.

A paper published in *Psychological Science* noted that women who live in countries with traditionally higher gender inequality tend to choose STEM professions more readily.

Algeria, for example, has one of the highest ratios of women in STEM professions, at 41 per cent. The paper surmises that women in these countries may be choosing careers with the strongest path to financial independence.



Prairie provinces renewables expansion in Canada

Electrical Business - The Prairie provinces will lead Canada's growth in renewable energy capacity over the next three years, according to a new report by the Canada Energy Regulator (CER).

"When people think about the Prairies, many of them think about fossil fuels. Interestingly, our projections show they are actually now leading the way in renewable energy growth, while national levels will slow in the next three years," said Darren Christie, CER.

The report *Canada's Renewable Power* says decreased reliance on coal and substantial increases in wind and solar capacity will increase the amount of renewable energy added to the grid in Alberta and Saskatchewan.

Meantime, Manitoba will "strengthen its position as a prominent hydro producer."

Canada will see gradual declines in overall carbon emissions from electricity generation largely due to Saskatchewan, Alberta, Nova Scotia and New Brunswick replacing coal with renewables and natural gas.

The pace of growth beyond 2023 in renewable power will depend on technological developments, consumer preferences, and government policies and programs, adds CER.

Report highlights:

- Wind capacity in Saskatchewan is projected to triple, and nearly double in Alberta between 2020 and 2023.
- Significant solar capacity growth is also projected, with Alberta adding 1200 MW by 2023.
- In Alberta, the share of renewables in the capacity mix is expected to increase from 16 per cent in 2017 to 26 per cent by 2023.
- Saskatchewan's renewable share of capacity is expected to increase from 25 per cent in 2018 to 33 per cent in 2023.

<https://www.pv-magazine.com/>

www.gamasutra.com

North Dakota a ‘geological jackpot’ for carbon storage

North Dakota KX News - North Dakota is a “geological jackpot” when it comes to the promise of carbon capture and storage, according to Gov. Doug Burgum.

Burgum addressed the Williston Basin Petroleum Conference in Bismarck. He challenged the industry to help make North Dakota a carbon-neutral state by the end of the decade.

Burgum said North Dakota has a storage capacity for 250 billion tons of carbon dioxide – nearly 50 times the United States’ annual energy-related carbon dioxide output.

He noted out-of-state ethanol companies have already expressed interest in storing CO₂ in North Dakota.

North Dakota’s daily oil production has stayed at over 1 million barrels a day since July 2020 and the state remains the nation’s No. 2 oil producer.

IEEE Volunteer STEM Portal go-to resource

TryEngineering.org - Institute of Electrical and Electronics Engineers’s (IEEE) TryEngineering.org Volunteer STEM Portal is the go-to resource for IEEE volunteers and student branches, chapters, sections and technical societies and councils.

It allows access to a searchable library of STEM programs developed by IEEE members.

The portal includes how-to resources and best practices to make it easier to develop and implement STEM outreach programs.

Engineers Canada appoints President

Engineers Canada - Engineers Canada is pleased to welcome Danny Chui, FEC, P.Eng., as President for the 2021–2022 term.

In the coming year, Chui and the Engineers Canada Board will work with the engineering regulators to advance Canadian engineering through national collaboration.

Prior to retiring, Chui worked for over 30 years in the capacity of Manager, Capital Works Department with the Board of Governors of Exhibition Place, City of Toronto.

Engineers Canada is also pleased to welcome Saskatchewan’s Stormy Holmes, FEC, FGC, (Hon.), P.Eng., as a Director to the Board.

Real-time measuring of tailings clay content may optimize reclamation processes

Mining.com - The Saskatchewan Research Council, Suncor Energy and the Northern Alberta Institute of Technology are working on a \$2.29-million project aimed at developing a technology to provide near real-time measurements of the active clay content in oil sands and mine tailings.

Once completed, the made-in-Canada technology is expected



www.nrdc.org

to help mining operators reduce tailings deposit footprints and minimize land disturbance, resulting in a faster path to reclamation and a smaller overall footprint of mining.

The real-time measurements of clay concentrations proposed by the researchers working in Saskatchewan and Alberta promise to help in limiting the use of treatment solutions based on strong chemicals that modify clay properties to accelerate dewatering and consolidation.

Called a “clay analyzer,” the system is based on the methylene blue index method that allows for in-field clay measurement, as the dye can help determine key properties such as particle size, mineral type, surface area, cation exchange capacity, plasticity and flow behaviour.

This can result in saving in operation costs and reduce tailing deposit footprints.

Ground-penetrating technology used to locate unmarked graves

Globe and Mail - Working at the site of the former residential school on the Muskowekwan First Nation in Saskatchewan in 2018, Dr. Terence Clark watched the screen display on his ground-penetrating radar, noting the size of the disruptions, their shape and distance under the ground, until he could say with certainty what those in the community had known all along: There were children buried on that hill.

The team at Muskowekwan located 35 gravesites before the project was paused for additional government funding.

The use of ground-penetrating radar (GPR) to locate remains of children on residential school sites has been going on around the country for several years, often spearheaded by university teams such as Dr. Clark’s, as well as others from the University of Alberta, UBC, Lakehead and Simon Fraser.

Ground-penetrating radar is increasingly being seen as an effective tool to locate unmarked gravesites, such as those believed to be present around Canada’s residential schools.

GPR equipment was developed for geophysical exploration, such as mining.



Madiha Salman

Woman killed was an environmental engineer

The Canadian Press – A woman killed in an anti-Muslim attack in London, Ont. June 6 was a “sparkling, generous, loving person” who overcame the odds to become a successful environmental engineer, said her professor at Western University.

Madiha Salman, 44, and her family were out for an evening stroll when they were run down by a pickup truck in what police have called a hate crime.

Salman, her 46-year-old husband Salman Afzaal, their 15-year-old daughter Yumna Salman and her 74-year-old mother were killed in the attack. The couple’s nine-year-old son, Fayez, was seriously injured.

Western University professor Jason Gerhard supervised Salman’s master’s degree in environmental science.

“She worked in environmental engineering, raised a beautiful family and contributed strongly to her professional and community networks.”

He said Salman obtained her bachelor’s degree in civil engineering in Pakistan, the only woman in a class of 174 students.

“And the male teachers would never let her ask any questions or answer any of her questions,” Gerhard recalled his student telling him.

Gerhard said Salman helped advance a soil-cleaning technology known as STAR that he invented a decade ago, finding that vegetable oil could be used with the technology to effectively clean decades-old toxins from soil.

“Her innovation has been highly promoted by Savron, the company moving STAR from the university and into the marketplace, and making cleanup happen at real sites around the world,” he said.

Using drones to lower risk of catastrophic flooding

The Conversation - Early in the morning on Dec. 13, 1941, the citizens of Huaraz, Peru, heard a terrifying rumble echo across the valley. Within minutes, a torrent of water, ice and rocks poured over the city, destroying a third of it and killing at least 2,000 people.

The natural dam of rocks and loose sediment that had held back Lake Palcacocha had failed. Eighty years later, its collapse remains one of Peru’s most tragic natural disasters.

This type of catastrophic event is known as a glacial lake outburst flood. Glacial lakes are often dammed by glacial



moraines that can reach heights of over 100 metres. They are impressive, but they are often unstable.

Heavy rainfall and rock, snow or ice avalanches can raise water levels in moraine-dammed glacial lakes, generating waves that overtop the moraine dam or cause it to collapse, releasing huge amounts of water.

Geological engineering models use variables such as the size and volume of the lake, height, width and slope of the moraine dam, and channel and valley dimensions to estimate the stability of the moraine dam and the risk of flood.

Unfortunately, these models don’t include much information about the composition of the moraine dam, which can vary significantly depending on its location and mode of formation.

A collaboration between McMaster University and Peru’s National Institute for Research on Glaciers and Mountain Ecosystems focuses on establishing the origin of these moraine dams and the physical characteristics of the dams and the lakes they hold back.

The research will enhance the reliability of predictive models to identify potential glacial lake flood hazards. It will also identify areas where remediation work, such as the building of additional outlet channels or armoured barriers, is most needed to strengthen the moraine.

This will be particularly important as glaciers melt more quickly, the volume of water held by these natural moraine dams builds, and the destructive power of floods continues to increase.

A recent study by researchers at the University of Calgary showed that the volume of water in glacial lakes has increased by 50 per cent globally since 1990.

Since the beginning of the 19th century, an estimated 165 moraine-dammed glacial lake outburst floods have occurred. In addition, approximately 12,000 deaths worldwide can be attributed directly to glacier floods.

The research in Peru will provide new insights into moraine dam stability that can be applied to other regions, such as Bolivia, the Himalayas and the Canadian Rockies, which are also experiencing an increased risk of glacial lake outburst floods as climate warming continues to melt glaciers.

News From the Field



<https://stoneandarrow.ca>

Indigenous Consulting partnership created in Saskatchewan

Stantec - Stantec has partnered with FHQ Developments (File Hills Qu'Appelle Developments) to create Stone and Arrow Consulting.

The newly formed partnership will create opportunities for both organizations to explore engineering and design work across Saskatchewan.

FHQ Developments is the Investment and Economic Development Corporation for the File Hills Qu'Appelle Tribal Council and is owned by the 11 Nations including Nekanee, Piapot, Muscowpetung, Pasqua, Wood Mountain, Standing Buffalo, Carry the Kettle, Star Blanket, Peepeekisis, Little Black Bear and Okanese.

The Nations ownership represents over 16,000 citizens throughout southern Saskatchewan within the Treaty 4 territory.

“This is the beginning of a partnership that will bring new capacity, equity and impact for our Nations of the File Hills Qu'Appelle Tribal Council as we begin growing this business throughout Saskatchewan and beyond,” says Thomas Benjoe, President & CEO of FHQ Developments.

“We are excited to be able to offer our customers a new diverse set of services across multiple industries including mining, oil and gas, energy, construction, infrastructure and consulting.”

Stantec shares the company's technical capabilities with the partner's local knowledge and experience. Indigenous partnerships require an understanding of culture, community values and a commitment to fostering mutually beneficial relationships, which includes knowledge transfers.

TECHNOLOGY



www.investopedia.com

Saskatchewan key for green energy world

CKRM - Saskatchewan has the resources for producing the technology needed in a green energy world.

Gary Delaney, P.Geol., FGC, Chief Geologist of the Saskatchewan Geological Survey with the Ministry of Energy and Resources, says the province has 22 of the 31 critical minerals on Canada's list.

He explains the list includes metals and non-metals considered vital for new technologies, which may be at risk due to supply issues.

Delaney says increasing global demand for critical minerals presents opportunities for growth.

One of the sectors showing great promise in Saskatchewan is rare earth elements, or REE.

The Saskatchewan Research Council's Rare Earth Elements Processing Facility in Saskatoon is slated to open in the fall of next year.

Vice-President of the SRC's REE division, Muhammad Imran, P.Eng., says the elements are used in technology such as batteries, wind turbines and electric cars.

He says rare earth ore prices have increased by 250 per cent and rare earth product prices have doubled.

Pre-feasibility study looking to progress CO₂ capture

Globe Newswire - Amplifying the impact of emission reductions through carbon capture and storage (CCS) is the focus of a new pre-feasibility study exploring the potential application of carbon dioxide (CO₂) capture on 750-megawatt coal-fired power plants.

This project is part of a broad study examining the viability of a regional commercial-scale geologic CO₂ storage hub in the Southeastern U.S.

The International CCS Knowledge Centre (Knowledge Centre), based in Regina, is collaborating with an international team on the U.S. Department of Energy (DOE)-funded project to develop the conceptual designs and capital cost estimates evaluating the installation of post combustion carbon dioxide (CO₂) capture on a Southern Company electrical generating station.

The project would represent a significant scale-up and is a natural progression in the maturation of carbon capture technology.

By bringing leadership, vision and experience based on its substantive learnings from both the fully integrated Boundary Dam 3 CCS Facility and its comprehensive second-generation CCS study (Shand CCS Feasibility Study), the Knowledge Centre is performing the carbon capture pre-feasibility study of the scenario.

WATER



policyoptions.ipp.org

Scientists measure new depths of hydrologic cycle

University of Saskatchewan - New research could allow people to make predictions about where it might be safer to store contaminants deep underground.

“It seems every time someone scratches a new spot in the subsurface, we find life existing somewhere we didn’t think it could before and one of the key aspects to that seems to be circulating water,” said co-author Dr. Grant Ferguson, Ph.D., P.Geol., Engineering Licensee, a professor with the University of Saskatchewan College of Engineering, School of Environment and Sustainability, and Member of the Global Institute for Water Security.

The article, *Deep Meteoric Water Circulation in Earth’s Crust*, was recently published by *Geophysical Research Letters*.

The research shows that water that began as precipitation can reach depths of more than one kilometre and as deep as five kilometres over much of North America. Steep mountains have deeper circulation of meteoric water and in places where the topography is relatively flat, the circulation depth is shallower.

This research touches on geological forces from when the Rocky Mountains were bigger or when the Grand Canyon was formed, so the water is hundreds to millions of years old.

The researchers used a “fingerprinting” technology with water stable isotopes – non-radioactive forms of atoms that can be measured in water samples.

The stable isotopes told them the origins and history of the water, which they compared to the predictions they had made on the depth of circulation based on topography and the geometry of the subsurface.

\$222M rejuvenation planned

Global News – The Buffalo Pound Water Treatment Plant that provides more than 260,000 people with potable water is set to undergo rejuvenation.

Three levels of government announced just over \$222 million in funding for the rejuvenation project.

The plant is nearing the end of its lifecycle since it was last upgraded more than 30 years ago.

Officials said rejuvenating the plant will allow it to meet the region’s forecasted potable water demands in the coming decades.

Buffalo Pound Water Treatment Corp. president and CEO Ryan Johnson, P.Eng., said that includes upgrading the main treatment plant, pump stations and reservoirs.

“We’ll be touching almost all areas of the facility and at the end of the day, it will be able to get us through the next 25, 30 years.”

The plant, first commissioned in 1955, serves the cities of Regina and Moose Jaw, as well as a number of other communities.

The Buffalo Pound Water Treatment Corp., which is owned by the cities of Regina and Moose Jaw, is contributing more than \$59 million to the project and is responsible for any additional costs.

In February, Regina city council unanimously approved its portion of funding for the project.

Regina Mayor Sandra Masters said the investment will not only help propel both population and economic growth, but help the environment.

“This renewal project will enhance the facility’s environmental sustainability and implement the use of renewable energy,” Masters said.

The federal government is providing just over \$89.1 million and just over \$74.2 million is coming from the Saskatchewan government.

Construction is expected to start in 2022, with completion in 2025.

CONSTRUCTION



www.forbes.com

New construction codes act coming

Construction Links Network - The Government of Saskatchewan recently passed *The Construction Codes Act* (Bill 4) in the Legislative Assembly.

The new Act will allow better alignment between construction codes and accessibility standards, including how they are applied to buildings, ensuring people with disabilities can better access and use buildings in Saskatchewan.

The new Construction Codes Act (CCA) repeals and replaces *The Uniform Building and Accessibility Standards Act* and will come into effect on Jan. 1, 2022 and will continue to oversee how construction standards are developed, adopted and implemented in the province.

The CCA also modernizes the powers and responsibilities for building owners, local authorities, building officials and the construction industry.

\$350 million wheat straw pulp mill

Industry West - Red Leaf Pulp Ltd. has announced that Regina will be the home of its new \$350 million proprietary wheat straw-based pulp mill.

The new facility's exact location will be announced at a later date, but the Red Leaf Pulp has secured properties on Regina's west side and construction will begin in early 2022. The project will be Canada's first non-wood pulp mill.

The plant will have the capacity to produce 182,000 tonnes of market pulp annually from locally-sourced waste wheat straw, and is expected to create 110 permanent full-time jobs with 250 additional jobs created during construction of the plant.

Red Leaf Pulp selected Regina for their first facility of this kind because of its access to feedstock supply, infrastructure, utilities, access to rain and transportation and overall population.

HELIUM

Largest helium plant in Canada

MooseJawToday.com - Canada's largest helium purification



science.howstuffworks.com

plant is now operating in Saskatchewan and can produce over 50 million cubic feet per year of purified helium for commercial sale – equal to filling 400,000 party balloons a day.

The new \$32-million plant is located near Battle Creek in southwest Saskatchewan about 50 km south of Maple Creek and is owned and operated by North American Helium Inc. (NAH).

Helium is a commodity in high demand worldwide since it can be used in medical research, semiconductor manufacturing, space exploration, fibre optics and advancements in nuclear power generation.

Helium is included on both the Canadian and American lists of critical minerals, considered necessary for the modern economy and emerging technologies.

Helium prices have risen by more than 160 per cent since 2017 due to increased global demand and shortage of supply. Canada currently has the fifth-largest helium resources in the world, with significant underground reserves in Saskatchewan.

Saskatchewan is one of the few jurisdictions in the world that can support drilling dedicated helium wells rather than producing it as a byproduct of hydrocarbon production.

This makes helium production significantly more environmentally friendly in Saskatchewan than in competing jurisdictions.

With the NAH plant, there are now nine active helium wells in the province and 24 in the drilling process. The Government of Saskatchewan expects the number of helium wells will eventually surpass 100.

Helium company makes massive discovery

CTV News - Saskatoon-based helium company Royal Helium Ltd. has discovered a large amount of the element in southwestern Saskatchewan.

"The funny thing about it is, we found everything we expected to find and then we found something much bigger below it," said CEO of Royal Helium Ltd., Andrew Davidson.

The discovery happened near the Village of Climax, located about 429 kilometres south of Saskatoon.

The drilling for the project takes up 50,000 hectares of land. The company estimates there is six billion cubic-feet of helium in the prospective area.

When many people think of helium, they consider helium balloons. Davidson said there is much more use for the element.

“Microchips, semiconductors, fibre optic cables, LCD screens. All these things cannot be manufactured without helium,” he said.

Hospitals also use helium as the health-care field accounts for 20 per cent of helium’s demand in North America.

“In North America the largest use for helium is health-care,” said Davidson. “Helium is used in MRI machines to cool the magnets as they spin.”

It’s also used for rocketry, small-scale nuclear reactors and the cryptocurrency market has also found a use for it.

ENERGY



Saskatchewan Indigenous companies to explore SMR investments

Global News - Three Saskatchewan Indigenous-owned companies have signed an agreement to pursue small modular reactor (SMR) investments.

Kitsaki Management, Athabasca Basin Development and Des Nedhe Group say they are in a position to support this emerging technology from construction to operation and maintenance.

Sean Willy, CEO of Des Nedhe Group, said their companies have supported uranium mining in northern Saskatchewan since the 1980s and they want to make sure their voices are heard in this “new and exciting technology.”

“We think if you’re serious about climate change and you want to make a difference decarbonizing the power-producing aspects, small nuclear reactors is the way to go,” he told *Global News*.

“We look at this as a made-in-Canada approach because all the uranium that’s coming out of Canada is coming from northern Saskatchewan.”

Willy feels they will be able to bring an Indigenous business focus to the development and construction of SMRs, one he believes no one else can bring to the table.

The Saskatchewan government is exploring the viability of SMRs. It has signed MOUs with the governments of Alberta, Ontario and New Brunswick to collaborate on advancing SMRs as an option to provide clean energy to address climate change.

Under the proposal signed by the provinces, Saskatchewan could have the first of four grid-scale SMRs in service by 2032.

Willy said their organizations have already been consulted by the Saskatchewan government, which he commended.

“I just think it would make good business sense to work with three business entities who have the strong experience and the strong, positive history in the nuclear industry that our three groups have,” he said.

The Ministry of Environment said it is open to exploring partnerships as SMRs develop and that having Indigenous participation in the economy remains a key goal for the government.

Willy said SMRs have the potential to supply power to isolated regions of the country, not just Saskatchewan.

“As three Indigenous organizations who are highly experienced in servicing the nuclear industry, it made perfect sense for us to get together and jointly pursue exploring opportunities in this exciting and emerging industry.”

Biofuel from flax straw

Canadian Biomass – A new start-up based in Regina called Prairie Clean Energy has developed a process for turning flax straw, which is often burned or trashed, into biofuel.

There are two processes that Prairie Clean Energy is researching, in conjunction with the University of British Columbia’s Biomass and Bioenergy Research Group and the University of Saskatchewan’s engineering department.

The first process is compressing bales of flax straw.

“That’s the simplest solution for us – the farmers bale the product, typically in round bales, and deliver it to our facility where we shred, dry, re-bale and compress the product,” CEO Mark Cooper explains. The bales are then shipped to customers, and can be used in fluidized boilers or similar systems that can accommodate baled product.

Prairie Clean Energy is also exploring the possibility of pelletizing the flax straw.

So far, tests show that biofuel produced from flax straw is highly efficient.

“When properly dried, flax straw produces 8,500 BTUs per pound, and the chemical composition is fairly similar to wood,” Cooper says.

Big biodiesel investments in Sask.

Regina Leader-Post - A sudden rush of canola crush investments could add billions to Saskatchewan's economy and drive up already sky-high prices for farmers, as the province looks to cash in on a new oil boom.

That's according to producers and economic analysts who've been watching the run of good news, as four companies announce plans to expand crush capacity or build brand-new facilities in southern Saskatchewan.

John Lee, president and CEO of Economic Development Regina, said the new crushing capacity is equivalent to adding four Chinas to Saskatchewan's export market for canola seed.

Richardson International is looking to double its capacity in Yorkton. Cargill is planning a million metric tonne facility in the Regina area, while Viterra is aiming to build a massive facility able to crush 2.5 million metric tonnes per year.

The latest announcement came from Ceres Global Ag, which is spending \$350 million to crush an annual 1.1 million metric tonnes in Southern Saskatchewan.

Ceres mentioned galloping demand for vegetable oil to supply biodiesel feedstock as a factor in its investment.

According to Richard Gray, an agricultural economist at the University of Saskatchewan, the price on carbon and the wave of clean fuel standards should keep driving up demand for renewable fuels.

The United States currently relies on soybeans for about half of its biodiesel feedstock. But Gray pointed out that canola has higher oil content — and is likely to win a growing share of a growing market.

500 Sask. companies work on inactive oil well cleanup

CBC News - The Saskatchewan government says the first year of its abandoned oil well clean-up program resulted in \$184 million in contracts to 500 companies in the province.

Last May, the federal government provided \$400 million over two years to the province for its Accelerated Site Closure Program. It aims to clean up 8,000 inactive wells and create the equivalent of 2,100 full-time jobs over two years.

The first phase of the program ran until December 2020 and used \$100 million of the allotted \$400 million. The second phase started in January 2021 and runs until March 2022.

Under the program, oil companies nominate wells they want cleaned up. Then the system allocates money based on the company's share of inactive wells across the province.

The Saskatchewan Research Council contacts eligible service companies to carry out the work.

The provincial government said \$61 million has been paid for work already completed under the program, including: 1,385 well abandonments and decommissions; 237 flowline

abandonments; 13 facilities; and 2,545 site remediation and reclamation activities.

The program includes more than \$184 million in work packages to the following regions:

- Estevan - \$59,513,766.
- Swift Current - \$36,714,611.
- Kindersley - \$27,863,467.
- Lloydminster - \$60,579,289.

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Global uranium output tipped for growth

Mining.com - Worldwide uranium production will recover by 3.1 per cent to reach 51,200 tonnes in 2021 as significant mines come back online following a COVID-19 hiatus, a new analysis shows.

GlobalData expects uranium output to grow at a compound annual growth rate of 6.2 per cent between 2021 to 2025 to 62,200 tonnes.

In March 2020, Cameco's Cigar Lake mine, which accounts for 12 – 13 per cent of global production, was suspended to contain a COVID-19 outbreak. The suspension stayed until September 2020 but was later halted again in mid-December because of the increasing risks. It reopened in April 2021.

In April 2020, the Kazakhstan state-owned miner Kazatomprom, the world's largest uranium supplier, reduced activities for nearly four months at all uranium mines across the country. The pandemic also led to restrictions in other countries, including Australia, Namibia and South Africa.

There has been recent optimism surrounding the global nuclear industry, with several governments incorporating nuclear energy within their plans to reach climate goals.

For instance, the U.S. is currently evaluating extending the operating life of its nuclear power plants for up to 100 years. The plants were initially licensed for up to 40 years but can now apply for renewals for up to 20 years.

Other countries such as China, Japan and South Korea, and

the EU, all upgraded their climate change policies during 2020, indicating higher demand for nuclear power going forward – alongside higher electricity generated from sources other than coal.

Chinese nuclear buildouts may also help drive a meaningful demand increase to send uranium prices to levels that incentivise new production.

BMO Capital Markets forecasts a 15,000 tonne deficit of uranium this year, or about 18 per cent of current demand, even with the restart of Cameco's Cigar Lake mine.

Flood risk closes Canadian potash shaft

Reuters - Fertilizer producer The Mosaic Company said it would immediately cut production at its biggest potash mine due to flood risks, and restarted an idled mine to offset some of the reduction.

Mosaic's K1 and K2 mine shafts at Esterhazy have long been prone to flooding, forcing the company to continuously pump out salty water. The company is building a new shaft, K3, to eliminate the problem and its associated costs.

Mosaic decided to close the K1 and K2 shafts early when the water inflow accelerated beyond the company's pumping capacity. No workers have been injured.

Florida-based Mosaic accounts for 13 per cent of global potash production, according to Scotiabank, and also produces phosphate fertilizer.

The closure will cut Mosaic's potash production by 1 million tonnes until the company can fully ramp up production at K3 by March 2022.

It is unclear how soon Mosaic could restart its idled Colonsay, Sask. mine.

Mosaic's production cut comes as global potash prices climb, following soaring corn and soybean prices. Potash is a crop nutrient that farmers apply to increase yields.

The impact of the closure will be minimal for workers as Mosaic moves employees from the closed mine shafts to K3.

Once K3 reaches full capacity next year and Colonsay returns to service, Mosaic forecasts its annual potash production to increase by 2 million tonnes from 2020 levels.

BHP approaches final decision

Financial Times - BHP Group is set to make a final decision on Jansen, a giant Saskatchewan potash project that could cost as much as \$5.7 billion.

As the deadline approaches, BHP is talking with Nutrien about a potential partnership to make the project less risky and provide critical infrastructure.

In order to feed a growing global population from limited arable land, crop yields will have to rise and fertilizers will play a critical role.



Scotiabank forecasts that the 70-million-tonne-a-year potash market will grow at about two million tonnes a year between 2022 and 2030.

But establishing a foothold in the fertilizer industry will not be easy for BHP because of competition from established producers in Canada and eastern Europe that have sophisticated logistics networks and large reserves of potash.

BHP is expected to make a final decision on Jansen before August. It has already spent more than \$4 billion sinking two one-kilometre shafts at Jansen but it will need to spend between \$5.3 - 5.7 billion to bring the mine into production. It also needs to find access to a port.

Construction is expected to take about five years, but the mine is unlikely to reach full capacity of about 4.5 million tonnes a year until 2030.

As BHP moves closer to a decision, it reportedly started discussions with Nutrien, the world's biggest potash producer. It is not clear what form any deal would take but options could include BHP swapping a minority stake in the project for access to Nutrien's rail and port facilities.

However, a deal on Jansen is by no means certain.

Nutrien has five million tonnes of idled capacity it could restart. It is also a member of Canpotex, an OPEC-style export organization that is anathema to a free marketer such as BHP.

"Is Jansen a necessary investment for the potash industry? That's debatable," said Humphrey Knight of consultants CRU. "Outside Canada there is plenty of new capacity under development, particularly in Russia and Belarus, which is expected to come online before Jansen."

Nutrien to boost potash output

Reuters - Canadian fertilizer company Nutrien Ltd expects to increase potash production by about half a million tonnes in the second half of the year compared to earlier expectations, due to strong global demand.

As crop prices rise, farmers have greater incentive to use fertilizer and maximize yields, boosting potash demand and spurring a surge in global sales of potash fertilizer.

Calendar of Events

The 60th Conference of Metallurgists

Aug. 17-19, 2021

Virtual event

<https://com.metsoc.org/#>

2021 ACEC-SK Annual Golf Tournament

Aug. 20, 2021

Saskatoon

https://www.acec-sk.ca/events/2021_acecsk_annual_golf_tournament.html

ACEC-SK – 2021 Virtual Industry Forum with SaskPower

Aug. 26, 2021

Virtual event

https://www.acec-sk.ca/events/2021_virtual_industry_forum_with_saskpower.html

LEED Green Associate (GA) Training

On demand or live webinars on:

- Aug. 26, 2021
- Sept. 18, 2021
- Oct. 1, 2021
- Oct. 23, 2021
- November 4, 2021

<https://leadinggreen.com/online-leed-green-associate/>

Virtual GeoConvention 2021

Sept. 13-15, 2021

Virtual event

<https://geoconvention.com/>

Law & Ethics Seminar

Sept. 17-18, 2021

Regina

<https://www.apegs.ca/Portal/Pages/event-details-7/97793>

CIM - Strategic Mine Planning with New Digital Technologies, Risk Management and Mineral Value Chains

Sept. 29-Oct. 1, 2021

Montreal

<https://www.cim.org/professional-development/mcgill-professional-development-seminars/strategic-mine-planning/>

4th Biennial SMA Environmental Forum

Oct. 20, 2021

Virtual event

<https://www.eventbrite.ca/e/2021-sma-environmental-forum-tickets-159533953349>

2021 ACEC-SK Awards of Distinction

Nov. 16, 2021

Saskatoon

<https://www.acec-sk.ca/event/index.html>

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