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EDGE

ISSUE 162

MAY/JUNE 2016



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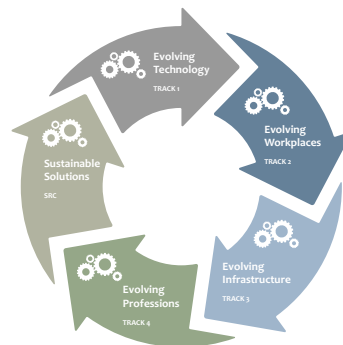
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ON THE COVER - President Tara Zrymiak, P.Eng., FEC receives the emblems of office from Past President Margaret-Anne Hodges, P.Eng., FEC

2016 Annual
Salary Survey

President's Message



And so it starts, but is it really a start? Or is it an evolution?

Although being sworn in as the APEGS president is a beginning of sorts, as I look back on my experiences with APEGS I can certainly see the evolutionary process. After moving back to Saskatchewan from Alberta I became an APEGS member in 2004 and then joined the new K-12 Committee in 2005, followed by the Experience Review Committee in 2006. As my sixth year on the K-12 Committee approached its end in 2011, I was thrilled to be nominated for and subsequently elected to Council, which also involved liaison assignments on the Awards Committee and the Connection and Involvement Committee. I also had the pleasure of chairing the Annual Meeting Planning Committee in 2013-2014. As the end of my first three-year term approached, I was looking forward to hopefully holding on to my Council position but instead I was invited to run for vice-president. It took some consideration, but I accepted the challenge, and was gratified to be elected to the position. The two years of vice-president and president-elect have been a whirlwind leading up to now – who knew evolution could happen so fast!?

APEGS itself is also going through evolutionary stages. One of the biggest changes was the welcoming of geoscientists into our fold with the resulting name change from APES to APEGS in 1997. The rapid growth in membership (from 5,400 in 2004 to over 12,400 in 2015) has necessitated a corresponding growth in staff (from 8 in 2004 to 18 in 2015). Needless to say, all these people needed more room so they were very relieved to move into the beautiful new office in Regina's Harbour Landing in 2014. The Association has also made great strides in developing and clarifying organizational objectives and strategic planning in order to ensure that we are all working towards the same goals. Some other components of growth include implementation of the licensee registration category, updating our awareness campaign, and the release of the new e-Edge. The most recent change for the organization is the retirement of Executive Director Dennis Paddock after 23 years at the head. He has left APEGS in a strong position with a number of great people, and we will continue to grow and prosper with our new leadership.

The membership of APEGS – the engineers and geoscientists who live or work in Saskatchewan – is also continuously changing, becoming more diverse both from within and from outside. We are proud of the growth so far in membership numbers of Aboriginals and women in our professions, at the same time realizing that we still have a lot of work to do. APEGS has a number of dedicated and passionate volunteers and staff working in these areas. At the same time, immigration continues to increase the number of members and potential members who were educated outside of Canada. Much work has been done and continues to be done to optimize the processes to register these competent and smart applicants, as we recognize the benefit that this diversity can bring to the professions.

The constant evolution of our professions presents itself in many forms. There are certainly more distinct disciplines than there ever have been. For engineering, no longer are the choices limited to the



President Tara Zrymiak, P.Eng., FEC presented Christine Enmark, P.Eng. (left) and Holly Annand, P.Eng. (right) with \$7500 APEGS Member Grants to further their education in post-graduate studies.

standard civil, mechanical, electrical and chemical. Prospective engineers can also choose agriculture and bioresources, computer software or hardware, environmental or various combinations of all of these in the new and growing systems engineering disciplines. Similarly, geoscience is no longer limited to geology and geophysics. One can now choose geochemistry, hydrogeology, paleontology, petroleum geology or other emerging fields. Over all of these is the new and deeper examination of how all disciplines serve the public and address new challenges to enhance the safety and prosperity of everyone in our society. At the Professional Development Luncheon at the Annual Meeting, the keynote speaker, Jesse Hirsch, made bold predictions about how engineers and geoscientists are gaining power in our world, with the move from institutional to cognitive authority in the media. It's all about literacy in the form of recognition of patterns, which is definitely in the purview of our professions.

So an evolutionary process has brought us to where we are today, but of course it doesn't stop here. I am very much looking forward to more advancement and growth over the next year. I have had the opportunity already to

see what is happening elsewhere in the country when I attended the EGM Annual Meeting in Winnipeg last fall and the Engineers Canada board meeting in Ottawa in February. There are many differences between APEGS and the other associations, but we all have the same overall goals and have much to learn from each other.

Congratulations to our new vice-president, Stormy Holmes, and our new councillors as you start on your journey. Also, welcome back to all of our returning councillors; I look forward to a wonderful year working with you all.

I want to express my sincere thanks to Dennis and Wendy Paddock for their guidance, advice and encouragement over the last few years, and I wish them good fortune in their new adventures. Similarly, I am grateful to all of the Executive Committee members over the last few years for their support and counsel – it's a huge responsibility to represent this great organization, but with their insights and assistance it will be amazing and exciting rather than terrifying. It is a wonderful experience, and I encourage all members to consider stepping into this exciting arena as an evolution in their own lives and careers.



Professional Development Luncheon Jesse Hirsh



The old saying goes:

“It’s not what you know, it’s who you know.”

According to Jesse Hirsh, it is in fact what you know and who will listen to you.

Hirsh, a respected Internet strategist and tech guru, treated guests at the APEGS Professional Development Luncheon to an abridged version of his acclaimed “Future of Authority” TED Talk.

Hirsh began by noting the way in which the notion of authority has changed over the last 30 years.

“In the days before the Internet, the media vetted authority for the public and made all the decisions about who deserved to be recognized as a credible source. Now any idiot with a Twitter account can call himself an expert.”

As Hirsh describes it, the public has largely abandoned institutional authority (for example, authority based on your university degree) and instead gravitates to cognitive authority, or authority based on apparent knowledge in an area in which the audience is interested.

“People are desperate to find those people who are able to provide some sort of coherent signal amongst the noise of the Internet. So we have seen the rise of professional video game players who produce YouTube videos of themselves playing video games. They have fans who look to them for guidance. Even the Khardashians have a certain sort of social authority that makes them experts within a certain niche.”

This new world of authority is not particularly fair. It is a world in which someone may win a case in a court of law but lose in the court of public opinion, which can inflict unfair and unethical penalties.

In this new world, communication is the key, Hirsh says.

“For engineers, this means that you must think more about how you communicate your ideas. It’s not good enough to have a degree and a P.Eng. after your name. Future authority will rest with those who can learn on the fly, adapt and communicate.”

The basis of this communication is literacy, a concept that Hirsh interprets broadly.

“It doesn’t matter whether you are talking about written language, computers or anything else. Literacy means pattern recognition. If you are literate, if you can recognize those patterns, then you have an advantage over anyone who is illiterate.”

As an example, Hirsh cited what he called the “echo chamber” of modern social media.

“No one goes on the Internet looking for people who disagree with them. They jump right over hypothesis to thesis and then go looking for those who agree.”

Social media like Facebook and Twitter have algorithms that feed these tendencies and deliver content that reinforces users’ biases.



“An algorithm is a pattern. If you have some level of social media literacy, you can see this pattern and turn it into a positive tool to deliver good, useful balanced signals. But that takes a level of sophistication that many social media users just don’t have.”

In many other cases, modern technology is imposing patterns in the form of algorithms without the awareness of the users of that technology.

“Take a look at self-driving cars. Designers are struggling with how to program their ethical algorithms. In the already-famous example, should a self-driving car make a choice that saves the driver but kills several bystanders, or the other way around? And once you’ve made that choice, who is morally and legally responsible for those deaths? It isn’t the car. It just did what it was told to do. Ultimately it’s the engineers and programmers who would be responsible.”

In another example, Hirsh described algorithms used to route 911 calls according to a computer-generated threat assessment. These assessments are often wildly inaccurate. However, there is no accountability for these errors because the companies who provide the algorithms claim that they are proprietary.

To counteract this, Hirsh recommends a greater degree of transparency with algorithms, including heightened use of open source technology.

“At least with open source, there is more multilateral discussion and sharing of best practices so that the moral responsibility is shared more broadly and collectively.”

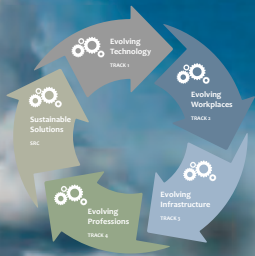
Hirsh also predicts that the rise of virtual reality (VR) and augmented reality (AR) will provide engineers and scientists with more opportunities to educate the public.

“This might sound crazy, but I predict that Minecraft, the online game, will soon replace the Internet. It’s like HTML in the 1990s. It’s a simple programming language that creates experiences in three dimensions. It is VR and AR ready.”

“It all comes back to literacy, to seeing patterns. As science professionals, you need to see beyond Minecraft as a game and see it as a tool.”

By staying ahead of the curve and mastering these tools, engineers can regain some of the ground that has been lost in recent years to self-proclaimed online experts.

“The future of authority comes down to three points: being a teacher, being a constant learner and being an excellent communicator.”



On the Front Lines Against Fire

La Ronge Area Forest Fires with Thomas Sierzycki

Fire is a terrifying force of nature, especially when it threatens communities -- like the recent forest fire in Fort McMurray, and last year's fire in La Ronge.

La Ronge Mayor Thomas Sierzycki was at the front lines of the emergency last year, and shared his mayoral account at an APEGS Annual Meeting professional development session.

The fires had been burning near the town for days, with Sierzycki and other leaders from nearby towns and First Nations meeting regularly to monitor the situation. The plan was to put in a mandatory evacuation if the fire came within 10 kilometres of the community.

Then on July 4, Sierzycki awoke to the hair-raising update that the fire had gone past that barrier overnight.

Though nowhere close to the 88,000 people evacuated from Fort McMurray, the La Ronge evacuation was the

largest in provincial history, forcing 13,000 people out of their homes.

"When you evacuate people, you know the hardship you're going to bring on to the people in the community, the businesses and the evacuation centres," Sierzycki says. "It was a pretty tough decision. We still get flack from some of residents because they didn't think they should have been evacuated."

First, the leadership needed to answer the question, "Who should stay and who should go?" Obviously anyone officially helping to fight the fires needed to stay, but there were many La Ronge citizens who wanted to stay to protect their own property.

"We had quite a few people who didn't want to leave, and RCMP had to go in and escort them out."



"We had quite a few people who didn't want to leave, and RCMP had to go in and escort them out."

This situation was made more complicated because legislation created a grey area of who would enforce the evacuation.

Moving forward, the town will be updating the emergency measures plan, reviewing the wildfire management process and reviewing legislation on who stays and who is evacuated.

Sierzycki says he's glad they pulled the pin on the evacuation when they did with the information they had, even though some people criticized them for the decision.

"If La Ronge ever has a situation again, it's going to be even more difficult to get people out because this time nothing burned."

By the time citizens started to return on July 17, a few nearby cabins had burned, but the town remained untouched. The biggest priority throughout the emergency was making sure essential services and crucial infrastructure was protected, including hospitals, the sewage plants and telecommunications, so power and water were available when everyone returned home.

Sierzycki credits good communication as part of the reason there were no major injuries, no lives lost and no damage to the town of La Ronge.

"Communication is going to be your Achilles heel," he says.

They used social media to make sure they were putting out the info people wanted to hear and needed to hear, and more importantly, the leadership stayed calm and organized throughout the emergency as they made the decisions that affected the town and surrounding communities.

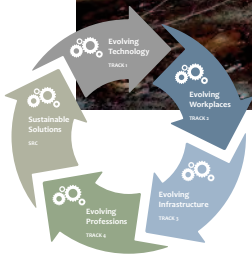
This second point is more challenging than it might appear on the surface. Sierzycki describes the situation as "A bunch of type A personalities around the table trying to do work over two weeks." They met daily, sometimes multiple times per day, and found a way to work together.

Watching the fires in Fort McMurray, Sierzycki's thoughts are with the leadership and everyone fighting the fires.

"We understand what those men and women on the front line are going to be facing in the coming weeks and the coming months."



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**“Have you ever been in a place that just gives you the willies?
You can’t quite put your finger on it but something about the place
just makes you feel unsafe?”**

Fighting Crime by Design

She doesn’t wear a cape, leap tall buildings or have super-powers, but Elisabeth Miller is a great crime fighter. Miller heads up the City of Saskatoon’s Crime Prevention Through Environmental Design (CPTED) efforts.

“Have you ever been in a place that just gives you the willies? You can’t quite put your finger on it but something about the place just makes you feel unsafe?” Miller asked the audience at her APEGGS Annual Meeting track session. Miller’s job is all about eliminating “the willies” as much as

possible from urban environments. Some factors about citizens’ feeling of security can’t be controlled – factors such as their gender, history of victimization or interpretation of cultural cues (for example, if a neighbourhood already has a reputation as a “bad part of town,” you may feel unsafe there no matter what the environmental cues).

Other factors can be controlled through a number of common-sense measures. Among the strongest of these is what Miller calls “natural surveillance” – ensuring that a space is designed in a way that anyone in the space can



see and be seen from multiple angles. An example of this would be positioning a park near apartment buildings.

Signalling – in other words signs or other cultural cues – is another way to modify behaviour.

“Here in Saskatoon, Kinsmen Park has a big sign at the entrance that says ‘Welcome to Kinsmen Park’ that tells people to act ‘parkish’ behave in a way appropriate to a public park.”

Miller also advocates establishing a sense of territory among surrounding residents. Through simple measures such as encouraging residents to get involved in planting flowers on city property, residents develop a sense of ownership and protectiveness of the space.

Some instances of CPTED do not involve crime so much as resolving misunderstandings among different user groups.

“For example, we got involved in a case of a seniors’ complex that’s in the path between a high school and a mall. Of course, the seniors’ complex had nice smooth asphalt paths so the students used it as a shortcut on their bikes and skateboards. The seniors got upset and complained. The students got defensive and reacted. Neither group was doing anything particularly wrong or offensive. In that case, we just needed to bring the students and seniors together to talk things through and understand how each other felt.”

Miller emphasized that, aside from vandalism, most crime is not random.

“People have an idea of crime as some stranger jumping

out of the shadows. In reality, most crime is committed by someone you know. Even so, if people don’t feel secure in their urban environment, it affects their quality of life.”

Miller noted a couple of cases of poor design in Saskatoon. One was a pedestrian underpass underneath a roadway.

“It’s dark, narrow and creepy looking. Once you are inside it, there are no alternatives for escape if someone blocked the ends. Would you let your child, mother or sister use this underpass unescorted?”

Another example is a common design for a bridge or road overpass that creates a natural (but again, dark and creepy) shelter for bored teens, vandals, substance abusers or homeless people.

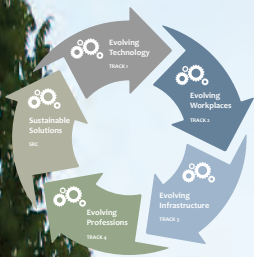
“These are things you might not think about as an engineer. You might be looking at a set of schematics and just be thinking about what sort of steel you’re going to use or what’s the most efficient way to build the structure.”

However, Miller notes that a structure that’s efficient from an engineering perspective might be a disaster from a social perspective.

“Every time the police are called for any sort of security issue, real or imagined, it costs \$500. That little crawl space under the bridge may not have cost the city much in physical maintenance but it has had a huge cost in social maintenance.”

Miller’s call to action is for engineers to consider the whole urban design picture when developing projects.

“Not only as a professional but as a citizen, a parent and a family member, you have a responsibility to consider crime prevention. It doesn’t matter how beautiful or well-built your structures are. If people won’t use them, they are a waste.”



Creating Space for Half a Million People

City of Saskatoon Growth Plan to Half a Million with Alan Wallace



When the City of Saskatoon started to work on its growth plan, it reached out to the community for feedback through Saskatoon Speaks and learned citizens wished they had more choice - in transportation, in housing options and in neighbourhoods. "We weren't building the city people wanted," says Alan Wallace, director of planning and development at the City of Saskatoon. After speaking to over 3,000 people via more than 70

community presentations, and years of research and planning, they released the final Growth Plan to Half a Million in April 2016. At the APEGS Annual Meeting professional development session, Wallace focused on corridor growth, transit and bridges, but the actual plan covers many more areas of concern.

One challenge with the plan was trying to determine what Saskatoon will look like as it grows, even though Wallace says, "Nobody knows the future; nobody can predict what 30 years from now will look like."



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First, they looked back: In the last 30 years, growth has been robust. In the past 10 years alone, Saskatoon has added the equivalent population of Prince Albert. But they also realized this type of growth is unusual, so tempered their predictions with that knowledge in mind.

The team studied intraprovincial growth (movement within Saskatchewan), interprovincial growth (movement

between provinces), international growth and natural increase from births. Using these metrics, they expect the city to reach half a million people by about 2045.

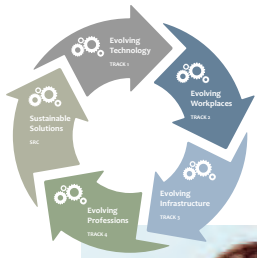
Imagining Saskatoon with 500,000 residents began by asking the question: If we didn't change anything over the next 30 years, what would happen?

"It didn't paint a picture of a well-functioning city," Wallace says.

If nothing changed, movement around the city would be one of the biggest problems. The plan calls for 75,000 new residents to move into strategic infill - both in established neighbourhoods and in land the University of Saskatchewan plans to free up for development - and those people will have to move across the city.

New bridges are part of the solution, but they aren't the only way to improve traffic. Currently there are 1.1 drivers per car in Saskatoon, and the public transit ridership is among the lowest in Canada at 4 per cent. Their target is to raise the ridership to 8 per cent, but to do that, Wallace says it has to be a completely different transit system.

And here is where Wallace hit upon the core of Saskatoon's transit problems: "We're not treating our transit customers like customers," he says.



Time Talks and Space Speaks

Non-verbal Communication



What you're not saying may be having a significant effect on you and the people you work with. The rules of non-verbal communication are "written nowhere, known to none, and understood by all," say Jeanie Wills and Debbie Rolfes with the Graham School of Professional Development. Their presentation at the APEGS Annual Meeting, "Time Talks and Space Speaks," outlined how to recognize and adapt to non-verbal cues, both in ourselves and in others.

Whenever we meet someone, whether we mean to or not, we size them up based on their physical appearance, vocal characteristics and body movements and gestures.

"We're not always aware of why we're making judgments," Rolfes says.

We take into account people's gender, weight, height, ethnicity, facial expressions and even accessories, and we make decisions about them, although we might be wrong.

The pitch and rate of speech in someone's voice combined with body movement and gestures -- like posture, fidgeting, tapping or twiddling -- all factor in to how we perceive someone.

We read things into this kind of communication, whether we're aware of our own thought processes or not. If you are aware of these subconscious judgments, you can short-circuit them.

"Think about how you are making judgments about other people and then intervene," Wills says.

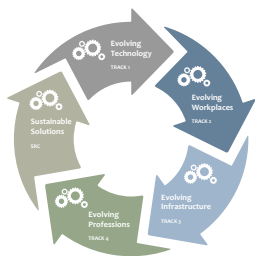
And if you know these things about yourself, you can address them and compensate for them. For example, when our non-verbal communication contradicts our words, the unspoken actions are often accepted as the truth. If we say confident words, but cross our arms and look away, those words will likely not come off as confident as we hoped.

Our use of other people's space and other people's time also affects how we're viewed. Both are commodities. We "save, spend, and waste" time, and the way an office space is set up can denote territory and power. Consider who has a cubicle versus who has an office and what kind of power differential this sets up. Also, the people with the most power in the office don't have to punch a time clock.

Yet the value of both space and time are culturally determined. In North America, we give others' a lot of space when we speak to them; we don't want skin to touch, and we don't want to be close enough to smell other people, but not all cultures have these boundaries. If you're aware that a co-worker from another country might have different space boundaries, knowing so will help you better interact with them.

If you're controlling someone's time, they will feel it as an assertion of power, so be cognizant of what you're asking people to do with their time. Stopping someone to chat, writing long emails for them to read or missing a deadline: All of these actions communicate a certain attitude about how you value their time.

Your understanding of non-verbal communication can help you in the workplace. If you value other's space and time, you show goodwill and demonstrate good character. If you put thought into the way you present yourself, other people will take your spoken words more seriously.



Sustainable Solutions from the Saskatchewan Research Council

SUBMITTED BY THE SASKATCHEWAN RESEARCH COUNCIL



On Friday morning during the APEGS Annual Meeting, the Saskatchewan Research Council (SRC) was pleased to host APEGS members and guests on a tour of its Saskatoon facilities.

From exploration to remediation, SRC Mining and Minerals Division provides research, development and demonstration (RD&D), exploration support, process development, tailings transportation, analytical and geoanalytical services to the mining and mineral industries worldwide. In all aspects of SRC's work, its world-class safety performance is demonstrated with a lost-time incident rate that has trended downward over the past decade, with zero lost-time incidents and zero lost days for its employees last fiscal year.

By leveraging its collective strengths, SRC has become a one-stop shop for clients to find solutions to challenges in the industries SRC operates in. The Environment Division assists clients in Saskatchewan, nationally and internationally with services in air and climate monitoring

and assessment, environmental site remediation, consulting and analytical services. SRC's Energy Division provides RD&D to major and junior oil and gas producers and pipeline operators, including enhanced oil recovery technologies that reduce input costs, increase reserves and extend pool production life. SRC's Business Intelligence (BI) Team is an enabling business partner, providing strategic and unbiased analysis on the most pressing points. The team highlights external risks with a forward-looking approach to trends, challenges and opportunities for the industries SRC operates in. These teams support sustainability by developing new methods and tools, finding efficiencies, cost reductions and energy reductions that lead to mutual benefits for Saskatchewan's economy, its environment and its people.

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Development Engineering and Manufacturing

The Development Engineering and Manufacturing Group provides engineering design and product development of automated systems and specialized instrumentation for companies in the mining sector and for Saskatchewan's large, small and medium-sized enterprises. Additionally, this team provides alternative energy engineering consulting to all sectors of the industry.

The Mining and Minerals and Environment Divisions have collaborated in mine site remediation through Project CLEANS (Cleanup of Abandoned Northern Sites). One aspect of this project involves filling numerous mining cavities in northern Saskatchewan because they are a public safety hazard. Knowing the cavity volume allows SRC to determine the amount of waste rock to be used. The Development Engineering and Manufacturing Group modified their high-pressure borehole and cavity survey camera to allow a 3-D volume survey to be performed, while simultaneously recording HD video. Using an advanced 3-D printer allowed a complex custom camera mounting head to be built for a fraction of the cost of a similar machined enclosure. SRC's custom camera control software can create a 3-D computer model and accurately calculate cavity volume. These optimizations result in a tailored approach to filling the various cavities with reduced costs in the quantity of waste rock used, improved time efficiencies and increased safety for workers.

This group is also developing and testing the integration of electronic gas detection modules as payload to measure and map various air emissions (such as hydrogen sulfide, H₂S) using an Unoccupied Aerial Vehicle (UAV). Mining, oil and gas and environmental companies, along with the government, require more reliable, cost-effective, efficient, accurate and less human-dependent methods for data monitoring and collection which improves safety.

Geoanalytical Laboratories

For over 40 years, SRC Geoanalytical Laboratories has provided high-quality, accredited and independent geochemical, minerals analysis and processing services to the mineral exploration industry (diamonds, uranium, gold, base metals, potash and rare earth minerals). New test methodologies, processes and laboratory systems are developed to enhance the industry's exploration efforts and are key to SRC's success. The laboratories work closely with junior and larger mining companies to prove out mineral deposits which can lead to the development of new mines in Saskatchewan, across Canada and internationally.

Along with SRC's Geoanalytical ISO 17025 accredited uranium and potash labs, SRC also operates in Saskatoon, one of the world's largest commercial diamond laboratories in Saskatoon. It provides high-capacity throughput, quick turnaround and dedicated service to deliver results on time. The lab has a heavy minerals circuit, which includes kimberlite indicator mineral recovery by heavy liquid separation, as well as a micro Dense Media Separation (DMS) Plant for heavy mineral concentration. SRC also operates an ISO 17025 accredited micro-diamond recovery lab. A total of 80 kilns are used to recover diamonds by caustic fusion. The lab also contains a larger DMS plant used for macro-diamond recovery. A high-pressure grinding roll improves liberation potential and minimizes diamond breakage. X-ray and grease table final recovery methods make certain the highest attainable recovery rates can be achieved.

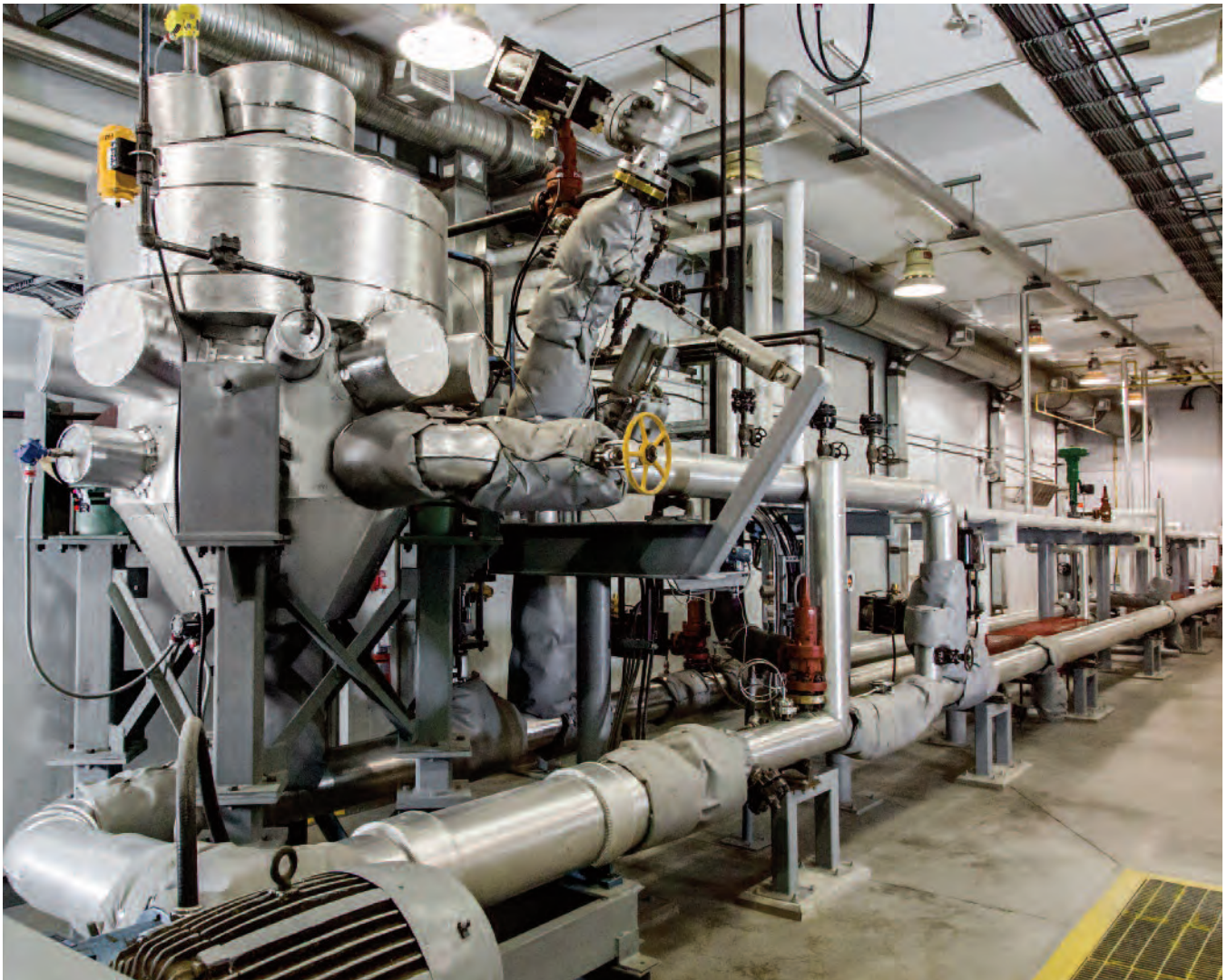
Minerals

The Minerals Group provides leading-edge services focused on RD&D for uranium, potash, rare earths, diamonds, gold, base metals and other minerals. The team's unique expertise and its Mineral Processing Pilot Plant in Saskatchewan attracts companies and investment to the province. The Minerals Group develops new processes to maximize recoveries, improve efficiency and reduce costs. One specialty is processing and increasing rare earth concentrates and grades. In addition the team is developing rare earth element (REE) separation technology. Comprehensive physical separation and hydrometallurgical testing capabilities as well as separation technology enable the production of high-purity, high-value individual rare earth elements.

SRC's Advanced Microanalysis Centre™ (AMC) uses advanced technologies including QEMSCAN®, electron microprobe, high-resolution mass spectrometry, X-ray fluorescence (XRF), X-ray diffraction and petrographic analysis. QEMSCAN can create detailed X-ray emission images of the sample for quantitative analysis of the mineral sizes, shapes and abundances. The electron microprobe can perform non-destructive chemical analyses of micron-scale minerals. The combination of quantitative mineral chemical and mineral abundance analysis makes these key tools for mineral analyses, especially for REE. SRC's XRF spectrometer provides one of the simplest, most accurate and economical methods for mineral analysis.

Pipe Flow Technology Centre™

SRC's internationally recognized Pipe Flow Technology Centre™ (PFTC) conducts research and development projects in multi-phase flow, process testing and



demonstration and pipeline design and development for the oil sands, heavy oil and mining and mineral processing industries. It consists of the Pipe Flow Facility, the Shook-Gillies High-Pressure High-Temperature (HPHT) Test Facility and a Tailings Test Facility. Actual pipe flow conditions are tested in a laboratory environment where temperature, flow rate and mixture composition can be controlled, and instrument performance can be optimized. The HPHT Test Facility is capable of handling and testing volatile materials at industrial conditions, including slurry fluid flows from enhanced oil recovery projects involving solvent or steam.

Over 55 years of research projects related to slurry pipeline flows at SRC have led to the development of the SRC PipeFlow Models including hydro transport technology for the oil sands industry in pipelining slurries – the same method that is widely used across industry today. Currently, SRC provides in-person instruction and training on the use of these models at its annual Slurry Pipeline Systems courses. SRC's multi-species turbulent flow model developed by Dr. Randy Gillies, P.Eng., is one of the most

significant developments in slurry flow modelling in the last decade. Rather than having to model all of the coarse solids in the slurry with a single particle size and density, the new model allows the designer to specify the full coarse particle size and density distributions. The new model is also capable of predicting the effect of pipeline slope on deposition velocity as well as model slurries with yield stresses, which the older versions of the model were unable to do. SRC will be offering training courses in the use of this new model to prior graduates of the SRC-Paterson & Cooke Slurry Pipeline Systems course starting in 2016.

The expertise and equipment at SRC's range of facilities offer valuable resources for new endeavours requiring research, analysis or technology development. SRC's broad base of specialists brings together a diverse technical team that develops unique and comprehensive solutions for industry in Saskatchewan and around the world. In every project SRC engages, quality is the focus and safety is the priority.



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Member Profile



This month *The Professional Edge* chats with long-time APEGS volunteer and councillor John Unrau, P.Geol., Manager of the Geotechnical Services Group at Mosaic Esterhazy.

Tell us about your personal and professional background.

I was born and raised in Leamington, Ontario, located just outside of Point Pelee National Park, the most southern point in Canada. For those who love Heinz ketchup the town is also known as “the Tomato Capitol of the World.”

When I left Leamington, I studied Earth Science at the University of Waterloo, with a specialization in engineering geology. I took my master’s degree at the same place.

Why did you choose to go into geoscience?

I’ve always loved rocks. As a kid, on family vacation trips in northern Ontario, I loved to crawl over rock outcrops trying to figure them out. I’ve always been captivated by the wonder and mystery of rocks – why they exist.

What was your biggest challenge in college?

As an undergrad, I had the same sort of challenges as everyone else: study, study, study. It was hard to find time for a social life. Probably my biggest challenge came after I got my bachelor’s degree. Jobs in the field were pretty scarce – hence the grad studies!

What brought you to Saskatchewan?

In grad studies at Waterloo, I worked as a lab assistant testing potash core samples to determine material properties for use in mine simulation studies associated with potash mining. I was intrigued by the research in soft rock mechanics and decided to pursue it further by continuing my studies at the University of Saskatchewan. Eventually this led to a job opportunity at IMC (now known as Mosaic). They had a water inflow issue that fit my area of specialization. I applied, they hired me and I’ve been with them ever since for 28 years.

What do you feel was your single greatest accomplishment as geoscientist?

A couple of things come to mind. When I first got to IMC, I worked on developing a new mine design. It was a challenge to collect all the data and do the modelling but it paid off. It was a safer design in terms of short-and long-term rock stability around mine workings. Elements of the design have been used ever since.

The new K3 mine currently in development was also a great landmark for me. I had the opportunity to oversee the exploration program critical in finalizing the location for the new shafts. Now that shaft sinking is in progress, I’m thrilled to be part of a team providing geological and geotechnical support to the sinking operations and mine development. This has been a lifelong dream for me.

What are your interests outside of work?

The big one is motorcycles. We have a Can-Am Spyder and a Yamaha V Star tourer. My wife and I enjoy going on day trips with them. When I first started talking about getting a motorcycle, I thought my wife would be upset but instead she said “maybe we should get two,” so I’m pretty lucky on that score.

Along with Peter Jackson and some other APEGS members, we go on group trips we call “the Fall Classic” in BC and “the Spring Fling” in the Black Hills of South Dakota. The trips are always entertaining with Peter in the group!

Have you ever met anyone famous?

I attended a Stuart McLean concert in Yorkton many years ago and had an opportunity after the show to shake his hand and have him autograph all my Vinyl Cafe CDs. He's quite an entertaining and a "down to earth" person.

What is your favourite vacation spot?

That's an easy one: Vancouver Island, specifically Parksville. That's our time to recharge. We love the scenery, the quiet and the serenity. That's the place where we have the time and freedom to take long walks, sit around and read a book.

What sort of books do you enjoy?

Espionage. Ken Follett, Tom Clancy and David Baldacci are some of my favourites.

Who has had the greatest influence on your life and career?

There are a few people I have to mention. Of course, my parents were always very supportive of everything I did so I wouldn't be where I am without them.

Likewise, my wife has been a pillar of support all the way through my career but most particularly by helping to put me through grad school.

I also have to mention my grade 12 geography teacher who helped connect me with the profession. Growing up, I had always enjoyed being outdoors, in the bush or out in the field studying rocks, but I had no idea you could make a living doing it. My teacher recognized my potential and encouraged me to pursue my interests further in university.



Something to Brag About?

The Professional Edge is all about you!

Our annual Profile in Achievement Issue will profile Saskatchewan-based engineering and geoscience companies and projects.

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

Please contact: Professional Edge Editor, Lyle Hewitt
lyle@martincharlton.ca

Council Notes

April 7 and 8, 2016

Hotel Saskatchewan, Regina, SK

18 of 19 Councillors present

- Council approved terms of reference for the newly formed Children's Development Museum Task Group.
- The Governance Board reported the following appointments: Sami Jasem, P.Eng. to the Professional Practice Exam Committee for a second three-year term; Eric Lamontagne, P.Eng. and Me Leu, P.Eng. to the Licensee Admissions Committee for a three year term; and the Licensee Admissions Committee appointed Rick Kullman, P.Eng., FEC, FGC (Hon.) Vice-Chair.
- The Licensee Admissions Committee terms of reference, as edited, and the Licensee Member Guideline, as edited, were approved by Council.
- Council approved Life Membership for:
Rolf B. Aslund, P.Eng.
Mukesh Beri, P.Eng.
William D. Chisholm, P.Eng.
Edward A. Grimm, P.Eng.
Ernest R. Harricharran, P.Eng.
Larry E. Hebert, P.Eng.
Robert F.T. Heng, P.Eng.
Geoffrey R. Jordan, P.Geo.
Vladimir Kocalka, P.Eng.
Paul P. Lafleur, P.Eng.
Brian C. Mahood, P.Geo.
Philip A. McConnell, P.Eng.
Fereshteh R. Samadi, P.Eng.
Constantin Sambotelecan, P.Eng.
Leslie F. Sawatsky, P.Eng.
Charles T. Sedgewick, P.Eng.
Lawrence W. Tse, P.Eng.
Jimmy D. Williams, P.Eng.
Alberto S. Windmuller, P.Eng.
Gary M. Yeo, P.Geo., FEC (Hon.), FGC
- Council approved the revisions to the Environment and Sustainability Committee terms of reference and the Student Development Committee terms of reference.
- Council approved the revisions to the Continuing Professional Excellence Members' Guideline document, now referred to as Continuing Professional Development.
- Council appointed Rajesh Shah, P.Eng. Chair of the K-12 Committee for a two-year term and Sebastian Walrond, P.Eng. Chair of the Professional Development Committee for a two-year term.
- Council established a task group to lead and coordinate the 30- by- 30 initiative for APEGS. Margaret Anne Hodges, P.Eng., FEC shall chair the 30-by-30 Task Group.
- The Education Board reported the following appointments: Ian Judd-Henrey, P.Geo. to the Environment and Sustainability Committee for a three-year term; and Adeline Chiu, P.Eng. Vice-Chair of the K-12 Committee.
- The Image and Identity Board reported that Kerry Mazurek, P.Eng. and Bruce Peberdy, P.Eng. were appointed to a second three-year term on the Awards Committee.
- Council received and approved the draft 2015 audited financial statements.
- The next Council meeting is scheduled for June 16, 2016 in Moose Jaw.



2016 APEGS Salary Survey Summary Results

The Association of Professional Engineers and Geoscientists of Saskatchewan (APEGS) contacted 5,621 Professional Engineers, Professional Geoscientists, Engineers-in-Training, Geoscientists-in-Training and Licensees living in Saskatchewan. A total of 2,246 members completed the survey, representing a 40.0 % response rate. Of those, 2,153 were employed full-time and used in the analysis. Surveys were completed in February and March 2016 and salaries reported were as at December 31, 2015. Inshatrix Research Inc. compiled and tabulated all results. The detailed report, which includes analysis by gender, can be found on the APEGS website at <http://www.apegs.ca/Portal/Pages/salary-survey>

The main goals of the survey are:

- to provide information to all members regarding monetary compensation for different levels of responsibility and advanced degrees;
- to provide information to employers to assist them in establishing appropriate pay levels for recent graduates and ensuring competitive compensation packages for experienced professionals; and
- to give students, career counsellors and other interested persons information on employment, including salaries, in the engineering and geoscience professions in Saskatchewan.

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

	Count	Mean	5	25	Median	75	95	%
1976 & Prior	42	\$138,858	\$85,222	\$110,760	\$143,188	\$166,612	\$180,482	2.0%
1977	11	\$150,018	\$100,000	\$105,400	\$139,000	\$188,000	\$260,000	0.5%
1978	16	\$135,355	\$35,000	\$89,000	\$143,500	\$171,250	\$270,000	0.8%
1979	18	\$146,221	\$75,000	\$124,000	\$156,000	\$162,000	\$200,000	0.9%
1980	12	\$142,335	\$60,000	\$133,000	\$138,500	\$161,000	\$205,000	0.6%
1981	13	\$144,269	\$62,000	\$135,000	\$153,000	\$170,000	\$200,000	0.6%
1982	26	\$138,023	\$96,000	\$106,300	\$138,000	\$168,000	\$196,923	1.2%
1983	16	\$150,677	\$62,000	\$105,330	\$150,678	\$195,432	\$225,000	0.8%
1984	22	\$140,605	\$97,000	\$115,000	\$137,500	\$160,000	\$225,000	1.0%
1985	20	\$142,035	\$37,000	\$103,200	\$128,500	\$190,500	\$250,000	1.0%
1986	26	\$135,970	\$62,000	\$108,000	\$136,408	\$160,800	\$203,000	1.2%
1987	29	\$140,259	\$84,700	\$113,000	\$135,800	\$160,000	\$228,000	1.4%
1988	21	\$137,625	\$100,000	\$123,000	\$137,000	\$150,716	\$185,000	1.0%
1989	22	\$136,214	\$90,000	\$117,000	\$135,900	\$155,000	\$180,000	1.0%
1990	30	\$147,121	\$77,000	\$118,000	\$140,570	\$175,000	\$207,000	1.4%
1991	26	\$141,009	\$105,000	\$114,000	\$135,210	\$150,000	\$196,890	1.2%
1992	17	\$117,355	\$30,000	\$92,000	\$113,000	\$145,000	\$220,000	0.8%
1993	24	\$134,228	\$86,300	\$107,292	\$135,000	\$154,491	\$190,800	1.1%
1994	33	\$129,510	\$30,000	\$89,200	\$131,000	\$163,000	\$210,000	1.6%
1995	34	\$159,596	\$85,000	\$100,000	\$131,000	\$170,000	\$240,000	1.6%
1996	35	\$147,664	\$73,000	\$105,000	\$137,000	\$175,000	\$230,000	1.7%
1997	35	\$118,516	\$71,400	\$90,000	\$110,000	\$132,000	\$193,000	1.7%
1998	30	\$114,293	\$29,120	\$80,000	\$117,750	\$138,500	\$226,000	1.4%
1999	50	\$124,758	\$87,000	\$100,000	\$118,300	\$135,200	\$191,000	2.4%
2000	53	\$114,907	\$74,600	\$96,000	\$110,000	\$126,507	\$166,000	2.5%
2001	59	\$116,753	\$83,000	\$98,880	\$110,000	\$134,000	\$167,000	2.8%
2002	64	\$115,470	\$57,200	\$103,250	\$112,500	\$137,000	\$158,000	3.1%
2003	69	\$113,279	\$65,000	\$96,000	\$114,800	\$127,000	\$162,000	3.3%
2004	76	\$112,967	\$45,000	\$85,000	\$102,750	\$120,550	\$175,000	3.6%
2005	81	\$107,204	\$66,408	\$96,000	\$105,550	\$120,000	\$150,000	3.9%
2006	68	\$100,705	\$51,000	\$84,800	\$100,100	\$114,650	\$149,000	3.2%
2007	102	\$100,473	\$70,000	\$82,888	\$97,817	\$117,000	\$135,000	4.9%
2008	93	\$92,664	\$68,500	\$82,680	\$91,105	\$102,161	\$121,400	4.4%
2009	115	\$88,275	\$50,000	\$77,700	\$89,000	\$100,000	\$125,000	5.5%
2010	135	\$82,728	\$59,000	\$72,500	\$83,000	\$95,000	\$110,000	6.4%
2011	122	\$81,927	\$58,000	\$71,241	\$78,000	\$90,980	\$119,890	5.8%
2012	131	\$74,442	\$56,311	\$66,500	\$72,240	\$81,000	\$98,900	6.2%
2013	123	\$72,056	\$52,658	\$64,500	\$70,000	\$80,000	\$93,750	5.9%
2014	107	\$64,613	\$41,000	\$60,000	\$64,600	\$74,000	\$82,500	5.1%
2015	87	\$62,476	\$39,000	\$57,000	\$62,666	\$71,000	\$83,200	4.1%

Annual Salary by Designation

	Count	Mean	5	25	Median	75	95	%
P.Eng.	1377	\$118,492	\$72,000	\$90,124	\$110,000	\$135,760	\$190,000	61.3%
P.Geo.	106	\$121,629	\$60,000	\$97,500	\$117,500	\$145,000	\$185,000	4.7%
P.Eng./P.Geo	19	\$129,856	\$50,000	\$92,000	\$131,000	\$160,000	\$202,000	0.8%
Engineering Licensee	12	\$121,246	\$70,000	\$87,250	\$110,228	\$145,000	\$240,000	0.5%
Engineer-in-Training	690	\$72,994	\$46,040	\$63,000	\$70,037	\$81,000	\$105,000	30.7%
Geoscientist-in-Training	40	\$75,853	\$24,000	\$60,000	\$70,000	\$87,000	\$150,000	1.8%
Geoscience Licensee*	NA	NA	NA	NA	NA	NA	NA	NA

*NA = Not available due to reporting rules (insufficient data)

Annual Salary by Discipline

	Count	Mean	5	25	Median	75	95	%
Civil	479	\$96,392	\$96,392	\$60,000	\$70,073	\$88,200	\$110,000	21.3%
Mech/nd	506	\$103,073	\$103,073	\$55,000	\$75,000	\$92,588	\$123,858	22.5%
Elec/Eng Physics	344	\$106,519	\$106,519	\$60,000	\$77,000	\$100,000	\$124,700	15.3%
Chem/Ceramic Metal	101	\$110,618	\$110,618	\$63,200	\$83,000	\$99,813	\$138,000	4.5%
Geo/Mining/Petro Eng	258	\$117,895	\$117,895	\$66,408	\$85,000	\$107,700	\$148,250	11.5%
Ag/Forestry	55	\$93,678	\$93,678	\$57,924	\$69,888	\$88,527	\$110,000	2.4%
Environmental	147	\$97,134	\$97,134	\$52,000	\$68,500	\$88,285	\$110,000	6.5%
Geosciences	122	\$109,338	\$109,338	\$53,329	\$79,000	\$105,261	\$136,000	5.4%
Computer Eng	35	\$92,799	\$92,799	\$55,000	\$69,432	\$84,242	\$103,000	1.6%
Biological/Biomedical*	NA	NA	NA	NA	NA	NA	NA	NA
Industrial*	NA	NA	NA	NA	NA	NA	NA	NA
Other	191	\$106,675	\$106,675	\$49,000	\$72,479	\$97,919	\$125,500	8.5%

*NA = Not available due to reporting rules (insufficient data)

Annual Salary by Function

	Count	Mean	5	25	Median	75	95	%
Corp Mgmt	177	\$147,490	\$88,000	\$116,000	\$140,000	\$170,000	\$228,000	7.9%
Project/Op Mgmt	843	\$109,617	\$63,000	\$82,000	\$100,000	\$130,000	\$185,000	37.5%
Project Admin	78	\$85,902	\$52,500	\$67,200	\$83,600	\$98,000	\$140,000	3.5%
Design	472	\$88,694	\$56,000	\$69,600	\$80,000	\$101,000	\$145,000	21.0%
Research/Planning	134	\$97,920	\$25,000	\$68,618	\$90,000	\$115,000	\$165,000	6.0%
Inspec/Quality/Res	57	\$80,069	\$52,200	\$64,000	\$71,000	\$85,200	\$148,318	2.5%
Operating/Maint	194	\$102,098	\$56,000	\$77,000	\$97,100	\$124,300	\$160,000	8.6%
Teaching	43	\$116,408	\$65,000	\$85,000	\$120,000	\$147,000	\$169,000	1.9%
Marketing/Sales	28	\$102,429	\$49,000	\$74,318	\$89,500	\$130,000	\$184,000	1.2%
Reg Approvals/Enforce	64	\$92,937	\$59,500	\$75,000	\$91,650	\$110,000	\$133,000	2.8%
Exploration	55	\$103,912	\$30,000	\$76,000	\$95,000	\$130,000	\$196,890	2.4%
Other	101	\$96,246	\$40,000	\$62,500	\$89,000	\$114,000	\$161,000	4.5%

Annual Salary by Industry

	Count	Mean	5	25	Median	75	95	%
Consulting Service	594	\$99,875	\$57,000	\$69,000	\$85,250	\$115,000	\$185,000	26.4%
Resource Ind Oil/Gas	111	\$106,828	\$50,000	\$78,000	\$99,000	\$127,000	\$190,000	4.9%
Resource Ind	414	\$118,833	\$73,000	\$92,800	\$111,500	\$140,000	\$189,000	18.4%
Procurement/Construc	181	\$94,308	\$56,500	\$70,000	\$88,000	\$110,000	\$164,900	8.1%
Manufac Durables	197	\$91,651	\$52,000	\$67,200	\$83,000	\$108,000	\$159,000	8.8%
Manufac Non-Durables	69	\$119,727	\$70,000	\$84,000	\$107,500	\$146,000	\$191,951	3.1%
Service For Profit	30	\$95,147	\$45,000	\$60,000	\$83,500	\$110,000	\$180,251	1.3%
Service Not For Profit	176	\$95,873	\$60,000	\$75,785	\$91,548	\$109,500	\$150,000	7.8%
Utilities	278	\$108,377	\$60,606	\$84,000	\$105,000	\$128,000	\$174,382	12.4%
Educational Services	79	\$114,013	\$23,000	\$75,000	\$102,000	\$145,000	\$203,000	3.5%
Agriculture/Forestry	27	\$91,013	\$55,570	\$63,000	\$88,500	\$105,427	\$135,000	1.2%
Other	90	\$96,499	\$24,000	\$72,100	\$89,819	\$112,000	\$151,000	4.0%

Annual Salary by Degrees

	Count	Mean	5	25	Median	75	95	%
Bachelor's	1489	\$100,518	\$58,000	\$72,760	\$91,000	\$118,245	\$175,000	66.3%
Bachelor's > Master's	249	\$108,420	\$58,000	\$84,498	\$103,188	\$130,000	\$179,000	11.1%
Master's Degree	358	\$106,651	\$50,000	\$78,000	\$100,000	\$127,000	\$186,000	15.9%
Master's > Doctorate	47	\$136,612	\$65,000	\$85,000	\$110,000	\$165,000	\$240,000	2.1%
Doctorate	103	\$122,387	\$35,000	\$86,603	\$120,000	\$150,000	\$186,000	4.6%

Annual Salary by Experience

	Count	Mean	5	25	Median	75	95	%
<1 year	100	\$65,775	\$30,096	\$54,000	\$62,583	\$75,000	\$113,000	4.5%
1 year	47	\$66,481	\$25,000	\$56,000	\$63,200	\$73,112	\$121,000	2.1%
1.5 years	77	\$67,014	\$43,000	\$60,036	\$68,000	\$74,100	\$90,000	3.4%
2 years	122	\$75,112	\$53,000	\$63,800	\$70,656	\$79,040	\$105,000	5.4%
3 years	175	\$74,993	\$54,000	\$65,000	\$71,450	\$82,000	\$107,000	7.8%
4 years	170	\$79,936	\$58,625	\$70,000	\$76,503	\$86,000	\$105,000	7.6%
5 years	179	\$86,582	\$64,000	\$74,250	\$84,000	\$96,700	\$120,000	8.0%
6 years	120	\$90,665	\$66,573	\$79,075	\$89,686	\$98,950	\$125,500	5.3%
7-8 years	211	\$98,317	\$68,000	\$85,000	\$95,160	\$112,900	\$132,000	9.4%
9-10 years	201	\$107,927	\$73,000	\$92,000	\$106,000	\$119,500	\$150,000	8.9%
11-12 years	119	\$117,733	\$74,334	\$92,250	\$110,000	\$130,000	\$175,000	5.3%
13-14 years	106	\$119,265	\$84,000	\$103,000	\$118,000	\$138,000	\$160,000	4.7%
15-17 years	147	\$123,238	\$85,000	\$100,000	\$120,000	\$140,000	\$172,000	6.5%
18-20 years	95	\$147,435	\$79,000	\$110,000	\$137,000	\$165,000	\$195,000	4.2%
21-24 years	93	\$142,025	\$78,000	\$108,000	\$135,000	\$168,000	\$228,000	4.1%
25+ years	284	\$148,508	\$76,000	\$120,300	\$145,000	\$170,000	\$228,000	12.6%

Annual Salary by Sector

	Count	Mean	5	25	Median	75	95	%
Public Sector	675	\$103,094	\$59,000	\$78,000	\$98,000	\$120,090	\$165,000	43.6%
Private Sector	1549	\$104,771	\$56,650	\$74,000	\$94,900	\$125,000	\$185,000	56.4%

Total Salary

	Count	Mean	5	25	Median	75	95	%
Base Salary	2153	\$104,239	\$58,000	\$75,000	\$95,680	\$125,000	\$180,000	100%
Salary including bonus	2153	\$121,601	\$60,200	\$82,000	\$107,900	\$147,000	\$225,000	100%

Salary Changes - Full Time Positions

	median	% increase	mean	% increase
1987	\$48,000	\$49,269		
1989	\$50,928	6.10%	\$62,887	27.60%
1991	\$54,110	6.20%	\$57,578	-8.40%
1993	\$54,480	0.70%	\$56,703	-1.50%
1995	\$56,400	3.50%	\$59,142	4.30%
1997	\$60,000	6.40%	\$62,266	5.30%
1999	\$62,500	4.20%	\$65,401	5.00%
2001	\$66,000	5.60%	\$68,877	5.30%
2003	\$68,800	4.20%	\$71,210	3.40%
2005	\$71,008	3.20%	\$73,607	3.40%
2007	\$74,000	4.20%	\$77,374	5.10%
2008	\$76,352	3.20%	\$83,025	7.30%
2009	\$80,000	4.80%	\$86,908	4.70%
2010	\$82,950	3.70%	\$91,548	5.30%
2011	\$84,224	1.54%	\$91,154	-0.40%
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%
	\$95,680	-1.36%	\$104,239	-0.83%

Regression Analysis

Stepwise linear regression was used to find the best model for estimating salaries. The formula produced explains over 50 per cent of the variance in salary (51.1%). Any model explaining at least 50 per cent of the variance in the dependent variable can be considered an effective model. Refer to the "Classification Rating Guide", which can be found on www.apegs.ca to determine the values for each factor.

Factor	B (Coefficient)	Beta (Relative importance)
Duties (A)	147	0.200
Experience (C)	338	0.287
Supervision Scope (G)	770	0.167
Professional designation	8,088	0.083
(Constant)	55,267	

Formula for expected salary (SE) without bonus:

$$SE = 55267 + (147 \times A) + (338 \times C) + (770 \times G)$$

Add 8,088 if you have acquired professional status within your field - P.Eng. or P.Geo.

Lost

The Association reports the following as “Active Lost”
as of May 15, 2016

Ahmed I. Abubaker
Paul F. Anderson
Robert J. Beckett
Chad T. Brittner
Tai D. Bui
Lyle E. Burford
John P. Chaput
Barry V.R. Comber
Anis N. Dagher
Victor Derkach
Angelina Eghan
David R. Francis
William H. Garland
Barrie R. Gorrie
Allan W. Greenberg
Gordon T. Haig
Paul J. Jamrozek
Terence D. Leahy
Zhiwu Liang
Nabil S.H. Makari

Barry W. Millar
Michael J. Morris
Ross L. Morton
Michael A. Nelson
Eric Paulsen
William L. Payne
John A. Pearce
Harry Pelech
Jinglin Peng
Robert W. Peterson
Leonard G. Powell
Paul R. Rachar
Clemence R. Roles
Amelie I. Sirois-Leclerc
Thomas R. Smith
Matthew P. Taylor
David A. Thomson
He (Xavier) Xu
R. Morris Yelland
Yonggang Zhang

In Memoriam

Aris Aligizakis, P.Eng.
Dr. Floyd W. Bigsby, P.Eng.
William Choukalos, P.Eng.
Ian A. Christensen, P.Eng.
Alexander Curran, P.Eng.
Leslie G. Harmsworth, P.Eng.
Paul J. Klotz, P.Eng.
R. Keith Konzuk, P.Eng.
James W. MacNeill, P.Eng.
Eric B. Moysey, P.Eng.
Murray W. Pyke, P.Eng.
Wayne M. Roma, P.Eng.
Robert J. Sanderson, P.Eng.
Valentin W. Shtenko, P.Eng.
Thomas L. Spraggs, P.Eng.
Karl G. Wetterstrand, P.Eng.

Women in Mining and
Women in Nuclear Saskatchewan Inc.

presents

MINE *your* POTENTIAL

CONFERENCE

September 23, 2016 — Saskatoon Inn, Saskatoon

Choose 4 of 8 breakout sessions:
(subject to change)

**We Are All Advocates • Work Life Balance
Emotional Intelligence • Mining for Talent • Nuclear 101
Milling 101 • Mining 101 • Interpreting Quarterly Reports**

Registration \$250 Students \$100

<http://wimwinsk.com/event/mine-your-potential-2016/>

Early bird \$200 (Ends August 16, 2016)!

WIM/WiN-SK's fourth annual Mine Your Potential Conference provides an excellent personal and professional development opportunity for people involved or interested in the minerals, mining, nuclear, and radiation industries.

Keynote Speaker:

Dr. 'Lyn Anglin, Chief Scientific Officer, Imperial Metals

'Lyn has extensive experience in managing geoscience research and engagement with the public. She guides research activities including the impact of the tailings breach at Mount Polley mine.

**WIM
WiN**
SASKATCHEWAN

Report on 2016 Renewals

Done by APEGS Members and Licensees Using the On-Line Profile

BY TINA MAKI, P.ENG., FEC, FGC (HON.), DIRECTOR OF REGISTRATION

Members and licensees are encouraged to use their APEGS On-Line Profile to do the following:

1. Pay annual fees
2. Update contact information
3. Renew Permission to Consult
4. Report Continuing Professional Development credits (formerly called “Continuing Professional Excellence”)
5. Volunteer for committees, one-time events and other activities
6. Select mail and email exclusions, including constituent societies
7. View application status
8. Register for APEGS events and meetings

** Items 1 and 2 can also be done by Official Reps and Authorized Signing Officers in the On-Line Profile of Certificates of Authorization.*

Your On-Line Profile can be used at any time of the year to manage your information with APEGS.

Announcing the winner of the iPad Draw

APEGS held a draw for an iPad to encourage members and licensees to use their On-Line Profile to renew their registration and to update their information on record with APEGS. At least one of #1 to #6 listed above had to be completed in the On-Line Profile by December 31, 2015, and registration had to be renewed for 2016.

5,694 of the 11,910 members and licensees who renewed for 2016 were eligible for the draw.

The winner is.... **Matthew Naylor, P.Eng.**

Congratulations and thank you to all our members and licensees who used their On-Line Profile for renewals.

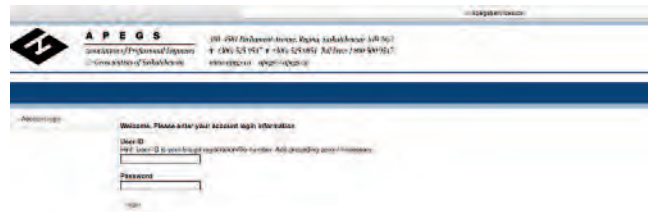
HOW TO ACCESS YOUR ONLINE PROFILE

Login at www.apegs.ca

Top right corner of the APEGS home page – Login button:



This will take you to the login screen:



Your User ID is your 5-digit registration number. Your registration number is found on one of the following: dues notice, APEGS registration certificate, APEGS seal, most correspondence from APEGS. If you can't find your registration number, contact the APEGS office.

If this is your first time logging in, or you have forgotten your password, you will have to click on “New password / Forgot password”. Complete the requested information and an automated email will be sent to you with a temporary password that you should log in and change as soon as possible.

For more information:

For more information on the use of your On-Line Profile, or for assistance with any of the data input/update, please contact the APEGS office.

apegs@apegs.ca

306-525-9547 / 1-800-500-9547

A close-up photograph of a hand holding a stream of water. The hand is cupped, and water is flowing from the fingers. The background is a light blue gradient. The image is used as a background for the article.

Investing in Water

A Message from the Environment and Sustainability Committee

BY KURTIS DONEY, P.ENG.

Opinions expressed do not necessarily reflect the views or policies of APEGS.

During a normal day the average citizen does not think about whether or not there will be water coming out of their tap. Residents expect that water will flow from their tap on demand and wastewater will flush away. This confidence in the water system allows residents to direct their attention to achieving success in their jobs and daily lives.

However, there are many components to delivering clean, safe, drinking water, collecting and treating wastewater and managing storm water that falls from the sky. These components involve natural aspects such as gravity and complex mechanical and biological plants to treat the water. It is the engineers and geoscientists of the past who are credited with many of these advancements in our water systems.

Today's engineers and geoscientists are responsible for maintaining and improving our water systems and dealing with new risks. Significant care and attention is required to ensure all aspects of the water systems continue to operate as designed. As water system infrastructure ages, engineers and geoscientists need to ensure the components are maintained, inspected and protected. Critical portions of the water systems include groundwater and surface water that are used for source water and need to be protected. Significant portions of the system are underground and "out of sight, out of mind."

It is engineers and geoscientists who are responsible to ensure that the underground system is not forgotten and that it is brought to the public's attention not only in crises, but also in everyday discussions, particularly during times of investment decisions.



Decision makers may find it easier to direct investments to other critical assets or needs that are much more in the public view. This tendency, if acted upon, will quickly bring the water system into perspective if the water does not flow from the tap or the wastewater does not leave the toilet.

Determining how much investment is required in this water system is not as simple as opening a textbook and looking up a formula. In this situation, it takes money to determine how much money to invest. An underground asset requires relatively advanced inspections, involving high-tech equipment, so that decisions can be made about the whole system. The most critical underground assets must be inspected and well understood in order to reduce the risk of system malfunction. If one large pipe were to collapse, the number of residents without access to life's basic necessity would be significantly larger than if a small pipe outside of a house was to fail.

With the current infrastructure deficit, municipalities must now focus on the most critical assets to ensure the largest number of residents continue to receive water on demand. In order for residents to enjoy the luxury of reliable water services in the future, municipalities need to educate residents and ensure they are aware of the risks and costs of this critical service. Engineers and geoscientists are

essential for understanding and communicating the risks that are present in a water system and looking to the future for upcoming threats.

Some of the changes that may have a significant impact on water availability include more extreme weather events. The Public Infrastructure Engineering Vulnerability Committee (PIEVC) has established some excellent material to assist engineers and geoscientists in understanding some of the potential risks of these weather events. However, the investments required to deal with the risks of extreme weather events are very significant. Should governments invest billions of dollars to deal with extreme weather events that may restrict water availability or cause flooding if the event is estimated to occur only periodically in a lifetime? If engineers and geoscientists can find ways to address extreme weather events and aging infrastructure at the same time, for example by replacing an aging pipe with a larger, higher capacity pipe, the potential to reduce costs while meeting residents' expectations is significantly improved. Good planning can assist the engineer and geoscientist in repairing past infrastructure and meeting the challenges of the future.

Kurtis Doney, P.Eng. is the Vice-Chair of the APEGS Environment and Sustainability Committee. He is currently the Manager of Water and Sewer Engineering at the City of Regina. In this position, he is responsible for overseeing a team to upgrade and rehabilitate the existing water, wastewater and drainage infrastructure within the city of Regina.



Thank You APEGS!

From the University of Saskatchewan Mining Games team

On behalf of the 2016 University of Saskatchewan Mining Games team, we would like to thank APEGS for their support. Without funding from sponsors such as APEGS we would not be able to attend events such as the Canadian Mining Games. These types of events are a hugely important part of engineering students' education.

We knew going into the Mining Games that our team was inexperienced and as such had low expectations. However, we blew away our expectations. We placed ninth overall, with three first place finishes in the Stock Market Challenge, Rock Mechanics and Mechanical Design, and one third place finish in Sustainable Development. Special mention goes to our Mine Design team who placed sixth. Considering that we have never placed higher than 10th in the past we believe that this is an achievement that should be celebrated.

Our performance this year is a testament to the university's new mining option. It speaks highly of our university in general that, as a Geological Engineering program, we are invited to the mining games as one of Canada's top 10 mining schools among nine other Mining Engineering programs.

University of Saskatchewan Mining Games team

2016

Annual Meeting



Newly elected councillors inducted at the Business Meeting (left to Right) – John Unrau, P.Geo., Leo Niekamp, P.Eng., David Kent, P.Eng., FEC, Stormy Holmes, P.Eng., FEC, and Ernie Barber, P.Eng.



ABOVE: Dennis and Wendy Paddock receive a plaque in appreciation of their service to the professions. Dennis Paddock, P.Eng., FEC, FCSSE, FCAE, FGC (Hon.) retired after 23 years as Executive Director and Registrar

RIGHT: Track sessions were well attended throughout the Professional Development Day on Friday





Attendees enjoyed a fun casino at the President's Reception Friday evening



Future engineers and geoscientists enjoying the Youth Science Day

Friend of the Professions Award

This award was established in 2013 to recognize exceptional achievements or unique contributions by a non-member in the promotion of the professions.

This year the APEGS Friend of the Professions Award goes to



Ben Freitag

Ben Freitag was born and raised in Regina. His passion for science, engineering and learning was instilled in him at an early age, in large part due to his parents' careers in education and engineering.

Ben began his career as the coordinator of the University of Regina's Educating Youth in Engineering and Science Program in 2009. In this role, Ben led a team to create, organize and deliver educational programming for youth across the city of Regina and southern Saskatchewan in an effort to spark curiosity and learning in the fields of science, engineering and technology.

His work at EYES also included a strong commitment to engaging under-represented youth and targeting lower-income neighbourhoods. Ben strongly believes that all youth deserve an opportunity to create and explore within our natural world.

Ben and his team at EYES facilitated the Youth Science Days for APEGS at the annual meeting and professional development conference in the years 2010, 2013 and 2015.

Ben served on the planning committee and was actively involved in the organization and planning of the Canadian Coalition for Women in Engineering, Science, Trades and Technology Conference 2014 held in Regina in May 2014.

Ben has a Bachelor of Science in physics, a Bachelor of Education and is currently completing a Master of Education, all from the University of Regina.

The Promising Member Award

The Promising Member Award, established in 1995, recognizes exceptional achievements by professional members in the early stages of their careers in Saskatchewan.

This year the award recognizes



Beatriz de Freitas, P.Eng.

Beatriz de Freitas – known as Bia to her friends - was born in Piracicaba, São Paulo, Brazil. She moved to Canada at the age of two. She has called Saskatoon home most of her life. She has retained many Brazilian customs and remains fluent in her native language of Portuguese.

Bia graduated with a Bachelor of Science in Civil Engineering from the University of Saskatchewan in 2006. After graduation, she was hired by UMA (now AECOM).

Over the last 10 years, Bia has had the opportunity to work on many exciting projects including the Circle Drive South utilities design, pipeline condition asset management for the City of Toronto and City of Saskatoon, civil design for the K+S Potash Legacy mine, as well as design and construction administration projects around Saskatchewan.

She enjoys helping colleagues and new staff as they join the AECOM team. Bia is a leader in promoting new individuals to enter the engineering and geoscience profession. Through her work on the APEGS K to 12 Committee, she connects professionals with students at career fairs, presentations and other volunteer opportunities.

She also holds the position of Chair for the Women in Consulting Committee for the Association of Consulting Engineering Companies (ACEC-SK) and is the Chair Elect for the Western Canada Water Environment Association.

Bia's interest in math, science and engineering has expanded beyond the confines of the office. Away from work, Bia continues to apply her talents of planning and design to projects for family and friends. Around the home, she is always being asked for her professional input.

Having completed a full renovation at home and helping her parents with the daunting task of a new home build, Bia now looks forward to her next, as yet undetermined project.

Bia is married and has two children – or, as she likes to call them, her little engineers-in-potty-training.

The Environmental Excellence Award

The Environmental Excellence Award was established in 2005. It is given in recognition of exceptional achievements by an individual or team in the application of engineering, geological or geophysical methods related to environmental protection and preservation.

This year the, APEGS Environmental Excellence Award goes to



**David
deMontigny,
Ph.D., P.Eng.**

David deMontigny is the Associate Dean, Special Projects and Student Services and an Associate Professor, Engineering at the University of Regina. His background is in industrial systems engineering, and his research program has been primarily focused on the post-combustion capture of CO₂.

David earned his bachelor's, master's and Ph.D. in Industrial Systems Engineering, all at the University of Regina. He has taught at the university for 12 years. In a poll by the *Prairie Dog* newspaper, students rated him one of the best professors on campus.

David has a long history of contributing to environmental and community issues. He is a researcher with the Clean Energy Technologies Institute which helps coordinate CO₂ capture and clean energy activities for the University of Regina.

He is one of the driving forces behind the local chapter of the Tetra Society, an organization that helps connect handicapped persons with technology solutions that make their lives better.

He has published numerous papers on carbon capture technology in peer-reviewed journals around the world.

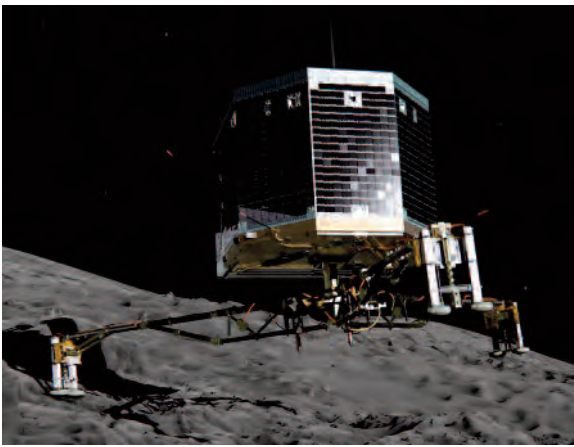
On May 6, 2014, David helped organize the "Greening Professionals for Sustainability" conference. Together with the Regional Centre of Expertise on Education for Sustainable Development, the Faculty of Engineering and Applied Science co-hosted this round-table event. Representatives from a range of fields discussed professional responsibilities with respect to climate change and sustainability in their work.

David credits his success to the encouragement and mentorship from his colleagues, as well as the love and support from his wife and children.

The Exceptional Engineering and Geoscience Project Award

This award, founded in 2001, recognizes accomplishments in engineering or geoscience. The project team must be predominantly made up of Saskatchewan engineers or geoscientists. The project may be located in or outside Saskatchewan.

This year, the APEGS Exceptional Engineering and Geoscience Project Award goes to SED Systems for its contribution to the



ESA Rosetta Mission

While the European Space Agency's Rosetta Mission may have ventured into deep space, it has a connection close to home here in Saskatchewan.

Rosetta is a space probe launched by the ESA in March 2004. Along with Philae, its lander module, Rosetta is performing a detailed study of comet 67P/Churyumov-Gerasimenko.

Almost every aspect of the mission is a "first" in space exploration history. But these firsts and the data gathered would not be possible if it were not for the craft's communications system, designed in part by SED Systems.

Located at Innovation Place in Saskatoon, SED designed, tested and constructed three 35-metre-wide satellite dishes in Australia, Spain and Argentina to communicate with the unmanned Rosetta probe and its dishwasher-sized lander. Each dish took at least three years to design, build and calibrate.

The ESA paid between \$80 million and \$100 million for all three.

Each massive dish weighs about 500 tonnes and is as tall as a six-storey building. They are, as the SED business manager described them, "like a commercial satellite dish on steroids," capable of detecting signals from more than a billion kilometres away.

The project required SED teams to push the envelope of engineering innovation, such as incorporating cryogenically cooled receivers to minimize interference from electronics on the ground.

While the dishes themselves were built overseas by subcontractors, much of the preparatory work was done in Saskatoon. Some smaller components were built and much of the testing was carried out in Saskatoon.

The McCannel Award

The McCannel Award was established in 1983 to honour service to the Association of Professional Engineers and Geoscientists of Saskatchewan, and to the professions as a whole. The McCannel Award is named after Roy McCannel, a founding member of the Association.

This year, the APEGS McCannel Award goes to



Malcolm Reeves, P.Eng., P.Geo., FEC, FGC.

Malcolm Reeves is a retired hydrogeologist and geological engineering consultant. He is considered one of the leading groundwater experts in western Canada and has authored numerous consulting and technical reports and published over 30 refereed and conference papers.

Malcolm was born in North Hykeham, a village in England. He attended Durham University and completed his undergraduate degree in Geology in June 1968 and his PhD in Engineering Geology in 1971.

Malcolm worked as an engineer and geoscientist in Britain in industry, government and academia from

1970-1982. He moved to Canada in 1982 when he accepted a position as professor of geological sciences at the University of Saskatchewan.

Over a 29-year period, from 1982 to 2011, he led the Geological Engineering program in the department and served in a number of other roles at the U of S. While a member of geological sciences, Malcolm served continuously on the department curriculum committee, numerous committees in Engineering and several committees in Arts and Science including the College Review Committee.

He retired as Acting Associate Dean of Engineering at the University of Saskatchewan in July 2011.

Malcolm helped found consulting firm MDH Engineered Solutions in 1995. MDH was sold to SNC-Lavalin on July 1, 2011, the same day Malcolm retired from the U of S. Malcolm has subsequently worked for SNC-Lavalin and SRK Consulting.

Malcolm has always been an active contributor to his professions. With APEGS, Malcolm has served on many committees and as a councillor. He is currently a member and past Chair of the Canadian Engineering Accreditation Board responsible for national accreditation of engineering programs in Canada.

In 2009 he became a Fellow of Engineers Canada and in 2013 became a Fellow of Geoscience Canada.

Malcolm and his wife Maryce have two sons and two grandchildren, all of whom live close to them in Saskatoon.

Until 2014 when he injured his knee, Malcolm was an avid runner. He completed 14 marathons and numerous 10k and 20k races all over western Canada.

He also collects and plays acoustic guitars. He currently has eight in his collection.

The Outstanding Achievement Award

The Outstanding Achievement Award was created in 1998 to honour members who show technical excellence and achievement in engineering or geoscience in Saskatchewan.

This year, the APEGS Outstanding Achievement Award goes to



Klaus Ottenbreit P.Eng., A.Sc.T.

Klaus Ottenbreit was born and raised in Regina, where he attended Miller Comprehensive High School.

After high school, he received a diploma in Electronics Technology from the Saskatchewan Institute of Applied Science and Technology in Moose Jaw. Upon graduation he worked as a technologist for two years.

In 1979, Klaus accepted a position in the Faculty of Engineering, University of Regina as a laboratory instructor. Klaus's knowledge and interest in electronics flourished while at the university. He obtained a Bachelor of Science in Electronic Information Systems Engineering while working full-time.

Klaus pioneered many of the labs and lab performance standards in the Electronic Systems Engineering program, and provided laboratory instruction in a diverse range of subject material. He was the technical supervisor and mentor to hundreds of undergraduate student thesis projects.

Klaus's role as laboratory instructor evolved over the years to include some classroom lecturing. He was responsible for the creation and delivery of an instrumentation class that continues to be offered to this day.

He was on various university committees during his tenure at the university. Over the 22 year span, Klaus estimates having taught well over 1,000 students. In 1999, Klaus was recognized for his teaching excellence and received a University of Regina "Inspiring Teaching Award."

In 2001, Klaus left the university and accepted a position with SaskTel Mobility as a radio engineer. Klaus was responsible for the detailed planning, engineering design, site selection, costing and documentation of SaskTel's new digital network.

Klaus moved into a senior planning role at SaskTel where he was responsible for the long-term strategic vision of SaskTel's cellular and wireless broadband network.

In 2008, Klaus left SaskTel and accepted a position with CUETS Financial as Vice-President and Senior Smart Card Strategist on the payment solutions and innovation team.

In 2011, Klaus rejoined SaskTel as a strategic technology planner. In this role, he helped lead the LTE cellular technology deployment.

Klaus now works as a strategic planner within the marketing team, providing analysis of potential and viable technologies and services suitable for SaskTel as well as acting as a liaison to the technology and information systems strategy teams.

Klaus and his wife have a daughter who is currently attending the University of Regina. Outside of work, Klaus is an accomplished musician, playing trumpet in three different bands and playing either guitar, bass or trumpet in two church groups.

He has played with the Regina Symphony Orchestra in the past and has even shared the stage as part of a trumpet trio with the principal trumpet of the National Arts Orchestra from Ottawa.

Brian Eckel Distinguished Service Award

The Brian Eckel Distinguished Service Award was established in 1978 to recognize outstanding contributions in service to the community, the Association, technical and learned organizations, as well as to honour distinctive and outstanding achievements in professional and technical fields. The Distinguished Service Award is an honour given only to those who truly exemplify the best standards of engineering and geoscience in Saskatchewan.

In 2004 this award was renamed the Brian Eckel Distinguished Service Award in recognition of Brian Eckel's contribution to society, the profession and the Association.

This year the Brian Eckel Distinguished Service Award goes to



Albert Munro, P.Eng., FEC, FGC (Hon.)

Bert Munro is the Vice President and General Manager of Associated Engineering for the Saskatchewan and Manitoba Region, where he is responsible for the business and engineering operations of the company. He is also the Vice President and General Manager of ATAP Infrastructure Management and the Director of the Asset Management Division for the Associated Engineering Group of Companies.

Bert likes to say that he was almost born in Saskatchewan but not quite. He was born, raised and worked in the mines in Flin Flon, Manitoba. It's also where he met his wife Leila who was from Creighton on the Saskatchewan side of the border.

After marrying in 1978, Bert and Leila moved around a good deal, including Winnipeg, The Pas, Saskatoon and then Alberta where their son Russ was born.

They finally settled down in Saskatoon where their daughter Teaghan was born and where the Munros have lived ever since.

Bert first earned a diploma in Water Resources Engineering Technology through SIAST before studying biology at the University of Manitoba. After that, Bert received a Bachelor of Science in Civil Engineering from the University of Saskatchewan.

Much of this has been in remote locations and for northern and First Nations communities. With over 35 years of experience in municipal and water resources engineering, project and business management, Bert has developed a keen interest in the roles of the engineer, contractor, owner and the public, in infrastructure planning, development and management.

Recently Bert has been involved in the Regina Bypass P3, the City of Saskatoon raw water supply and Avenue H Water Treatment Plant expansions.

Bert is a Past President of APEGS, the Western Canada Water and Wastewater Association and the Consulting Engineers of Saskatchewan, and Past Chair of ACEC-SK. Bert has also served as a volunteer with the Canadian Society for Civil Engineering; the University of Saskatchewan; SIAST; the Columbarium at St. John's Cathedral in Saskatoon; and the Canadian Cancer Society.

Bert is a past recipient of the McCannel Award. He is a Fellow of the Canadian Society for Civil Engineering and Fellow of Engineers Canada and an Honorary Fellow of Geoscientists Canada. Bert has been recognized by the American Water Works Association, Western Canada Water, APEGS, ACEC-SK and the Lt. Governor of Saskatchewan with the Meritorious Achievement Award. He was also recently honoured by the Canadian Cancer Society.

Bert is planning to retire from AE as of June 30 this year. He plans to invest his free time travelling and volunteering.

News Beyond Our Borders



www.japantimes.co.jp

Industrial robot market growth in China

Electronics360 - China accounted for 13 per cent of global industrial robot sales revenue in 2015, and is expected to comprise 25 per cent in 2020.

The Chinese market for industrial robots reached an estimated \$1.3 billion in 2015. This market is expected to grow at a compound annual growth rate (CAGR) of 20 per cent, reaching \$3.3 billion in 2020, according to IHS Inc., the leading global source of critical information and insight.

As capacity utilization begins to increase in 2018, industrial robot adoption will accelerate as end-users start to optimize the technology in their factories, and prices fall. Increasing labour costs, low commodity prices, and competition from other low-cost manufacturing regions will promote further adoption of industrial robots. The effect of China's 13th strategic plan is expected to positively impact growth in beginning in 2018, providing direct access to credit and tax relief, which will increase investment.

Robot suppliers headquartered outside of China accounted for over 80 per cent of 2015 industrial robot sales in China. These companies maintain a dominant presence in the market because they have established relationships with leading end-users and provide high-quality hardware, software and support services.

Engineers and Geoscientists New Brunswick doing its part to meet 30 by 30

Engineers Canada - A recent newspaper insert profiles Engineers and Geoscientists New Brunswick's efforts to encourage more women to study engineering as part of their 30 by 30 activities.

For example, the association has created a Diversity and Inclusion Committee to look at broadening the diversity of the engineering profession in New Brunswick and the committee is actively increasing the number of scholarships and networking opportunities for women in the profession. Just this past year, the committee introduced the Jocelyne Roy-Vienneau Undergraduate Engineering Scholarships for Women, two annual scholarships that are awarded to female engineering undergraduate students at UNB or the Université de Moncton.



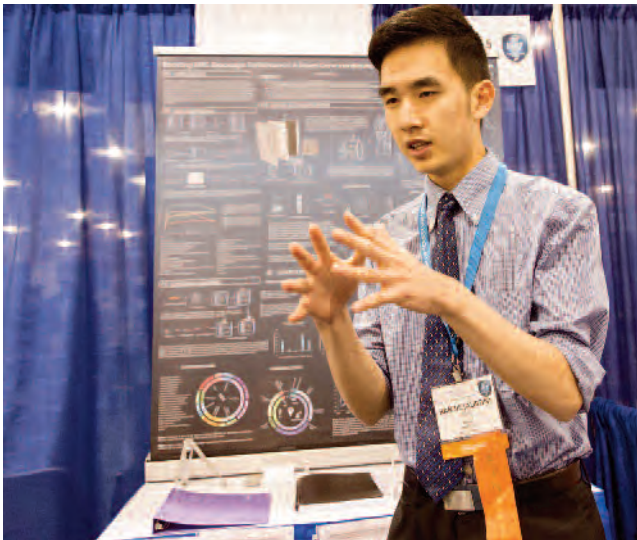
APEGBC members identify areas of success and for improvement

APEGBC - Just over 2,000 members participated in APEGBC's recent Member Satisfaction Survey, which assesses the alignment between APEGBC's duty, programs and services, and members' expectations and perceptions.

Overall, the survey found that satisfaction across all areas amounted to 65 per cent. Findings showed that the highest levels of satisfaction related to the resources available about ethics, law and conduct, interactions with APEGBC staff and the information available about members' obligations under the Code of Ethics.

Areas of lower satisfaction related to access to Council (40.76 per cent), information available about the Practice Review program (38.98 per cent) and APEGBC's professional development course offerings (35.01 per cent).

The majority of respondents indicated they felt APEGBC is fulfilling its duty. The minority who felt APEGBC is not fulfilling its duty indicated perceived shortfalls in the following areas: protecting the interests of members and licensees (63.09 per cent) establishing, maintaining and enforcing standards of professional and ethical practice (24.51 per cent), and establishing and maintaining academic and experience standards for entry to the professions (16.16 per cent).



mms.businesswire

Canadian student wins top prize at international science fair

Canada Newswire - For the second year in a row, a Vancouver high school student was awarded first place at this year's Intel International Science and Engineering Fair, which is the world's largest high school science research competition.

Han Jie (Austin) Wang, 18, is the recipient of the first place Gordon E. Moore Award and US\$75,000 for developing microbial fuel cells (MFCs) that more efficiently convert organic waste into electricity.

His win follows that of Raymond Wang, who won first place in 2015 for engineering a new air inlet system for airplane cabins to improve air quality and curb disease transmission.

Canada had an excellent showing at this year's fair with eight students winning awards.

The Intel International Science and Engineering Fair, a program of the Society for Science and the Public, honours the world's most promising student scientists, inventors and engineers. Finalists are selected annually from hundreds of affiliated fairs. The 2016 Intel International Science and Engineering Fair featured more than 1,700 young scientists selected from 419 affiliate fairs in 77 countries, regions and territories.

Robot falcon chases away birds

Electronics360 - A robot designed to mimic the look and flight of a peregrine falcon to scare birds away from airports and waste processing plants has made its maiden flight at an airport in Germany. The bird is the flagship product of Netherlands-based Clear Flight Solutions. In addition to testing the robot bird, the company is also training its pilot to watch for air traffic. According to the



www.audubon.org

company, bird control at airports worldwide costs billions of dollars, the result of defacement of property by bird droppings and damage to aircraft equipment arising from bird strikes.

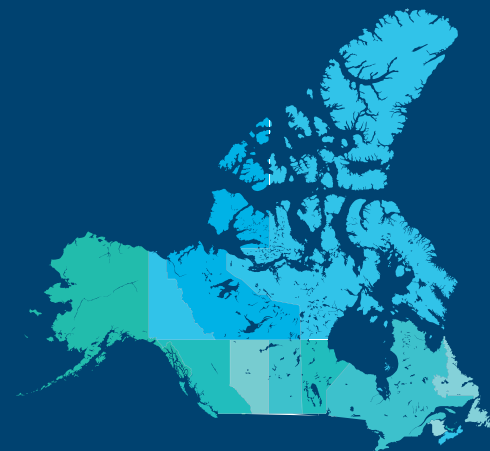


http://factor-tech.com

3D printed clothing

Electronics360 - Personalized 3D-printed clothing is the goal of a project led by Loffborough University that its developers hope will change the way consumers shop for garments. Advancements in 3D-printed textiles have made it possible to produce 3D-printed garments directly from raw material such as polymer in a single manufacturing operation. This technology not only has the potential to reduce waste, labour costs and CO2 equivalent, the project partners say, but also can modernize clothing production by encouraging localized manufacturing and production.

News From The Field



Engineers hit by slumping economy

Regina Leader-Post - Saskatchewan's economy shrank by 1.4 per cent in 2015, the third-worst performance among the provinces, next to Alberta's 4 per cent contraction and Newfoundland and Labrador's 2.2 per cent decline, according to Statistics Canada.

Construction fell 19 per cent as lower oil prices led to a significant drop in oil and gas engineering construction, while other engineering construction declined as new mining capacity came on stream, the federal agency said.

Residential construction declined 15 per cent on weaker demand for housing, and non-residential building construction decreased 2.6 per cent. Support activities for oil and gas extraction also fell significantly, while oil and gas drilling decreased.

By contrast, mining and quarrying increased 13 per cent with significant gains in potash and uranium mining, StatsCan said.

Manufacturing output decreased 2.8 per cent as losses in machinery, primary and fabricated metal products, transportation equipment and chemicals were partly offset by gains in refined petroleum products, food products and wood products.

Lower economic activity contributed to decreases in wholesale and retail trade and truck transportation. Crude oil pipeline transportation rose 7.1 per cent as inventories were reduced, the report said.

Surprisingly, economic output for the mining and oil and gas sector actually grew in both 2014 and 2015 with increases of 7.7 per cent and 0.5 per cent respectively.

"We are simply measuring the fact that oil, gas, potash and uranium production did not decline in volume last year. The number of new wells being drilled and potash mines being constructed did," said Doug Elliott, publisher of *Sask Trends Monitor*.

Cameco, AREVA bring legacy trust fund to northern Sask.

Saskatoon StarPhoenix - Two nuclear resource giants have teamed up with community leaders in Saskatchewan's North to create what they hope is a lasting legacy trust fund focused on education, health, sport and recreation investments for youth.

In the small community of Buffalo Narrows, officials from Cameco and AREVA Resources Canada announced plans for the Six Rivers Fund, which they hope grows to more than \$50 million in the coming decades.

The fund has \$100,000 for community projects in 2016 alone. The corporations behind it say it "reflects a new approach" of resource development sharing. Representatives from northern communities control where the funds are allocated.

Developed in consultation with leaders from across the North, the fund is governed by a four-person board. Its initial members are from Fond-du-Lac, Pelican Narrows, the English River First Nations and Southend.

In order to be eligible, projects must have at least 25 per cent of their funding from other sources and applicants must demonstrate that the project is viable.

Vincent Martin, CEO and president of AREVA, said the fund is a way for the corporations to express their gratitude to the North, while helping build a strong workforce in the region through increased education and training.

UNIVERSITIES AND RESEARCH

New research infrastructure at U of S

LabCanada – Researchers at the University of Saskatchewan (U of S) will develop materials critical to sustainable energy development and other fields through \$577,000 funding from the Canada Foundation for Innovation (CFI). The project received the funding from the John R. Evans Leaders Fund.

The \$1.4-million funding will be used to purchase a state-of-the-art X-ray photoelectron spectrometer.

“This major investment will allow us to expand our critically important research into sustainable energy solutions and establish new research programs,” said Karen Chad, U of S Vice-President Research. “The instrument is a perfect complement to the Canadian Light Source synchrotron and will help our researchers push new boundaries of knowledge that will lead to new and improved materials.”

Through the powerful X-ray photoelectron spectroscopy (XPS) technology, the spectrometer blasts a material sample with a beam of X-rays. By measuring the sample’s response to the X-rays, the instrument gives researchers highly detailed information about the material’s chemical makeup. The XPS instrument analyzes the surface of a material rather than its bulk and is the only instrument able to provide the information on material surfaces that the three scientists require for their research.

One application will be in research into nuclear waste disposal. With XPS, researchers will be able to test if these materials are stable enough to keep radioactive waste locked away for thousands of years.

Other uses for the new instrument include research into developing better catalysts for processing sustainable biofuels and research into developing functional nanomaterials – extremely small-scale materials with many applications including protective non-stick coatings and water-repellent textiles.

Industrial partners in the local mining, manufacturing, nuclear and biofuels industries – many of whom already have working relationships with the researchers – will benefit from research collaborations involving the instrument. Additionally, the instrument will help in the training of more than 30 students and post-doctoral researchers each year.

Uplifting events for horses

Manitoba Co-operator - A new collaborative invention from a multidisciplinary research team at the University of Saskatchewan promises new hope for injured horses.

A research team from the University of Saskatchewan is hoping to improve the outcome for horses suffering from fractures or other musculoskeletal problems.

After a horse undergoes surgery to fix a fracture, it’s normally confined to a stall and given medication to alleviate the pain. However, due to a horse’s heavy weight and its strong flight response, recovery from musculoskeletal problems is uncertain.

A multidisciplinary research team at the University of Saskatchewan is hoping to change that by partnering with

RMD Engineering, a local firm, to design and build a robotic lift system, a University of Saskatchewan release says. The lift will help rehabilitate horses suffering from acute injuries and other musculoskeletal problems by providing mobility, weight distribution and support.

The lift can reduce and redistribute the weight the horse is carrying. The system allows the animal to be mobile with its weight partially or fully supported by the lift.

RMD Engineering has been involved with many other veterinary-related innovations at the university revolving around large-animal handling, including a “bovine tilt table.”

U of S student selected for international telecom technology project

Saskatoon StarPhoenix - A University of Saskatchewan engineering student has been selected to travel to China as part of Huawei’s “Seeds for the Future” program.

Megan Leach, a third-year engineering student, is one of 19 Canadian university students selected for the program, which aims to strengthen ties between Canada and China and explore opportunities in international telecommunications.

“This program creates an opportunity to connect Canadian engineering talent with the innovative research happening in both Canada and China,” Huawei Canada president Sean Yang said in a statement.

Leach is the only student from a Saskatchewan institution selected for the program. The other 18 come from institutions across the country, including the University of Toronto and the University of Waterloo.

Launched last year, the Seeds for the Future program provides students with opportunities to visit Huawei’s facilities and meet with its scientists and researchers.

Since 2011, the telecommunications giant has invested \$6 million in Canadian university research projects and programs.

University of Regina team wins robotic competition in the US

CKRM and Modern Farmer - Gerrish Farms is one of the oldest family-owned farms in Indiana, but it may also be ground zero for a movement that could bring sweeping changes to the future of agriculture: autonomous robotics.

The inaugural AgBot Challenge at Gerrish Farms attracted hundreds of interested students, engineers, industry partners and robotics enthusiasts who descended upon Rockville, Indiana, to watch teams demonstrate their homemade inventions. The specific challenge was to develop an unmanned seeding robot that could

autonomously plant two seed types in half-mile-long rows, all while being constantly tracked from a remote computer.

A team of three fourth-year engineering students from the University of Regina has won top honours in a farm robotic competition in Rockville, Indiana.

Ten teams participated in the AgBot challenge, including two from Saskatchewan.

The challenge was to build a complete robot seeder for corn.

One of the team members, Joshua Friedrich, says it took several months to plan and build the unmanned seeding device. He says the machine was required to seed 12 rows, half a mile long, and provide feedback to the user to be able to change the rate of seeding or the distance between seeds, seed types, and other factors.

The winning entry receives \$50,000. A second team entered in the competition included Regina engineer Nathan Muchowski.

This was the first event in a planned three-year series, each one targeting a different farm management need that the student teams and entrepreneurs have to solve.

U of R students' work highlighted at Project Day



Regina Leader-Post - Fourth-year engineering students at the University of Regina showcased dozens of final-year design projects at Project Day 2016. The conference-style event included sessions in which the senior students presented their projects and displayed them for the public. Here are a handful of those designs, projects and inventions:

EEG-Based Drowsy Driving Alert System - Drowsy driving can be just as dangerous as impaired driving, and Jesse Schmitz and Frank Elechi hope their project could help change that.

The EEG detects electrical activity in the brain and determines whether the subject is relaxed, focused or drowsy.

By frequently checking the readings, drivers — such as long-haul truckers — can determine when they are becoming too tired to safely stay on the road.

Human Powered Kitchen Mixer - Developing countries often don't have the benefit of reliable power, which hampers the work of kitchens and bakeries. Students Syed Mehroz Ali, Christopher Chmielewski and Ibim Inko-Tariah are looking to simplify that process through their human-powered kitchen mixer, which allows a person to pedal the device like a bicycle.

The invention allows bakeries to increase productivity through mechanization and human power, since lack of funds and unreliable electricity often prevent the purchase or use of kitchen appliances.

Hydraulic Hose Builder - With hydraulic hose a common item in agriculture, mining and construction, students Micheal Tymiak and Ben McVicar set out to find a simpler and quicker way of attaching fittings to the ends on hoses — currently a largely manual process.

The prototype is described as portable, light, versatile and easy to use, cutting down significantly on the time it takes to work with the hose. Tymiak and McVicar say the design also cuts down on wrist injuries from repetitive manual hose installation.

EZ Shot: Hockey Puck Return System - For hockey players looking to practise shooting and receiving, collecting those spent pucks is a thing of the past — should the prototype designed by Josh Hextall, Tyler Kenny and Wesley Taylor catch on.

The trio describes the prototype as lightweight, portable, easy to assemble and operable off a cordless power supply, with pass speeds between 32 and 64 kilometres per hour. While there is more work to be done in terms of perfecting the system, it is intended to be used by both adults and kids.

OIL AND GAS

Husky Energy begins production at Edam East

OilVoice - Husky Energy has started production at its Edam East Lloyd Thermal Project in Saskatchewan, the first of three thermal developments scheduled to come online this year.

First oil at the 10,000 barrels per day (bbls/day) development was achieved about seven weeks following the startup of steaming operations.

“Our growing portfolio of heavy oil thermal projects continues to lead Husky’s transition into a low sustaining capital business,” said CEO Asim Ghosh. “Edam East is

another example of the quick ramp ups that we've come to expect from these developments, which have operating costs amongst the lowest in the industry."

Husky's operating costs for its Lloyd thermal product line averaged about \$7 per barrel, including energy, in the fourth quarter of 2015.

Two additional Lloyd thermal projects are expected to begin production in the third quarter: the 10,000 bbls/day Vawn project and the 4,500 bbls/day Edam West project. Husky's total thermal production is expected to reach approximately 80,000 bbls/day by the end of 2016.

Husky's thermal projects are supported by the Lloyd value chain, which originates with the company's extensive resource in the Lloyd area and includes the Saskatchewan gathering system, the Upgrader and asphalt refinery, and oil storage capacity at Hardisty, Alberta.

INFRASTRUCTURE

Sinkhole woes in Saskatoon

Saskatoon StarPhoenix and CTV – Potholes aren't often a topic of academic debate but the massive sinkhole on Saskatchewan Crescent in Saskatoon has everyone talking.

Ian Fleming, P.Eng., a Professor of Geotechnical Engineering at the U of S, said the banks of the South Saskatchewan River are littered with similar slides, adding the Saskatchewan Crescent slope failure is no different than any occurring outside of the city.

"Landslides are very, very common in the deposits of this part of the world," he said.

Fleming said the geotechnical professionals in Saskatoon are "second to none," worldwide and are very capable of assessing what — if anything — can be done.

"While geotechnical engineers can't always make everything perfect for those who have built property in places that are prone to sliding, certainly a rigorous evaluation can help us to understand what we can and can't do to avoid making things worse.

But University of Saskatchewan Geology Professor Brian Pratt, P.Geo., disagrees. He says rebuilding the road on Saskatchewan Crescent, which has collapsed 2 more metres since last week, would be an ongoing task for years to come.

Mayor Don Atchison said last week engineers would be brought in to evaluate the slump and come up with a solution to fix the collapse. He said rebuilding work will likely begin in the late summer or early fall.

Pratt says attempting to fix the road would be a waste of money.

"Probably no amount of engineering is going to save this street," Pratt said.

MINING

De Beers eyes diamond exploration in northern Saskatchewan

Saskatoon StarPhoenix – The world's largest diamond mining company has entered into a multi-million-dollar agreement to look for crystallized carbon in northern Saskatchewan's Athabasca Basin.

De Beers Canada Inc. optioned land claims south of Lake Athabasca from CanAlaska Uranium Ltd., and can now explore and drill 75 "kimberlite-style targets" identified in the 2011 Saskatchewan Geological Survey.

Kimberlite is a volcanic rock famous for containing diamonds. A kimberlite target is a geological formation — described as a "gas volcano" — extending more than 100 kilometres below ground that can propel diamonds close to the surface.

Under the agreement, De Beers can invest up to \$20.4 million in four progressive stages spread over seven years. Each investment would earn the global diamond giant a progressively larger stake in the project, up to a total of 90 per cent.

If it chooses to proceed, De Beers will conduct a detailed airborne survey, sample for diamond indicators near the targets and then "drill test" prioritized targets, the Vancouver-based uranium company said. CanAlaska can participate as a joint venture partner.

Fortune's fortunes expand as electric car market grows

Fortune Minerals press release – Tesla Motors' exotic electric cars have down-to-earth importance for Fortune Minerals Limited. The company owns a vertically integrated gold-cobalt-bismuth-copper development, consisting of a planned mine and concentrator in the Northwest Territories and refinery near Saskatoon to process concentrates from the mine to higher value products.

Tesla Motors made automotive history on March 31, 2016 with the launch of its Model 3 electric vehicle, receiving 325,000 pre-orders of these cars in the first week.

This heightened demand for high-performance batteries is good news for Fortune Minerals, one of the few companies in the world with the potential to produce battery-grade cobalt.

The project has already been assessed in a positive

feasibility study and has received its environmental assessment approvals in the Northwest Territories and Saskatchewan.

URANIUM AND NUCLEAR

500 jobs lost in Sask as Cameco shuts uranium mine

The Canadian Press - An oversupply of uranium around the world, caused in part by the shutdown of nuclear facilities in Japan, has resulted in Cameco suspending its Rabbit Lake uranium operation in northern Saskatchewan.

The company announced that 500 jobs will be lost at the non-union mine and about 85 at its US operations, including employees and long-term contractors.

Company CEO Tim Gitzel said the mine was old and small compared to the company's two large mines in the province, which each produce as much as 9.7 million kilograms of uranium a year. Rabbit Lake only produced about 1.8 million pounds.

In addition, he said the market has been soft for about five years since a 2011 earthquake and tsunami caused a nuclear meltdown at three reactors in Fukushima, Japan, with uranium selling for about two-thirds less than it did before the accident.

Cameco said it will offer employees exit packages and will consider relocating workers to other Cameco facilities and job-sharing options. About 150 people will be kept on at Rabbit Lake to maintain the facilities and do environmental monitoring and reclamation.

Small reactors could be “game-changer” for Saskatchewan: SaskPower VP

Saskatoon StarPhoenix - SaskPower has no plans to build a nuclear power plant within the next decade, but small modular reactors (SMRs) could be a “game-changer” for the province in the long term, according to the Crown corporation's Vice President of Transmission.

“(It is) something we're looking at,” Tim Eckel said in an address to the Saskatchewan Chamber of Commerce's annual general meeting, held in Saskatoon.

Traditional nuclear power plants have a generating capacity of at least 600 megawatts (MW), which makes them unsuitable for Saskatchewan's comparatively small electric grid, which currently has a maximum capacity of 4,400 MW, Eckel said.

If a nuclear plant responsible for producing a sizable portion of the province's power went off-line, the demand for electricity could suddenly outstrip supply, leading to problems, he said.

However, SMRs with a generating capacity of between 300 and 400 MW — slightly smaller than SaskPower's big coal- and natural gas-fired plants — would likely make sense in Saskatchewan, Eckel added.

In a 2008 feasibility study, Bruce Power Limited Partnership, which operates a nuclear plant northwest of Toronto, said Saskatchewan will likely require at least 1 000 MW of nuclear generation capacity by 2020.

A plant north of Saskatoon would likely cost between \$8 and \$10 billion, but contribute \$240 million annually to the provincial economy and create 1,000 permanent jobs over its 60-year lifespan, the study said.

A 2014 study conducted at the University of Saskatchewan found that 50.3 per cent of Saskatchewan residents had a positive impression of nuclear power generation, while 22.9 per cent had a negative impression and 18.5 per cent reported no opinion on the subject.

Several companies in the United States, China and other countries are developing SMRs.

ENVIRONMENT

Refinery launches massive water recycling facility

Co-Op Refinery Complex press release - Oil and water don't usually mix but they did at the Co-Op Refinery Complex (CRC) in Regina as Co-Op officials announced the completion of CRC's Wastewater Improvement Project (WIP).

WIP is aimed at making CRC's operations more environmentally sustainable by reducing the amount of fresh water used in its operations and limiting the amount of outgoing wastewater.

Construction of the facility began in the fall of 2014. With a price tag exceeding \$300 million, WIP is one of the largest private sector megaprojects in the province's history. WIP uses state-of-the-art biological technology to recycle 65 per cent of the refinery's wastewater, allowing it to reduce its use of fresh water by nearly 30 per cent.

Following CRC's Section V expansion, the refinery's water use rose to 2,125 US gallons per minute (GPM). Now, with WIP fully operational, water use is expected to decline to 1,600 GPM. The reduction is the equivalent of the water use of 3,100 households.

In addition, WIP will reduce strain on the city's wastewater treatment facilities.

Calendar Of Events



Introduction to Stormwater Management

June 15, 2016, Nanaimo, BC
www.apeg.bc.ca

Soft Skills to Enhance Your Career & Life

June 16, 2016, Vancouver, BC
www.apeg.bc.ca

VISTA Expo 2016 – Vancouver Island Sustainable Technology Association

June 17, 2016, Langford, BC
www.vistaexpo.ca

Fatigue Design and Failure Analysis

June 20, 2016, Richmond, BC
www.apeg.bc.ca

Canadian Academy of Engineering

June 27-28, 2016, Winnipeg, MB
www.cae-acg.ca

What Does it Take to Achieve Net-Zero Low-Carbon Building Energy Solutions?

June 28, 2016, Vancouver, BC
www.apeg.bc.ca

Fundamentals of Power Systems for Non-Electrical Engineers

July 14-15, 2016, Vancouver, BC
www.apeg.bc.ca

PNWER 26th Annual Summit

July 17-21, 2016, Calgary, AB
www.pnwer.org/upcoming-events.html

International Mineral Processing Congress - IMPC 2016

Sep 11-15, 2016, Quebec City, QC
www.impc.org

MainTrain 2016: Sustainable, Effective, Evolving

September 19-22, 2016, Toronto, ON
www.MainTrain.ca

Geological Society of America Annual Meeting 2016

September 25-28, 2016, Denver, CO
www.community.geosociety.org/gsa2016/home

Building a Personal Brand and Selling Skills for Engineers & Geoscientists

September 29, 2016, Vancouver, BC
www.apeg.bc.ca

69th Canadian Geotechnical Conference

October 2-5, 2016, Vancouver, BC
www.geovancouver2016.com

Canadian Design-Build Institute Conference 2016

Oct 13-14, 2016, Winnipeg, MB
www.cdbi.org/conference/2016-conference/

Ingenium 2016 - Professional Development Seminars

Oct 27, 2016, Winnipeg, MB
www.apegm.mb.ca