THE PROFESSIONAL

EDGE

ISSUE 156

MAY/JUNE 2015

2015 Annual Meeting

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President's Report

APEGS President
Margaret Anne Hodges, P.Eng., FEC

A week before our annual meeting, a good friend asked the proverbial, "What's new?" As I opened my mouth to answer I realized there was so much to say, and the magnitude of the APEGS President role struck home. I didn't know where to start.

Fortunately I overcame my (highly atypical) speechlessness quickly and explained that I was looking forward to the Professional Development and Annual Meeting weekend and that I was assuming the role of President of APEGS. A quick congratulations followed, and then an onslaught of questions: "What does the role entail?", "What opportunities and challenges face the organization?" and "Are you the first woman president?"

I responded to the last question by proudly saying, "No, I am not first, I'm the third—and that's a good news story." In fact, the good news continues: our President-Elect, Tara Zrymiak P.Eng, will be our fourth woman president. In March, at the University of Regina's Inspiring Leadership Forum, guest speaker Kim Campbell, the former Prime Minister, addressed this very point. She noted that you don't want to be first: you want to be part of a clear change, in which being a woman is part of the norm—a very good observation.

Something else I told my friend was that Council is 30 per cent women, a significant number because of the Engineers Canada 30 by 30 goal—to have 30 percent of new members in the professions be women by 2030. That's a milestone of great importance, because that's the point at which the number of women in the professions becomes sustainable and noticeable to the general populace, which in turn means more young women recognize they have the opportunity to pursue engineering and geoscience as career choices: to join our professions, which contribute significantly to making the world a better place. So while there is still a way to go overall, we are making progress.

As for the second question, "What opportunities and challenges face the organization?", the issues we will be working on include:

Continuing Professional Excellence (CPE). For years now it has been mandatory that members "keep themselves informed in order to maintain their competence..." In the past few years APEGS has worked to improve the on-line reporting system and provide more opportunities for professional development activities. Seven of our sister associations have adopted mandatory reporting and others are evaluating taking the next step. It's time for APEGS to start planning a path in that direction. Why? Taking this action demonstrates to the public that assuring public safety in the practice of our professions is of vital importance to us all.

Recommendations from the Surplus Task Force were presented at the Annual Meeting. There are a number of options for Council to consider, from a study to communicate to provincial decision-makers the economic and public value which engineers and geoscientists provide to Saskatchewan, to additional forms of professional development, to additional assistance for regulatory process improvements.

APEGS will be paying attention to the initiatives being considered and prioritized as part of Geoscience Canada's Moving Forward Implementation Plan. Engineers Canada also has a number of initiatives, such as the Educational Credential Assessment, Framework for Regulation, and results of the Linkages Task Force.

And finally, in response to the first question, "What does the role entail?", I answered that I was looking forward to the leadership role on Council as we address the opportunities ahead of us.

This will start at our New Council Orientation Session in June. This is a great opportunity for Council and committee chairs alike to gain an understanding of what is expected of them, their responsibilities, and their fiduciary responsibility as an APEGS Council member. We will also kick off the APEGS Value Proposition (AVP) Planning Session to identify committee initiatives and align those activities to APEGS' Vision, Mission and Values. The APEGS volunteer community is over 200 strong, and Council wants to help the committees' efforts to achieve the goals established in the AVP and implement their many great ideas through defining ownership of initiatives and actions, ensuring resources are available and budget is identified for the coming year. Volunteers are the heart and soul of APEGS, and we want to see them succeed.

I am likewise looking forward to representing APEGS at Canada's Constituent Association events across the country, and at Engineers Canada and Geoscience Canada meetings. Typical of Saskatchewan people, APEGS tends to bring a voice of realism and pragmatism to the national scene, whether it be through our contributions and feedback on Engineers Canada and Geoscience Canada committees, our actions at home, or the relationships we develop across the country.

Congratulations to Dr. Ernie Barber, P.Eng, P.AG, coming onto Council as Vice-President, and Tara Zrymiak, P.Eng, FEC, taking on the role of President-Elect. Welcome and congratulations to our new Councillors, Holly Annand, P.Eng, Kristen Darr, P.Geo, and Kaylee Puchala, Engineer-in-Training, and welcome back to our returning Council members. I look forward to working with you all. I am sure it will be an exciting and active year.

My thanks to Andrew Loken, P.Eng, FEC, for being a role model over the past year and providing me with additional insight into the job ahead. As well, the coming year would not be possible if not for the support of my employer, SaskTel, and my Director, Colleen Madden, P.Eng, for allowing me the development opportunity of a lifetime.

Finally, thanks to my family, husband Edward Willett and daughter Alice Willett, for all the support they have provided me in the years leading up this one, and their encouragement for the year to come.

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Professional Development Lunch

DR. LOWELL CATLETT, FUTURIST

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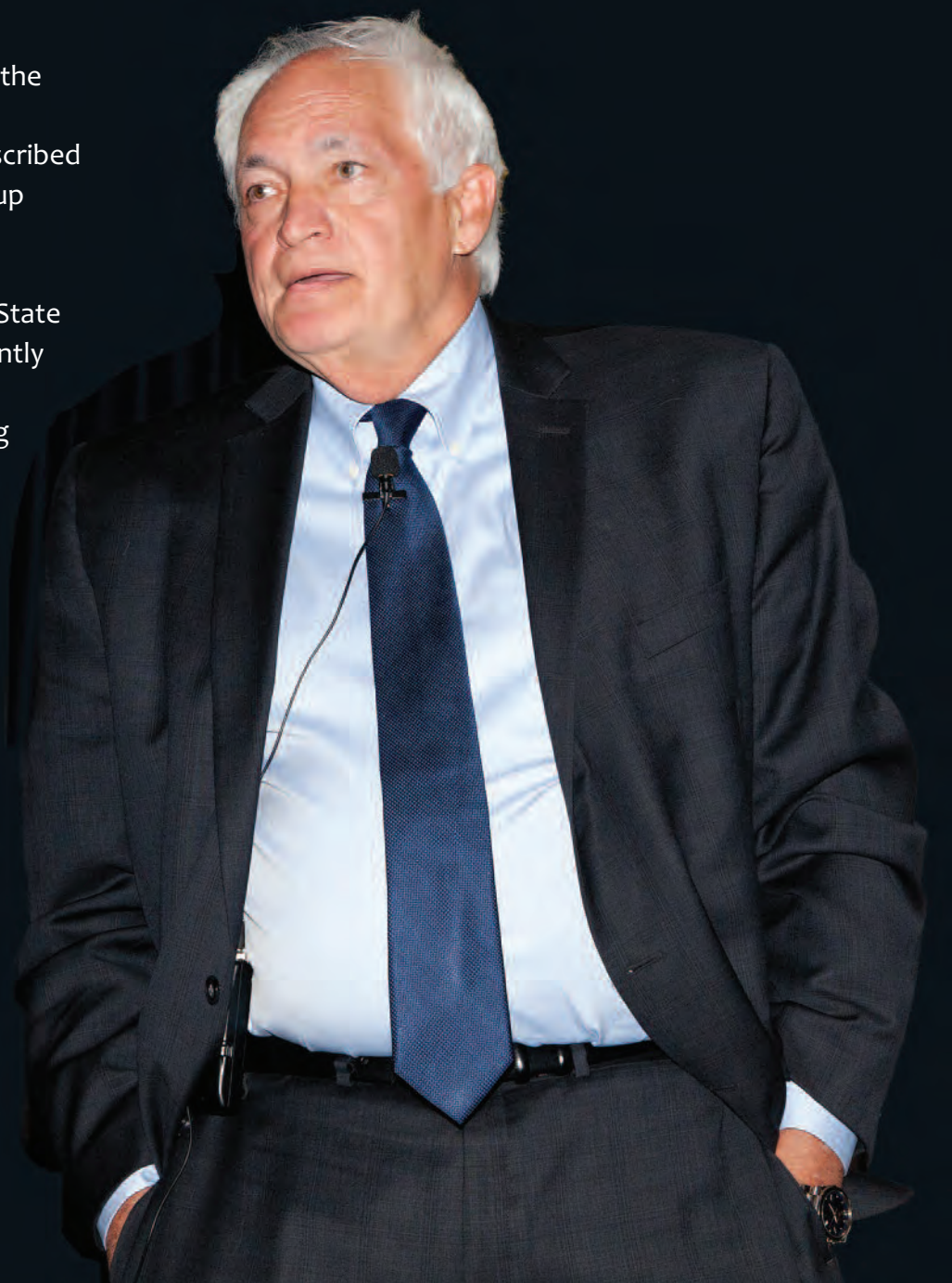
As an expert in agricultural economics, futurist Lowell Catlett has some peculiar advice about experts: don't trust them.

Catlett's keynote speech at the Professional Development Luncheon could be best described as half TED Talk, half stand-up comedy routine.

The garrulous New Mexico State University professor frequently punctuated his insightful statistical analysis by waving his gangly arms, rubbing his face in disbelief and pulling at his mop of white hair, using physical as well as verbal mockery to deflate his peers in the profession of prognostication.



Catlett kicked off his presentation by urging the audience to take all expert predictions with a grain of salt. We walked through numerous examples and statistics that showed that in the long term (five years and up), predictions made by experts were no more likely to be accurate than wild guesses made by amateurs.

"The only major difference was if the person was some sort of celebrity. If the person was famous, the accuracy of their predictions was 5 per cent lower than that of amateurs," Catlett said.

For this reason, Catlett focused primarily on trends that had occurred in the past or that were going on right now and used those to focus on what the world would need to do, rather than predicting what would happen.

Catlett focused on the under-reported good-news story of the dramatic drop in world poverty of the last 25 years, which is leading to an ever-growing proportion of the human race becoming middle class. This new-found consumer wealth around the world has generated what Catlett calls the "crap factor."

"This new middle class wants things. They now already have everything they need so now they want to spend their money on stuff they want. Who can help with that? Engineers!"

As well, Catlett noted that the emerging middle class would dramatically increase demand for food, which could require the world to more than double its output of meat in the next few years. The only way to achieve that, Catlett asserts, is through more intensive agriculture and genetic engineering.

Such practices fly in the face of modern North American tastes for organic food for which Catlett expressed disdain.

"We've got so much money, we've gotten picky. We would never have gotten away with that attitude when I was a kid. On our farm, we had free-range chickens – they were called 'the neighbours'."

Catlett noted that people of his generation who grew up on North American farms are much more able to sympathize with people in Third World countries than many younger people.

"I can still remember when we did not have running water or electricity and when we did not have a great variety of food so it's easy for me to identify with people in other countries who are still emerging from that sort of life. I understand what a difference it makes to your life to have that sort of basic infrastructure."

Catlett noted that engineers have done more than doctors to extend human longevity through improvements in food production, food safety and water supplies. The skills of engineers will be increasingly in demand as more people demand and can afford these services.

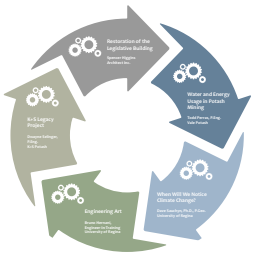
Delving into demographic trends, Catlett noted that the developed world was on the brink of replacing the largest generation – the Baby Boomers – with its smallest generation – the so-called Millennials.

"You hear a lot of Boomers criticize the attitudes and behaviours of Millennials, but look back on our history. We did drugs, protested, joined communes. We got it out of our system and then got on with the job of getting things done. So be patient with the Millennials – they'll figure it out too."

On the whole, Catlett painted a picture of a future of boundless optimism.

"We have a world with more money than it's ever known. We are growing more food than ever before. People are healthier, better educated and living longer than ever before. Exciting technological change is coming at us faster than we can imagine."

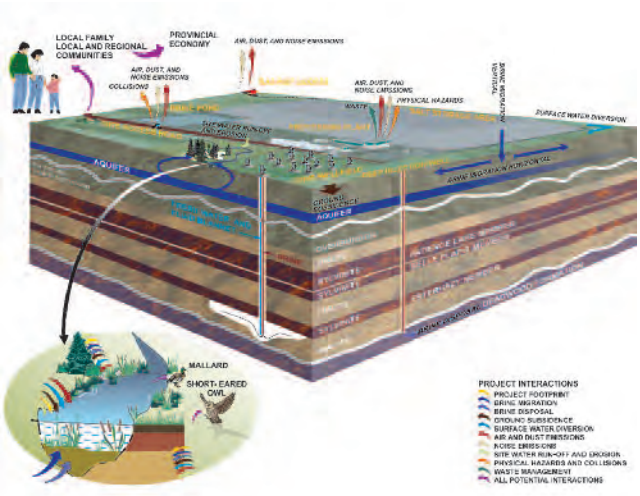
"The future is going to be a great place."



Water and Energy Use in the Solution Mining Process

Few people know that at the turn of the 21st century Saskatchewan was hit by a drought that was, technically, worse than the Dirty Thirties. You didn't notice this because the province has become a world leader in water management techniques. This expertise will be increasingly put to the test as company's expand water-intensive operations such as solution potash mining.

Todd Perras, P.Eng., Vale Potash Canada principal process Engineer on the Kronau Project, presented a track session on the water and energy recovery systems being planned for the proposed solution potash project.



Vale is a global mining company headquartered in Brazil. The company began exploring in the Kronau area in 2008 and is now in the construction planning stage of the project. They expect a final investment decision in 2016 and, if that decision is favourable, expect to begin construction around 2020. The Kronau Project is located approximately 25kms southeast of Regina along Highway 33, just north of the hamlet of Kronau.

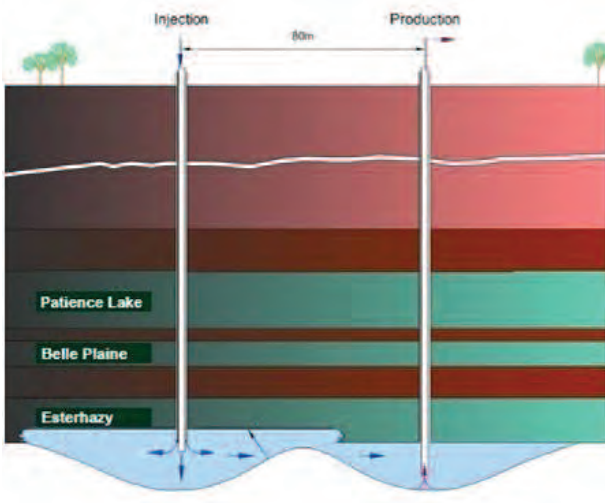
Solution mining, in brief, involves repeatedly pumping underground chambers with water and then distilling the potash out of the salty brine that's pumped out.

In the solution processs, wellfield brine is fed to evaporators where compressed vapour and steam are used to heat and concentrate the brine.

Obviously, this all requires a large and constant source of water. Vale's Kronau planning team, in consultation with the provincial Water Security Agency, plans to draw from Buffalo Pound via a 90km pipeline. The power for the evaporators will be supplied from an on-site cogeneration plant with a backup power supply from SaskPower.

The biggest losses of water result from the underground processes. Vale is aiming to minimize these losses by using the cavern development water efficiently, ensuring that the brine is as saturated with minerals as possible. They also plan to exclude areas that are high in impurities so that the water that comes out is as high in potash content as possible.

Vale also anticipates a significant loss of water to the atmosphere due to the evaporation process. The

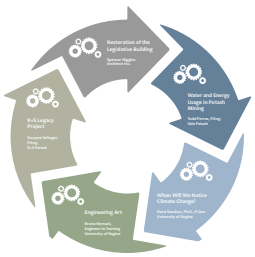


evaporation process will not only use up a significant amount of water. It will also consume the most energy. Perras estimates that evaporation will use up to 70 per cent of the facility's energy.

While the evaporators are the biggest user of energy, most of this energy is recovered using heat recovery systems. Multiple stages of evaporative cooling will be used to cool the brine and collect the potash. As the brine is flashed down to increasingly lower pressures in each stage, the energy that is released is used to reheat the brine from other stages in the cylce.

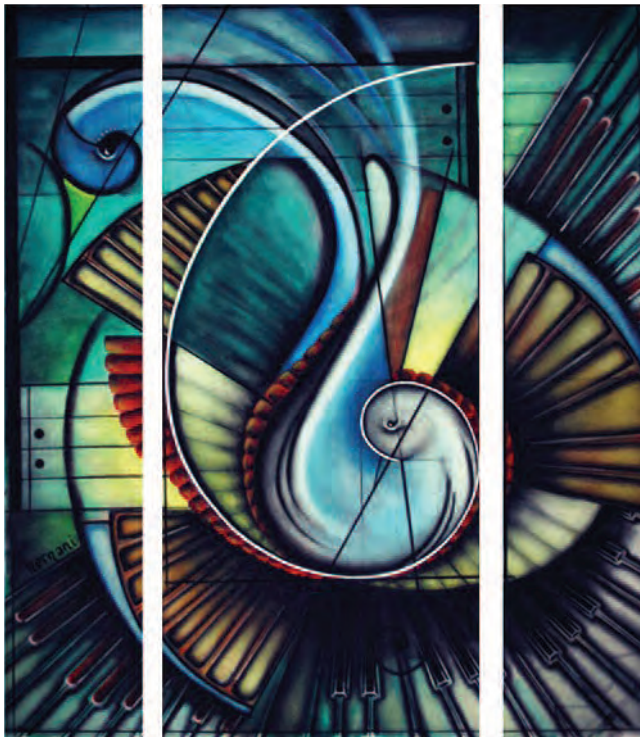
A number of other steps in the cycle will likewise use a portion of the mine's energy, but at every stage Vale engineers are working on solutions to keep the plant's water and energy use to a minimum.

All of this is good for the environment but it's also good for business. Perras noted that the recovery measures will help to keep the mine cost-efficient while also reducing its environmental footprint.



When Engineering Meets Art

One does not normally think of engineering and art being connected. Engineering is, after all, a field that demands logic and precision – more the realm of Mr. Spock than Salvador Dali. Yet Peruvian-born engineer and artist Bruno Hernani, Engineer-in-Training, has a different perspective.



"When I asked one of my art mentors if he thought there was a connection between engineering and art, he said 'they're not connected – they're the same'."

Hernani cited a number of examples of famous engineers who also had artistic sides, such as Leonardo da Vinci and Nicola Tesla.

As Hernani sees it, artistic and technical skill are like two sides of the same coin.

"In engineering, we are often searching for creative solutions to technical problems. In art, we try to develop better techniques, try to understand our materials better – the physical qualities of our brushes, paints and canvases – in order to overcome creative problems."

"By working at unifying the left and right sides of your brain, you can develop a transcendent creativity that helps both sides of your work."

In his own case, he noted that his love of art arose in part from his fascination with geometry. He walked through an example of how he goes about creating one of his abstract paintings. He starts by simply laying out a number of geometrical shapes on a canvas.

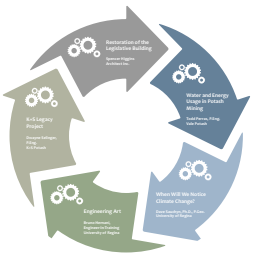
"I love to ponder the interactions of shapes – about the tensions and attractions among and between them. That leads me to start combining and extending shapes which then leads me to other inspirations."

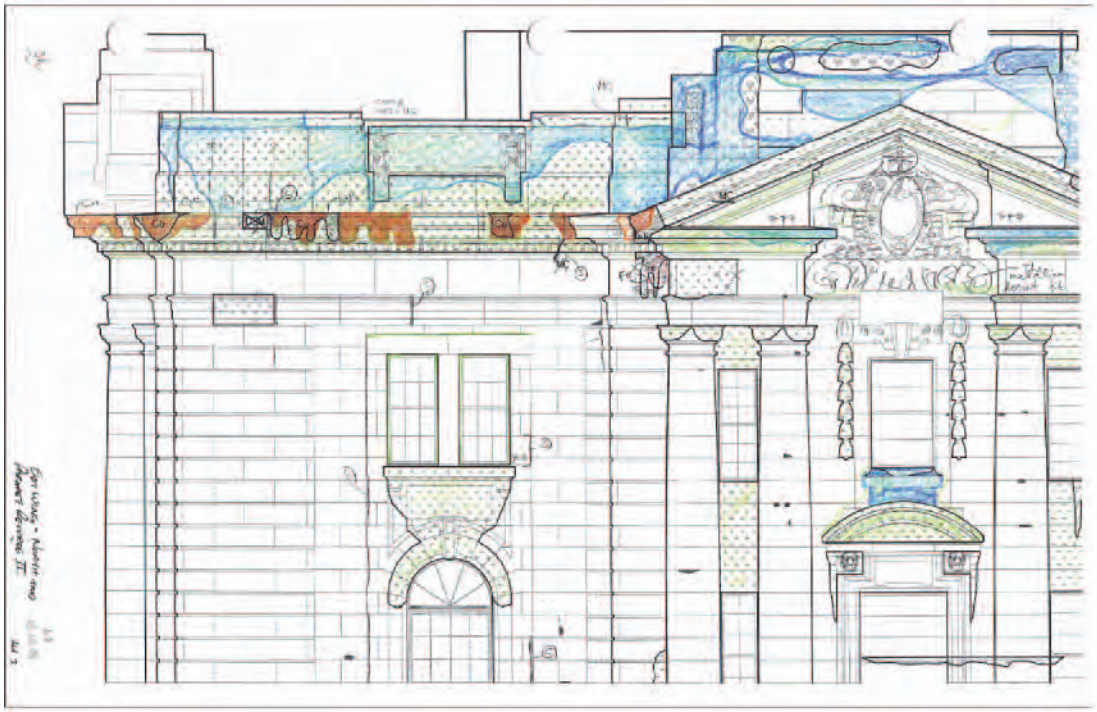
In the sequence he showed, Hernani combined a triangle and a semi-circle into a shape that reminded him of a bird. Many combinations, recombinations and colour experiments later, he completed an abstract work that conveyed the sense of a tropical bird.

"As I work through these combinations, it is like I am digging through layers of reality. It's much like the work of geologists examining rock samples or of any engineer gradually adding on layers of complexity to a project."

Even though art involves more of a sense of intuition and playfulness than most engineers would find comfortable, Hernani sees many convergences in the mindsets of both professions.

"In both my engineering and artistic work, I am focused on the solution, not the problem. In both cases, I look at reality and ask 'How can I improve it?' I think that's a question all of us are trying to answer."





Tower Conservation Project

There are many people in Saskatchewan who would be pleased to know that, at one point during renovation work, laser cannons were mounted on the roof of the provincial legislative building and pointed inward. Fortunately for the politicians inside, the lasers were only set on "scan."

Toronto architect Spencer Higgins described how the lasers and other innovative technologies have been used on what is likely the most important heritage preservation project in the province's history – the remediation of the century-old Legislative Building.

The current project is focused on the central tower structure but this isn't the first time it's undergone major work. Regina homeowners may feel a certain shameful glee to know that the legislative building suffers from the city's swampy soil just like every other building in the city. Throughout the 1980s-1990s, contractors overhauled the building's sub-basement to replace and enhance its underpinnings.

The records of this work, along with numerous conceptual and architectural drawings and photographs from the building's original construction, were all compiled into the historical structure report (HSR) which marked the first phase of Higgins's work.

Higgins found many of the HSR photographs intriguing and, in some cases, alarming.

"In one photograph, you can see that just 15 years after the legislature's construction there are areas that are

crumbling due to improperly installed eavestroughs that were never repaired," Higgins said.

Higgins and his engineering teams anticipated a slough of challenges in undertaking the restoration, not the least of which was Saskatchewan's winter weather which would not only take a toll on the workers but would also play havoc with various mortars, bonds and other materials that needed to cure.

From the outset, it was a given that the reconstruction would happen inside an enclosure. To work the bugs out of the logistics of an enclosure system, Higgins and his teams ran what was essentially a test run on a corner of the building on the east side of the entrance.

After that year, the team was ready to move on to constructing the main enclosure. This was delicate work that would require the enclosure to be built to a tolerance of within an inch of the main structure. The original architectural drawings in the HSR were far too inaccurate for this. That's when Higgins's team brought in the lasers which were used to create an extremely detailed scan of the building's structure.

"The laser scans – or 'point-clouds' as they're called – were converted into very detailed architectural drawings in a process that took four months. These drawings then became auto-CAD renderings – a process that took another three months. So scanning the building with lasers certainly was not a quick, easy fix. But it does the job of getting down to a few millimetres of accuracy."

In fact, when Higgins compared the new laser-guided drawings to the old architectural drawings, he found places where they varied by as much as a foot.

With this information in hand, Higgins's teams could proceed with building the enclosure around the dome and surrounding tower area of the building. It was built to be a complete temporary construction site including offices, bathrooms and an extensive heating and ventilation system.

The latter kept the enclosure at a comfortable 10 degrees even when there were howling minus 40 winds outside.

The heating system is not actually self-enclosed but pipes in steam from the legislative building's general heating system. This caused a humorous bureaucratic encounter with city building inspectors, who demanded to know why the team hadn't applied for a permit to install a temporary furnace at a worksite. It took a while to convince the inspectors that they weren't actually using one.

In addition to amenities for the workforce, the enclosure also features extensive safety and fire suppression equipment.

"If something happened up there, it would be impossible for city fire crews to get up there in time. With all of the rotted old wood we have exposed, the entire building could go up in a matter of minutes. We have to be fully prepared to get on top of fires before they spread."

An area of the building that is particularly vulnerable during renovation is the dome itself. Higgins's team peeled off the copper from the dome and found what Higgins calls "a rotten disaster." The underlying wooden structure of the dome had to be rebuilt and much of the copper has to be completely replaced.

Higgins's teams will also be replacing much of the stonework in the tower, which gave him an opportunity to re-examine the mortars used in the building. Much of the original mortar work is cracked and crumbling, a victim of the province's brutal freeze-thaw cycles.

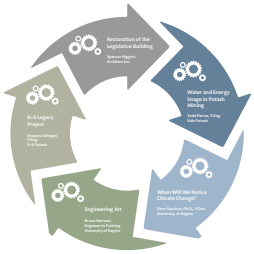
Higgins's goal was to develop a "100-year mortar" that could hold the building together in the face of harsh weather for another century. To achieve this, he examined hundreds of mortar formulations.

"Interestingly, we found that many ancient mortars were more durable than modern ones. When you think about it, this makes perfect sense when you think about some of the ancient buildings that have remained standing for millennia."

This isn't to say Higgins ignored modern innovations. He ultimately came up with his own formulation that enhanced ancient techniques with modern chemistry.

The $15 million rehabilitation project is now at its halfway point and should be complete in less than a year. But, as with any renovation project, this won't be the end of the road for upgrades to the legislative building.

"It's an old building that needs a lot of work. Renovations have been going on for the last 30 years and I would say to do a thorough job you would want to keep at it for another 20 years," Higgins said.



When Will We Notice Climate Change?

Renowned climate researcher David Sauchyn, P.Geo. began his presentation with an excerpt from the Canadian short story Broken Globe.

The story tells of a scientifically curious boy living in rural Alberta in the 1930s. He brings home a cardboard globe he made as a school project. His father, a poorly educated immigrant farmer, is angered that his son's head is being filled with "rubbish." He smashes the globe and then takes him out into the field.

"Look," he said very slowly and quietly. "She is flat and she stands still."

How do we in Western Canada know that the Earth is round and goes around the sun? We can't see it, feel it or experience it in any way. Yet we believe it because many scientists and astronauts have told us so.

In the same way, it is difficult to wrap our heads around climate change since it occurs on too large of a scale for us to perceive it. Any perceptions we have about climate are too local and short-term to be meaningful.

"What we experience is weather, not climate," Sauchyn said.

The up-and-down variability of short-term local weather patterns is part of the challenge in measuring truly global climate trends. This natural variability represents a sort of "background noise" which researchers must filter out before they can see the real patterns.

The presence of this noise also plays into the psychological tendency known as confirmation bias. Humans by their nature will go to great lengths to reject any information that is not consistent with their established beliefs. Also, as animals, human brains are hard-wired to be focused almost exclusively on our local environment so that long-term global thinking is extremely difficult.

To make matters worse, we in Western Canada happen to live in one of the places on Earth where the effects of climate change will be least noticeable at any stage.

"Here in Saskatchewan, we regularly go through days where there can be as much as a 20 degree variation in temperature from the morning to the afternoon. How would we ever notice a gradual two degree change in average temperature?"

But while we cannot sense these changes in our daily lives, climate scientists can detect it through studying long-term data. Sauchyn noted that, planet-wide, average temperatures have not been below average since 1985.

Although changes in air temperatures have levelled off in recent years, Sauchyn rejects suggestions that this means climate change has plateaued.

"Right now, most climate change is being absorbed by the oceans and glaciers. Because of this, the effects of climate change are affected by the natural El Nino and La Nina patterns which sometimes mitigate the effects and sometimes make them worse."

Sauchyn showed charts documenting that all rivers that flow from the Rockies have been steadily declining over time. From a human perspective, this has been hard to perceive because the trends can go back and forth over the course of decades.

"A full climate phase is 50 years yet we've only been collecting detailed climate data for about 100 years," Sauchyn said.

To compensate for this deficiency, Sauchyn's team and other researchers look at core samples from trees and polar ice. What these show is that Western Canada has enjoyed relatively stable water levels for centuries but that this has not always been the case. In the 1700s, our region went through nearly a century of drought. A similar cycle could start at any time.

For this reason, Sauchyn's research has lately been funded by EPCOR, the Alberta water and power utility.

"It is their business to plan municipal water supplies. They are taking climate research seriously and they are revisiting the entire concept of long-term stable water supplies."

Likewise, Sauchyn notes that insurance companies are highly attuned to climate research which lines up with their own actuarial research.

"What they are telling us is that climate disasters are going up while geological disasters are not. They tell us that they attribute this to climate change."

Yet for all the factors supporting climate change, there is still much debate about it. Sauchyn notes that there are several climate models used by researchers and they do not completely agree.

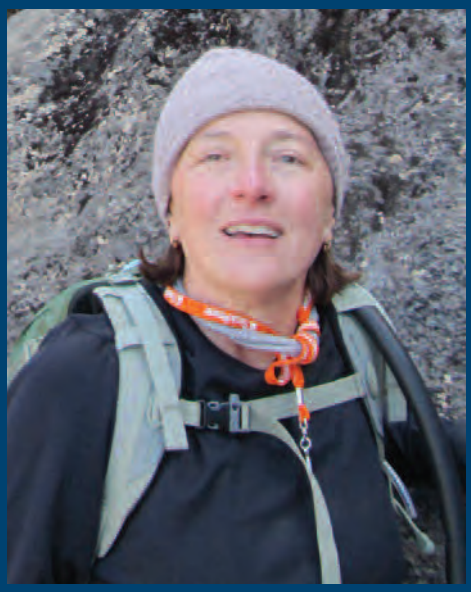
"Generally, the shorter the term and the smaller the scale, the less they agree."

As well, Sauchyn noted that even with ever-increasing computational power, natural climate variability continues to defy all efforts to render a definitive model.

Despite these provisos, Sauchyn maintains that we must make infrastructure decisions based on worst-case scenarios rather than on assumptions about the climate we've enjoyed to date.

"When they hand out licences for water use by a potash mine, the government is basing those on mean average watershed volumes. I do not believe those volumes are going to remain stable. Instead, they should be making estimates based on what the water volumes might be like after a 25-year drought."

Member Profile



In recent years, the Annual Meeting editions of Member Profile have unfortunately become the place where we say farewell to people who have had long service to APEGS.

In this issue, *The Professional Edge* chats with Patti Kindred, P.Eng. FEC., former director of education and compliance at the APEGS office. Patti retired after last month's Annual Meeting.

Tell us about your personal background.

I'm a Regina girl. I was born and raised here and never really left. I went to Martin Collegiate before going on to study industrial systems engineering at the University of Regina. My dad was a city police officer who had an interesting career that included undercover work. My mother worked in banking and prior to that was a pediatric nurse.

What inspired you to go into engineering?

Our parents were very big into outdoor activities – camping, hiking and so forth. Whenever we were out in nature, our parents made a special effort to instill a love of science and inquiry. Consequently, I took all the sciences I could in school.

Even so, I didn't choose engineering until second year. I had originally enrolled in fine arts. I had intended to become a professional artist. Ultimately the science side of my interests took over.

Do you still pursue your artistic side?

Yes, I've kept up with painting and sculpture through the years and I'm hoping to do more of that in retirement. I'm planning to do some metal work. I'm brushing up on my welding skills.

Did you face any challenges in university?

Well, of course, there weren't too many ladies in my classes when I went through. Probably the biggest difference between then and now is that we didn't have many female peers to serve as mentors. Nonetheless, the professors were very supportive. That was the era when Art Opseth was a teacher. He was a great mentor to a lot of students.

What did you do after college?

I started off with SaskTel. They had never hired an industrial systems engineer before so they gave me half an hour to make a sales pitch about how I could help them. I graduated in May, they hired me in June and I was with them for 21 years in various departments.

What led you to work at APEGS?

I got to a point where I knew I had to decide whether I was going to spend the rest of my career at SaskTel or try out some different experiences and responsibilities. APEGS was hiring so I thought I would give it a try.

It was a great decision. The APEGS staff has been a great team to work with. I have enjoyed being part of the exciting growth we've been through as a team. We've gone from being a small hands-on shop to being a big business with significant processes and systems.

What has been the greatest achievement of your career?

I've had the opportunity to coach and mentor a number of people who have gone on to leadership and executive careers. Given how few female mentors there were when I was coming up, I'm very proud that I've been able to provide that role.

What are your interests outside of work?

My big interest is cars. I love anything with a motor. My husband and I are active members of the Superformance Cobra Owners Association. We haul our Cobra around to rallies all over North America.

I think you're leaving something out. Aren't you also into mountain climbing?

Lately, yes. My husband and I have always enjoyed hiking and trekking. After we adopted a boy from Ethiopia, our oldest son wanted to raise money to help the people from the place where his new brother came from. At first, he wanted to donate his Xbox, but we convinced him that wasn't practical. Instead, as a family we raised money for Water Canada, an organization providing water infrastructure to villages in Africa.

We went over to Africa a few times as part of that project. We were struck by the beauty of the country. We decided to tackle Mount Kilimanjaro as a fundraising project. We succeeded in raising $50,000 as a result of our trek.

What was that like?

The summit night was the most physically difficult experience I've ever had. We got up at 10 p.m. and climbed until dawn so that we could see the sunrise. That was an incredible experience – everything around us was so clear, even the stars. But we only got to enjoy it for about an hour. We then descended until 2 p.m., stopped for a quick lunch and kept descending until 6 p.m. before we could rest.

Any other major treks planned?

We were hoping to visit Everest base camp in 2016 as our 30th anniversary gift to ourselves but the recent earthquakes have delayed that, obviously. We also plan to do the Inca Trail in South America this August.

So will this be a real retirement or one of those fake retirements?

Pretty much a fake retirement. My husband and I have established a consulting company so we plan to keep working but only half-time. We want to invest some time into travelling, renovating the cabin and spending time with our kids.

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

For my life in general, I would say my kids. They have brought a whole new perspective to every aspect of my life.

As for my career, I would say my husband, Tom. We were married quite young, in university. His guidance and support for me in university and afterwards has been the most significant factor in helping me to achieve my goals.

Grand Opening!

APEGS celebrated its new office by hosting a grand opening and reception March 25, 2015.
Over 80 members and guests attended the event.
APEGS wishes to thank all for attending.

APEGS is proud to now have the ability to host board and committee functions in modern meeting facilities consisting of five boardrooms, a fully equipped refreshment centre and over 40 parking stalls.

The new APEGS office is located at:
300 4581 Parliament Avenue
Regina SK S4W 0G3

TOP: (left to right) Legislative Secretary Larry Doke, Saskatchewan Party MLA Cut Knife-Turtleford, APEGS President Andrew Loken, P.Eng., FEC and John Nilson, New Democratic Party MLA Regina Lakeview cut the ribbon at the APEGS office grand opening March 25, 2015.

ABOVE (left to right) Geoscientists Canada Past President Greg Vogelsang, P.Eng., P.Geo. chats with City of Regina Mayor Michael Fougere.

APEGS View

2015 Election Results

The votes for the annual election of persons to Council have been tabulated by Insightrix. The tabulation took place on April 27, 2015, polling day, at the offices of Insightrix after voting closed at 5:00 p.m. The total number of votes cast was 1,847 (1,815 online and 32 mail), being 15.73 per cent of the 11,739 eligible voters (11,212 electronic and 527 mail). There were zero spoiled ballots.

President*
Margaret Anne Hodges, P.Eng., FEC

President-Elect*
Tara Zrymiak, P.Eng.

Vice-President*
Dr. Ernie Barber, P.Eng.

Councillor, Group II**
Andrew R. Lockwood, P.Eng., FEC

Councillor, Group V**
Holly Annand, P.Eng.

South East District**
Robert Stables, P.Eng.

Geoscience South District**
Kristin Darr, P.Geo.

Members-in-Training**
Kaylee S. Puchala, Engineer-in-Training

* *Denotes one-year term;*
** *Denotes three-year term.*

The next Council meeting is scheduled for June 19, 2015 in Moose Jaw.

COUNCIL NOTES

April 16 and 17, 2015, Delta Bessborough, Saskatoon, SK
18 of 19 Councillors present

- Dwayne Gelowitz, P.Eng., FEC was appointed by Council as APEGS Director to Engineers Canada for a three-year term and will replace Rick Kullman, P.Eng., FEC, FGC (Hon.) who served in this role for the past three years.
- Council was informed that Shawna Argue, P.Eng., FEC, FCSSE, FGC(Hon) will serve as a member at-large on the Canadian Engineering Qualifications Board.
- The Governance Board reported that Jason J. Liu, P.Eng. has been appointed to the Experience Review Committee for a three-year term.
- Changes to Experience Guideline 1, and the addition to the academic review policy AR3.0, as recommended by the Governance Board, were approved by Council.
- Council approved the following as Life Members: Bishoff, Alan J., P.Eng.; Boyd, Wayne K., P.Eng.; Franklin, Neil A., P.Eng.; Geall, Edward W., P.Eng.; Hwang, Cheng-Ping, P.Eng.; Jacobson, Stephen, P.Eng.; Misskey, William J., P.Eng.; Potter, John R., P.Eng.; Rangacharyulu, Chilakamarri (Chary), Engineering Licensee; Sareen, Dr. Baldev K., P.Eng.; Sen, Pabitra K., P.Eng.; Thanawala, Paresh R., P.Eng.; Vowles, Alan K., P.Geo.; Williamson, Bryan E., P.Eng.
- Erin Moss, P.Eng. was appointed Chair of the Investigation Committee for a two year term. Council also appointed Margaret A. Ball, P.Eng., FEC, Lenard Erickson, P.Eng., FEC, Michel R. Detharet, P.Eng., Russell F. Johnson, P.Eng. and Ross A. Welford, P.Eng. to the Investigation Committee for a three year term.
- Council appointed Brian Aucoin, P.Eng., Cory Belyk, P.Geo., and Jody Scammell, P.Eng. to the Discipline Committee for three year terms.
- Council received and approved the draft 2014 audited financial statements.
- Council appointed Deloitte LLP as the auditor for the 2015 fiscal year audit and the following four fiscal year audits, with the audit fee negotiated annually.
- Shawna Argue, P.Eng., FEC, FCSSE, FGC(Hon), APEGS delegate to the Pacific North West Economic Region (PNWER), provided Council with a report of the recent and pending PNWER activities.
- Council is scheduled for a joint Past Presidents' and Council meeting Friday, May 1, 2015 in conjunction with the Annual Meeting events.

Annual Meeting Gallery

Top left: Jeff Paterson, P.Eng. (left) and Thon Phommavong, P.Eng. receive the Environmental Excellence Award from APEGS President Margaret Anne Hodges, P.Eng., FEC

Middle left: (left to right) Lily Yan, Thomas Chong, M.Sc., P.Eng., FEC, PMP President PEO, Dwayne Gelowitz, P.Eng., FEC, and Donna Gelowitz

Bottom left: Bruno Hernani, Engineer-In-Training displays his art

Top right: Danae Bradshaw, Engineer-In-Training and Dr. Lowell Catlett

Bottom right: David MacDougall, P.Geo. (left) chats with Bruce Ughetto, P.Eng.

College Corner

GEORGES KIPOURIOS
DEAN AND PROFESSOR,
COLLEGE OF ENGINEERING, UNIVERSITY OF SASKATCHEWAN

As another academic year draws to a close, our college is both wrapping up the various loose ends of the 2014-15 year and preparing for the start of classes and an influx of new first-year engineering students this September. But before we turn our attention too much into the future, we have more than 300 graduating students who will see the culmination of their hard work rewarded as they cross the stage and receive their engineering degrees at the University of Saskatchewan's convocation celebrations June 1-4 at TCU Place in Saskatoon.

ABOVE RIGHT: First-year U of S engineering students showcased their design projects for refugee camps on April 8; from left to right, Aldo Scribante, Anthony Loeffen and Aubrey Hughes show off their water purifier.

Photo courtesy: Richard Marjan Saskatoon StarPhoenix.

For these students, a significant component of their final year of studies is their fourth-year capstone design project. Top-placing projects were awarded at the Saskatoon Engineering Society's Engineering Innovative Design and Student Paper Presentations competition on March 26 at Marquis Hall at the U of S. Our students now gain hands-on design experience in each year of their studies. For example, first-year students researched, designed and built refugee camp furniture as part of their Introduction to Engineering Design course and our second-year students again had the opportunity to work with a client from the Tetra Society to design a device that would address a physical disability challenge.

Starting this fall, the college will offer three mining-related options in geological, mechanical and chemical engineering. This is supported by three new mining-focused professors who joined our faculty complement this past year: Shafiq Alam in Chemical Engineering, Travis Wiens in Mechanical Engineering and Paul Hughes in Geological Engineering. They are leading mining-focused courses as well as expanding our research activities related to this important industry for our province and nation.

As you may know, our college is currently in an accreditation review year. We had an accreditation team here in October, 2014. Since then, the visiting team has provided its report to the Canadian Engineering Accreditation Board (CEAB), the report has been shared with the college and our response to the report has been submitted to the CEAB, which now is reviewing all of the information to provide an accreditation decision likely by June this year.

Since I last wrote this column, we hosted our two biggest annual events: the C.J. Mackenzie Gala of Engineering Excellence on January 27, featuring distinguished lecturer Gilbert Le Dressay (BE'89, Chemical Engineering), and our 56th Annual Student Awards Ceremony on February 4. Both events brought us together—alumni, donors, industry members, students, faculty and staff—in celebration of achievement and our engineering profession.

Finally, good luck to our newest alumni!

Celebrating Our Own

Mark F. Fracchia, P.Eng.

Mark Fracchia, P.Eng. president, PCS Potash, has been elected chairman of the Board of the Saskatchewan Potash Producers Association Inc.

Mark Fracchia was appointed president, PCS Potash in July 2014. He was previously vice president, safety, health and environment, with responsibility for PotashCorp's safety and environmental performance, for three years.

Mr. Fracchia has worked in a variety of capacities at the company's potash operations, rising to the position of general manager at Rocanville (2003-04), Lanigan (2004-07) and New Brunswick (2007-11)

He began his career with Kalium Canada Ltd. He joined Potash Company of America at its Patience Lake mine in 1984, and was involved in its conversion to solution mining in 1988. He was technical superintendent when the company was purchases by PotashCorp in 1993 and was promoted to general superintendent in 1998.

Mr. Fracchia has a degree in chemical engineering from the University of Saskatchewan. He is a member of the Association of Professional Engineers and Geoscientists of Saskatchewan and also a member of the Canadian Institute of Mining.

The Saskatchewan Potash Producers Association Inc. is headquartered in Regina and is an association of the three potash mining companies based in Saskatchewan. Members include Agrium Inc., Mosaic and Potash Corporation of Saskatchewan Inc.

ADVERTISEMENT

WSP Client Reception

On Thursday March 26 2015, WSP Canada Inc. held a client reception and rebranding event for their clients and staffs in Regina, Saskatchewan. The successful event had over 100 attendees.

WSP, Canada's premier engineering firm employs approximately 6,650 specialists: engineers, technicians, scientists, architects, planners, surveyors, program and construction management professionals across all provinces. Headquartered in Montreal, WSP's Canadian operations provide services to transform the built environment and restore the natural environment. Our expertise ranges from engineering iconic buildings, to designing sustainable transport and telecommunications network, from environmental remediation to urban planning, and from developing the energy sources of the future to enabling new ways of extracting essential resources.

In Saskatchewan, the firm has been operating since the mid 1970's, first as a structural engineering firm, and later as a multidiscipline engineering firm. WSP has over 100 employees located in Saskatoon, Regina, and Swift Current. Worldwide, WSP is ranked amongst the top 10 professional services firms with 32,000 employees based in more than 500 offices across 39 countries, on every continent.

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.

Pat Faulconbridge with her husband Gary

Pat Faulconbridge

Pat Faulconbridge has carved a 30-year career in human services that has taken her from one end of the province to the other.

She has served as program administrator of the first community-based outreach prenatal program in Canada for at-risk Aboriginal women.

She has been a counsellor working to reintegrate women and men back into the workforce.

She has travelled to Saskatchewan's far north to work as a foster care program administrator and trainer.

Heading in the opposite direction, in the province's southeast corner she has been the manager of a rural social services centre with responsibility for income assistance, child and family services, foster care, young offenders and career and employment services.

Pat has served as executive director of the Government of Saskatchewan Status of Women Office (SWO) since 2006. She is committed to gender diversity and improving social and economic conditions for women and girls. Through her work at the SWO, Pat has created partnerships among APEGS, the Canadian Coalition of Women in Engineering, Sciences, Trades and Technology (CCWESTT), and multiple levels of government to raise awareness of opportunities for women in engineering and geosciences.

Pat has supported the APEGS Women's History Month Committee in its annual celebration of the anniversary of the "1929 Persons Case" whereby women became included in the legal definition of "persons" in Canada.

She has also provided opportunities for members of APEGS to raise awareness of the International Day of Remembrance and Action on Violence Against Women to commemorate the deaths of the 14 female engineering students killed at Montreal's l'École Polytechnique.

Pat partnered with APEGS and others in hosting a policy forum at the CCWESTT national biennial meeting that was held in Regina in 2014.

Pat is a recipient of the Saskatchewan Employment Equity and Diversity Association Eddy Award for employment equity and diversity, Regina YWCA Women of Distinction Award in the Circle of Friends category for the first Regina Habitat For Humanity Women's Build and two Premier's Awards of Excellence for contributions on the Provincial Partnership Committee for Missing Persons and on the Provincial Emergency Response Team as area lead for the Estevan emergency social services response to the flooding in 2011.

Pat began her life journey in a foster home, and then was raised in an adoptive family outside of her Métis heritage. She has two successful adult children and is a proud grandmother and great-grandmother. Pat is married to Gary, a retired RCMP officer.

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.

Jerad Kupiec, P.Eng.

Jerad is the senior engineer - network and service development at SaskTel. He received his Bachelor of Applied Science in electronic systems engineering from the University of Regina. Jerad has been a key contributor to technology development and strategies within SaskTel over the past 10 years. He is recognized inside and outside of SaskTel as a technical leader in many technology areas.

Jerad was one of the recipients of the 2014 SaskTel Technical Career Path Pathfinder Award. He has contributed towards several high-profile projects at SaskTel with the most recent being the launch of InfiNET(TM) Fiber to the Home services. These contributions have enabled SaskTel's continued success as a leading communications provider within Saskatchewan.

Jerad is always looking for opportunities to expand the breadth and depth of his knowledge. His drive to understand and use new technologies truly indicates his desire for continuous learning and his ability to lead change.

Jerad is not scared by personal inconvenience, and will dig in and get things done. Whether this is building a house or evaluating the next generation of SaskTel equipment, Jerad applies the same determination and thoroughness.

Jerad has demonstrated a willingness to help others. Outside of a busy work life he surrounds himself with many activities in his church and in the community. He has been married to his wife, Tauna, for 10 years. They live in Emerald Park and have two children. He has many hobbies including hunting, fishing, camping, shooting, archery, woodworking, construction, snowmobiling and all things related to electronics and technology.

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.

The Saskatchewan Ministry of Environment for its results-based regulatory reform which included the developing and implementation of the Saskatchewan Environmental Code.

In 2008, the ministry began a comprehensive review of the province's existing regulatory model. This included comparing Saskatchewan to models in Alberta, British Columbia, Manitoba and Ontario.

It also included extensive consultation with the public. More than 1,300 people participated in the code review process, including over 350 face-to-face meetings.

While there was a wide range of interests involved, there were also broad areas of agreement. Everyone agreed the province needed an approach to regulation that balanced strong environmental protection and resource management with economic growth.

The recommendations were to modernize and streamline the Acts, develop an environmental code and foster the use of qualified persons and innovative environmental solutions.

The ministry went further and embarked on extensive organizational changes. Business processes were streamlined. Online services were introduced. A client service office was created. The ministry improved access to information and fostered partnerships by setting up working groups of public and private interests.

The outcome of this process is a results-based regulatory model that specifies the environmental protection to be achieved and largely leaves decisions about how it is achieved to the proponent.

Results-based regulation does not involve deregulation, self-regulation or any reduction of government responsibility. It establishes clear performance expectations while eliminating ineffective scrutiny of details. This is especially useful for managing routine, well-understood, low-risk activities. It allows government resources to be focused on the monitoring and compliance of activities, including environmental audits, to support enhanced environmental protection and resource management while promoting public accountability.

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.

SaskPower's Boundary Dam Carbon Capture and Storage Project

Our province faces hard choices about coal power. On one hand, Saskatchewan and Canada are clamping down on greenhouse gases given off by coal-powered electrical plants. On the other hand, coal is part of SaskPower's generation mix due to its abundance and affordability. Replacing it would be difficult and expensive. Twenty-one per cent of greenhouse gases in Saskatchewan come from power production

To confront this problem, SaskPower sought to become a leader in carbon capture and storage (CCS) so that the province could manage emissions while keeping coal as an affordable fuel source.

In October 2014, the Boundary Dam Integrated Carbon Capture and Storage Project began operation. This project is SaskPower's flagship CCS initiative - the first and largest commercial-scale CCS project of its kind in the world.

This project transformed the aging Unit #3 at Boundary Dam Power Station near Estevan into a reliable, long-term producer of 120 megawatts of baseload electricity. The project is also able to reduce greenhouse gas emissions by 1 million tonnes of carbon dioxide (CO_2) each year. That's equivalent to taking more than 250,000 cars off Saskatchewan roads annually.

The captured CO_2 is transported by pipeline to nearby oil fields in southern Saskatchewan where it will be used for enhanced oil recovery. Any CO_2 not used for enhanced oil recovery will be stored permanently and safely, 3.4 km underground at the injection well commonly known as the Aquistore Project.

In addition to CO_2, there will be opportunities for the sale of other by-products. Sulphur dioxide will be captured, converted to sulphuric acid and sold for industrial use. Fly ash, a by-product of coal combustion, will also be sold for use in ready-mix concrete, pre-cast structures and concrete products.

In addition to generating electricity, the Boundary Dam facility has generated a great deal of interest from countries around the world. There is a significant market for this technology as many countries struggle to solve the environmental challenges of coal power. Coal is used to provide power around the globe — it's a non-renewable energy source that generates approximately 40 per cent of the world's electricity.

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.

Charles Harper, P.Eng., P.Geo.

Charlie Harper has been a registered professional engineer since 1977. He was inducted into the Saskatchewan Geological Society Geoscience Honour Roll in 2011 for his significant contribution to the understanding of Saskatchewan geoscience and his contributions to the development of the province's mineral resources.

Charlie has over 47 years of extensive experience with geological and mineral exploration projects in Canada and abroad. He earned his Ph.D. through his research into the geology and uranium deposits within the Carswell meteorite impact structure. Because of this knowledge, he identified a large, previously unknown meteorite impact structure at Pasfield Lake in northeastern Saskatchewan in 2008.

During his 34-year career as a project geologist with the Saskatchewan Geological Survey (SGS), he managed geoscience projects ranging from detailed mineral deposit studies to regional scale mapping projects. He has mapped over 13,500 square kilometres of the Precambrian Shield. He directed the Phelps Lake Geological Mapping Project in the northeast corner of Saskatchewan, one of the largest projects undertaken by the survey. Charlie also managed the cartography and publications section providing geological and technical editing of survey reports and maps.

Charlie has supervised, trained and mentored over 150 geology graduate and undergraduate students both in the field and out, and sat on numerous thesis and dissertation committees. He introduced elementary students to geology by leading field trips to the Avonlea badlands. As well, Charlie has authored and co-authored over 150 papers, maps and abstracts published in provincial, national and international journals. He also co-edited two Saskatchewan Geological Society symposium volumes and contributed to other materials, including the Saskatchewan Geological Highway Map and the Northern Saskatchewan Geoscape poster.

Since 2008, he has worked as a geological consultant, providing geoscience expertise and advice to numerous companies for gold, uranium and rare earth element exploration projects.

Charlie has been involved in sports since high school, competing in hockey and football at university and in local runs for charity. He has achieved multiple medals in masters swimming and sprint kayaking at local, national and world competitions. He has also volunteered with the Wascana Racing Canoe Club for over 25 years.

He has an extensive stamp collection started when he was seven and is a member of the local stamp club.

Charlie has been married to Marlene for 44 years. They have a daughter who lives with her husband and two children in Ottawa.

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.

Dena McMartin, P.Eng., FEC

Dena is the associate vice-president (academic and research) at the University of Regina. She is a full professor in the Faculty of Engineering and Applied Science. Dena served as Chair of several faculty and campus committees prior to joining the president's office.

Dena has fostered many academic and research partnerships within the university, across the province, and with national and international organizations.

Dena's national profile includes serving on the Women in Engineering Committee of Engineers Canada and the executive of the Canadian Coalition for Women in Engineering, Science, Trades and Technology. She also champions the engineering profession as a professor and member of the Canadian Engineering Education Association.

In 2013, she was named a Fellow of Engineers Canada in recognition of her contributions to the engineering profession. She volunteers annually at the local Kipling Camp's Ritual Calling of the Engineer and as an orator at the university's convocation ceremonies.

From 2012 to 2014, Dena served as the Chair of the national CCWESTT conference, an event that supports and promotes women in engineering, science, technology and trades. Her team of organizers hosted one of the best CCWESTT conferences in the 30-year history of the event and brought national attention to the activities and leadership of the engineering profession.

Dena is a volunteer with Habitat for Humanity Regina and has created a scholarship for engineering students at the University of Regina. She is a co-founder of the monthly Science Pubs presentations hosted at the Bushwakker Brew Pub in Regina at which University of Regina scientists and engineers discuss their research with a public audience.

Dena has also written several articles about the role of engineers in society, about the responsibilities of engineers to confront controversy and about changing the way governments respond to natural disasters.

Dena also volunteers as a judge for the regional science fair in Regina. This year she is mentoring two high school girls in their quest to design and build a more efficient microbial fuel cell. Every year she mentors several capstone design projects in the environmental systems engineering program.

She has received numerous awards and distinctions over the years. She has been recognized by the YWCA's Women of Distinction Award. She was a finalist in the Progress 2 Capital entrepreneurial competition. In 2005, she received the University of Regina Inspiring Teaching Award.

At the U of R, Dena holds the designation of president's teaching and learning scholar, focusing on the recruitment and retention of women in engineering.

Dena holds PhD and MSc degrees in environmental engineering and a BSc in agricultural and bioresource engineering from the University of Saskatchewan.

The 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.

Professor Arthur L. Opseth, P.Eng., FEC, FGC (Hon)

Art Opseth was born and raised on a farm near Prince Albert.

He attended a one-room country school until grade 8 and then moved up to a two-room high school in a small town. He completed grade 12 at Lutheran Collegiate Bible Institute at Outlook in 1954.

He received his Bachelor of Science in mechanical engineering (with distinction) in 1959 and his Master of Science degree in mechanical engineering in 1961 from the University of Saskatchewan.

After graduation he spent one year with the National Aeronautical Establishment at the National Research Council in Ottawa. He then spent two years with White and Partners Consulting Engineers in Montreal, where he worked with a team making modifications to armoured personnel carriers for the Canadian army.

In 1964 he joined the Saskatchewan Government Computer Centre in Regina where he conducted computer programming and systems design. In 1974, he joined the University of Regina Faculty Of Engineering, first as a visiting associate professor before being appointed assistant professor (with tenure) in 1977.

During his time at the U of R, Art served in many roles including Acting Dean, Acting Assistant Dean and, for 12 years as Assistant Dean. Although he says he retired in 2001, since then he has served as Associate Dean of Special Projects, Adjunct Professor, Professor Emeritus and, until 2012, as a sessional lecturer. He has also served the University on many committees including the Executive of Council.

Over the years, he has taught 12 different classes and over 5,000 students.

When he transferred from the Quebec association in 1964, Art became a member of the Association of Professional Engineers of Saskatchewan (or APES as it was known then). He served as a member of the APES Council representing the University of Regina from 1979 to 1981 and on the professional examination committee.

He served on APEGS Council from 1998 to 2000, then as vice-president in 2001, president-elect in 2001, president in 2003 and past president 2004. He has served on many APEGS committees and is currently serving as the APEGS representative to the University of Regina Senate.

Art has received numerous awards and honours, including the University of Regina Inspiring Teacher Award, the Regina Engineering Society Award of Merit and Volunteer Service Award and the APEGS McCannel Award. He has been named a Fellow Engineers Canada and an Honorary Fellow of Geoscientists Canada. In 2013, he received an honorary Doctor of Laws degree from the University of Regina.

Art has been a member of the Society of Automotive Engineers, the American Society for Engineering Education, the Canadian Association for Co-operative Education, the Co-operative Education Council of Canada, the Interamerican Conference for Engineering and Technical Education, and the Index Trade Show Board.

News Beyond Our Borders

Lucara Diamond unearths 342-carat rock in Botswana

Mining.com - Canada's Lucara Diamond announced it has unearthed a 341.9-carat gem quality diamond from its Karowe mine in Botswana.

The "exceptional colour and clarity" stone, said the Vancouver-based firm, was recovered while processing fragmental kimberlite from the central and south lobe interface of the mine, located in the central district of the southern African country.

According to Lucara, this diamond will be sold along with two other greater-than-100-carat diamonds, also recovered at Karowe.

Last year, the company sold a 203-carat diamond for $8.2 million three weeks after Gem Diamonds sold a 198-carat stone from its Lesotho mine for $10.6 million. A bit earlier, a 123-carat gem from South Africa got Petra Diamonds $27.6 million.

New source of methane discovered in Arctic

University of New Hampshire - Research led by a University of New Hampshire professor has identified a new source of methane for gas hydrates — ice-like substances found in sediment that trap methane within the crystal structure of frozen water — in the Arctic Ocean. The findings, published online now in the May 2015 journal *Geology*, point to a previously undiscovered, stable reservoir for abiotic methane — methane not generated by decomposing carbon — that is "locked" away from the atmosphere, where it could impact global climate change.

The researchers showed that the hydrate system is long-lived, about 2 million years old. Further, because the hydrates exist under very deep water - more than 1500 metres - the methane is less vulnerable to potential release due to changing sea levels or ocean warming. Such stability has important implications for climate change; as a greenhouse gas, methane is 20 times more potent than carbon dioxide.

Although this research focused on the crust of Earth, not interplanetary space, researchers noted that these findings are interesting, as some researchers have suggested abiotic methane formed by serpentinization may exist and reside as gas hydrates on Mars. And as gas hydrates gain popularity as potential fuel for the future here on Earth, the energy sector is likely to take notice as well.

Sewage could be a source of valuable metals

American Chemical Society - Poop could be a gold mine - literally. Surprisingly, treated solid waste contains gold, silver and other metals, as well as rare elements such as palladium and vanadium that are used in electronics and alloys. Now researchers are looking at identifying the metals that are getting flushed and how they can be recovered. This could decrease the need for mining and reduce the unwanted release of metals into the environment.

"If you can get rid of some of the nuisance metals that currently limit how much of these biosolids we can use on fields and forests, and at the same time recover valuable metals and other elements, that's a win-win," says Kathleen Smith, Ph.D.

Smith, who is at the US Geological Survey (USGS), says more than 7 million tons of biosolids come out of US wastewater facilities each year. Smith and her team are on a mission to find out exactly what is in our waste.

So far, her group has collected samples from small towns in the

Rocky Mountains, rural communities and big cities. For a more comprehensive picture, they plan to combine their information with many years worth of existing data collected by the Environmental Protection Agency and other groups at the USGS.

In the treated waste, Smith's group has already started to discover metals like platinum, silver and gold. She states that they have observed microscopic-sized metal particles in biosolids using a scanning electron microscope.

"The gold we found was at the level of a minimal mineral deposit," she says, meaning that if that amount were in rock, it might be commercially viable to mine it. Smith adds that "the economic and technical feasibility of metal recovery from biosolids needs to be evaluated on a case-by-case basis."

In a recent *Environmental Science & Technology* paper, another research group also studying this issue calculated that the waste from 1 million Americans could contain as much as $13 million worth of metals.

Centimetre-accurate GPS system

University of Texas at Austin - Researchers in the Cockrell School of Engineering at the University of Texas at Austin have developed a centimetre-accurate, GPS-based positioning system that could revolutionize geolocation on virtual reality headsets, cellphones and other technologies, making global positioning and orientation far more precise than what is currently available on a mobile device.

The researchers' new system could allow unmanned aerial vehicles to deliver packages to a specific spot on a consumer's back porch, enable collision avoidance technologies on cars and allow virtual reality (VR) headsets to be used outdoors. The researchers' new centimetre-accurate GPS, coupled with a smart phone camera, could be used to quickly build a globally referenced 3-D map of one's surroundings that would greatly expand the radius of a VR game. Currently, VR does not use GPS, which limits its use to indoors and usually a 2- to 3-foot radius.

"Imagine games where, rather than sit in front of a monitor and play, you are in your backyard actually running around with other players," said Todd Humphreys, assistant professor in the Department of Aerospace Engineering and Engineering Mechanics and lead researcher.

Humphreys and his team in the Radionavigation Lab have built a low-cost system that reduces location errors from the size of a large car to the size of a nickel — a more than 100 times increase in accuracy.

Centimetre-accurate positioning systems are already used in geology, surveying and mapping, but the survey-grade antennas these systems employ are too large and costly for use in mobile devices. The researchers anticipate that their software's ability to leverage low-cost antennas will reduce the overall cost of centimetre accuracy, making it economically feasible for mobile devices.

As well, the researchers believe their technology could make a significant difference in people's daily lives, including transportation, where centimetre-accurate GPS could lead to better vehicle-to-vehicle communication technology.

Tesla's home battery paves way for solar

Engineering & Technology Magazine - American electric car manufacturer Tesla Motors has unveiled a home battery system designed to store energy when rates are cheap for use in expensive peak times.

The sleek white storage device named the Powerwall was designed with the ambition to facilitate the shift away from fossil fuels towards renewable power.

In addition to the Powerwall for homes, Tesla offers a whole range of battery sizes for use by businesses and utilities – all derived from lithium ion battery technology used in Tesla Motors cars.

Tesla envisions a world where people have solar panels on their roofs, generating power throughout the day. As electricity demand of households tends to peak in the morning and evening hours, not in line with the peak generation times, the home battery would store this surplus energy for later use. Currently, home generators can only sell energy they don't need to the grid (and buy it back at peak times at the more expensive rate).

The cheapest six-inch-wide 10kWh Powerwall is $3,500, excluding inverter and installation cost.

News From The Field

Robots play bigger role in Saskatchewan economy

Global News - Practical, innovative machines that help industries prosper: meet the robotic assistant farmer, developed by Dr. Reza Fotouhi, P.Eng., a mechanical engineering professor at the University of Saskatchewan.

The powerful robot self-navigates, finding its way around fields and terrain alone. Dr. Fotouhi said it has the ability to tow equipment, plant crops and maintain them.

"The laser scanner helps act as the eye of the robot; it will see whatever is coming in front of it. It will see the holes, the road," he said.

However, inventions like these continue to fuel concerns about job loss.

"To be honest, it would take away some of the jobs, especially manufacturing… but again, we can't blame robots for taking jobs because it's competition–that's how the world is evolving," said Fotouhi.

In Saskatchewan, robots may also help with labour shortages.

"Traditionally, they've had to be in the barn to milk either two or three times a day, whereas now with the robot doing the actual work, they can readdress or redistribute their work to the farm in other areas," said Morgan Hobin, manager at the Rayner Dairy Facility.

MISCELLANEOUS

Committee approves more study of hydro project

Saskatoon StarPhoenix - Saskatoon city councillors want to learn more about the business proposals for a potential hydroelectric project at the South Saskatchewan River weir.

An administration recommendation to further explore and report on development proposals was approved by council's environment, utility and corporate services committee on Tuesday. The committee received a report that stated a hydroelectric project could cost between $48.8 million and $51.7 million.

The administration put the recommendation to city councillors because of renewed interest from private interests wanting to partner with a city to build the project, which would reduce the city's financial risk should it move forward.

The 5.5-megawatt station would power 2,880 to 3,520 homes, depending on how high the weir was raised, the report stated.

It said the hydro project's output could be worth between $3 million - $4 million a year and its annual operating cost would be about $1 million.

First Nations businesses growing with Saskatchewan resource boom

Business Vancouver - A three-year agreement involving the Battlefords Agency Tribal Chiefs (BATC) and Site Energy Services Ltd. (SES) is the latest example of how the boom in Saskatchewan's resource sector is helping the growth of First Nations businesses.

First Alliance Energy Services is the name of the new entity expected to generate revenue in the millions of dollars from work in the oil patch, say BATC and SES officials.

"We felt it was a really good fit for us," said Ed Standinghorn, director of industry relations with BATC. "In addition to providing a range of services in the oil-field, we also have a training module getting our clients work ready. For example, we help them get their driver's licences, complete their GED and so on."

He said the new joint venture is a natural progression of the projects BATC has under its belt.

Meanwhile, the billion-dollar expansions and a greenfield project in Saskatchewan's potash industry are being aided by a four-year-old limited partnership called PAFHQ Construction.

PAFHQ Construction is a First Nations limited partnership in southern Saskatchewan comprising File Hills Qu'Appelle Tribal Council Developments LP (50%), Points Athabasca (17%), and Graham Construction (33%).

Created in 1999, Points Athabasca is another partnership involving Graham and a development corporation representing seven primarily Dene First Nation communities in northern Saskatchewan.

PAFHQ is doing work at the $4.1 billion K+S Legacy potash mine under construction 50 kilometres north of Moose Jaw and the $2.9 billion expansion of the PotashCorp mine at Rocanville, in east-central Saskatchewan.

Standinghorn said that on-reserve members often face various challenges such as lack of work qualification and experience, lack of literacy, mental health issues, addictions, lack of child care, limited transitional financial support and culture shock in the workplace or educational institutions.

"The chiefs want the people to become self-sufficient and to get away from social assistance dependency," he said. "The chiefs' focus is on the reduction of social assistance clients for the reserves by five per cent per year, so we have developed programs to achieve this benchmark."

MINING

Growth forecast in minimg

Saskatoon StarPhoenix - Commodity prices may have dipped, but the outlook for Saskatchewan's mining sector is one of growth, says the president of the Saskatchewan Mining Association (SMA).

"I think it (the global outlook) is good," said Neil McMillan, who spoke to about 1,000 delegates at the seventh annual Saskatchewan Mining Supply Chain Forum at Prairieland Park. "It is about food and energy. People have to eat and are going to turn electricity on."

Mining makes up about 7.2 per cent of Saskatchewan's GDP, with the potash and uranium sectors being global leaders.

And McMillan said the outlook for those two commodities is strong.

The supply chain event, put on by the SMA, the Saskatchewan Ministry of the Economy and the Saskatchewan Industrial Mining Suppliers Association, discussed current mining operations and projects in Saskatchewan and related supply chain opportunities for manufacturing and service businesses. The event also featured a trade show with more than 200 suppliers and mining companies taking part.

winnipegfreepress.com

Deadline extended for companies interested in developing Manitoba potash deposit

Winnipeg Free Press – A provincial search for companies interested in developing a potash deposit near the Saskatchewan border was extended to give more companies a crack at the underground fertilizer stash.

In 2014, Manitoba amalgamated 2247 square kilometres worth of potash deposits — previously held by several interests — near the town of Russell. An expression-of-interest document for what's officially known as the Russell-McAuley potash deposit was issued in January, with a closing date of March 13. The province extended the deadline another two weeks at the behest of unnamed entities.

It's not known whether anyone responded to the expression-of-interest document prior to March 13.

Aecon awarded K+S Potash Canada contract

Global News - Aecon Group announced they have been awarded two contracts worth $110 million for work in mining. One of the contracts is for the K+S Potash Legacy mining project near Bethune.

According to Aecon officials, the work for Saskatoon-based K+S includes the installation of process mechanical equipment, piping, electrical and instrumentation systems for the load-out building.

Work is expected to start during the second quarter of 2015, with a completion date in the second quarter of 2016.

The K+S Legacy project is the first new greenfield potash mine to be built in Saskatchewan in over 40 years. Commissioning on the mine is scheduled to start in the summer of 2016.

URANIUM AND NUCLEAR

Cameco raises capital spending 2015 budget

The Canadian Press - Cameco Corp. says it has raised its capital spending budget for this year by nearly 10 per cent to $405 million, mostly due to higher spending at the

ckom.com

McArthur River-Key Lake uranium operation and Areva's McClean Lake mill.

The Saskatoon-based company had previously budgeted $370 million for capital projects this year.

Cameco said that its share of spending on the McClean Lake mill modifications this year is now estimated at about $80 million, up from the previous estimate of $60 million to $70 million, due to larger quantities of piping, electrical and instrumentation materials and related labour.

The McClean mill is being ramped up to handle output from the Cigar Lake mine, which is expected to produce between 6 and 8 million pounds of uranium in 2015 — half of it attributable to Cameco.

The revised capital spending estimates were included with Cameco's first-quarter financial results.

Time to revisit nuclear power: Brad Wall

CBC - Saskatchewan Premier Brad Wall says nuclear energy could hold the key in helping certain parts of Canada reduce their greenhouse gas emissions.

"For parts of the country that are heavily reliant on coal, I think it should be part of the baseload discussion," Wall said.

"The bottom line is: if we want to do something about baseload GHG which are principally coming from coal, the renewables aren't quite there yet to replace that in a way that's cost-effective, especially for developing economies. But uranium obviously is. I think it's time to revisit the issue," Wall said.

Earlier, at a climate change summit in Quebec City Brad Wall talked about his province's efforts to capture and store carbon dioxide.

He says the federal government has been an active partner in that file and that Ottawa needs to collaborate with the provinces on innovative approaches to climate change.

"The federal government invested a quarter of a billion dollars in our carbon capture project in Saskatchewan, so they were meaningful partners. If we are going to find technological solutions to baseload electricity in our country, but also in places like China and India and other places around the world that are still using coal, we need the federal government to be part of that, like they were in our project. That's what I hope they continue to do," he said.

India's Prime Minister visit reboots Canada-India nuclear co-operation

The Globe and Mail - Prime Minister Narendra Modi's whirlwind visit to Canada – the first bilateral visit by an Indian prime minister in 42 years – saw the completion of several memoranda of understanding in a range of areas, including civil aviation, rail regulation, space co-operation, education and health. And while the three-day visit to Ottawa, Toronto and Vancouver resulted in a number of key initiatives and agreements between our two countries, none was as significant as the sale of uranium and the closing of a chapter of suspicion and mistrust between Canada and India over the uses of nuclear technology.

Saskatchewan-based Cameco signed a $350-million agreement last week to provide 7.1 million pounds of uranium to fuel nuclear reactors in India over a five-year period. The sale is the first substantial trade outcome from the Canada-India Nuclear Co-operation Agreement, and opens the door once again for trade in nuclear fuel, technology and services.

The Cameco deal effectively reboots Canada-India civil nuclear energy co-operation, which ended more than 40 years ago when India tested a nuclear weapon built using Canadian nuclear technology. It also positions Canada ahead of Australia – our fierce competitor – for access to the growing Indian market.

Beyond the pages of the Cameco deal, the bilateral visit produced a number of positive outcomes that will help Canada-India civil nuclear energy collaboration achieve its long-term potential.

First, the visit highlighted specific opportunities for Canada-India civil nuclear co-operation beyond the commercial exchange of reactor fuel. The Canadian Nuclear Safety Commission finalized a formal agreement with its Indian counterpart for collaboration in the field of nuclear and radiation safety regulation. The government of Canada could build on this momentum to develop an expanded MoU on civilian nuclear technology co-operation that includes research in pressurized heavy water reactor technology, nuclear medicine and other areas discussed by the prime ministers.

Second, the bilateral discussions set a tone of trust and

http://kidseolais.com/

respect. The joint statement issued by the prime ministers emphasized that Canada and India would collaborate as equal partners in nuclear energy technology and services. India has a good track record on non-proliferation and the joint statement importantly highlights India's commitment to preventing the spread of nuclear weapons.

Third, many Canadian and other foreign companies have been unwilling to supply nuclear technology and services to India because Indian laws leave suppliers open to financial liability for damages to third parties in the case of a nuclear accident. During last week's visit, the prime ministers made progress on this front.

Finally, elevating the nuclear discussion to the prime ministerial level is a strong indication to government, scientific and corporate communities that a new era of collaboration and trust is in place. Canadian and Indian scientists and businesses are once again free to work together.

China restarts nuclear power plant construction

World Nuclear News - China has now resumed construction of new nuclear power plant projects, starting with the fifth unit at the Hongyanhe nuclear plant in Liaoning. All nuclear construction in China had been halted for the past 15 months.

ENVIRONMENT

Greenhouse gas emissions still a concern

Regina Leader-Post - Saskatchewan remains a leader in Canadian greenhouse gas emissions. Despite an 8 per cent reduction of GHGs from 2006-2012, the province continues to release more than one-tenth of Canada's emissions with only about 3 per cent of the country's population.

"We want to minimize our environmental footprint wherever we can," said Jonathan Tremblay, spokesman for SaskPower, but added it's a delicate balance between environmental impacts, power reliability and affordability.

www.unspoiled.org

According to the 2015 State of the Environment Report, Saskatchewan's oil, gas, mining and electricity industries are the largest sources of greenhouse gases (GHG). Together they make up over half of the province's emissions.

Electricity generation accounts for 21 per cent.

"It has to be a mix (of coal and wind power) so that the lights can stay on when the wind's not up and the sun's not out," said Tremblay.

This year might be better. The Saskatchewan Environmental Code will begin to take effect this year and, according to the Ministry of Environment report, the code will give flexibility to industries and communities to create their own solutions to government environmental objectives.

INFRASTRUCTURE

K+S gets permit to build facility in B.C. port

Saskatoon StarPhoenix - K+S Potash Canada (KSPC) has been given the green light to construct a handling and storage facility in Port Moody, B.C., where potash from its Legacy Project mine near Moose Jaw will be shipped.

The Legacy Project mine is scheduled to begin production in the summer of 2016.

Pacific Coast Terminals (PCT) received the permit from Port Metro Vancouver (PMV). The permit calls for the modification of PCT's existing facility, which includes the construction of a railcar unloading building and potash storage warehouse, and upgrades to the water treatment facilities and ship-loading equipment.

The facility in Port Moody will have the capacity to hold more than 150,000 tonnes of potash, and the warehouse will be three football-fields in length. Construction has started at the site and is scheduled to be completed to coincide with the opening of the Legacy mine in 2016.

KSPC will also construct a 14 km line that links to the Belle Plaine spur along with a six km storage track.

Freight trains as large as 177 cars and five locomotives will travel twice a week from the mine to the Port Moody port.

Calendar Of Events

staticflickr.com

IUPESM World Congress on Medical Physics and Biomedical Engineering
June 7-12, 2015, Toronto, ON
wc2015.org/general-information

Turbine Technical Conference and Exposition
June 15-19, 2015 , Montreal, QC
www.asmeconferences.org/TE2015/

Risk Assessment and Management in Engineering Systems
June 22-24, 2015, Vancouver, BC
www.apeg.bc.ca/Events/Events/15JUNRAM

Small Business Essentials
June 25, 2015
Webinar
www.apeg.bc.ca/Events/Events/15JUNSBE

THRIVE 2015 - CIP / SPPI Conference
June 27-30, 2015 , Saskatoon, SK
www.inscriptevent.com/thrive2015

Innovation in Water, Energy & Biosystems
July 5-8, 2015, Edmonton, AB
csbe-scgab.ca/edmonton2015

Construction Law for Consultants Seminar
July 07, 2015, Vancouver, BC and Webinar
www.apeg.bc.ca/Events/Events/15JULCLF

Winter/Spring 2015 Crisis and Trauma Workshops CTRI and ACHIEVE
July 28, 2015, Regina and Saskatoon
www.ctrinstitute.com/

NOCMAT 2015 International Conference
August 10, 2015 - Aug 13, 2015
Engineering and Information Technology Complex, University of Manitoba
http://umanitoba.ca/conferences/nocmat2015/index.html

A Climate of Change
Western Canada Water 2015 Annual Conference
September 15-18, 2015, Winnipeg, MB
www.wcwwa.ca/events

Healthcare Facilities and the Technology Highway
September 20, 2015 - Sep 22, 2015
Shaw Conference Centre, 9797 Jasper Avenue, Edmonton, AB
www.ches.org/conferences-and-events

Expert Witness Seminar
September 22, 2015, Vancouver, BC and Webinar
www.apeg.bc.ca/Events/Events/15SEPEWZ

The ENGAP 30th Anniversary Celebration and Homecoming
October 2-3, 2015, Winnipeg, MB
bit.ly/1Gxjgbz

Canadian Dam Association 2015 Annual Conference
October 3-8, 2015, Mississauga, ON
www.imis100ca1.ca/cda

Hydraulic Modeling of Water Distribution Systems Seminar
November 06, 2015, Vancouver, BC
www.apeg.bc.ca/Events/Events/15NOVHMO

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