PEG

FALL 2014

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APEGA

The Association of Professional Engineers and Geoscientists of Alberta

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“For me, it’s not about winning awards. It’s about ensuring quality in everything we do.”

Alex Campbell, P. Eng.
Founder

TORONTO, April 1, 2014 – Founder Alex Campbell (left) receives Vista’s 2013 Canada’s Best Managed Companies award at a gala to honour winners of the country’s leading business awards program.

I founded Vista to build an engineering firm that does right by our people so they can focus on producing high quality work for our clients. 29 years later, Vista is one of the largest independently owned engineering providers in Western Canada and we work on some of the most successful projects in the oil sands. I’m proud that we’ve been recognized as a top Canadian employer five years in a row and as one of Canada’s Best Managed Companies. But what matters most is that our focus on quality people doing quality engineering will never change.

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Deadline for nominations is October 15, 2014.

APEGA SUMMIT AWARDS®

APEGA The Association of Professional Engineers and Geoscientists of Alberta

How to Make Our Professions Healthy and Sustainable

BY **JIM GILLILAND,** *P.ENG., FEC, FGC (HON.)*
APEGA President

The words roll off the tongue easily enough: APEGA needs to address the health and sustainability of Professional Engineering and Geoscience in Alberta. Yet to discuss the issue requires some sort of definition of what being healthy and sustainable actually means.

To me, the word healthy in the APEGA context means our professions are successful, confident and prosperous, while also being rigorous in the application of professional practice. Sustainability begins with health, certainly, but it's also about being able to address emerging trends and anticipate future demands as they relate to protecting public safety. Failure to consider sustainability, by this definition, will result in the erosion of our self-regulatory status.

Fortunately, APEGA is well positioned to provide an assessment of how healthy and sustainable we are as professions. In fact, we already provide leadership on these matters in Alberta and across Canada.

That's great. It may even give us an extra degree of comfort — but what it does not do is let us off the hook. While it's easy to argue that our professions are generally healthy and facing continued prosperity, issues are frequently raised. Health and sustainability are a process rather than a place.

THE GRADUATE QUESTION

One measure of our health is the demand for APEGA professionals, which remains strong. This fact is reflected in the 10,000 applications for individual licensure that APEGA predicts it will receive this year. In Alberta, however, only about 2,500 potential engineers and perhaps 500 potential geoscientists graduate from our universities each year. Alberta schools are not satisfying provincial demand, and some people consider that a big problem.

I suggest, however, that these statistics do not tell the complete story. Clearly, there are fields of Professional Engineering and Geoscience for which demand is extremely high and human resources are scarce. It's always welcome news when the provincial government announces funding for added seats in engineering faculties, which it did recently. But it's important to look at the details more closely to understand what the numbers might mean.

Educating anywhere close to 10,000 new future professionals each year is not a reasonable expectation. In any case, Alberta does not need to educate all of its Professional Engineers and Geoscientists. Through many economic cycles, industry has always found the professionals it needs to get its work done. Applicants arrive from across the country and around the world to meet our demand; global economic forces are always at play.

What is important for Alberta is not that we attempt to hit an impossible graduate target. What is important is that we maintain the core engineering and geoscience knowledge and expertise vital to support industry. This will enable us to develop future leaders for the Alberta economy. This has always been part of the Alberta Advantage, and it can be quantified. Albertans can create an objective and work towards it. Achieving this objective will help APEGA develop the ongoing health and sustainability of our professions.

FILLING SPECIFIC GAPS

With Alberta's rapidly expanding economy, it is necessary to consciously consider the limited resources available in the province to achieve desired outcomes. There are many examples of APEGA and its Members making decisions to address gaps in our professions.

Due to a shortage of Professional Engineers entering the consulting industry, the Consulting Engineers of Alberta has started initiatives to encourage students to pursue careers in building design. These initiatives include the involvement of senior practitioners in the teaching of lighting and HVAC design. The University of Alberta and the University of Calgary have added expertise in hydraulic fracturing to complement their more traditional mining and extraction expertise. This is a very significant development, and it's designed specifically to support the Alberta economy and the needs of industry.

Concerns have been raised that we are losing professionals in the construction sector. This could be a result of ambiguity in what constitutes engineering in this field of practice. APEGA is working to clarify the situation and communicate with the affected industry stakeholders. Maintaining a strong professional presence in the construction industry is clearly in the public interest — which goes hand-in-hand with maintaining healthy and sustainable professions.

Both the U of C and the U of A are making efforts to track graduates and their leadership roles in companies operating in Alberta. This promotes their own programs, obviously, but it also serves to highlight the importance of Professional Engineering and Geoscience to the Alberta economy, and to identify graduates who significantly influence the economic development of Alberta.

I don't have the exact numbers, but many companies operating in Alberta are led by engineering and geoscience

graduates from Alberta universities. As such, these high-ranking executives make decisions with the best interests of Albertans in mind. As the Alberta economy grows, the likelihood of companies operating in Alberta also being led by engineering and geoscience graduates might decrease — unless we take steps to develop more leaders.

The significance of developing Alberta leaders should be debated by more than just APEGA's stakeholders. Nevertheless, I believe that the outcome of this discussion will influence the future health and sustainability of our professions. As such, APEGA and our Members should be at the forefront of this debate.

Through its Member network, APEGA can provide information and leadership to all stakeholders in the Alberta economy, particularly those who are consumers of Professional Engineering and Geoscience services.

APEGA is in a unique position to monitor the health of our professions, as well as provide leadership in identifying emerging and future trends. Armed with this information, APEGA can engage governments and other policymakers in Alberta, helping them reach decisions that are in the public interest.

REGULATORY DISTINCTIONS

We're going through a major renewal at APEGA, as we carefully evaluate our regulatory boundaries and roles in Alberta today. Maintaining healthy and sustainable professions is about adapting and changing, which is what we are doing.

Regulation in Canada is a complex system involving the general public, interest groups, professions, governments and governmental bodies, First Nations, organizations, industries, individuals, laws, procedures, standards, the courts, and just about any other subset of process and society that comes to mind.

I suspect that statement applies more today than it ever has. You, as a Member of a self-regulating organization, are responsible for your own professionalism. APEGA, meanwhile, represents you on a bigger, broader stage.

This gets particularly tricky when national regulatory roles are involved. For example, I'm keeping my eye on an interesting case unfolding in Quebec. The Ordre des ingénieurs du Québec (OIQ), a sister self-regulatory organization for Professional Engineers, has officially filed accusations against Bombardier that some of its employees are identifying themselves as engineers and practising engineering, even though they are not licensed as Professional Engineers. Professional Engineering is provincially regulated, OIQ notes, so the cited Bombardier employees must be licensed.

Bombardier, meanwhile, says the employees' credentials are not in question and meet Transport Canada criteria. Because Bombardier is the only maker of airplanes in Canada, its engineering employees require federal certification but not provincial licensure, the company claims.

I know where I stand on the issues surrounding Bombardier. Although APEGA has not developed an official position, it's fair to say that APEGA, OIQ and the rest of our sister associations need clarity on the licensing of Professional Engineers and Geoscientists within federally regulated industries.

The health and sustainability of our professions require that we pay attention to regulatory issues. Our perspective should be heard and understood, whenever and wherever necessary.

Worth noting is that APEGA has an effective tool for influencing and working with industry in Alberta. Our Permit to Practice — a mandatory corporate membership for companies practising the professions — extends professional obligations into the corporate culture. That's yet another important way of keeping our professions healthy and sustainable.

Questions or comments?
president@apega.ca

Unionization of E.I.T.s Conflicts with Our Right to Self-Regulate

BY **MARK FLINT,** *P.ENG.*
APEGA Chief Executive Officer

In my last article I issued a challenge. I said that as Professional Engineers and Geoscientists, we should not be content with accepting standards that are foisted upon us, particularly in the energy sector. Rather, we should be setting the standards for others to emulate.

Your feedback suggests my message was not as understandable as I had intended. I hope that this article proves to have a message that is more clearly articulated.

In the fall of 2013, the Canadian Union of Public Employees (CUPE) Local 38 in Calgary won an argument before the Alberta Labour Relations Board that Engineers-in-Training employed by the City of Calgary should be included in the local's bargaining unit. The City of Calgary had earlier asked for APEGA's support on this issue, and our Registrar provided assistance and advice.

The situation now appears to have fundamentally shifted. This is no longer about employer-employee relations in one organization. It appears to be more widespread — an issue that may impact five or more major employers of engineers in the province.

My intent here is to make it clear that APEGA is firmly opposed to Engineers-in-Training being members of unions. There is an inherent conflict between adhering to collective bargaining requirements and adhering to the *APEGA Code of Ethics*. Our code is germane to APEGA professionalism and every Member's right and obligation to self-regulate. As such, it relates directly to our putting the public's interest above all others.

The Government of Alberta exempts Professional Engineering and several other professions from the Alberta *Labour Relations Code*. I believe that the reason for this lies within the very definitions of these professions: they are all self-regulated.

Under provincial law, these professions have been formally granted the privilege to decide for themselves, as fiduciaries of the public, what regulatory criteria are most appropriate. Through APEGA, you and I as Members have the legal right to set our own standards for professional conduct and our own rules of licensure. To fully appreciate the position proposed by CUPE 38, it is critical to understand this framework.

As I see it, the heart of the matter from CUPE's perspective is that Engineers-in-Training are not qualified to practise engineering; therefore, they are not covered by the professional exemption. This is not factual — the *Engineering and Geoscience Professions Act (EGP Act)* is clear that Engineers-in-Training *do* practise engineering.

The *EGP Act* sets the stage by defining the practice of engineering in Section 1(q). From there, in Section 2(1), it creates an exclusive scope of practice for engineering. Following that, in Section 2(4)(b), is a clearly stated exemption from that exclusivity for persons "engaged in the practice of engineering as an engineer-in-training or engineering technologist in the course of being employed or engaged and supervised and controlled by a professional engineer, licensee, permit holder or certificate holder."

Therefore, under the laws of Alberta, APEGA Engineers-in-Training are qualified to practise their professions.

Another CUPE contention is that Engineers-in-Training have a limitation placed on their practice: that they must be supervised and controlled. That's true — and consistent with all of our practices. We have restrictions based on our areas of competence. The intent of self-regulation is for us to take personal responsibility by limiting ourselves to work we know we can do competently.

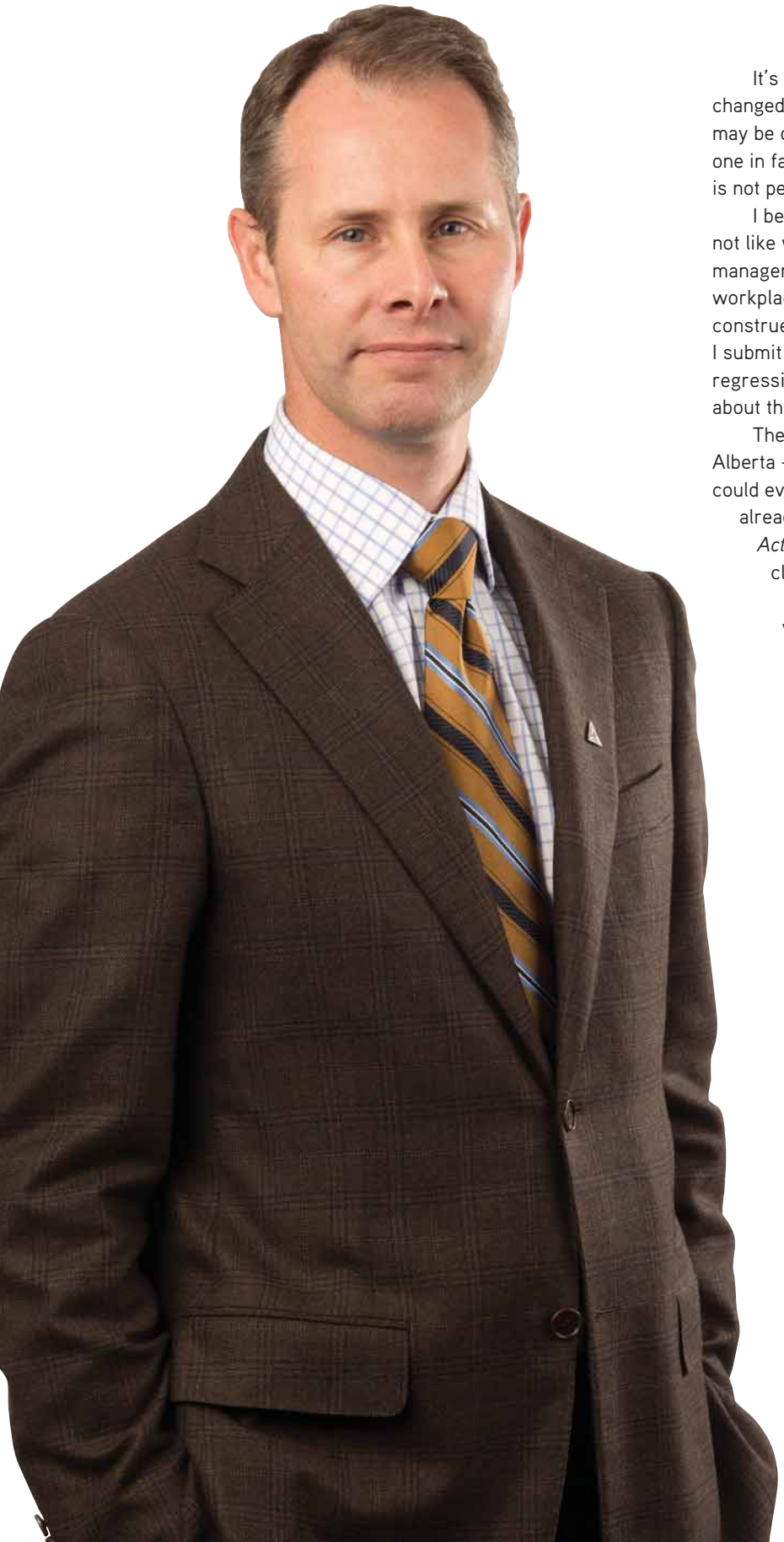
Our professions have created an appropriate timeframe for junior practitioners (in this case Engineers-in-Training) to be mentored and coached to the point at which we — as individuals regulating the Professions of Engineering and Geoscience — are confident that they have a clear understanding of the boundaries of their practice. This timeframe used to be two years, but in the mid-1990s, APEGA decided four years was more appropriate.

We decided this on the public's behalf. The professions have set the standard.

The *Labour Relations Code* of Alberta recognizes the special status of the professions it exempts from union membership. Engineering and the other professions listed are the bodies best positioned to determine how our practices should be used for the public's benefit. This responsibility does not belong to others.

It is not the intent of the *Labour Relations Code*, I believe, to create an opportunity for a bargaining unit to place people on a career path featuring unionization, and then abruptly release them once they've achieved the benchmarks established by their professions.

CEO's Message



It's not what our Members want either. I have spoken or exchanged emails with many Members who have been compelled, or may be on the cusp of being compelled, to unionize. I know of no one in favour of this. From a collective bargaining perspective, that is not pertinent, but it is certainly pertinent to me.

I believe that forcing people into a work situation they do not like will degrade future relationships between leadership/management and unions. In their formative years in the workplace, the message to young professionals could be construed as unions do not respect you or your professions. I submit that this type of workplace environment is hugely regressive and not at all consistent with contemporary attitudes about the relationship between workers and their employers.

There's a long-term solution available to the Government of Alberta — amending the *Labour Relations Code*. The government could even use the wording that relates to its own employees, already contained within the *Public Service Employee Relations Act*. That act is explicit that Engineers-in-Training are excluded from unionization.

The provincial government obviously understands the value and role of the professions in its own workforce. It should demonstrate that understanding just as explicitly in the *Labour Relations Code*, in which it is every bit as important.

I realize that this is a contentious issue. I also believe strongly that it is fundamental to self-governance, and that we must educate others about why it is important to the Alberta public. The public, through our government, has charged us with the responsibility of self-regulation. While we need to keep an open mind to anything that challenges our professional judgment, in this instance we have already created the conditions needed to develop professionals who will serve Albertans' needs responsibly.

Our junior professionals simply want to do their jobs in a way that advances their careers while allowing them to hold the interests of the public paramount, as the *APEGA Code of Ethics* requires of them. Alberta's workplace conditions must allow them to do exactly that.

Questions or comments?
ceo@apega.ca

Planned Giving: Help Build the Future Now

BY **DAN MOTYKA,** *P.ENG., FEC, FGC (HON.)*
President
APEGA Education Foundation

Each year, the APEGA Education Foundation (AEF) works to attract young people into the Engineering and Geoscience Professions through our various scholarships and bursaries, and outreach funding. Since its inception in 1996, AEF has disbursed about $2 million to deserving students and has reached elementary, junior and senior high school students through funding of science outreach across the province.

We couldn't reach as many youth as we do without the generous support of APEGA Members.

In 2013, donations hit a record $259,000, thanks in part to a change to APEGA's membership renewal form. The form sets $50 as the minimum expectation for a donation to the foundation. Many of you responded positively.

Here's another option: planned giving.

Planned giving is a commitment by donors to allocate a portion of their estate to a charity like AEF. This can happen before death, after death, or both. A planned gift lets you meet philanthropic and financial goals while maximizing tax benefits. If you want to honour someone's memory, a planned gift is a great way to do so. By planning ahead, it allows you time to make the long-term decisions best for you, your family and your estate.

Planned giving isn't only for the wealthy. No matter your income or assets, you can leave a gift that will support a cause you care about.

Giving a future gift to the APEGA Education Foundation is a powerful way to create a lasting legacy that will support the foundation for years to come. It's one way you can help the foundation remove financial barriers for students and encourage bright young minds to explore engineering and geoscience careers.

There are several different planned giving options to consider.

MONTHLY DONATIONS

Most donors want to ensure that they have enough money for their retirement, so they may feel uncomfortable overcommitting to a charity. Yet the size of their estate often enables them to make regular contributions prior to death. This support ensures the foundation has regular contributions to support its ongoing expenses and funding needs.

In 2014, monthly donations were added to the foundation's suite of donation options.

WILLS

Upon death, and with a proper will, your financial situation becomes clear. Wills are one of the simplest ways to bequeath a larger gift to AEF than you might have been able to make during your lifetime. You'll then be confident that your support will continue after you're gone.

A bequest of five per cent of your estate to AEF, compounded by others who are doing likewise, will make a huge difference in enabling the foundation to further its objectives of supporting youth as they consider, and enter, our professions. Your support could even enable the foundation to expand its support for post-secondary educational institutions themselves — an objective we so far have not been able to consider.

LIFE INSURANCE

There are a few ways a life insurance policy may be contributed to AEF.

1. A donor may assign AEF ownership of a paid-up policy that names AEF as beneficiary. A charitable tax receipt is issued for the current cash surrender value of the policy at the time the gift is made.
2. A donor may assign to AEF ownership of a life insurance policy that names AEF as beneficiary on which premiums remain to be paid. A charitable tax receipt is issued for the cash surrender value of the policy and an annual receipt for the premiums for as long as the donor continues to pay them.
3. A donor may name AEF as a primary or successor beneficiary of the proceeds. A charitable tax receipt is issued for the value of the death benefit received and may be used to offset other taxes in the year of death.

PUBLICLY TRADED SECURITIES AND MUTUAL FUNDS

Special tax savings are available for donors who make gifts of publicly traded securities and units or shares in mutual funds that have appreciated in value. To receive these savings, donors must donate the actual securities or shares (not sell them and donate the cash value).

Donors receive a donation receipt for the fair market value of the securities on the day AEF receives them. You don't pay tax on the capital gain that results from the gift.

OTHER OPTIONS

There are many other gifts that AEF accepts, including charitable remainder trusts, charitable gift annuities and retirement plan assets.

We encourage you to talk to your legal and financial advisors to determine what options work best for you. You can also contact AEF for more information. We will work with you to create a gift that meets your needs and has maximum impact.

If you've already committed to leaving a gift for the foundation, thank you for your support. If you haven't advised us, please let us know to help us better plan for the future.

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CIVIL				
Preventive Maintenance of Facilities	04-0419-2287	Calgary, AB	November 3-4	14
Stormwater Management - Design, Inspection and of Operation/Maintenance Stormwater Control Facilities	05-1024-2298	Edmonton, AB	November 13-14	14
Flood Control, Land Drainage and Stormwater Management	05-1142-2298	Calgary, AB	November 27-28	14
Slope Stability - Analysis and Design	05-1206-2298	Calgary, AB	December 1-2	14
Structural Design for Lateral Loads and Stability	05-0215-2303	Calgary, AB	February 3-5	21
Interpretation and Enforcement of Construction Contracts	05-0218-2303	Calgary, AB	February 11-13	21
Asphalt Mix Design	05-0219-2303	Calgary, AB	February 19-20	14
Geotechnical Aspects of Pavements	05-0220-2303	Edmonton, AB	February 23-24	14
ELECTRICAL				
Power Cable Engineering	05-1121-2298	Calgary, AB	November 3-4	14
Grounding and Bonding of Electrical Systems	05-1210-2298	Calgary, AB	December 9-10	14
Modern Power System Protective Relaying	05-0108-2303	Edmonton, AB	January 19-21	21
ENVIRONMENTAL				
Designing Wastewater Pumping Stations and Lift Stations	05-0110-2303	Edmonton, AB	January 28-30	20
Air Emission Management	05-0216-2303	Calgary, AB	February 4-6	21
CONSTRUCTION				
Foundations of Construction Law	05-1207-2298	Edmonton, AB	December 1-2	14
Using Standard Form Contracts for Construction and Design Services	05-1208-2298	Calgary, AB	December 3-4	14
Cost Engineering - Effective Estimating and Cost Control of Engineering and Construction Projects	05-0109-2303	Calgary, AB	January 26-27	14
GENERAL				
Fundamentals of Managing Engineers and Technical Staff	05-0217-2303	Edmonton, AB	February 5-6	14
MECHANICAL				
Plumbing Systems Design For Multi-Residential, Commercial, Industrial and Institutional Buildings	05-1122-2298	Calgary, AB	November 3-4	14
Pumps: Selection, Operation and Maintenance	05-1120-2298	Calgary, AB	November 3-5	21
Practical Understanding of In-Plant Cranes and Lifting Equipment	05-1123-2298	Calgary, AB	November 6-7	14
A Practical Understanding of Industrial Piping and Associated Equipment	05-1209-2298	Edmonton, AB	December 8-10	21
WEBINARS (All times are in EST)		**TIME**		
Harness the Business Writing Process (Emphasis on Email)	1101-WEB14	12:30 - 2:00 pm	November 7	1.5
Google Apps for Engineers	0103-WEB15	12:30 - 2:00 pm	January 8	1.5
Wearable Computing For Engineers	0104-WEB15	12:30 - 2:00 pm	January 15	1.5

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APEGA Gathers Email Consent To Comply with Anti-Spam Legislation

For the last decade, APEGA has relied heavily on email to interact with Members. Now Canada's Anti-Spam Legislation (CASL) has entered the mix. Complying with the law — the toughest of its kind in the developed world — has presented major challenges, and not only because of APEGA's reliance on email.

"The law includes heavy penalties for contraventions, and our understanding of its impacts remains unclear," said Malcolm Bruce, MSM, APEGA Director, Corporate Services. Definitive legal advice took time for lawyers to develop, so many of APEGA's decisions were necessarily made in the few months leading up to July 1, the day CASL took effect.

Most of the Association's mass electronic messaging reaches Members through the e-PEG and branch newsletters, which contain blends of Association, professional, regulatory and other information of Member interest. APEGA uses email to survey Members, recruit volunteers and collect registrations for events. Email is also routinely used for one-on-one interactions regarding regulatory and other Member business.

Any unsolicited email that can be construed as a commercial electronic message is a potential contravention. The law identifies two types of consent that an addressee can give, which allows a sender to email commercial electronic messages. Implied consent means that — through membership or another relationship with the sender — an addressee has, in effect, given permission to receive email. Express consent means that the recipient has consciously decided what types of email he or she will allow, and informed the sender.

"One approach, but the one with the most risk, would have been to rely on the implied consent we already had and to continue sending emails to everyone. The more responsible approach, but more cumbersome, was to seek express consent from as many Members as possible," explained Mr. Bruce. "We chose the more responsible approach. It was the right thing to do, and it demonstrates our due diligence, showing that we know we're reaching out to Members who want to interact via email."

> "We chose the more responsible approach. It was the right thing to do, and it demonstrates our due diligence, showing that we know we're reaching out to Members who want to interact via email."
>
> **MALCOLM BRUCE**
> *APEGA Director, Corporate Services*

Before July 1, APEGA sent CASL-consent requests to every address in its database — about 115,000 of them. As of mid-August, over 60,000 addressees had given express consent for one or more types of email. Choices were regulatory, non-regulatory Association business, and newsletters.

"That's a great response, but 40,000-plus addressees have not made any choice at all," said Mr. Bruce. Anyone can subscribe to receive emails from APEGA or change his or her email options at any time. Simply visit consent.apega.ca and enter your information.

Mr. Bruce continued: "We encourage everyone, particularly Members, to give us consent. All of our Professional Members should at a minimum give us consent to send them regulatory messages via email." A single mailing by regular post to all Members costs APEGA about $80,000. If all regulatory messaging went to Members by regular post, the cost would be 10 times that. "That also represents a lot of unnecessary paper and a significant environmental impact," Mr. Bruce added.

MORE INFO

Consent Options
consent.apega.ca

Canada's Anti-Spam Legislation
crtc.gc.ca

Malcolm Bruce, MSM
Director, Corporate Services
mbruce@apega.ca

Trouble Keeping Current?

Perhaps You Should Restore Your APEGA Connection

Under Canada's Anti-Spam Legislation (CASL), we require your express consent before we send you unsolicited email. If you have not given us consent, we've removed your address from our emailing list.

We respect your right to control the amount of email you receive. But we also want to get you the information you want and need to make the most of your membership. This is also a major part of APEGA's self-regulatory responsibility.

For these reasons, you can give us consent or update your subscription preferences at any time.

Three types of APEGA email are listed. You can checkmark any or all of them. And you can change your mind anytime — simply return to the website and change your options or click Unsubscribe.

Stay in the know. Visit consent.apega.ca today and select the email content that suits you.

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APEGA

Readers' Forum

Readers' Forum submissions should be emailed to George Lee, *PEG* Editor, at **glee@apega.ca.** Please limit them to 300 words or less. Longer letters are printed at the discretion of the editors. Letters may be edited for brevity, taste, clarity and legality. Please note: Readers' Forum items are treated as opinions and therefore are NOT peer reviewed. They do no necessarily reflect the views of APEGA Council, Executive Committee or staff.

✉ TEMPERATURES DON'T MATCH PROJECTIONS

The world is constantly bombarded with the message that 97 per cent of scientists "believe" in global warming and that humans have contributed to it. Let us breakdown that message.

The world has warmed up about 0.8 C since the Little Ice Age; so yes, it has warmed. And yes, humans have influenced climate through deforestation, irrigation, desertification, urbanization, real air pollution and the effect of CO_2. Carbon dioxide is a greenhouse gas in theory, but in the atmosphere the back radiation spectrum is dominated by existing water vapour. The amount of additional back radiation declines logarithmically with additional CO_2, so the actual effect of more CO_2 is unknown.

These parts of the message should have near universal agreement. So where are the important differences in opinion?

1. How sensitive is the climate to changes in CO_2 concentration?
2. Can CO_2 warm the climate enough to cause catastrophic events?
3. What is a reasonable probability of this occurrence?

Two temperature sets from satellites show an increasing divergence from the projections from climate models. The assumptions that have been plugged into the models appear to massively overestimate the effect of changes in carbon dioxide concentration on temperatures. This is most noticeable in the tropics, where the models and theory say carbon dioxide should cause the most warming.

CONTINUED ON PAGE **14** ››

REMOVE BARRIERS OPEN DOORS
SHAPE THE FUTURE

Planned giving is a powerful way to support our Professions.

Your planned contribution to the APEGA Education Foundation provides scholarships for vibrant, smart, young people working towards their degrees in our Professions.

Shape the future of Alberta and Canada with a planned contribution to the APEGA Education Foundation.

www.apega.ca/educationfoundation

APEGA education FOUNDATION

CONTINUED FROM PAGE **12** ››

The temperature of the world has been statistically flat for almost 18 years now, which is close to the length of the previous warming period. This has occurred despite a rapid rise in carbon dioxide concentration. Temperatures are now so far outside of the projections from climate models (in a probability range of less than five per cent) that it is now very unlikely that CO_2 is the primary driver of climate change.

WILLIAM E. KERR, *P.ENG.*
Calgary

✉ SCIENCE IS A VERB

My name is Ella Stephen and I am 11 and in Grade 6. Thank you, APEGA, for being so passionate about science and sponsoring my award. You have helped my future by starting me off strong.

I would love to tell you a little bit about my project. The title was Caution Slippery and my testable question was,"Which surface covering prevents slipping the most?" I tested eight materials 10 times each and the grippiest material was 80-grit sandpaper. Continuing on, I tested different weights, but 80-grit sandpaper was the mode result that was best.

In my project I learned what force, friction and a coefficient of friction are. The project taught me a great deal about things that I never knew existed. Physics was the main topic that I learned about, and I found it very interesting.

Last year, I earned a gold and that encouraged me to go further and I earned gold again this year. Both times I have been to the science fair, I have learned so much. In my mind, science is a life skill that everyone needs and should have. I do not think that

SCIENCE GOLD
Ella Stephen, who earned gold at the Calgary Youth Science Fair in April, receives her plaque from Chuck Buckley, P.Geo. The Grade 6 student says APEGA's sponsorship of her award is much appreciated — and that back-to-back golds have helped build her love and appreciation of science.

Readers' Forum

"I do not think that anyone in the world should not be able to have access to science or to learning science, because science helps with so much."

anyone in the world should not be able to have access to science or to learning science, because science helps with so much. My teacher always says that science is a verb and I totally agree with him. Science is my favourite subject in school. I love it because it is so hands-on and you learn so much.

Thanks again for helping me move forward another step into science. Always remember that when you kindly sponsor the science fair like you do, you are leading so many kids like me towards the goal of our dreams.

ELLA STEPHEN
Calgary

The Buzz

MUSIC TO CALGARY'S EARS — AND THE REST OF CANADA'S, TOO

Canada is hitting a high note in Calgary, in the form of the new National Music Centre of Canada under construction in the city's East Village. Slated for a 2016 opening, the centre will be home to the Canadian Music Hall of Fame, the official collection of the Canadian Country Music Hall of Fame, and an iconic collection of musical instruments and sound equipment.

Featured will be five floors of performance, exhibition and collections space. Interactive educational programs for all ages, a recording studio and a broadcast centre are also included in plans.

Described as a new architectural landmark for Calgary, the $168-million, 160,000-square-foot building was designed by Allied Works Architecture. Builder is CANA Construction, with project team members Haley Sharpe Design and Kasian Architecture.

-Jacqueline Louie

DOWNTOWN TRANSFORMATION KICK OFFS IN EDMONTON

Traffic detours are the norm as dramatic developments begin to transform Edmonton's downtown. Large-scale construction projects including the Rogers Place arena, the new Royal Alberta Museum and the Kelly Ramsey Building account for more than $1 billion in construction.

The biggest investment is coming from the new arena project, being built by the Katz Group. Once completed in September 2016, it will be 60 per cent larger than Rexall Place. This summer, media were given their first peek at progress on the $480-million facility, which spans 9.5 acres. At the time, 80,000 cubic metres of dirt had been excavated and 560 of 700 pilings for the project installed.

Across the street from the arena, construction is also underway on a 27-storey office tower at 101 Street and 104th Avenue, a project of the Katz Group and WAM Developments. The City of Edmonton will be the building's biggest tenant, with a 20-year lease on 60

per cent of the space. Slated for completion in August 2016, the $300-million structure will tie into the pedway system and will contain four levels of underground parking

Nearby, on the northeast corner of 103A Avenue and 99th Street, the $340-million Royal Alberta Museum is taking shape. And a short walk to the southwest on Rice Howard Way, the former Kelly Ramsey Building is being redeveloped into a 29-storey, $250-million office tower.

-Caitlin Crawshaw

HITTING THE RIGHT NOTE
Spanning Fourth Street S.E. in downtown Calgary, the National Music Centre will be a tourist attraction for music and architecture lovers alike.
-artist's rendering courtesy National Music Centre/Allied Works Architecture

ELECTRIC TREETOPS

The lumber industry usually discards the tops of aspen trees. But in La Crete, some 810 kilometres north of Edmonton in Mackenzie County, that organic waste will soon be feedstock.

About 418 megawatts of Alberta's 14,000 MW of electrical generation comes from biomass. Mustus Energy of Calgary will give the category a big boost with its 41.5-MW Windy Hill Biomass Generation Plant — enough electricity to power 30,000 homes. Mills in the area typically only use about 40 per cent of a tree for lumber.

Ash, produced as a byproduct, will be offered to farmers as a fertilizer.

Windy Hill, which will cost $170 million to build, is one of six biomass power plants Mustus Energy plans for Alberta. Lockheed Martin Canada is building the plant, which is expected to be complete by the end of 2016.

For more about what's happening in bioenergy industry, see the third installment of The Other Energy Sector, starting on page 62 of this edition of *The PEG*.

-Corinne Lutter

SOLAR MODULES PEFORM AT NEW CAMROSE CENTRE

Students returning to the University of Alberta's Augustana Campus this month will notice something new on the horizon. The Camrose Performing Arts Centre, featuring a 23-metre fly tower covered in solar modules, is now complete.

A total of 488 solar modules have been integrated into all four sides of the tower's exterior walls, part of the $24-million facility built by the university, the City of Camrose, the provincial government and other partners. The solar PV system — the largest building-integrated solar array in Canada — will supply about 20 per cent of the building's electricity.

Other sustainability features were incorporated into the building to help reduce operating costs and contribute to environmental efficiency, including high-grade insulation, and high-efficiency chiller and boiler systems.

LEDs will make lighting more efficient. For example, 104,250 watts of traditional stage lighting will be reduced to 12,480 watts from LEDs. Not only will it save energy, performers will be lot less sweaty.

Inside, the 550-seat performing arts centre features a multipurpose space for drama and musical productions. The fly tower will be used to raise sets and fly curtains above the stage.

The centre's debut is in October, when its first shows will be staged.

-Corinne Lutter

HOCKEY HEAVEN
Construction on Rogers Place arena started in March with excavation and foundation work. Erection of the steel and concrete structure begins this fall – in total, 9,000 tonnes or 10,000 pieces of structural steel will be used, along with 24,000 cubic metres of structural concrete.
-artist's rendering courtesy Edmonton Arena Corporation

MAJOR CALGARY PROJECT INCLUDES ITS OWN LAKE

Calgary's western edge continues to grow. One of the latest projects to get off the ground is Harmony, a $6-billion development by Bordeaux Properties. It's expected the project, located next to Springbank Airport, will include up to 3,500 homes and a village centre, a school site, a recreation centre, offices, light industrial development, a 36-hole golf course and a 140-acre lake.

-Jacqueline Louie

SYLVAN LAKE HOUSING MARKET STAYS HOT

Sylvan Lake is one of the fastest growing areas in Canada — and it's showing no signs of slowing down.

Calgary developer Belterra Land Company is planning the Slopes of Sylvan Lake, a $40-million residential project on the lake's northeast side. The first development approved under Lacombe County's new area structure plan, it will include 49 homes to be built over the next four years.

-Jacqueline Louie

The Buzz

NORTHERN GATEWAY GETS FEDERAL OK — BUT WITH CONDITIONS

The federal government has given Enbridge the go-ahead to build the Northern Gateway pipeline, which would transport crude oil from Bruderheim, Alta., to Kitimat, B.C. But its approval of the $7-billion project is subject to 209 conditions that Enbridge must meet — including that the company must consult First Nations communities in B.C., many of which have voiced strong opposition to the pipeline.

The B.C. Government has also set out five conditions it wants met, including an environmental review, Aboriginal consultations and a fair share of economic benefits.

-Jacqueline Louie

WORK HARD, BORROW HEAVY

We all know them: the family with the brand-spankin'-new motorboat parked in the driveway of their two-storey, custom-built house in the burbs. But even though Alberta's economy means most of us make healthy incomes, we still spend more than we make.

Data from the Bank of Montreal's *Annual Debt Report*, conducted by Pollara, show that in the last year the average debt in Alberta has risen 40 per cent, from $89,026 to $124,838. In fact, Albertans have the most household debt in the country — about $50,000 more than the average Canadian.

Rising housing costs are partly to blame, say analysts, since much of this debt comes from mortgages. Additionally, debt from student loans has also increased. But plenty of our debt comes from good old consumer debt — racked up, in some cases, through the accumulation of expensive toys.

Sadly, Albertans may not have much spare time to spend enjoying the purchases that are landing us further in debt. A new study from the Fraser Institute examined labour trends across Canada and found that Albertans are working longer hours per week to compensate for labour shortages. On average, Albertans work 35.1 hours per week, but one-third of workers are toiling for 50 hours or more.

Overtime hours across Canada have increased by 3.3 per cent since 2003. Not so in Alberta, where the increase is a whopping 57 per cent.

-Caitlin Crawshaw

BACKCOUNTRY BOOST

A flood rehabilitation program for backcountry trails promises to restore hiking and off-road vehicle trails along the eastern slopes of the Rockies. Bridges and trails are being repaired in areas that include McLean Creek, Kananaskis Country, and the Ghost and Castle wilderness areas.

The Government of Alberta has put aside $10 million toward trail and bridge repair in recreational areas and other public lands outside provincial parks. That funding comes on top of $81 million previously set aside to rebuild campsites, trails, and day-use areas in provincial parks. Repairs are scheduled for completion by March 2017.

Rebuilding continues in other areas as well. Fish Creek Provincial Park in Calgary is undergoing repairs after suffering major damage to pathways, bridges and river banks in the 2013 floods. About $16 million has been set aside for this work.

-Jacqueline Louie

MULTI-PURPOSE LEISURE CENTRE WILL MAKE AN EVEN BIGGER SPLASH

A new aquatic centre approved for Lethbridge is getting bigger before construction has even started. In early August, city council voted to add a fitness centre that will include an indoor field, an indoor playground, a running track, a gym and commercial space.

This new multi-purpose leisure centre will adjoin the Crossings Ice Complex — twin arenas and a curling centre, under construction on the city's west end. The entire centre will cost an estimated $109.5 million. The previously approved aquatic centre, featuring water slides, whirlpools and a lazy river, had a price tag of about half of that.

Building both parts of the centre now will be more cost effective in the long run, city council decided. Also, a full leisure centre will generate more operating revenue. Construction is expected to begin in fall 2015 and be complete by 2019.

-Corinne Lutter

CORRECTION

The Mosaic Centre, now under construction in Edmonton, will be 2,800 square metres in size. An incorrect size appeared in The Buzz in our Summer 2014 edition. *The PEG* regrets the error.

WORLD WATCH

BY **GAIL HELGASON**
Freelance Contributor

-photo courtesy British Antarctic Survey

TINY TALES FROM A TUNNEL

What do you do with an unused Royal Mail tunnel underneath London's West End? Study it to increase engineering knowledge, of course.

In places, the mail tunnel is a mere three metres above a new tunnel being excavated. Researchers have placed hundreds of sensors in the mail tunnel, allowing them to gauge the effects of the current excavation.

It's all taking place at and around Liverpool Street Station, where crews are working on a section of the new Crossrail Platform Tunnel, reports the U.K.'s Institution of Mechanical Engineering.

Using optical fibre, computer vision and other technology to measure humidity, temperature and other conditions, the sensors can detect movements as tiny as 1/100th of a millimetre. The information answers important questions about tunnel movement and changes, says civil engineer Robert Mair, head of the Centre for Smart Infrastructure and Construction.

Researchers believe the technology will be widely used to monitor the country's vast network of Victorian and 20th century infrastructure.

DISSIPATION ACT — MADE-IN-CANADA DEVICE COULD IMPROVE VEHICLE AND BUILDING SAFETY

When you drive a tank through a war zone, you want to know your vehicle is tough enough to withstand any type of collision. But sometimes strategic weakening is the way to improve safety.

That's where Bill Altenhof (P.Eng.-Ont.), a mechanical engineering professor from the University of Windsor, can help. Dr. Altenhof has helped develop and patent an axial cutting device that features a novel way of dissipating energy, the university announced on its website.

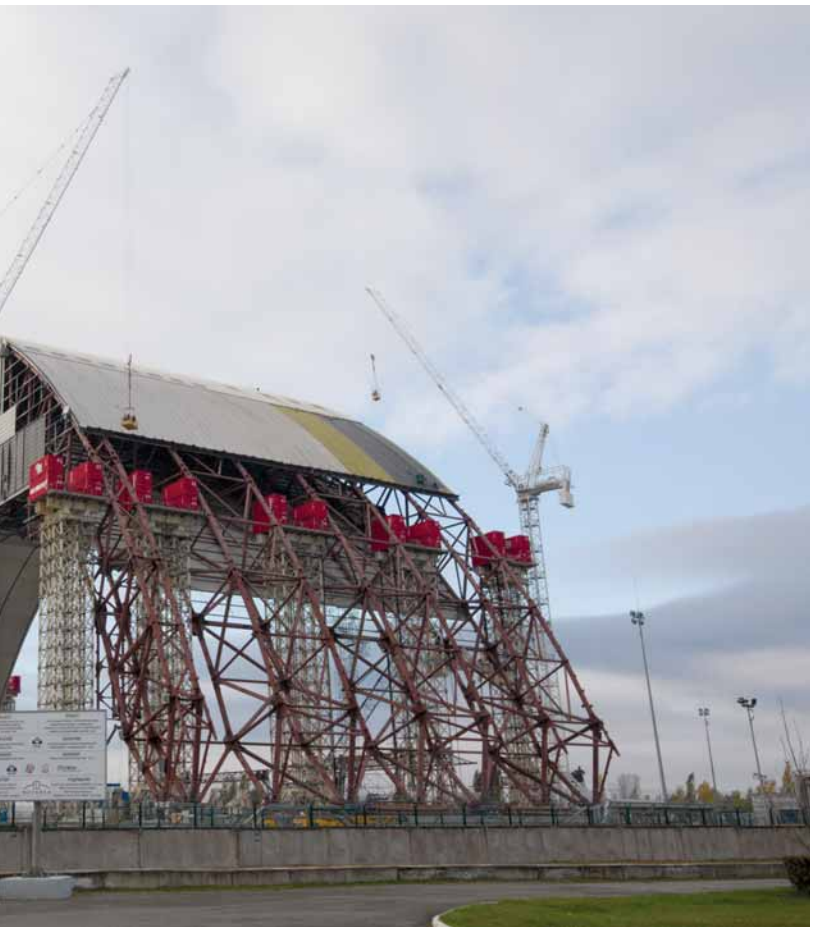
The concept features a steel device shaped like a wheel with four spoke-like blades. The device can be built into the end of a tubular aluminum frame. On impact, it would cut down into the frame, splitting it much like you'd peel a banana.

By lessening the transfer of energy on impact, injuries to passengers could be reduced. The design could also have applications in designing buildings to withstand earthquakes.

A HOT DESIGN IN A COLD PLACE — ANTARCTIC RESEARCH STATION NAMED PROJECT OF THE YEAR

The Halley VI Antarctic Research Station has been named Project of the Year in the Global Best Projects competition, presented by the *Engineering News-Record* (New York).

The Institution of Civil Engineering in the U.K. reports that the innovative US $42-million station, built in one of the Earth's most hostile environments, was the unanimous choice of the competition's judges.



CONFINING CHERNOBYL
The New Safe Confinement Facility will entomb the Chernobyl nuclear disaster site with a 32,000-tonne, stainless steel arch. It will be built nearby and moved on hydraulic jacks to enclose the whole site.
-photo by Tim Porter

Built by British Antarctic Survey and designed by AECOM in collaboration with Hugh Broughton Architects, Halley VI features seven, 152-square-metre modules designed to stay atop rising snow on four-metre stilts. Lead engineer Michael Wright of AECOM explains that the modules were designed to stand in a line like train cars, but perpendicular to the wind to keep blowing snow from collecting.

Telescopic leg tubes that go up and down at the touch of a button are another important innovation. They allow a bulldozer to compact snow and create a new, higher base for the legs. The legs are affixed to skis so the modules can be pulled to a safer site if a nearby ice shelf calves — the cause of the previous model's failure.

SNOW ANGELS
The Halley VI Antarctic Research Station includes seven aerodynamic modules that protect researchers from temperatures as low as -56 C. The modules can be raised on stilts at the touch of a button if the snow gets too high.

WAVE HARVESTER TO BE TESTED IN CORNWALL

An Australian developer of ocean-energy machines has announced plans to test a prototype of its Wave Harvester technology in Cornwall, England.

The developer, Perpetuwave Power of Queensland, says the technology can convert up to 40 per cent of the ocean energy that passes through it into electricity, reports *Bloomberg News* (New York). Lightweight, rectangular floats capture wave energy and transfer it to a rotary generator through a direct drive.

The company believes the system could be competitive with wind and solar energy, and hopes the prototype will lead to a full-scale pilot power plant.

CHERNOBYL ARCH WILL ENTOMB DISASTER SITE

Picture an arch that weighs 32,000 tonnes, spans more than 250 metres and is sheathed in enough stainless steel to enclose the Statue of Liberty. That's what it will take to confine the remains of Ukraine's Chernobyl Nuclear Power Plant, the *New York Times* reports.

The US $1.5-billion facility, called New Safe Confinement and being constructed by the French consortium Novarka, will contain radioactive material remaining from the 1986 explosion of Reactor No. 4, the world's worst nuclear accident. Completion in 2017 is expected.

An existing containment vault over the area is in danger of collapse. The new arch will be assembled nearby, then moved on hydraulic jacks to enclose the whole site. Engineers have designed the structure to last 100 years — the estimated time it will take to clean the area.

Movers&Shakers

COMPILED AND WRITTEN BY
GILLIAN BENNETT
Content Developer

ONE MAN, TWO WHEELS — MANY TIMES OVER

Do you seek a healthier lifestyle? How about a greener way to get around town? Then **Christopher Grant, P.Eng.**, has you covered. The APEGA Member is the founder of Alberta Bike Swap, and his work for the not-for-profit organization earned him an Environmental Achievement Award from the City of Calgary in June.

Mr. Grant and his wife, Laura, are making bicycles more accessible to Albertans. The bike swap began as a simple process of buying bicycles at police auctions, fixing them up, and selling them for the price of parts to those in need of transportation. Now after three years, the organization has sold hundreds of bikes, and proceeds are split evenly between donations to the community and the cost of running future swaps.

In 2013 Calgary Mayor Naheed Nenshi opened the Calgary bike swap to a lineup estimated at 2,500 people long. About 650 bikes were sold at the event, with an additional 120 donated to local non-profits for reuse and repurposing.

Mr. Grant's engineering expertise came into play with the design and building of 60 bicycle racks for use at the swaps and in the community. Racks are provided free for use by those who require them, and are often borrowed by the City of Calgary and the province for major events. The racks — thousands of bikes' worth — have been used at Folk Fest, Sled Island, BikeToberFest, TransRockies and Heritage Days.

An enthusiastic cyclist himself, Mr. Grant bikes to work every day and finds time in his busy schedule to plan, manage and coordinate swaps in four Alberta cities every year. The swaps pair cyclists with a bike that is suited for them and ready to ride for years ahead. As a CAN-Bike instructor, Mr. Grant also teaches safe cycling for free.

The Environment Achievement Award from the City of Calgary recognizes environmental achievements and promotion of the city's environment. In addition to helping individuals live healthy lives, cycling benefits air, land and water, of course. And reuse, fostered by Alberta Bike Swap, diverts trash from the landfill.

-photo by Amro Maghrabi

RECYCLING CYCLES
APEGA Member Christopher Grant, P.Eng., is a cycling enthusiast and founder of Alberta Bike Swap. The non-profit runs buy-and-sell events throughout Alberta to promote a healthy lifestyle and reduce carbon footprints.

Movers & Shakers

MAKING YOUR WORKSPACE SAFER
Lee Nichols, P.Eng., receives the Work Safe Alberta Individual Achievement Award from the Hon. Thomas Lukaszuk in April. The award recognizes long-term commitment to workplace health and safety.
- photo courtesy the Government of Alberta

MEMBER HONOURED
FOR PUTTING SAFETY FIRST

He has over 51 years of experience in geotechnical engineering, has served as a ground control expert to governmental organizations, and is a 50-year member of the Canadian Institute of Mining, Metallurgy and Petroleum. But what **Lee Nichols, P.Eng., P.Geol.**, is really focused on right now is your health and safety. The President of **Terracon Geotechnique Ltd.** was presented with the Work Safe Alberta Individual Achievement Award in April.

Mr. Nichols began his education at Queen's University, graduating in 1963 with a bachelor's degree in geological engineering. He then obtained a master's of science in geological and civil engineering from the University of Syracuse, and started work at the Iron Ore Company of Canada. Mr. Nichols moved to **Syncrude Canada Ltd**. and Luscar Limited, working in different capacities from Junior Engineer to Chief Mining Engineer.

In 1983 he became President and CEO of Terracon Geotechnique Ltd. in Calgary, a private consulting company. At Terracon, Mr. Nichols provided leadership for corporate health and safety programs. He created an undergraduate program at the University of Alberta focused on improving safety and reducing injury incidents in the workplace. The program addresses risk control, safety, and loss management. Political leaders and industry professionals from across Canada participate regularly in the program.

In his 51 years of experience, Mr. Nichols's work has involved geotechnical engineering, mine and tailings facilities development and design, ground and mine dewatering studies, water quality studies, surface geology, and ore reserve estimates. He has served as a ground control expert to governmental organizations in the Northwest Territories and Nunavut, as well as mining companies in both Canada and the United States. He was an expert witness at ERCB (now the Alberta Energy Regulator) oil sands hearings and has project experience overseas in such countries as Iran, Indonesia, Surinam and Chile.

The Individual Achievement Award recognizes long-term commitment and contribution to enhancing workplace health and safety.

TWO MEMBERS MAKE TOP 50
Brenda Kenny, P.Eng., and Harbir Chhina, P.Eng., made *Alberta Venture*'s list of 50 most influential people.
- photo of Ms. Kenny courtesy of the Canadian Energy Pipeline Association
- photo of Mr. Chhina courtesy Cenovus Energy

PAGES OF INFLUENCE

People of influence come from all walks of life, and there's actually someone known as the Godfather of In Situ Oil Sands Developments. That's the sort of thing you learn from *Alberta Venture* magazine when it publishes its annual list of Alberta's 50 most influential people. Two of the people listed this year are APEGA Members.

Pipelines are in the news a lot these days, which must keep **Brenda Kenny, P.Eng.**, busy. She's been the President and CEO of the Canadian Energy Pipeline Association (CEPA) since 2008, when she was promoted from Vice-President, Regulatory and Financial.

A metallurgical Professional Engineer, Ms. Kenny received a doctorate in resources and the environment before joining the National Energy Board. In 2006 she joined CEPA , and she's led the development of its Integrity First Program, an initiative designed to improve member performance in areas of health, safety and the environment. Ms. Kenny taught at the Haskayne School of Business and was also a part-time fellow at the University of Calgary's Institute for Sustainable Energy, Environment and Economy.

As President and CEO of CEPA, Ms. Kenny works with industry partners to develop industry positions related to issues such as safety, regulatory efficiency, financial competitiveness and the environment. CEPA member companies transport 97 per cent of the oil and natural gas produced in Canada, with pipelines forming an energy delivery system that serves over 400 million people in Canada, the U.S. and Mexico.

Ms. Kenny is a fellow of the Canadian Academy of Engineering and serves on the boards of the University of Calgary and the Climate Change and Emissions Management Corporation.

Harbir Chhina, P.Eng., has been christened the Godfather of In Situ Oil Sands Developments. With a nickname like that, how can you not be one of *Alberta Venture*'s 50 most influential people?

Mr. Chhina has 30 years of experience related to enhanced oil recovery. As Executive Vice-President, Oil Sands, at **Cenovus Energy**, he currently oversees all its oil sands activities, including operations at Foster Creek, Christina Lake, Narrow Lake and Greater Pelican.

After graduating from the University of Calgary, Mr. Chhina joined the Alberta Oil Sands Technology and Research Authority. He moved to Alberta Energy Company, now **Encana**, and worked for 24 years in the area of SAGD development.

In the *Alberta Venture* article, Mr. Chhina was praised as having a natural intuition for finding underlying value — and that means in people as well as oil and gas assets. He mentored Drew Zieglgansberger, now Senior Vice-President of Operations at Encana, when he was just 24, offering him the lead on a drilling and completion group at Foster Creek — the largest commercial steam-assisted, gravity-drainage project to reach royalty payout status. Mr. Zieglgansberger credits Mr. Chhina as being the "single biggest continuous light on this whole in situ side of the industry."

GEOTECHNICAL AWARD GOES TO WELL-TRAVELLED ENGINEER

He has worked in every province and territory in Canada, and in countries such as Afghanistan, Botswana, Iceland and Trinidad. **Mickey Davachi, P.Eng.**, was presented with the 2014 Calgary Geotechnical Society Engineer of the Year Award in May.

Mr. Davachi attended the University of London, where he obtained a master's in geotechnical engineering and his PhD in civil and geotechnical engineering. He worked as a Principal Geotechnical Engineer for Acres International Limited for

FELLOWSHIP OF SEVEN
Seven APEGA Members were inducted recently into the Canadian Academy of Engineering for their dedication to the principles of science and engineering. Their efforts have had considerable effect on the country and its enterprises. From left to right are Judy Fairburn, P.Eng., Robert Reid, P.Eng., Clement Bowman, CM, P.Eng., C. Peter Watson, P.Eng., Owen Tobert, P.Eng., Steve Hrudey, P.Eng., and Jim Beckett, P.Eng.

- photo courtesy Cenovus Energy

26 years before moving to **AMEC Environment & Infrastructure.**

Currently the Senior Principal at **Coffey Geotechnics Inc.**, Mr. Davachi has 45 years of experience in the field of geotechnical engineering. He has a wide range of experience, with projects for oil and gas projects, industrial plants, and ports and marine facilities. He's also been professionally involved in mining, wind power, transportation, and cold region geotechnical engineering for the Beaufort Sea region.

The award is presented to an outstanding individual who has provided exceptional efforts, energy, and/or contributions to the "Art of Geotechnique," as the society calls it, in Calgary.

MICKEY DAVACHI, P.Eng. . .
. . . geotechnical expert
- photo courtesy Coffey International

SEVEN FELLOWSHIPS FOR SEVEN MEMBERS

It's that time of year again - when the Canadian Academy of Engineering (CAE) takes on the task of reviewing career highlights and accomplishments of Professional Engineers from across the country, selecting a few of the best as fellows. This year seven APEGA Members were inducted at a June ceremony in St. John's.

Robert Reid, P.Eng., is all about solutions. He has resolved everything from technical challenges to complex political and multi-discipline issues. His concepts for resolution have brought closure to several contentious natural gas and transportation issues.

Mr. Reid graduated from the University of Saskatchewan with a degree in electrical engineering. He went on to receive a master's from the University of Waterloo and began a career at **TransCanada Pipelines Limited**, serving as President, Energy Transmission, and Senior Vice-President. At TransCanada Mr. Reid implemented a plan to access frontier supplies of natural gas and was instrumental in negotiating the first deregulated price for natural gas in Canada.

After 33 years with TransCanada, Mr. Reid retired in 2000, but he continued to lend his expertise to conflict resolution. He became an Executive Associate with Ziff Energy Group (now **HSB Solomon Associates Canada Ltd.**) and later President of the Mackenzie Valley Aboriginal Pipeline LP. Mr. Reid's work on the pipeline saw N.W.T. Aboriginals brought into a one-third ownership interest and active participation in the development.

Mr. Reid is an honorary life member of the Canadian Gas Association and a past chair of the Canadian Energy Pipeline Association.

Water expert **Steve Hrudey, P.Eng.**, was inducted into the CAE for his pioneering efforts in environmental risk assessment, management and communication. His expertise during the Walkerton Inquiry led to international recognition and the development


- photo courtesy the Government of Alberta


- photo courtesy Calgary.ca

of preventive risk management methodology currently used all over the world.

Dr. Hurdey is no stranger to *PEG* pages, having been honoured in 2012 with the A.P. Black Research Award and in 2013 with a Diamond Jubilee Award. An APEGA Councillor, he has served on 25 expert panels and is currently a Professor Emeritus at the University of Alberta.

Owen Tobert, P.Eng., managed an annual operating budget of almost $3 billion and oversaw 15,000 employees. As City Manager for the City of Calgary, he had his hands full. Now retired, he has been inducted for the significant impact his leadership had on the city during his 10 years of service.

After receiving a degree in civil engineering from the University of Alberta, Mr. Tobert joined the City of Calgary's administrative team in 1982 and then worked his way through increasingly senior engineering positions. In 2000, he became General Manager of Utilities & Environmental Protection and was appointed to the executive team. In 2004 city council appointed Mr. Tobert to the position of City Manager, responsible for a yearly capital budget of $2 billion, along with the aforementioned operating budget.

During his time with the City of Calgary, Mr. Tobert introduced a corporate project management framework, increased financial planning and helped foster a culture that put citizens first. In 2005 he faced the biggest flood Calgary had seen in half a century. He identified the need for a group of resources focused purely on recovery and undertook a study of emergency management.

Did that work ever pay dividends. His efforts prepared the city for the massive floods of June 2013, earning it praise for its coordination and recovery efforts.

A chemical engineer with a career spanning 60 years, APEGA Life Member **Clement Bowman, CM, P.Eng.,** was inducted as an honorary fellow.

Dr. Bowman's career began in Ontario, where he worked with Imperial Oil Limited to test the process of bitumen separation on a variety of oil sands. The testing led him to the oil sands formation in Alberta, and later he joined **Syncrude Canada Limited.** Appointed by Premier Peter Lougheed in 1975, he was the first Chair of the Alberta Oil Sands Technology and Research Authority. He also advised the Premier on energy issues.

During his time with the authority, Dr. Bowman started a project to obtain access to deep oil sands deposits by directional drilling – the basis for the process now known as steam-assisted gravity drainage.

After returning to Imperial Oil as Vice-President, he became President of the Alberta Research Council and later opened his own consulting practice.

At a time when most people are thinking about retirement, Dr. Bowman was inspired to create a methodology for decision-making management for situations such as selecting research projects, choosing corporate strategies and making decisions on proposals. ProGrid Evaluation Solutions was the result. Dr. Bowman continues to work as advisor to the Bowman Centre for Commercialization of Technology in Sarnia.

Dr. Bowman has received numerous awards, including the APEGA Centennial Summit Award, the Alberta Science and Technology Leadership Award, and the Laureate of the Global Energy International Prize.

A man responsible for the development of many significant policy frameworks, **C. Peter Watson, P.Eng.**, was inducted into the CAE for his personal leadership, integrity and ability to forge consensus among diverse interests.

Mr. Watson has just been appointed Chairman and CEO of the National Energy Board, meaning he leaves behind his Government of Alberta roles as Deputy Minister of the Executive Council

and Head of the Alberta Public Service.

He's also served in two of the most technically complex and challenging departments, as Deputy Minister of Energy and Deputy Minister of Environment. He led the development of Alberta's Provincial Energy and Water for Life Strategies as well as Alberta's Climate Change Regulatory Framework. Bringing an engineering perspective to his work, Mr. Watson has advanced Alberta's carbon capture and storage initiatives and improved Alberta's competitive position for oil and gas investment and development.

Jim Beckett, P.Eng., FEC, FGC (Hon.), is an Honorary Life Member and a past-president of APEGA. Mr. Beckett has been involved in leadership for most of his career.

Mr. Beckett spent almost 37 years with the ATCO Group of Companies, starting in 1973 as Manager of Systems Operations and later acting as vice-president of various departments, including Transmission, Commercial and Regulatory. He led ATCO in the development of computer systems to optimize transmission and distribution assets, and in 1995 he was seconded to lead a provincial team working on electric utility deregulation. The team's work led to the Alberta Electric Utilities Act.

Mr. Beckett assisted Alberta in deregulating the electric and natural gas utilities industries, and helped narrow the focus of ATCO's utilities business to the provision of pipes and wires. In 2010 he was appointed Utility Advisor to the City of Edmonton.

He was APEGA's 90th President and went on to serve as President of Engineers Canada. He currently provides consulting services with Beckett Consulting.

In the winter edition of *The PEG*, we'll have more on **Judy Fairburn, P.Eng.**, who was also named a fellow of the CAE.

$35 MILLION WORTH OF REASONS TO REDUCE CARBON

The Climate Change and Emissions Management Corporation is serious about carbon management. To the tune of $35 million. An Alberta-based competition launched by the corporation is challenging participants to find innovative uses for carbon. *The Edmonton Journal* reports a University of Alberta project has been announced as one of the 24 first-round winners.

The project, being developed by the University of Alberta and Alberta Innovates – Technology Futures, endeavors to create a fuel cell that consumes carbon dioxide rather than produces it. The cell will be capable of combining methane, carbon dioxide and air to produce water, electricity and carbon monoxide.

Thomas Etsell, P.Eng., a professor in the U of A Department of Chemical and Materials Engineering, is the leader of the project. In an interview with the *Windsor Star*, he said his group has developed a catalyst that favours hydrogen being oxidized rather than carbon monoxide. By stopping the CO from reacting and having only the hydrogen react, the result is a formation of water as opposed to CO_2. Dr. Etsell says the cell is 92 per cent effective so far in converting only hydrogen, and the team is working to improve that number.

Selectees in the first round of the competition will receive $500,000 in funding over two years. The final project will be awarded a $10-million grant in 2018. So far the competition has received 344 submissions from 37 countries.

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www.engineerscanada.ca/scholarship-program-terms-reference

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APPLICATION DEADLINE: March 1, 2015

Application forms are available at engineerscanada.ca or by contacting the Engineers Canada National Scholarship Program at **awards@engineerscanada.ca**

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INTERNATIONAL QUALIFICATION SERVICES MANAGER

Reporting to the Director of Registration, the International Qualification Services Manager will act as a point of contact for internationally qualified applicants (IQAs). Duties include outreach, relations with government and immigrant agencies, and other support of IQAs, including assisting them in the description of their work experience and in other tasks necessary to complete the APEGA licensing process.

This role relates directly to APEGA's ongoing initiative to enhance services provided to IQAs, and to improve the timeliness and success of their licensure.

Considered assets in this position would be

- Prior leadership or significant contribution in a not-for-profit, service, or training environment, including responsibility for program development and implementation
- Prior experience working with and/or assisting immigrants or foreign-trained professionals
- A university degree in engineering or the geosciences
- Licensure with APEGA or another Professional Engineering or Geoscience self-regulating organization in Canada

This position requires superior communication and presentation skills — written and spoken. The successful candidate will have a strong ability to empathize with people going through career and life transitions. Also essential is a proven track record of building professional and productive relationships with colleagues, clients and stakeholders.

APEGA regulates the practices of Professional Engineering and Geoscience in the province. Since 1920, APEGA has been a vibrant and progressive self-governing Association — one that is committed to national and international leadership in setting practice standards, advancing competencies and ethics, and challenging Members to flourish in their professions.

The International Qualifications Services Manager will receive competitive compensation and benefits.

For more information, contact:

Elizabeth Hurley, Partner
Cecilia Oteiza Ayres, Search Assistant
Davies Park Edmonton
1505 Scotia 2
10060 Jasper Avenue
Edmonton, AB T5J 3R8
Ph: 780-420-9900
Fax: 780-426-2936
Email: careers@daviespark.com

APEGA

Real Jobs, Real Pay — Real Success

A partnership involving the Rotary Club helps APEGA Permit Holders fill job openings with people with developmental disabilities. Good fits abound, supporters say — and the workers themselves are not the only beneficiaries

BY **CORINNE LUTTER**
Member & Internal Communications Coordinator

Communicating is often a challenge for Jeffrey Kim. But that doesn't stop him from loving — and excelling at — his job as a filing clerk in the Urban Land Engineering Department of Stantec in downtown Edmonton.

Jeffrey, 25, has autism. He started a temporary job at Stantec in 2011, scanning documents and filing them in the company's electronic library. The APEGA Permit Holder was so impressed with his neat and meticulous work that he was asked to stay on as a permanent employee.

"He takes pride in his work and puts 100 per cent into it," says his father, Youngsoo. "He takes it very seriously and he likes it when other people appreciate his work, too."

Before starting at Stantec, though, it was difficult to find employment for Jeffrey. He tried working at a few places but it never panned out.

"Jeffrey needs a lot of nurturing at work. It takes longer to train people with special needs and not many employers are willing to do that," explains Youngsoo. "The biggest challenge was to find a workplace that's tolerant and patient, and provides meaningful work."

Jeffrey and his family found exactly that at Stantec.

MAKING IT MEANINGFUL

Jeffrey is one of five employees Stantec has hired through the Rotary Employment Partnership, a project of the District 5370 and 5360 Rotary clubs, the Alberta Association for Community Living (AACL) and the province's Persons with Developmental Disabilities Program. The goal of the partnership is to create meaningful employment opportunities for people with developmental disabilities. Supporters say it lives up to its slogan: Real Jobs with Real Pay.

"The employer gets an employee who is committed and eager to work. The employee gets an opportunity to earn a real pay cheque and contribute to society," says Nadine Fulmer, who coordinates the partnership in Edmonton.

There are always potential employees looking for work. Ms. Fulmer says more than 30 people with developmental disabilities are currently seeking jobs through the partnership, but only about two people find work each month. Most of those seeking jobs receive Government of Alberta support through Assured Income for the Severely Handicapped. Many have previous volunteer and work experience and hold high school, college or vocational degrees.

Just like everyone else, Ms. Fulmer says, workers in the program have strengths, talents and skills to share. "These are people who really want to work and not rely on government funding."

Since 2002, more than 300 people have been hired through the partnership in Edmonton, Calgary, Lloydminister, Grande Prairie and Red Deer. A wide variety of companies have participated, from one-person businesses to large international corporations, from hotels and restaurants to banks, software companies and office suppliers. Several APEGA Permit Holders, including Stantec, have also come on board.

> "Historically, people with disabilities have been kind of hidden from the public eye, and yet here we have a great resource in terms of an untapped employment pool — people who are really willing to work and yet often don't even get an interview for a job."
>
> **DAVE KINDERS, P.ENG.**
> *Senior Principal of Community Development*
> *Stantec*

Stantec first got involved in 2010, when senior leaders Rick Prentice, P.Eng., and Dave Kinders, P.Eng., championed the initiative. Mr. Prentice, the company's Vice-President, is a Rotarian. Mr. Kinders, Senior Principal of Community Development, is connected to AACL through his 15-year-old daughter Kelly, who has Tourette Syndrome and cognitive delays. Stantec invited AACL to its offices to talk to staff about the employment partnership.

"We had the presentation in our biggest boardroom. It seats 75 people and it was standing room only," recalls Mr. Kinders. "It was overwhelming how many staff were interested. Just about all of them had some connection to a person with disabilities, whether a child, a niece, a nephew or a neighbour."

IN HIS ELEMENT
Jeffrey Kim, who has autism, is one of five employees hired by Stantec through the Rotary Employment Partnership. Jeffrey found a "tolerant and patient" employer, his father says, that values his dedication and the high quality of his work.
-photo by Magdalena Pawlowski

QUICK FACT

What is a developmental disability?

This term is used to describe people with a disability who have difficulty learning and need assistance to carry out the practical and social activities of daily living. It can apply to a wide range of individuals, including those with Down syndrome, cerebral palsy or autism.

Source: Rotary Employment Partnership

It's not surprising that the Edmonton-based, international company embraced the idea. "We put people first," after all, is a corporate value. Big, bold letters on its business cards read: "We are better together."

Mr. Kinders says: "Historically, people with disabilities have been kind of hidden from the public eye, and yet here we have a great resource in terms of an untapped employment pool — people who are really willing to work and yet often don't even get an interview for a job. This was a real opportunity to give back to the community, and it has a very real connection with many of our employees."

One of the keys to the partnership's success is the support and information provided to employers before, during and after the hiring process. "We provide support as long as the company needs it," says Ms. Fulmer. That includes information for employees and supervisors on what to expect from people with different challenges, like autism, developmental delays and cerebral palsy.

To start the process, coordinators like Ms. Fulmer meet with employers to answer questions and explore job possibilities. The goal is always to come up with positions that a person with developmental disabilities could perform and that also benefit the business. Employers are encouraged to think about job tasks, not just job titles, and if necessary reorganize positions to create opportunities. A job coach is also available to help staff with training.

POSTIVE PRESENCE
Calvin Austrom, P.Eng., Operations and Production Manager at RAM Manufacturing, right, joins Todd Uditsky on the company's shop floor. Mr. Uditsky, who has a developmental disability, is a general labourer who was hired through the Rotary Employment Partnership. He loves his job and RAM is happy he's on the team.

-photo by Corinne Lutter

Jobs don't have to be full time to be meaningful. In many cases, jobs created through the partnership start off as part time and evolve into full time as the employee learns new skills and gains confidence.

"We work with employers to develop potential job possibilities. We help them think about jobs that could add value — for example, things that aren't getting done because other employees don't have time," says Ms. Fulmer. "There's a lot of matching that goes on to make sure there's a fit. Not only can the person do the work, but will they fit into the company's culture?"

At Stantec, administrative positions were developed to fit the skills and abilities of potential job candidates. "Not everybody can do every job. But there is a fit somewhere for them," says Mr. Kinders.

One Stantec employee had cerebral palsy, used a wheelchair and communicated using a computer with a voice box. "We took three jobs and moved some tasks around to customize it for what she could do," he says. "You do have to be a little flexible and maybe a little creative in how you make the job fit, modify some duties and build some natural supports."

'THE PEOPLE HERE ARE NICE'

Across the city in an industrial park on the west end, Todd Uditsky is busy hanging up parts in the powder coating room at RAM Manufacturing, a company that creates lifts and elevator systems for people with disabilities. Mr. Uditsky, who has a developmental disability, has worked at RAM for almost 10 years and he's not planning on leaving anytime soon.

"The people here are nice," he says. "If I need something and don't know where it is, I just ask and they always help. It's a lot better than the other jobs I had before."

Company founder Richard Meunier, P.Eng., heard about the Rotary Employment

QUESTIONS TO CONSIDER

If you're wondering whether a person with a developmental disability would fit into your workplace, the Rotary Employment Partnership has developed the following questions to consider.

- Are there jobs that are left undone at the end of the day because your staff cannot or do not make them a priority? Ask your managers and staff to consider making a list
- Is this unfinished work causing stress for you or your employees?
- Are higher paid, more qualified employees doing tasks that take them away from more important priorities?
- Would some of these tasks provide added value for your customers?
- Would it be more efficient and cost effective to delegate these tasks to a part-time employee?
- Could a person with a developmental disability do this work?

"It's good having a diverse mix of people in your organization. It keeps everybody a bit more human, to be an inclusive workplace."

RICHARD MEUNIER, P.ENG.
Founder, RAM Manufacturing

Partnership through a friend in the service club. His interest piqued, he contacted AACL. "We manufacture lifts for people with disabilities, so it was in line with what we do as a business," he explains.

In the course of his work, Mr. Meunier sees the challenges people with disabilities face. "Whether you have a physical disability or a mental disability, getting integrated into the workforce and other parts of society is not always easy," he says. "It's good having a diverse mix of people in your organization. It keeps everybody a bit more human, to be an inclusive workplace."

Mr. Uditsky was hired as a general labourer, a job that involves moving parts around during manufacturing, assembling small parts, and keeping the shop and office neat and tidy. "Being clean and organized helps create an efficient workplace. There is value in what Todd is doing for the company," says Mr. Meunier.

He required a little extra training at first, but a shop supervisor took Mr. Uditsky under his wing and mentored him. He sometimes still needs extra guidance and supervision, but he fits in like any other employee. Sometimes, he can be found chatting over lunch about wrestling and the company hockey pool.

"He gets along with everybody, is hard working and has a positive attitude," says Calvin Austrom, P.Eng., the company's Operations and Production Manager. "It just takes a little more patience and understanding of his disabilities."

An added benefit to the company, Mr. Uditsky's loyalty has saved RAM time and money in the long run because it doesn't have to continually keep training new labourers, a job that typically has high turnover.

'A CONTRIBUTOR TO OUR SUCCESS'

Nuna Logistics, an Edmonton-based company that provides civil construction and mining support services in the Canadian North, has also had success hiring through the Rotary Employment

Partnership. Colleen, an administrative assistant, was hired by the APEGA Permit Holder more than a year ago, and the filing system in the human resources department has never been better, says Human Resources Manager Johanne Johnson.

After learning about the partnership, Ms. Johnson approached senior managers to get the OK for a new part-time position. She sold them on the need for a filing clerk — it didn't make business sense for highly qualified employees to spend their time putting away paper when they could be working on more important priorities.

"Nobody wants to do filing. It's time consuming and you could spend hours looking for something," she says.

Before hiring Colleen, Ms. Johnson had some worries. Would the rest of the staff accept her? Would it take more time to train her?

"All of those concerns are real. The integration of Colleen into the Nuna community was longer than it is for most people. But now she's part of the team and a contributor to our success."

POSITIVE STEPS

Like most parents, Youngsoo Kim wants his son to have a purpose in life and a valued place in society. He hopes that Jeffrey can one day have the skills to live semi-independently. His job at Stantec is a step towards that goal.

"Jeffrey is one of very few lucky people," says Youngsoo. "I'm really grateful to this group of people who have very kind hearts at Stantec. Without these special people, Jeffrey probably wouldn't have lasted in the job. I really admire the culture there."

Stantec's Dave Kinders encourages other companies to take the leap and create an employment opportunity for someone with a disability, and see how things evolve. "Take advantage of the supports offered by the AECL and Rotary," he suggests. "Someone needs to be a leader and take a chance."

MORE INFO

Would you like to learn more about the Rotary Employment Partnership and how you can get involve?

Visit *aacl.org*

or contact

- Wendy McDonald
  Rotary District 5370 Employment Partnership Committee Chair
  and AACL Development Director
  780-974-1310
  possibilityworks@shaw.ca
- Bruce Uditsky
  District 5370 Employment Partnership Committee Member
  and
  AACL Chief Executive Officer
  1-800-252-7556, Ext. 417 or
  780-940-4269
  buditsky@aacl.org

SIDEBAR

READY, WILLING AND ABLE

More than 30 people with developmental disabilities are currently seeking work through the Rotary Employment Partnership. Some of these individuals are profiled below. Could one or more of them be a match for your company?

- Taylor is outgoing and friendly, and enjoys working with people. He is skilled with computers and enjoys working on digital presentations. A Calgarian, he has experience volunteering for TELUS Spark as a much-loved greeter and guide. He has also worked for a number years as a greeter at the Calgary Stampede. Taylor wants a role where he can work directly with people in a facilitator or greeter role, and also contribute his computer skills
- Francine is looking for full-time employment in Edmonton in administration, data entry or reception. She has experience answering telephones and filing, and doing basic data entry. Her strengths include attention to detail and strong interpersonal skills, including a great sense of humour. Despite many setbacks in her life, Francine has worked hard to be successful and is living in her own apartment, driving her own car and pursuing many interests. She seeks full-time hours in a welcoming team environment
- Kevin seeks part-time employment in Edmonton in the heating, ventilation and air conditioning (HVAC) industry. He completed the HVAC program at NAIT as an audit student, where he took classes in refrigeration, gas and heating, air conditioning and electrical theory, and took part in electrical labs. Kevin enjoys working with his hands, taking things apart and learning how they work. He often finds creative solutions to technical problems. He has experience working as shop trainee and is ready for new challenges
- Kyle is from Lloydminster. He is quiet but friendly, and he enjoys being around other people. He likes to work in teams but can also work independently. Ideally, he'd like to work full time for an event or catering company, or for a landscaping company. He understands the value in hard work, and he doesn't mind getting dirty and working with his hands. He also enjoys computers, music and travelling
- Chelsea is a young woman from Edmonton who has just begun to explore the working world. She wants to put her exceptional organizational skills to good use in part-time employment in administration, data entry, filing or food services Chelsea has experience as a stock person, a dishwasher, a camp counsellor and a meeting coordinator. She is an avid sports fan and in her spare time participates in basketball, bowling, golf, badminton and billiards
- Crystal is committed to lifelong learning and is currently taking online courses in basic accounting and bookkeeping. Crystal has experience working as a retail sales associate, a kitchen helper in a fast-food restaurant, a daycare worker and an animal groomer. In addition to customer service skills, she has a proven track record of working well within a team. She is eager to find a part-time job in retail or animal care, or as a bookkeeping assistant

APEGA INVESTIGATIVE COMMITTEE VOLUNTEER POSITIONS AVAILABLE

Are you a seasoned Professional Engineer, Professional Geoscientist, or Professional Licensee with 10 or more years of industry experience seeking an opportunity to advance the profession by sharing your knowledge and experience?

The APEGA Investigative Committee, a statutory committee established under the *Engineering and Geoscience Professions Act*, is looking for Professional Members to fill upcoming vacancies. Its mandate is to investigate complaints against APEGA Members and Permit Holders received by the Registrar's designate in accordance with the requirements of the act.

Qualifications

Applicants must:

- Be licensed as a P.Eng., P.Geo., P.Geol., P.Geoph. or P.L. with APEGA
- Have a minimum of 10 years of industry experience.

Preference will be given to candidates with experience in residential and commercial construction, geotechnical engineering, and environmental practice.

Duties and Expectations of Members

The Investigative Committee meets approximately eight times per year, roughly every six weeks. Meetings are normally one-half day each. There are, on average, four face-to-face meetings per year, alternating between Edmonton and Calgary, and four meetings per year conducted by videoconference from APEGA's Edmonton and Calgary offices. Authorized travel expenses will be reimbursed. In addition, investigative panel meetings and investigative interviews may occur from time to time. Candidates should be prepared to commit up to two full days per month on committee business.

The duties and expectations of Investigative committee members are:

- Serve a three-year term
- Attend committee meetings regularly
- Participate in investigative panel meetings as required
- Participate in panel interviews of complainants and Members under investigation
- Review agenda materials in preparation for monthly committee meetings
- Be prepared to commit up to two days per month on committee activities.

Questions

If you have any questions about the work of the Investigative Committee or the expectation of members, please contact Ross Plecash, P.Eng., M.Eng., FEC, Director of Corporate Affairs & Investigations, at toll-free 1-800-661-7020 or rplecash@apega.ca

Volunteer Application

Interested candidates are asked to submit an application, indicating the volunteer position for which you wish to be considered, including a resume with your name, address, telephone, fax, email and employer information. If you have previously served on APEGA committees, please indicate which ones and when.

Please forward your application to:
Sue Armitage
Volunteer Management Coordinator
volunteer@apega.ca
Toll-Free 1-888-262-3688

Thank you for your interest in volunteering with the Investigative Committee. Candidates will be selected for the committee or redirected to other volunteer opportunities.

APEGA Volunteer

If you are into Rock visit the APEGA Rock & Fossil Clinic

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SATURDAY, OCTOBER 18, 2014
10 a.m. to 4 p.m.
TELUS World of Science — Edmonton
11211 142 Street

APEGA

EDMONTON BRANCH CALENDAR

LUNCHEONS

APEGA Edmonton

Tuesday, September 16, 2014
Alberta's Electricity System — Challenges and Opportunities
David James, MBA, Executive Director, Electricity Policy

Tuesday, October 21, 2014
Edmonton Downtown Renaissance
Mayor Don Iveson

Monday, November 17, 2014
Engineering the Diversification of Alberta's Economy through Emerging Technologies
Dr. Perry Kinkaide, M.Sc., CMC, Founder & Past-President, Alberta Council of Technologies

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Luncheons held at: Westin Hotel, 10135 100 St.

Schedule: 11:30 a.m. Registration
12 p.m. Lunch
12:30 p.m. Presentation

Cost: Members — $35 ($40 at door)
Non-members — $40 ($45 at door)
Students — $20

To register: Online at **www.apega.ca** under Fast Find › Branches › Edmonton; or phone Sara Wolbeck at 780-426-3990, toll free 1-800-661-7020, ext 2338.

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CALGARY BRANCH CALENDAR

LUNCHEONS

APEGA Calgary

Wednesday, September 10, 2014
Countdown to Entrepreneur
Suzanne West, P.Eng., Imaginea Energy Corp.

Thursday, October 16, 2014
Alberta Energy
David Erickson, CEO of AESO

Thursday, November 13, 2014
Modularization for Alberta Projects
Duane Bearss, CET Bantrel Co.

Thursday, December 11, 2014
TBA
Sett Policicchio, P.Eng., President of ATCO Electric

Luncheons held at: Fairmont Palliser Hotel, 133 9 Ave SW

Schedule: 11:15 a.m. Registration
11:45 a.m. Luncheon

Cost: Members & Guests — $50
Students — $25
ASAP *(APEGA Student Advantage Program)* — $15

Register: Online at **www.apega.ca** under Fast Find, Branch Events Registration; or the Calgary APEGA Office at 403-262-7714, noting any dietary restrictions.

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BY **MIKE NETH,** *P.ENG.*
Director of Registration

Last December in this space, I made big promises. A rebuild of the Registration Department had begun, I said — a reinvention of the way we deliver services to applicants, Members and the public. The project wasn't going to be without its challenges, but we were up for them and committed to make real change, because the status quo was simply not acceptable.

I'm pleased to say that one of the first step-changes has occurred; we have re-launched two major forms in the applications process — the Work Experience Record and the Reference Questionnaire — using new web-based software. These forms are very important parts of the process, allowing the Board of Examiners to assess the experience and competency of applicants. Previously, both were MS Excel documents, and they were sent back and forth by e-mail. Internal processing was labour intensive.

The new forms, however, are web-based. Software-enabled workflows and processes make handling faster and more accurate for our staff, and also for Members and applicants.

There have been a few growing pains, so I want anyone who has had difficulties to know that are we are addressing them. Still, for the most part reviews are very positive. The transition was nearly seamless, and generally speaking the result is a much-improved experience for individuals applying to become Professional Members of APEGA.

Here's how it works now. You receive an email notice to login and complete the form or answer the questionnaire. You go to a secure web platform and complete the task in an environment that protects the privacy of your information.

You're at the airport? Not a problem — the system is mobile friendly. The old one was not.

You don't use Excel? No longer necessary.

A series of prompts will make sure you don't leave out information. If you don't understand something, you can immediately take advantage of easy-to-access, step-by-step instructions written in training-manual form. The need for staff involvement on our end is drastically reduced. Manual inputting is eliminated, which greatly reduces the chances of processing errors.

This is a simple, intuitive and streamlined system, and it's resulting in reduced frustration and confusion.

We had some applicants and new Members compare the new with old. Said one P.Eng. after completing the new Work Experience Record: "It was much cleaner and more professional looking." He also filled out the Reference Questionnaire and gave it similar kudos.

Here's what one of our Applications Coordinators had to say: "The new Work Experience Record system is an amazing upgrade. Processing applications has become a breeze — each application only takes a couple of minutes. And the reference questionnaire approval has gone from tedious to fun. The simplicity of this process is saving us tons of time."

Faster processing by staff means our applications get to the Board of Examiners more quickly than they used to.

THE TEAM EFFORT

Now, I'm the person who gets to write the column. But the credit I can take is limited. The E-Form Project began in December and we launched it in August. It was cross-departmental, involving many hours of effort from dozens of staff. There's not enough room to name you, but I do want to acknowledge your hard work and offer a heartfelt thank-you.

WHAT'S NEXT?

We receive about 9,000 new applications a year and, in the past, we weren't keeping up. The result was a lower standard of service than we were comfortable with and a lower standard of service than Members and applicants deserve.

That's changing. Although we've taken a big step forward in our program of reinvention, there's still much to come.

Next up: now that we've got the software up and running, we are going to embark on a modernization of our entire online application system. Prompts will guide applicants through the process and towards complete and submitted applications. Steps will be clearly identified. Documentation requirements and other information will be clearly defined and easily accessible.

Our reinvention is well and truly underway. And implementation of the E-Form Project has given me great confidence in what lies ahead.

The Importance of Compliance Education

BY **JESSICA VANDENBERGHE,** *P.ENG.*
APEGA Director of Compliance

Before joining APEGA management, my discipline was chemical engineering. I continue giving career talks about it, and I often say that chemical engineers are like fortune tellers — we work to predict the future. The difference is, of course, that we have science on our side.

With the help of past data, mathematical models are created and checked against monitored real-time data. This helps us provide a best estimate of what will happen in the future. It is always better to be proactive than reactive, especially when it comes to operating plants to ensure public safety.

A similar thing can be said about the Compliance Department. We would rather be proactive, working with groups to make sure they know and understand the rules and regulations, than be reactive, taking action against violators.

A major intent of the Compliance team is to open up dialogues with non-licensed persons and corporations that represent themselves as Members and Permit Holders. Most of the more than 500 compliance cases we opened in 2013 were closed once the individual or company was informed of the rules. This suggests a need educated the public and remind our Members of a few key definitions.

Within Alberta there are many different engineering disciplines. There's also a wide array of engineering and geoscience roles within a variety of industries. Creating a definition that encompasses every case is difficult. It has to be a definition that is broad enough to encompass existing positions as well as future positions.

We have definitions in our governing legislation, the *Engineering and Geoscience Professions Act (EGP Act).* The practice of engineering is defined as "reporting on, advising on, evaluating, designing, preparing plans and specifications for or directing the construction, technical inspection, maintenance or operation of any structure, work or process

(A) That is aimed at the discovery, development or utilization of matter, materials or energy or in any other way designed for the use and convenience of humans and

(B) That requires in that reporting, advising, evaluating, designing, preparation or direction the professional application of the principles of mathematics, chemistry, physics or any related applied subject. . ."

Similarly, the practice of geoscience is "reporting, advising, evaluating, interpreting, processing, geoscientific surveying, exploring, classifying reserves or examining related to any activity

(A) That relates to the earth sciences or the environment,

(B) That is aimed at the discovery or development of oil, natural gas, coal, metallic or non-metallic minerals, precious stones, other natural resources of water or that is aimed at the investigation of surface or subsurface conditions of the earth and

(C) That requires, in that reporting, advising, evaluating, interpreting, processing, geoscientific surveying, exploring, classifying reserves or examining, the professional application of the principles of mathematics, chemistry, physics or biology through the application of the principles of geoscience. . ."

The Act also says that teaching at university is the practice of geoscience.

Often the Compliance Department is approached with cases that question whether what a person is doing falls within the definitions in the Act. These people may be formally trained as engineers or geoscientists, or they may be scientists, technologists, operators, inspectors or surveyors, to name a few.

This is where the definitions turn from black and white into a lovely shade of grey. Where does science end and engineering (or applied science) begin? When do conducting experiments, summarizing data, and writing reports start approaching interpretation and application? These are difficult questions to answer and they have to be treated case by case, combining the knowledge of past decisions and existing perceptions with a feel for potential implications.

A BIG TEAM

Taking a proactive, education-based approach is a team effort. You, our Members, are part of that team effort, whenever you help educate others or bring forward possible Compliance cases, whether you do so anonymously or not. Thank you for being proactive.

I would like to also thank the Enforcement Review Committee (ERC), which is a crucial part of the Compliance Department's review process. It's composed of APEGA Members who volunteer their time and expertise.

Finally, I would like to acknowledge the APEGA staff and contractors who make up the Compliance office team, working diligently to ensure that folks on the job know the boundaries and understand when an APEGA licence or permit is required.

It is because of the proactive efforts — and sometimes reactive efforts — of all these groups that Compliance plays a huge role in giving APEGA licences and permits meaning.

If you are aware of practice or title violations, please contact Jessica Vandenberghe, P.Eng., Director of Compliance, at jvandenberghe@apega.ca.

Where ‘out of this world’ ideas change this world.

Professional Engineers and Geoscientists are problem solvers, visionaries and out-of-the-box thinkers. Curiosity and creativity fuel their efforts and imaginations help keep Alberta constantly moving forward. Warmth, light, power, water, and the ability to travel and communicate over a distance come from the work of our Members. Childhood is a magical time ripe with unique ideas and a drive to create and learn. Harnessing and nurturing the passion of future engineers and geoscientists at an early age is important to Alberta’s continued economic success and is a key to enhancing our quality of life.

APEGA

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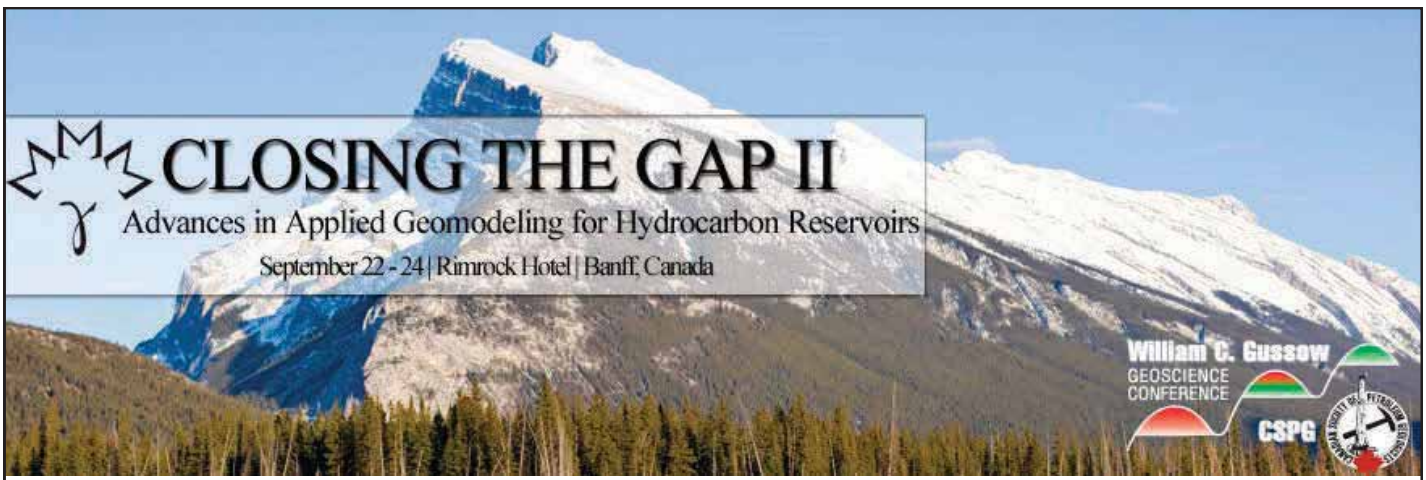

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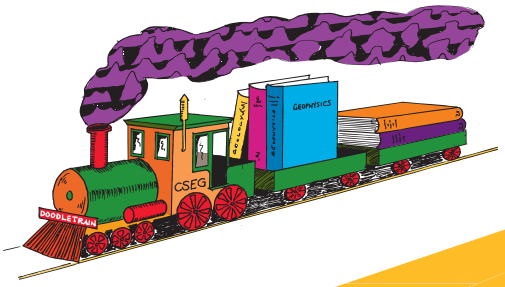

November 3–7, 2014
Calgary, Alberta

BASICS

1 **The Basics of Migration for Seismic Interpretation**
John Bancroft — Nov 3–4

2 **Introduction to Petrophysics**
Winston Karel — Nov 5

INTERDISCIPLINARY

3 **Microseismicity Monitoring in Oil and Gas Reservoirs**
Leo Eisner — Nov 3–4

4 **Completions and Stimulation for Geophysicists**
Jennifer L. Miskimins — Nov 5

5 **Value of Geophysics with Case Histories**
Lee Hunt / John Duhault / David Gray / Paul Anderson — Nov 5

6 **Geophysics Under Stress: Geomechanical Applications of Seismic and Borehole Acoustic Waves**
Colin Sayers — Nov 6–7

7 **Recent Sand Models**
Larry Meckel — Nov 3–4

8 **Seismic Geo-Morphology**
Henry Posamentier — Nov 6–7

9 **Integrated Approaches to the Study of Carbonate Reservoirs**
Lynn Watney — Nov 3–4

PROCESSING / ACQUISITION

10 **Processing, Inversion and Reconstruction of Seismic Data**
Mauricio Sacchi — Nov 3–4

11 **Migration DMO and Velocity Model Building**
Piet Gerritsma — Nov 4–5

12 **A Practical Understanding of Geophysical Inversion from Deconvolution to Full Waveform Inversion (FWI)**
John Bancroft — Nov 6–7

13 **Integrated Seismic Acquisition and Processing**
Jack Bouska — Nov 5–6

14 **Multicomponent Seismic Exploration in Western Canada**
Richard Bale / Rob Kendall — Nov 3–4

RESERVOIR CHARACTERIZATION

15 **Rock Physics for Geophysical Reservoir Characterization and Recovery Monitoring**
Gary Mavko — Nov 6–7

16 **Exploration Rock Physics and Seismic Reservoir Prediction**
Per Avseth / Tor Arne Johansen — Nov 3–4

17 **3D Seismic Attributes for Prospect Identification and Reservoir Characterization**
Kurt Marfurt / Satinder Chopra — Nov 3–4

18 **Seismic Amplitude Interpretation**
Fred Hilterman — Nov 5–6

19 **Fractured & Shale Reservoirs – From Geologic Concepts to Reservoir Models**
Ahmed Ouenes / Scott Cooper — Nov 6–7

20 **Geophysical Petrophysics**
Winston Karel — Nov 6–7

DATA

21 **Bits Bytes Seismic Data Formats: Pitfalls in Seismic Data Loading**
Eric Keyser — Nov 5–6

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All That Glitters

Gold panning in the North Saskatchewan River Valley near Laurier Park reveals the region's rich geological history — and yes, a little bit of gold, too

-photo by Maryanne Protz/ Alberta Geological Survey

HIDDEN TREASURE
Water and a sifter (left) are used to help separate larger rocks from sand and silt, which hide tiny flakes of placer gold. Gold and other heavy minerals fall through the sifter into the pan below. Joan Waters, P.Geol., (top right) uses a magnifying glass to search for placer gold among the other heavy minerals left after sifting. Panning in the North Saskatchewan River might not make you rich, but you could collect enough placer gold that it looks impressive — suspended in water and under a microscope (bottom right).

STORY AND MAIN PHOTOS BY
CORINNE LUTTER
Member & Internal Communications Coordinator

Prospectors aren't likely to strike it rich panning for gold in the North Saskatchewan River Valley, but they will discover evidence of Alberta's rich geological history.

Their pans will turn up tiny flakes of placer gold, washed down from the mountains and Canadian Shield. They'll also reveal everything from petrified wood and garnets to small chunks of quartzite, granite, coal, sandstone and more. Even tiny diamonds and other gems can be found in the river valley — if you're lucky and have sharp eyes.

Joan Waters, P.Geol., a Geographic Information Systems Analyst with the Alberta Geological Survey, enjoys gold panning along the North Saskatchewan as a hobby. Over the past five years or so she's found a small amount of gold flakes and has a growing collection of tiny sparkling minerals including garnet, epidote, olivine, illmenite and magnetite. A favourite spot to find these treasures from the past is Laurier Park, an area was once known as Miner's Flats because of the prospectors who set up their tents and sluices in the area in search of the mother lode.

That was back in the late 1800s. Today, most prospectors are hobbyists, although there are some who pay $50 for a recreational mining licence, set up their sluices and try to turn a profit. For Ms. Waters, though, it's simply about being ankle deep in water on a warm summer day, sifting shovelfuls of river rocks through her pan and seeing what turns up.

"I like to collect the different minerals and admire their beauty," she says. "There are many almandine garnets and I'm still looking to find sapphires, which reportedly can be found here."

If you want to try your hand at gold panning, groups like the Edmonton Geological Society and the Alberta Gold Prospectors Association sometimes hold events to teach newbies the craft. Visit their websites for details.

SURFABLE

egs.ab.ca
agpa.ca

1. ATHABASCA GROUP SANDSTONE

This stone hails from the Athabasca Group, a geological formation found in the northeast corner of Alberta and in northern Saskatchewan. This type of sandstone is not commonly found in the Edmonton region. It was deposited here by glaciers and is an estimated 1.5 to 1.7 billion years old.

2. FIRED SHALE

A relatively rare find in Edmonton's river valley, fired shale is formed when coal seams catch fire underground, firing the shale and turning it a red or orange colour. These smooth, soft pebbles — about 65 million years old — are often found near coal mines. This particular find possibly originated from Lake Wabamun, where coal mining has taken place for more than a century.

3. CHERT

Chert is a sedimentary rock commonly made up of fossils from silica-secreting organisms like sponges. This sample is fractured, with calcium carbonate in the fractures.

4. COAL

Edmonton was once home to a bustling coal mining industry and coals seams are still easy to spot along the North Saskatchewan River Valley's steep banks. These coal seams continue to deposit small pieces of these black diamonds, as they're often called, along the river's banks. More than 100 coal mines operated in Edmonton in the early 1900s, with 13 million tonnes of coal produced from three major coal seams.

5. SANDSTONE

Only one per cent of pebbles in the Edmonton region are sandstone. They are usually smooth and rounded and light grey or tan in colour.

6. GRANITE WITH ORTHOCLASE FELDSPAR and 7. GRANITE WITH POTASSIUM FELDSPAR

At around two billion years old, this granite is likely from the Canadian Shield in Northern Alberta, or possibly the Northwest Territories. It was carried here by glaciers during the last ice age, around 12,000 years ago.

8. QUARTZITE

This is the most common pebble in the river valley — about 70 per cent of pebbles found there are quartzite, which is hardened sandstone. These pebbles, about 550 million years old, came from the Gog quartzite formation in the Rocky Mountains around Jasper. Quartzite pebbles are very dense and resistant to erosion, which helped them survive the journey to Edmonton. The white ring in this pebble is a fracture filled with quartz cement.

9. CHERT WITH IRONSTONE COATING

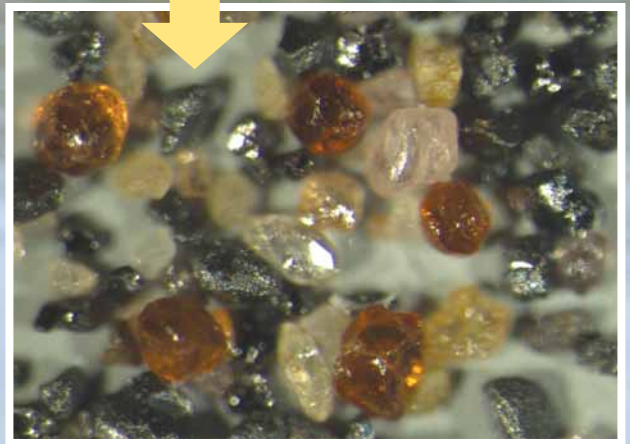
Another example of chert — this one with an ironstone coating. Ironstone forms within sedimentary rocks as layers or concretions from iron-rich groundwater. This pebble likely came from a chert-bearing formation in the Rocky Mountains.

10. PETRIFIED WOOD

Petrified wood is the provincial stone of Alberta. A common find in the river valley, it is formed when silica fills the cells of buried wood, preserving the wood's shape.

11. HEAVY MINERAL CONCENTRATE

After you sift through a few pans of river gravel looking for gold, heavy mineral concentrate is what remains. Miniscule flakes of gold are hidden below the dark sand in the bottom on the pan.



Heavy mineral deposits, which can include garnet, epidote, illmenite and magnetite, are magnified to reveal the beauty of each component.
-photo by Maryanne Protz/Alberta Geological Survey

A PEBBLE (GUIDE) IN YOUR POCKET

Every rock has a story to tell.

That's why the Edmonton Geological Society (EGS), with support from the Canadian Geological Foundation, recently developed *Pebbles: A field guide to the Identification of Pebbles in the Edmonton Area.* The easy-to-use guide is a great resource for amateur rock hounds of all ages — especially elementary school students learning about geology and maybe even starting their own rock collections.

"We are always eager to promote geoscience topics in the Edmonton area," says Dr. Matthias Grobe, P.Geo., Publications Manager with EGS and one of the guide's authors.

The waterproof guide includes full-colour images and brief descriptions of pebbles found in the Edmonton and Alberta Plains regions, including details about how they are shaped through weathering, erosion and transport. It can be purchased from the Edmonton Geological Society for $7.50 per copy, and is also available at Audreys Books on Jasper Avenue, the Science Shop in Southgate Mall, and Ghossein Rocks and Fossils in West Edmonton Mall.

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2014 APEGA SALARY SURVEY

Highlights from the *Value of Professional Services*

FOREWORD

The *Value of Professional Services* is one of APEGA's most highly sought after publications. It provides APEGA Members, both individuals and corporations, with an unbiased salary and benefits comparison across a wide range of industries in Alberta. APEGA encourages the use of this resource, and any other at your disposal, to ensure fair compensation for individual practitioners while helping corporations remain competitive in the labour market.

Again this year, APEGA engaged the services of Aon Hewitt to administer and conduct the *2014 Value of Professional Services* salary and benefits survey. As a direct result of feedback supplied by Members, the survey has undergone a redesign. A number of enhancements have been incorporated into the study. Key new features include:

1. Revised Definitions and Terminology outlining the components of pay gathered and reported on
2. Additional results for APEGA licensing type, and size of company (revenue category) by responsibility level
3. Additional tables providing results for actual bonus amounts, long-term incentives (expressed as a percentage of annual base salary), total actual cash, target total cash and total compensation.
4. Presentation of hourly rates of pay and annual hours of work for contract employees
5. Updated benefits and perquisites results with annual dollar amounts (where available)
6. Results on flexible work arrangements, employee turnover rates and overtime payment practices and policies

It is worthwhile mentioning that part of the Revised Definitions and Terminology includes slight rewording of the responsibility levels and a change in the industry categories. We would like to emphasize that the changes to the responsibility levels does not affect the score rating when determining your responsibility levels, but is reflective of typical categorization. Users are advised to accurately determine their responsibility levels prior to applying the results. The industry category changes were done to provide more clarity to ensure accurate categorization of participating companies. As well, the final publication, *PEG* highlights, and an Excel file with additional detailed results will be available on our website (apega.ca) by October 2014, if not sooner.

Data were gathered from 89 employers (with over 10,996 individual data points), representing APEGA's 10 regional branches and major industry sectors. We appreciate the effort required by the participating Permit Holders who complete this annual survey every spring. Without your help, this service would not be possible. We know from experience that this service is appreciated by the membership.

A brief follow up satisfaction survey may be distributed later this year to gather feedback; however, please don't hesitate to contact either Jessica Vandenberghe (APEGA) or Suzanne Thomson (Aon Hewitt) directly.

Thank you for your continued support.

Sincerely,

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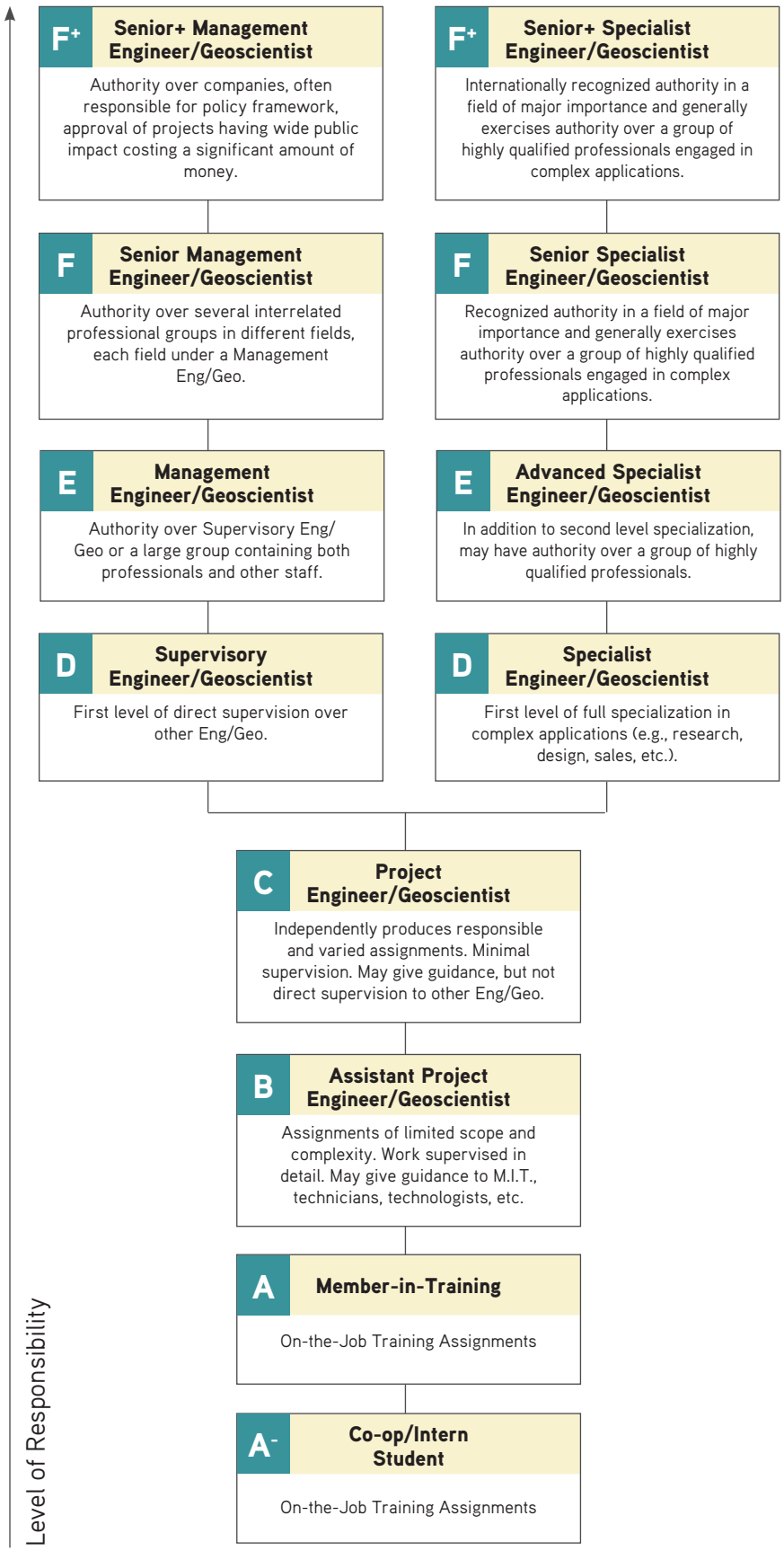
*Since this introduction was written, Ms. Vandenberghe has transferred to another APEGA position — Director of Compliance. For the time being, she will remain the APEGA contact for the *Value of Professional Services.*

JOB CLASSIFICATION FLOWCHART



2014 EMPLOYER SALARY

HOW TO USE THE SALARY SURVEY RESULTS:

Step 1: Determine your responsibility level

Step 2: Determine your 2014 cash compensation results based on responsibility level

Step 3: Review predicted salary increases, as reported by Permit Holders

The flowchart to the left gives a generalized overview of responsibility levels. In order to determine your responsibility level more accurately, please see the *Value of Professional Services* final report for a detailed methodology.

NOTE ON SALARY SURVEY METHODS

Again this year, APEGA engaged the services of Aon Hewitt to administer and conduct the 2014 Value of Professional Services salary survey. Invitations to participate in the survey were distributed to all registered APEGA Permit Holders in May. Results were gathered and compiled by Aon Hewitt throughout the months of June and July in preparation for the final report publication and distribution this month.

The Salary Survey is completed by each Permit Holder's human resources department (or other applicable department) and all data are anonymous.

The nine industry categories used in this report are:

- Engineering and/or Geoscience Consulting Services
- Engineering, Procurement, and Construction
- Resource Exploitation (except oil & gas)
- Resource Exploitation (oil & gas only)
- Manufacturing (durables)
- Manufacturing (non-durables)
- Not-For-Profit Service, Control and Utilities
- For-Profit Service, Control and Utilities
- Information and Other Advanced Technologies

DATA REPORTING METHODS

The statistical information reported includes the average, mean, mode, median (D50), minimum value, maximum value, D10, D25, D75 and D90. Please refer to the figure at the top of the opposite page for further clarity. In an effort to ensure data confidentially, a minimum of three responses in any given reporting break is required to publish a survey average. Responses noted as "n/a" in any table or chart is defined by having less than three data points or the inability to compute a given value.

Data results were filtered by individual job classification and responsibility level to ensure all salary data points were within three standard deviations of the sample average, using a single iteration approach to remove any potential outlying data point.

Base salary is provided as an annual value, effective as of May 1, 2014. Base salary includes pay for time worked at normal rates plus the cost of benefits for time-

SURVEY HIGHLIGHTS

not-worked (e.g., vacation pay, statutory holiday pay, payments in-lieu of holiday/vacation, etc.). Base salary does not include payment of overtime.

Total compensation is the sum of the base salary, actual bonus/short-term incentives, other cash payments, remote location allowance, and long-term incentives (expressed as a % of base salary). Other cash compensation includes direct payments to the employee for items such as profit sharing, productivity/gain sharing, commissions, signing, retention and project completion bonuses. For more details on what is included, please see the *Value of Professional Services* final report.

INFORMATION ON PARTICIPANTS

Participation for the 2014 survey is based on 89 companies submitting data in time for inclusion in the final published report. The 2014 survey captured current compensation data for 10,996 Engineering and Geoscience Professionals across Alberta.

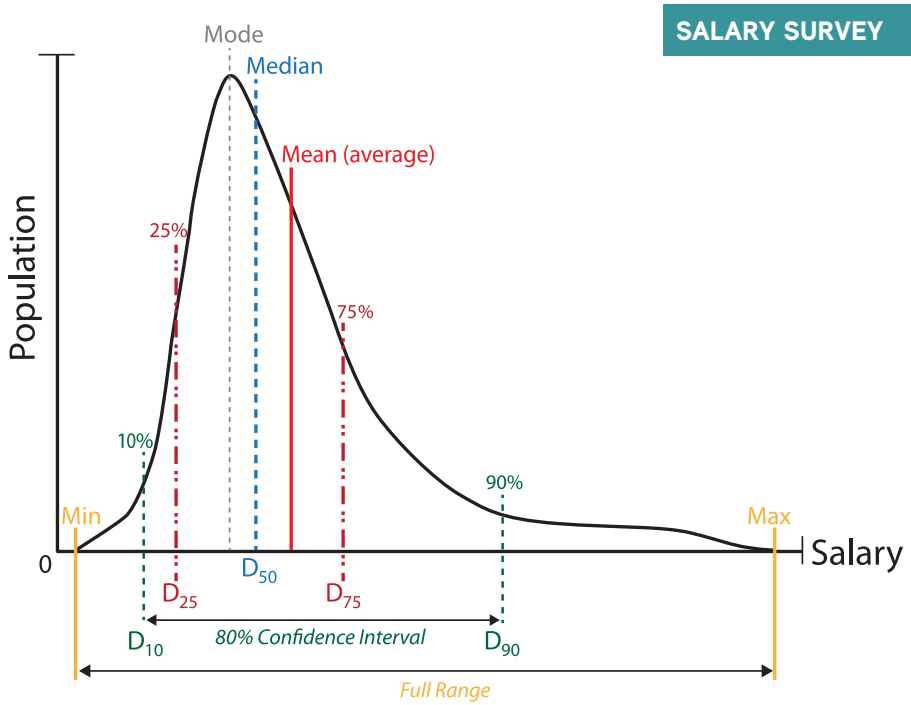
PREDICTED SALARY INCREASE

Based on current survey responses, 94% of companies plan to increase salaries in the next 12 months by an average of 3.5%, with a range of 2.0% to 7.0%, whereas 6% of companies are forecasting a salary freeze in the next 12 months. 4.5% of respondents were unable to provide a response to their predicted salary increases.

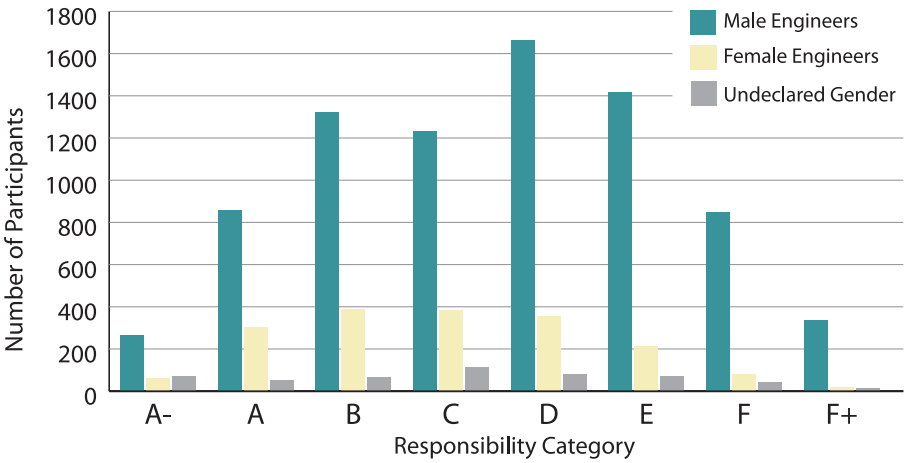
Please be sure to pick up your full copy of the *Value of Professional Services*. Included are the full salary survey results, with other information pertaining to:

- Benefits & Additional Cash Compensation plans
- Vacation Entitlement
- Personal & Family/ Sick Days
- Flexible Work Arrangements
- Overtime Policies
- Turnover
- Contract Employee Rates of Pay
- Gender
- Location
- Engineering Disciplines
- Years of Experience
- APEGA License
- Company Size
- Co-op Student Salaries
- Degrees

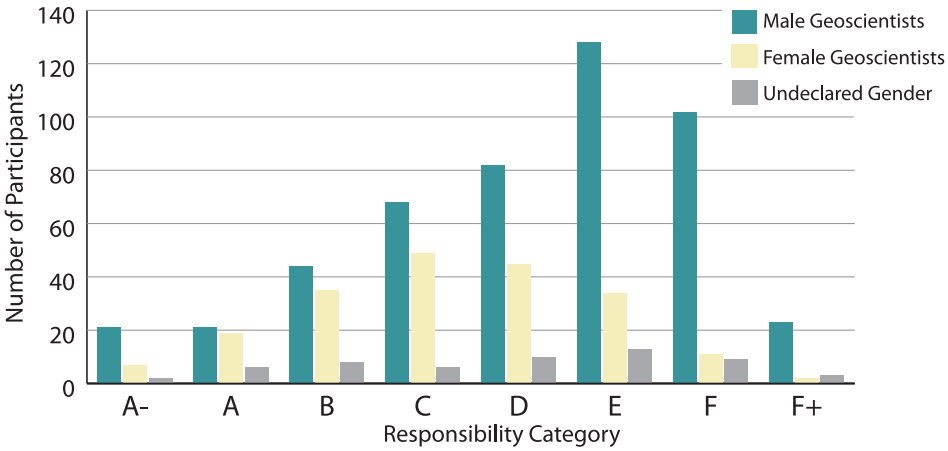
Participation in the salary survey is free and encouraged by all Permit Holders in an effort to garner the most robust and representative data-base possible. As survey participation grows, a more accurate representation of our membership is shown. Please visit our website apega.ca or contact APEGA directly to ensure you are sent your 2015 survey participation package next May.



GENDER VS. RESPONSIBILITY CATEGORY – ENGINEERING



GENDER VS. RESPONSIBILITY CATEGORY – GEOSCIENCE



Engineering

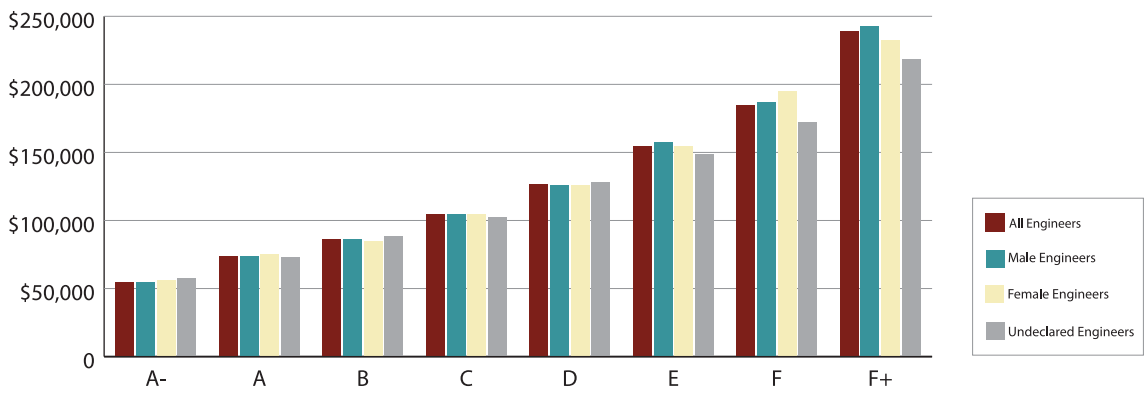
ANNUAL BASE SALARIES – ALL INDUSTRIES

Category	# Engs.	Average $	Mode $	Median (D50) $	Min Value $	Max Value $	D10 $	D25 $	D75 $	D90 $
A-	357	54,425	---	54,927	43,115	71,495	45,735	50,008	58,846	61,118
A	1,172	73,772	72,000	72,500	60,000	91,044	63,302	68,579	80,306	84,343
B	1,671	86,354	75,000	85,828	69,183	115,260	74,060	77,211	92,860	98,858
C	1,664	104,900	97,000	101,347	73,000	155,500	87,692	93,661	113,501	129,980
D	2,019	127,083	117,000	126,780	94,000	169,350	107,644	116,167	134,976	147,738
E	1,575	154,574	135,000	150,900	96,000	213,250	131,177	137,200	172,766	183,761
F	940	184,770	160,000	184,520	100,000	260,000	148,862	163,500	205,891	217,317
F+	365	239,294	260,000	229,731	135,000	340,000	182,505	198,222	278,512	313,067

TOTAL COMPENSATION – ALL INDUSTRIES

Category	# Engs.	Average $	Mode $	Median (D50) $	Min Value $	Max Value $	D10 $	D25 $	D75 $	D90 $
A-	357	54,810	---	54,927	44,715	71,495	46,218	50,469	59,716	61,118
A	1,172	80,265	---	76,301	60,000	119,266	64,794	71,123	87,714	99,746
B	1,671	99,840	---	91,976	71,384	328,086	75,533	82,243	106,154	128,528
C	1,664	128,638	---	109,528	73,000	846,193	92,580	98,953	129,280	164,546
D	2,019	152,143	120,000	137,357	94,000	555,450	114,826	124,035	156,327	200,464
E	1,575	195,912	---	172,381	120,920	724,338	136,029	148,311	210,400	279,495
F	940	252,380	---	223,485	115,000	831,890	158,769	185,456	284,150	368,336
F+	365	379,029	---	283,473	156,000	1,371,525	197,154	220,550	446,133	636,847

ANNUAL BASE SALARY BY GENDER – RESPONSIBILITY LEVEL



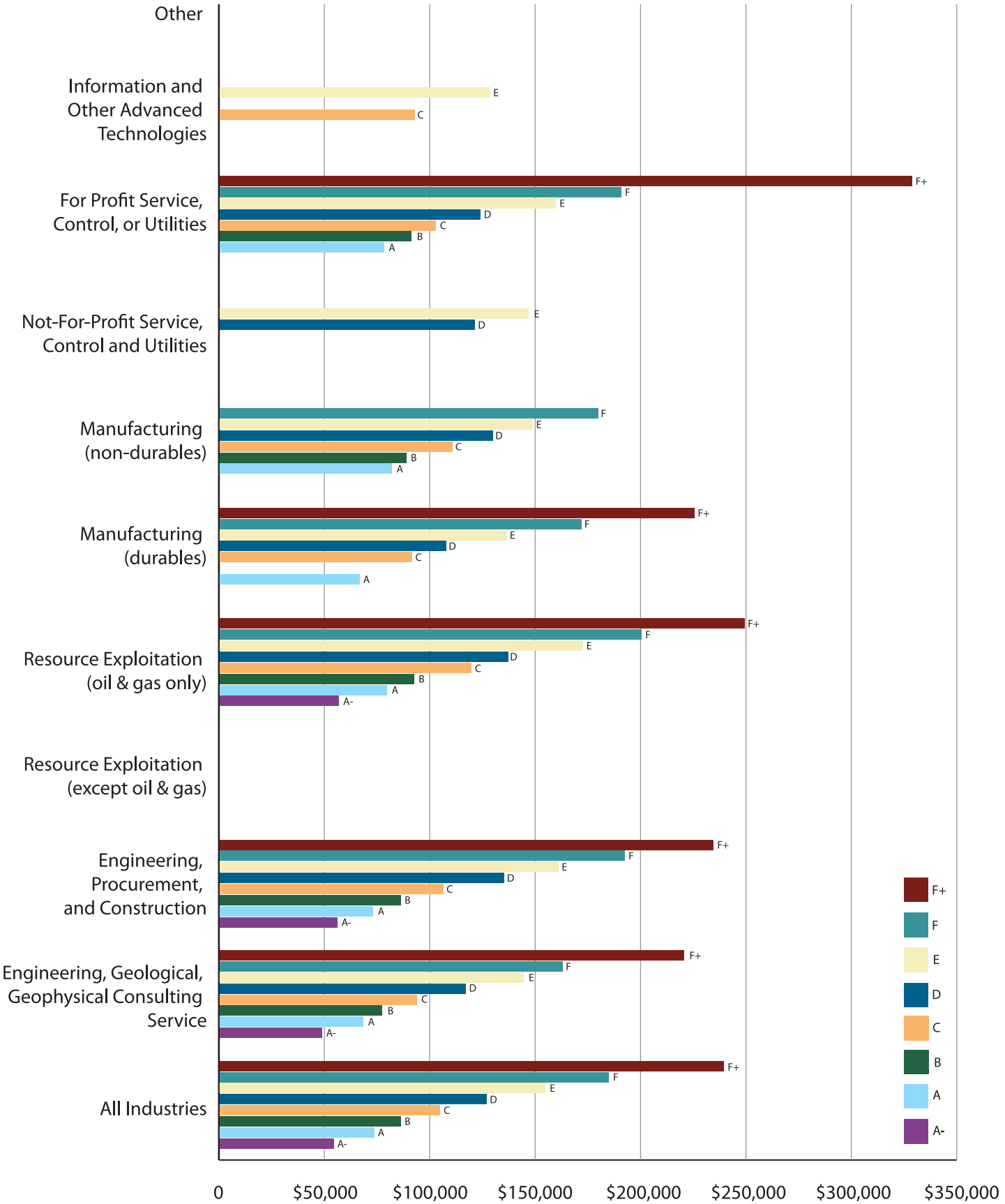
For Engineers (ranging from A- to F+), base salaries have increased for all levels except levels E and F, while total compensation values only increased for Levels C and F.

It is well know that a labour shortage is upon us, which is expected to continue well over the next decade. As more Engineers and Geoscientists leave the workforce, the heightened demand for experienced professionals will increase. This is apparent in the increase in number of hits to APEGA's job board (apegajobboard.ca).

The widely publicized labour shortages will continue to heighten employers awareness towards the importance of a meaningful and successful total rewards strategy, including *(but not limited to)* competitive base salaries, variable pay plans, benefit programs, work life balance programs and career development plans. As the increase in demand for talent within the Engineering and Geoscience Professions continue, employers' total rewards strategies will continue to evolve and adapt to ensure they remain market competitive.

Engineering

ANNUAL BASE SALARIES – COMPARISON ACROSS INDUSTRY



Geoscience

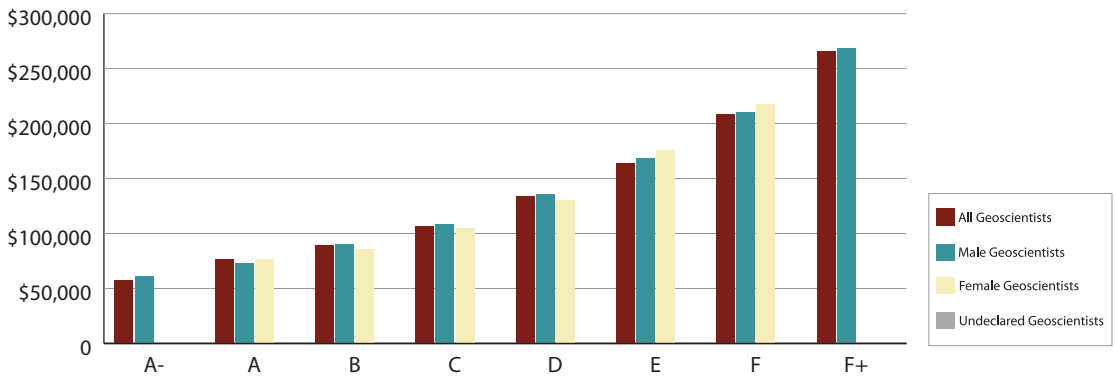
ANNUAL BASE SALARIES – ALL INDUSTRIES

Category	# Geos.	Average $	Mode $	Median (D50) $	Min Value $	Max Value $	D10 $	D25 $	D75 $	D90 $
A-	29	57,696	---	60,901	45,703	63,281	---	---	---	---
A	46	76,750	88,000	78,919	58,142	88,220	59,426	69,541	87,853	88,000
B	87	89,155	---	93,278	71,466	101,293	74,876	82,335	96,664	97,752
C	123	106,725	---	108,390	81,945	145,367	89,848	97,541	111,476	120,080
D	136	134,444	---	133,155	101,650	174,700	114,188	121,523	139,434	159,454
E	174	164,245	---	173,000	105,040	198,750	131,562	138,823	182,045	194,799
F	122	208,922	---	211,812	156,000	285,714	166,081	192,311	218,940	244,446
F+	27	265,742	270,000	261,975	170,768	394,680	193,455	234,209	300,075	345,084

TOTAL COMPENSATION – ALL INDUSTRIES

Category	# Geos.	Average $	Mode $	Median (D50) $	Min Value $	Max Value $	D10 $	D25 $	D75 $	D90 $
A-	29	59,296	---	60,901	52,101	63,281	---	---	---	---
A	46	86,149	---	88,000	59,426	120,100	60,446	71,666	94,524	118,044
B	87	121,775	---	110,152	71,466	300,735	76,088	87,335	132,287	155,610
C	123	130,414	---	125,432	81,945	243,514	96,222	108,634	144,845	154,492
D	136	198,389	---	165,450	106,628	673,931	122,979	140,770	208,945	240,671
E	174	261,808	---	236,758	123,000	861,994	136,390	165,648	293,909	328,622
F	122	315,723	---	312,913	174,400	418,127	190,838	272,954	387,978	408,577
F+	27	787,093	---	521,321	219,582	4,499,806	250,805	339,154	715,275	841,232

ANNUAL BASE SALARY BY GENDER – RESPONSIBILITY LEVEL



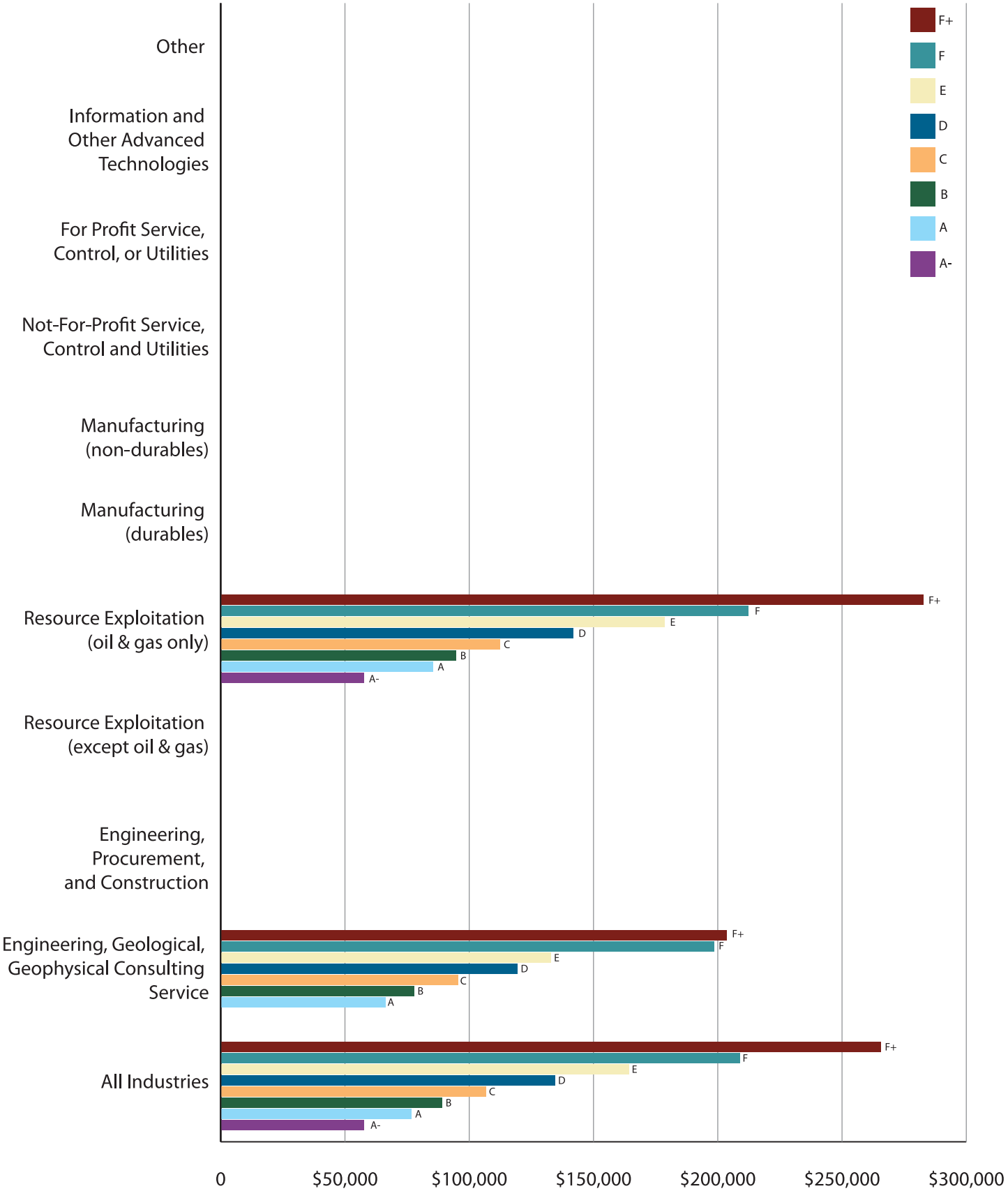
For Geoscientists, with the exception of level E, base salaries have increased across all responsibility levels (ranging from A- to F+), while total compensation values increased across all responsibility levels.

In addition to maintaining market competitiveness from a total compensation perspective, the majority of industry continues to focus on targeting other pools of potential members, especially internationally educated graduates, females and Aboriginals. Outreach and diversity programs targeted for these groups continue to gain momentum, as are meaningful collaborations among APEGA, industry, government and various outreach organizations. APEGA is continuing its aggressive targets of increasing the female Members to 30% and Aboriginal Members to 2% by 2030. To support this, the salary survey is one means to gather information to better gauge progress.

It is encouraging to see more females in the Geoscience Profession, who represent just over 27% of the total Geosciences data sample in the 2014 survey. Base salary survey results for female Geoscientists are consistent and equitable with their male counterparts for the majority of responsibility levels. The female Engineering base salary survey results continue to show a directional shift towards equitability for the majority of responsibility levels, however these results only represent 17% of the total engineering survey sample.

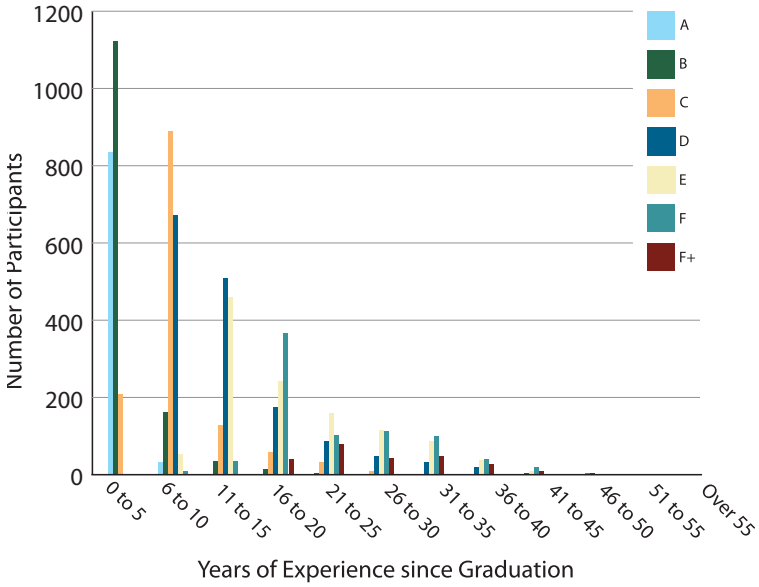
Geoscience

ANNUAL BASE SALARIES – COMPARISON ACROSS INDUSTRY



Engineering – Years of Experience

PARTICIPANTS VS. YEARS OF EXPERIENCE



SALARY VS. YEARS OF EXPERIENCE

When calculating the Years of Experience since Graduation, it is assumed that an individual enters the workforce immediately upon completing their last degree. This may not necessarily be the case for all individuals; however, it is considered the norm from a surveying perspective.

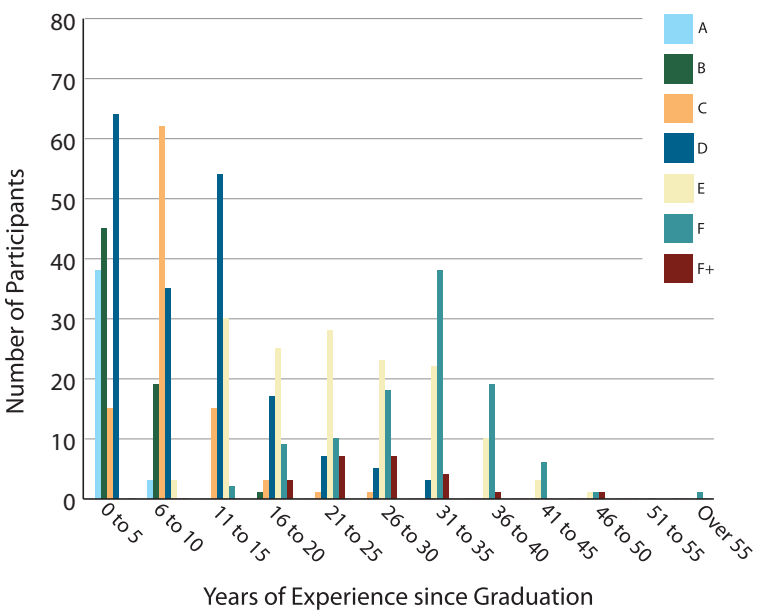
Typically, progression to the next responsibility level is also dependent on an individual's years of experience in the workforce. As more in-depth knowledge and specializations are gained over time, an individual's overall level of contribution and responsibility within a company progresses as well.

The highest average base salary is not necessarily solely attributed to the individuals with the most Years of Experience. Generally it is more directly related to an individual's level of expertise/specialization, performance and overall contribution within the company.

Responsibility level A- has been omitted in these charts, as this level falls outside of the defined parameters for Years of Experience since Graduation.

Geoscience – Years of Experience

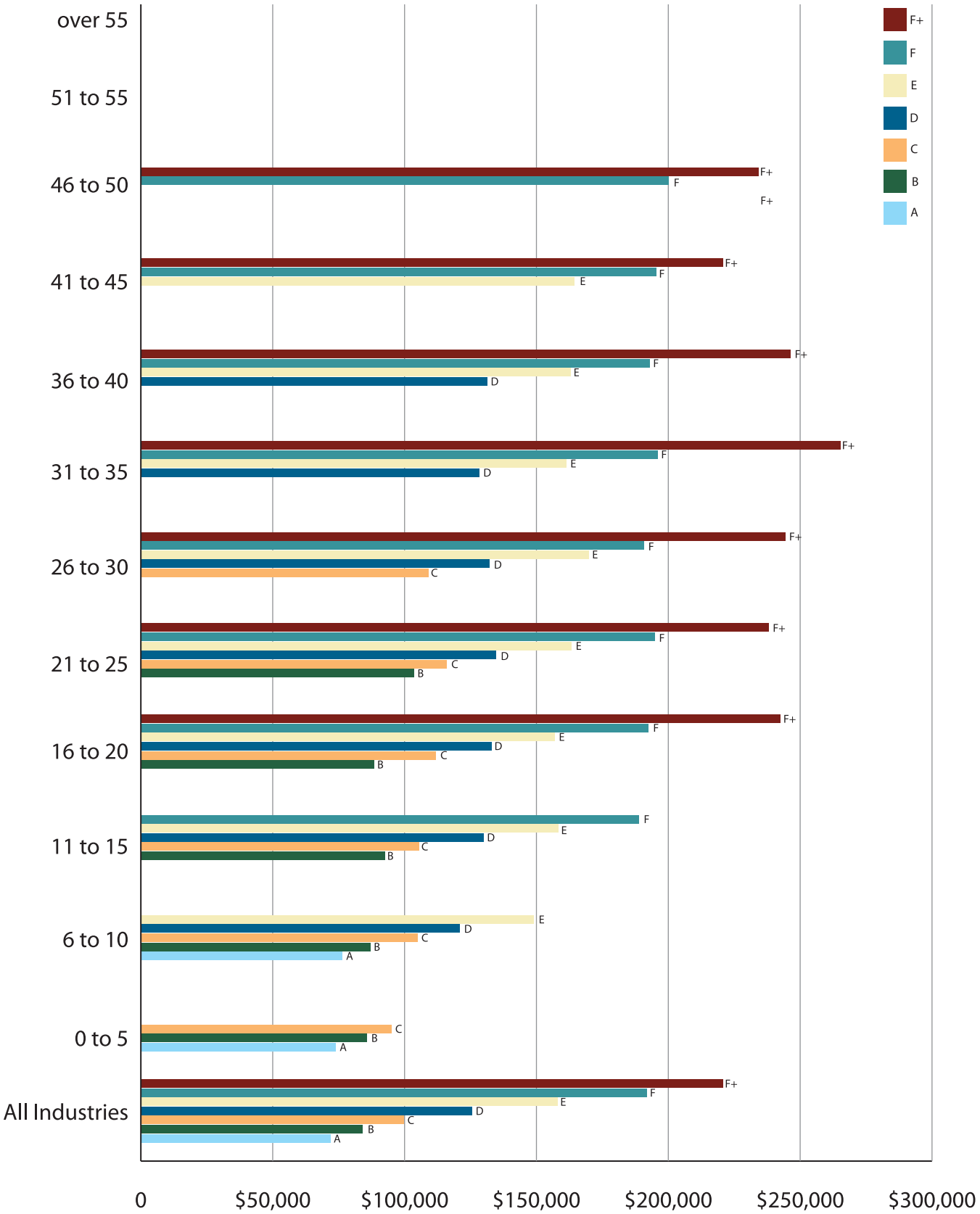
PARTICIPANTS VS. YEARS OF EXPERIENCE



SALARY VS. YEARS OF EXPERIENCE

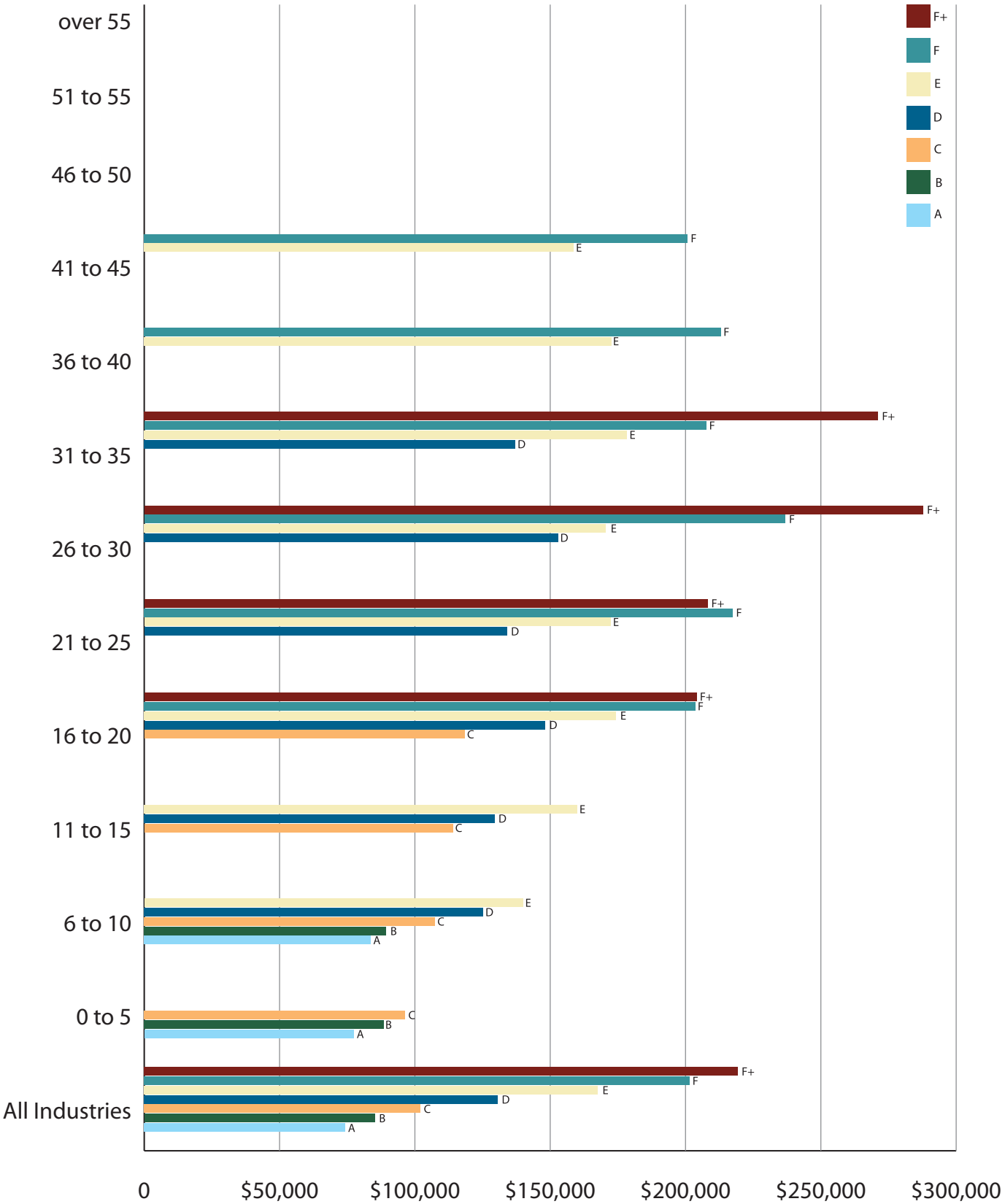
Engineering – Years of Experience

ANNUAL BASE SALARIES – COMPARISON ACROSS YEARS OF EXPERIENCE



Geoscience – Years of Experience

ANNUAL BASE SALARIES – COMPARISON ACROSS YEARS OF EXPERIENCE



RANKED LOCATION – ENGINEERING BASE SALARY

		A-		A		B		C		D		E		F		F+	
APEGA Branch Regions	Total # Engs	# Engs	Avg Salary $	# Engs	Avg Salary $	# Engs	Avg Salary $	# Engs	Avg Salary $	# Engs	Avg Salary $	# Engs	Avg Salary $	# Engs	Avg Salary $	# Engs	Avg Salary $
Calgary	4,741	140	54,264	469	74,251	677	86,048	736	105,591	982	129,026	925	159,778	547	187,347	265	241,704
Edmonton	1,809	47	52,638	294	71,103	300	83,877	398	100,451	332	121,087	244	148,789	151	182,376	43	224,645
Fort McMurray	1,280	72	53,977	106	79,455	324	87,760	175	106,133	272	125,384	171	151,552	129	183,120	31	214,538
Lakeland	36	2	n/a	8	83,240	14	90,256	5	n/a	5	133,135	1	n/a	1	n/a	0	n/a
Central Alberta	274	5	n/a	37	75,840	42	89,550	46	106,203	78	125,394	47	155,223	16	185,380	3	232,645
Vermillion River	107	26	60,510	18	80,714	18	87,739	12	n/a	15	n/a	14	151,881	3	n/a	1	n/a
Peace Region	67	1	n/a	13	78,890	31	76,611	8	94,512	7	120,722	5	159,223	0	n/a	2	n/a
Medicine Hat	2	0	n/a	0	n/a	0	n/a	0	n/a	1	n/a	1	n/a	0	n/a	0	n/a
Lethbridge	24	0	n/a	6	62,921	4	80,481	4	88,683	5	117,142	1	n/a	4	n/a	0	n/a
Yellowhead	8	2	n/a	1	n/a	1	n/a	1	n/a	1	n/a	2	n/a	0	n/a	0	n/a
Canada (outside Alberta)	553	62	n/a	52	73,599	82	87,566	77	100,253	173	126,666	73	162,941	16	190,586	18	231,253
U.K., U.S.A., International	6	0	n/a	0	n/a	0	n/a	2	n/a	0	n/a	3	n/a	0	n/a	1	n/a
Other	856	0	n/a	168	n/a	178	77,521	200	100,432	148	123,839	88	n/a	73	215,676	1	n/a
Total	**9,763**	**357**		**1,172**		**1,671**		**1,664**		**2,019**		**1,575**		**940**		**365**	
All Industry Average Salary			**$54,425**		**$73,772**		**$86,354**		**$104,900**		**$127,083**		**$154,574**		**$184,770**		**$239,294**

The top four locations, in terms of base salary rankings compared to the all industry average at various levels, are:

1. Calgary ($54,264 to $241,704 for A- to F+)
2. Fort McMurray ($53,977 to $214,538 for A- to F+)
3. Edmonton ($52,638 to $224,645 for A- to F+)
4. Central Alberta ($75,840 to $232,645 for A to F+)

The top four locations, when ranked against the all industry average at various levels from a total compensation perspective are:

1. Fort McMurray ($59,129 to $343,746 for A- to F+)
2. Calgary ($54,264 to $390,748 for A- to F+)
3. Central Alberta ($82,996 to $415,259 for A to F+)
4. Edmonton ($52,638 to $307,007 for A- to F)

Not surprisingly, Fort McMurray consistently ranks as one of the top three locations in terms of overall total compensation at all levels of responsibility with the exception of level F+. In an effort to attract and retain Professional Engineering services at remote/northern work locations, variable pay plans (above and beyond base salaries) will continue to be an important and vital component of the total compensation pay mix.

Engineering – Location

RANKED LOCATION – ENGINEERING TOTAL COMPENSATION

		A-		A		B		C		D		E		F		F+	
APEGA Branch Regions	Total # Engs	# Engs	Total Comp $	# Engs	Total Comp $	# Engs	Total Comp $	# Engs	Total Comp $	# Engs	Total Comp $	# Engs	Total Comp $	# Engs	Total Comp $	# Engs	Total Comp $
Calgary	4,741	140	54,264	469	79,644	677	99,223	736	130,092	982	156,273	925	206,596	547	257,696	265	390,748
Edmonton	1,809	47	52,638	294	73,793	300	88,563	398	107,901	332	131,038	244	171,490	151	222,608	43	307,007
Fort McMurray	1,280	72	59,129	106	102,747	324	114,672	175	133,703	272	166,262	171	211,171	129	272,825	31	343,746
Lakeland	36	2	n/a	8	97,845	14	102,193	5	n/a	5	180,195	1	n/a	1	n/a	0	n/a
Central Alberta	274	5	n/a	37	82,996	42	101,885	46	120,768	78	143,537	47	195,339	16	290,253	3	415,259
Vermillion River	107	26	60,510	18	90,558	18	99,728	12	n/a	15	n/a	14	208,188	3	n/a	1	n/a
Peace Region	67	1	n/a	13	99,749	31	97,990	8	136,732	7	161,459	5	234,178	0	n/a	2	n/a
Medicine Hat	2	0	n/a	0	n/a	0	n/a	0	n/a	1	n/a	1	n/a	0	n/a	0	n/a
Lethbridge	24	0	n/a	6	62,921	4	80,481	4	88,683	5	122,475	1	n/a	4	n/a	0	n/a
Yellowhead	8	2	n/a	1	n/a	1	n/a	1	n/a	1	n/a	2	n/a	0	n/a	0	n/a
Canada (outside Alberta)	553	62	n/a	52	84,235	82	105,141	77	124,582	173	141,311	73	225,219	16	302,609	18	396,312
U.K., U.S.A., International	6	0	n/a	0	n/a	0	n/a	2	n/a	0	n/a	3	n/a	0	n/a	1	n/a
Other	856	0	n/a	168	n/a	178	81,750	200	103,339	148	133,088	88	n/a	73	237,330	1	n/a
Total	**9,763**	**357**		**1,172**		**1,671**		**1,664**		**2,019**		**1,575**		**940**		**365**	
All Industry Average Total Compensation			**$54,810**		**$80,265**		**$99,840**		**$128,638**		**$152,143**		**$195,912**		**$252,380**		**$379,029**

For full results and the Geoscientist data, please see the *Value of Professional Services* report.

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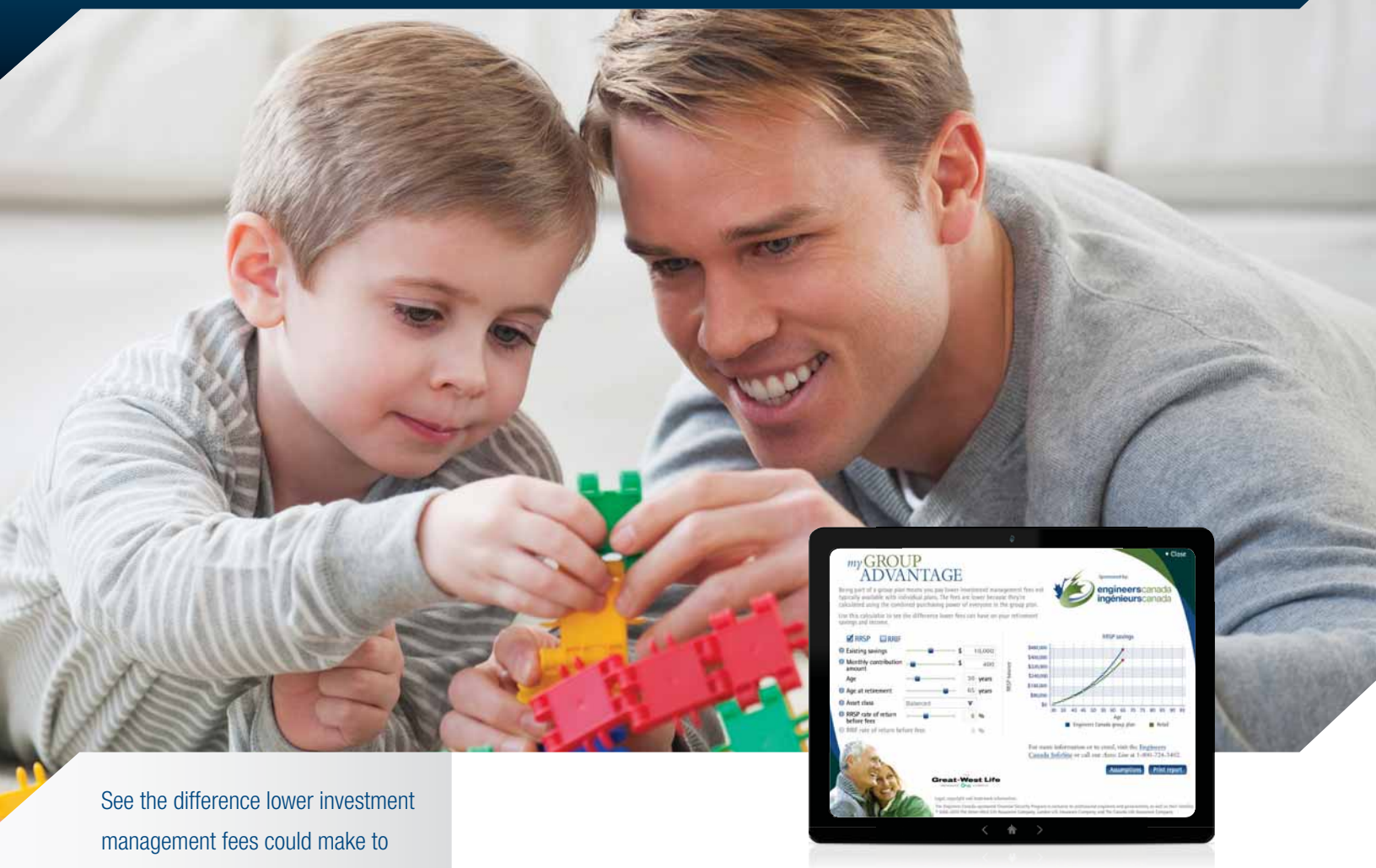

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THE OTHER Energy Sector
Part III

Will bioenergy processes like ethanol from trash or diesel from canola ever play a significant role in an economy as flush with fossil fuels as Alberta's? The odds look better and better that they will, as new technology continues to unlock the potential of this emerging area of renewable resource development. In this, the third installment in our series on renewable energy, *The PEG* explores the emerging role of garbage, manure and other biomass feedstocks

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and
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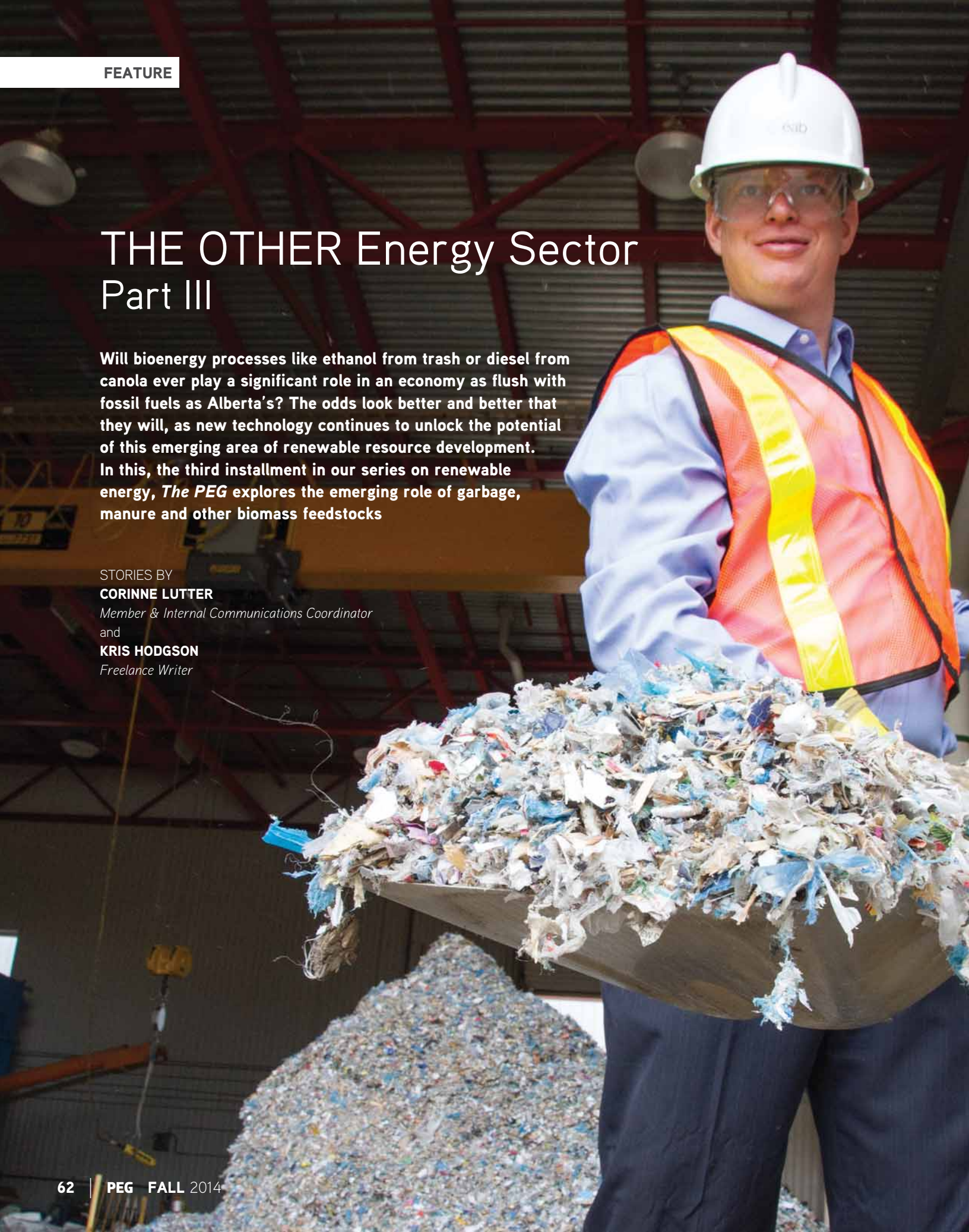


The Biofuel Journey — From a Smattering of Pumps To Government-Mandated Blends

Long before the term biofuel was in common use, consumers were familiar with ethanol, an alcohol commonly made from fermented plant material like wheat or corn. Beginning back in the 1980s, Western Canadians were seeing it promoted on gas pumps and billboards. These days, new facilities in Alberta are making ethanol from waste, including household garbage and manure. And thanks to government regulations begun over the last decade or so, another fuel under the bioenergy umbrella, called biodiesel, is blended into every litre of diesel sold in the Canadian market.

It's been a long and challenging haul, but biofuels are slowly but surely emerging as players in Alberta's fuel industry. Today they continue gaining traction in Alberta and elsewhere as local, national and international companies realize their dreams of creating sustainable bioenergy on a commercial scale.

The journey began when gasoline with five per cent ethanol content became available at Western Canadian pumps in the late 1980s. Manitoba offered a 10 per cent ethanol blend as early as 1981; Ontario and Quebec came on board in the '90s. Today, the ethanol industry is well established, with more than 20 plants across the country — fuelled in part by provincial ethanol mandates first introduced in the mid-2000s. These mandates were reinforced in 2010 with the federal government's Renewable Fuels Standard (RFS), which requires an ethanol content of at least five per cent in gasoline sold in Canada. Companies have stepped up and Canada now produces almost all the renewable fuel needed to meet the requirement.

Newer to the game is biodiesel, which is made from feedstocks like canola, soy and animal fats. Growth has been slower than for ethanol, and there were no provincial mandates until 2009. In 2011, another federal government RFS was introduced, this one requiring two per cent of diesel to be biodiesel.

Other provinces have gone even further — in British Columbia, a four per cent mandate came into effect in 2012. Ontario will require four per cent by 2017. Such biodiesel mandates have given investors more confidence and helped spur development of the resource. But Canada still falls well short of the 20 per cent blend commonly found in the United States.

DIVERSION TACTIC
David Lynch, General Manager of Research and Development at Enerkem, holds a small sampling of household waste that will be turned into biofuel at the plant. After recyclables and compostables are removed, the remaining trash is sent through a huge shredder and the resulting feedstock is processed.
-photo by Corinne Lutter

SIDEBAR

BIO THIS AND THAT

What exactly is bioenergy? The term covers renewable energy derived from organic plant or animal matter called biomass, which can include manure, garbage, forestry waste, crops like wheat and canola, and more. These feedstocks can be converted into biofuels and chemicals, or they can be used to generate electricity and heat.

‘This is really going to change the way people look at waste and what you can do with it. Currently, there aren’t any good solutions that can take real waste and convert it into a useable product. And this plant will do it. We’re leaders in this area.’

DAVID LYNCH
General Manager of Research and Development
Enerkem

THE ENERGY IN TRASH

The only things certain in life, it is said, are death and taxes. A strong case can also be made for garbage, because humans tend to generate an awful lot of it. Each Canadian, the Conference Board of Canada said in 2009, produces 777 kilograms of garbage year.

“It’s pretty much universally available wherever there are people,” says David Lynch, a chemist and recent arrival in Edmonton from Connecticut via Quebec. He’s the General Manager of Research and Development at Enerkem, owner of the world’s first, industrial-scale, waste-to-biofuels facility. “That’s one of the advantages of using municipal waste as a biofuel feedstock. It’s one of the most prevalent and least expensive biomass feedstocks available,” says Mr. Lynch.

Enerkem’s $100-million plant will soon begin turning Edmonton’s household trash — the stuff that can’t be recycled or composted and therefore goes to the landfill — into ethanol and methanol. An estimated 100,000 tonnes of trash will be converted into 38 million litres of biofuel each year. The ethanol alone would fuel 400,000 cars a year at a five per cent blend.

“This is really going to change the way people look at waste and what you can do with it,” says Mr. Lynch. “Currently, there aren’t any good solutions that can take real waste and convert it into a useable product. And this plant will do it. We’re leaders in this area.”

The process gasifies waste at temperatures of around 700 C and, in comparison to fossil fuel production,

WASTE NOT
At full capacity, Enerkem's waste-to-biofuels plant in Edmonton will process 14.5 tonnes of trash per hour, turning it into ethanol and methanol.
-photo courtesy Enerkem

reduces greenhouse gas emissions by about 60 per cent. "We use waste material that normally goes to landfills and contributes to greenhouse gases by decomposing there. So we're actually able to offset greenhouse gas emissions, both from saving these materials from the landfill and by offsetting gasoline production for vehicles," explains Mr. Lynch.

It took Quebec-based Enerkem more than a decade to develop and perfect its technology, which has been described as game changing and revolutionary. The company was founded in 2001 by Dr. Esteban Chornet (ing. – Que.), a chemical engineering professor at the University of Sherbrooke.

EDMONTON FINDS A PARTNER

Around the same time that the company was testing its thermo-chemical technology at a small pilot plant, the City of Edmonton was searching for ways to get rid of waste without burying it. A world leader in waste management, the city cited its desire to divert 90 per cent of household trash from its landfill. "We were selected as the technology of choice from over 100 different technologies and companies Edmonton was looking at," notes Mr. Lynch.

As part of the cross-country partnership, Enerkem signed a 25-year agreement with the city to build and operate the plant, located at the Edmonton Waste Management Centre near the city's northeast boundary. As plant owner, Enerkem will sell the ethanol and methanol it produces — and return on investment is not a worry.

"The projections look very, very encouraging," says Mr. Lynch. "Typically, the main feedstock for ethanol is either sugar cane or corn. We're very competitive with those processes."

A process chemist, Mr. Lynch moved his young family to Canada almost six years ago for the opportunity to help bring Enerkem's vision to reality. "I love Enerkem's approach to sustainability. We're not just trying to sell this technology. We are an owner and operator of our facilities, and that's very important to me," he says. "We all believe very strongly that this is the right approach to sustainably treating waste."

One of the biggest challenges for Enerkem's engineers was scale-up. The pilot plant initially processed 200 kilograms of garbage per hour. At full capacity, the Edmonton plant will process 14.5 tonnes per hour, says Mr. Lynch.

Feedstock for the plant arrives directly from a next-door neighbour, the city's new Integrated Processing and Transfer Facility, on a 120-metre conveyor belt. A sorting process removes compostables and heavy recyclables, and then the material goes through a huge shredder, which turns the waste into a light and fluffy material called refuse-derived fuel (RDF).

Enerkem expects to begin making methanol later this year and to add an ethanol module next year. By 2016, the plant will process about 30 per cent of Edmonton's waste — a significant chunk of the goal of 90 per cent diversion.

The company's methanol, just like its ethanol, will be sold commercially in Alberta. There's a large market for the chemical, which traditionally comes from natural gas. "It's used for everything from windshield wiper fluid to deicing fluids. It can even be used to feed microbes for wastewater treatment," says Mr. Lynch.

Interest in the Edmonton plant is strong from other municipalities and government agencies, from chemical companies, and even from the oil and gas industry, all of which face waste disposal challenges. "A lot of companies are looking to find sustainable solutions to their waste."

Other Enerkem plants are being developed in Quebec and internationally. Because of the plant's modular design — parts of it were built in Quebec and shipped to the site — it can be

> "We have witnessed an evolution of public awareness around biofuels. We have toured well over 2,000 people through our biofuel technology centre, so the education and awareness that come with that is a very big win."

TANYA MCDONALD
Associate Vice-President of Research and Learning Enterprises
Olds College

replicated to the same scale quickly and cost-effectively.

Another key aspect to the overall project was the development of the Advanced Energy Research Facility, an $11-million facility also located at the Edmonton Waste Management Centre. Owned and operated by the City of Edmonton, it was built with joint funding from the city and Alberta Innovates — Energy and Environment Solutions. Researchers from various organizations, including Enerkem and the University of Alberta, are using the facility to develop and test new technologies for converting different waste products into biofuels and biochemicals.

MEANWHILE AT THE DIESEL PUMP

Reducing the pressure on landfills while creating energy products the marketplace already needs and accepts — that sounds like an easy sell to a sometimes fickle public. And, compared to the travails of the biodiesel energy, it most certainly is.

Biodiesel's challenges have centred on public acceptance and policy. A decade ago, the misconception persisted that biodiesel would ruin diesel engines. Testing, research and development eventually showed that vehicles run just as efficiently with biodiesel blends as they do with traditional diesel alone, and manufacturing on a large scale became more attractive. These days, retailers sell biodiesel blends at the pumps, with little question from the public.

Still, several business failures of biodiesel producers have occurred in Alberta over the past few years. And the debate continues about whether or not traditional food crops should be crushed for use as a fuel feedstock.

The industry cut its teeth in the U.S., which until recently supplied Canada with most of its biodiesel. In 2010, Canada's production was 110 million litres; it grew to 420 million litres in 2013. To meet federal requirements and domestic demand on its own, Canada needs to produce 600 million litres of biodiesel a year, with 330 million litres coming from producers in Western Canada.

While much of the biodiesel sold in Canada still comes from the U.S., where renewable fuel credits make production more profitable, that's starting to change. One big reason for the increased Canadian supply is the opening of North America's largest biodiesel plant, in Lloydminster. In October, Archer Daniels Midland Company (ADM) began operations at its 267-million-litre biodiesel plant, located next to the company's existing canola crushing facility.

QUICK FACT

Biofuel use in Canada reduces carbon emissions by 4.2 megatonnes annually. That's equivalent to removing the air pollution and greenhouse gas emissions associated with one million cars from our roads.

Source: Canadian Renewable Fuels Association

SIDEBAR

CITY OF CALGARY FUELS UP ON BIODIESEL

A City of Calgary project is a good example of how acceptance of biodiesel is growing. In 2004, a small co-op in the city was creating biodiesel. As well, a handful of people were eager enough for change that they were making batches at home. Then the city decided to run a pilot project on its service vehicles, running some of them on a blend of diesel and biodiesel.

The pilot succeeded, confidence grew and today almost 200 city vehicles have made the transition. The biodiesel content has now reached 20 per cent — that's 18 per cent higher than the national mandate. Each biodiesel vehicle emits 16 per cent less greenhouse gas than it would with regular diesel fuel.

VALUE ADDED
Developing new, higher value compounds from biodiesel waste streams is one of the research areas scientists like Jianxin Cai are exploring at the Olds College Centre for Innovation.
-photo by Dr. Paul Tiege

The plant now runs at full capacity, and ADM's biodiesel is destined for the Western Canadian and international markets.

"We used our own plant design developed by an ADM engineer from Hamburg, Germany. This is the sixth plant we've built using this process design," says Robert Cash, P.Eng., from his home in Guelph, Ont. Mr. Cash manages ADM's Environmental Technology Centre for Canada, Australia, New Zealand and the South Pacific.

For obvious reasons, ADM typically builds its biodiesel-producing plants next to its crush plants. In this case, the feedstock is canola oil. "Biodiesel creates incremental demand for oil produced from crush, allowing us to run our integrated crush, oil refining and biodiesel plants at higher capacity and with greater efficiency, while also creating new market demand for the oil," explains Mr. Cash.

He adds that biodiesel produced in the Lloydminster plant has environmental benefits — it reduces carbon dioxide equivalent (CO_2e) emissions by about 78 per cent. "That saves over 730,000 tonnes of CO_2e emissions per year when compared to petroleum-based diesel," he says.

While the ADM opening is good news, the industry has faced its setbacks over the past several years. In 2010, the province's first biodiesel plant, located in High River, ceased operations and went into receivership. In May another one in southern Alberta also went into receivership — Kyoto Fuels Corporation. The Lethbridge-based company had just started production at its $40-million facility a year ago.

In the mid-2000s, about a dozen other plants were proposed. But they never went

ahead, thanks in large part to the 2008 global economic downturn. One company, Dominion Energy, returned a $4.6-million grant to the provincial government for what was supposed to be the largest biofuel refinery in North America — a production capacity of 378 million litres a year of biodiesel (and the same amount of ethanol). Some projects also dried up when provincial and federal bioenergy incentive programs to spur development in the sector were cancelled.

EDUCATION AND AWARENESS

Even though the actual production of biodiesel is still in its infancy here, Canada — Alberta included — has been building knowledge for years. In fact biodiesel is an area of focus at the Olds College Centre for Innovation (OCCI), which has won a succession of research grants for a variety of projects since it began operating in 1999.

> "Good biofuels are a solution, so attacking them is counterproductive."
>
> **IAN THOMSON**
> *President*
> *Western Canada Biodiesel Association*

The college has provided third-party verification of new biodiesel technology and has studied the benefits of various feedstocks, among them mustard, pennycress (sometimes called stinkweed), camelina (an oilseed), off-spec canola and even algae. It's gathered information from biofuels contacts in the agriculture industry, among them nearby farmers who have used biofuels on their farms.

Tanya McDonald was a bioenergy research scientist at the innovation centre and is now the college's Associate Vice-President of Research and Learning Enterprises. "Research was needed to determine the technical and economic feasibility of small-scale biodiesel production," she says. "Good advancements have been made in terms of cold-climate performance. There was originally a lot of concern about how a low-level blend would perform in a Canadian climate, and that has now been put to rest."

OCCI continues to work on processes to winterize biodiesel and make it even more appealing to use year-round in cold climates, experimenting with high ratio blends of up to 100 per cent biodiesel.

Another strong research focus of OCCI is expanding the potential revenue streams for biodiesel processors. Biodiesel byproducts like glycerol, for example, can be converted to higher-value commodities like solvents, surfactants and monomers. But right now, glycerol is usually sent to the landfill and is a cost burden to manufacturers.

By exploring these complementary production paths, researchers hope to make biofuel production more profitable, which is especially critical now because government grants for the industry have ended, says Dr. Paul Tiege, an OCCI research scientist.

"We are working with several organizations to find simple, efficient and environmentally friendly processes to convert waste glycerol into higher-value chemicals," he says. "By producing a second or third product, a primary biodiesel producer moves to more of a biorefinery model — similar to that of the petroleum industry."

The college initiated its work before governments had come forward with renewable fuel standards, notes Ms. McDonald.

"We have witnessed an evolution of public awareness around biofuels," she says. "We have toured well over 2,000 people through our biofuel technology centre, so the education and awareness that come with that is a very big win."

CHANGING THE EQUATION

Most players in the petroleum market have embraced adding biofuels to their fuel blends. Despite what appears to be strong market adoption by the petroleum industry, though, opposition does still exist. "Petroleum companies' positions vary and at least some of them would like the Renewable Fuel Standard to disappear," says Ian Thomson, President of the Western Canada Biodiesel Association.

But with biodiesel's performance no longer in question, the whole equation changes, he says.

"You no longer have truckers and manufacturers questioning the quality of biodiesel blends," he says. "However, anyone hoping to be a biodiesel manufacturer today needs to understand that they must exceed minimum quality requirements to have a market with fuel distributors."

FOOD VERSUS FUEL

Greenhouse gas reduction and quality aside, another debate has not gone away — food versus fuel, it's become known as. But placing the two in opposition does both a disservice, say biofuel proponents.

Problems feeding the world stem from high oil prices, ineffective governments, waste and underinvestment in agriculture, says Mr. Thomson. "Media do a great play about food versus fuel. But there's more than enough food being produced — getting it to people is the problem. The biggest threat to global agriculture is climate change. Good biofuels are a solution, so attacking them is counterproductive," he says.

Alberta Energy reports that only about 1.2 per cent of the province's available grains and oilseeds are used to manufacture renewable fuel.

Still, there's definitely a market pull away from conventional, first-generation biofuels made from crops like canola or corn, says Mr. Lynch with Enerkem. "A lot of companies don't want their products or their fuels coming from land that could be used to grow food," he says.

Some researchers and companies are exploring the use of cellulosic materials — parts of plants that would otherwise be waste, such as corn cobs, sawdust or wood chips. "That's referred to as second-generation or cellulosic biofuels. And the Enerkem process is actually going even a step further in taking household waste material," says Mr. Lynch.

ECONOMICS OF SUCCESS

The economic competitiveness of biodiesel presents yet another challenge. Some politicians say that renewable fuels should stand on their own and be competitive at the pump. "That's an unrealistic view," says Mr. Thomson. "We are a new industry and it will take some time for us to get up to scale."

Look to Brazil and its experience with ethanol, he says. Brazilian ethanol — made from sugarcane — makes up 45 per cent of the gasoline blend there. It took the country years to get where it is, and it did so with considerable government support. "Renewable fuel is now much less expensive than gas alone. It's a huge part of the economy in Brazil," Mr. Thomson says.

He points out that traditional oil and gas in Canada haven't succeeded without government help either. "Alberta's petroleum industry has enjoyed decades of very significant subsidies, and it still does. Petroleum fuels are subsidized at a huge scale globally. This idea that renewable fuels should not have some support in their infant years to allow them to grow is misguided thinking," he says.

Consistent, long-term understanding from politicians is necessary. And time is needed, too. "This industry will be years in the making," says Mr. Thomson.

SURFABLE

Map of Canada's Biofuel Plants
greenfuels.org

Megawatt Manure Mush

How yummy does that sound? If you're part of a busy little colony of Lethbridge microbes, the answer is very

CAUTION: DINING MICROBES AHEAD
Lethbridge Biogas produces energy 24 hours a day and can be managed remotely using a computer, iPad or even an iPhone.
-photo courtesy Lethbridge Biogas

A huge helping of liquid manure with a pallet of rotten fries, please — it's not something your average human would order. But it is a typical meal at Lethbridge Biogas, a cogeneration plant where employees play chefs of a sort to hungry microbes, fine-tuning how much of this goes with how much of that as they create powerful recipes.

The ingredients at their disposal are the organic byproducts and waste that arrive from nearby livestock operators, meat and food processors, and restaurants. From these feedstocks come energy and fertilizer, with a lot of help from those voracious microbes.

"The mixture of what goes in — what quantities and what elements you need to balance — is all part of the fun of operating one of these plants," says Lethbridge Biogas President Thane Hurlburt. "There's a fine line in how we develop the diet for the microbes that are doing the work for us. We want to maintain a 90 to 95 per cent controlled diet so we don't shock our little bugs."

The main ingredient is liquid cow and hog manure, which there's an abundant supply of from farms within 15 kilometres of the plant. Other organic products are also added to the mixture, like the previously mentioned fries. Earlier this year, 15 pallets of frozen fries had gone bad and were destined for the dump — but a savvy truck driver knew about the biogas plant and took them there instead. "The cardboard went to the recycler. Nothing went to the landfill," says Mr. Hurlburt.

Located in Lethbridge County in the Rave Industrial Park, the plant features three anaerobic digesters that will, when at full capacity, process up to 120,000 tonnes of raw materials per year. That includes enough manure to fill more than 3,300 tanker trucks.

Bacteria in the oxygen-free tanks break down the materials over about 30 days. The methane gas produced by the bacteria powers the plant's generators, which feed the Alberta power grid. Right now, the plant can produce up to 1.2 megawatts of electricity. By 2017, it should reach full capacity of 4.2 MW – enough energy to power more than 2,500 homes. It's estimated the plant will offset greenhouse gas emissions by 45,000 tonnes every year.

And yes, as long as livestock does what livestock does, there are opportunities for growth.

"If you could capture all the manure from every animal just in the confined feeding operations in Lethbridge County, you could build an anaerobic digestion plant north of 500 MW. We are not going to run out of manure here in southern Alberta. We are quite full of it," laughs Mr. Hurlburt.

At the time of its grand opening a year ago, Lethbridge Biogas was Canada's largest agriculturally based cogeneration plant using anaerobic digestion. Similar plants have since opened, but it continues to be the largest, privately owned plant of its kind in Alberta. Most other digesters in the province are smaller and owned by municipalities for wastewater treatment.

"It's a brand new industry that's trying to develop in Alberta, and it's fun building it," says Mr. Hurlburt.

FIVE YEARS IN THE MAKING — NOT

He may be smiling now, but it took a dozen years for Lethbridge Biogas to get off the ground. Patience has been a virtue for Mr. Hurlburt, and perseverance, too. "I originally said it would be five years. I'm very happy we got it in under the 13-year mark. I'm not superstitious — but so be it," he says.

A rancher and entrepreneur, he hails from near Fort Macleod, a ranching area about 50 kilometres west of Lethbridge better known for another renewable energy source — wind farms. Mr. Hurlburt first began investigating biogas technology while sitting on the board of a concrete manufacturer. The company was marketing concrete storage containers to farmers to tackle the growing challenge of manure storage.

After a research trip to Germany, where there are more than 6,000 biogas plants currently in operation, Mr. Hurlburt began looking for investors to partner with his company, ECB Enviro North America. Several firms expressed interest but none would commit. Eventually he crossed paths with PlanET Biogas Solutions, an Ontario company that has built 14 biogas plants across Canada and more than 300 in Europe through an affiliate in Germany. Seven months after that first meeting, backhoe buckets were clawing up Lethbridge ground.

> "There's a fine line in how we develop the diet for the microbes that are doing the work for us. We want to maintain a 90 to 95 per cent controlled diet so we don't shock our little bugs."
>
> **THANE HURLBURT**
> *Lethbridge Biogas President*

"We were looking for someone to join us to bring this development to fruition, and at the same time PlanET was interested in putting an investment into a biogas facility in a new area," says Mr. Hurlburt. "They were the first that were serious and understood the technology."

The plant, which cost $30 million to build, received a $6.4-million grant from Alberta Energy and an $8.2-million grant from Alberta's Climate Change and Emissions Management Corporation, plus a $5-million loan from Alberta's Agriculture Financial Services Corporation.

"Now that the plant is up and running, it's starting to foster other growth of this industry in Alberta," says Derek Hundert, P.Eng., General Manager of PlanET Biogas Solutions in St. Catharines, Ont. "We've seen a significant increase in interest from other sources looking to follow in our footsteps. That's really a result of people seeing the pioneering work of ECB and Thane, and his perseverance to see this project through to completion."

PlanET's plants in Ontario, B.C. and Manitoba use some manure, but they derive most of their biogas from food processing and greenhouse waste, fats, oils and greases, and even grape pumice from wineries.

"This is certainly the first time that we have done an industrial application — taking agriculture and matching it with industry and really having a harmonious plant that balances the needs of both," says Mr. Hundert. "That was one of the main challenges we faced,

"This is certainly the first time that we have done an industrial application — taking agriculture and matching it with industry and really having a harmonious plant that balances the needs of both"

DEREK HUNDERT, P.ENG.
General Manager
PlanET Biogas Solutions

in terms of coming up with initial concepts and how we would derive the final plant design."

The plant also extends the life of area landfills. "Potato and vegetable plant waste, poultry plant waste — we're creating value from this waste," says Mr. Hurlburt. "Forty per cent of volume in a landfill can be organics. That's a huge volume that something could be done with."

The project's success spurred PlanET to plan a second Alberta biogas plant, this one 30 kilometres east of Lethbridge and with a 633-kilowatt capacity. It will be operational later this year.

A RECIPE FOR RURAL FRIENDSHIP

One reason farmers willingly supply their manure — for free — is because the plant sends it back to them after it has been processed. They can continue to use it as fertilizer. "They put it back on their fields to grow more crops, to feed more animals, to make more manure to haul back to the biogas plant," says Mr. Hurlburt.

Not only that, the recycled fertilizer doesn't stink as much as typical liquid manure — the odour is, by some estimates, 80 per cent weaker. Mr. Hundert offers some anecdotal evidence. His story features a dairy farmer whose neighbour was holding an outdoor party. The neighbour asked the farmer to wait a week before spreading his fertilizer, because manure stinks. "The operator kind of smiled and said, 'Actually, we spread yesterday.' "

The plant also plans to sell fertilizer pellets. Also of note — Lethbridge Biogas is the first facility in Alberta licensed by the Canadian Food Inspection Agency to use thermal hydrolysis to destroy animal carcasses and BSE prions, which cause mad cow disease.

FEEDING THE BIGGER BEAST

North America has a huge appetite for energy, and society is continually looking for cleaner fuels to find a balance between human indulgence and environmental sustainability, says Mr. Hurburt. The

SIDEBAR

BIOGAS BUILDUP

Here's a list of other biogas projects on the go around Alberta.

- Near Vegreville is Growing Power Hairy Hill biogas facility. It has a 2.5-MW capacity, and its feedstocks include feedlot manure, industrial food processing waste, and residential organic waste from metro Edmonton. The plant produces ethanol as well as electricity, and fertilizer is coming soon. The company's founders built and commissioned a one-MW biogas plant at Hairy Hill in 2005, which uses wheat as a feedstock
- West Fraser Mills Ltd. is installing a $40-million system featuring anaerobic digesters in Slave Lake. It will treat wastewater from its pulp mill there, producing up to six MW of electricity for use by the mill. The system is expected to be up and running by year's end
- Plans are in the works for a $35-million biorefinery in Lacombe. BioRefinex Canada will convert organic waste — mostly animal byproducts — into biogas for electricity and fertilizer
- Mustus Energy of Calgary is building the 41.5-MW Windy Hill Biomass Generation Plant in Mackenzie Country — and the feedstock will be the tops of aspen trees. The plant, which will cost $170 million to build, is one of six biomass power plants the company plans in Alberta

question for entrepreneurs like him is: Can you marry environmental and social responsibility with profitability? His simple answer is yes.

"The plant is good for the environment and good for the area. But in order for it to work, we still have to make a profit. It's not an automatic return," he says." It takes a little while to get things going and it's a very slow start, but things are coming along quite nicely. What a good place to try and prove it, in Alberta."

The Containment Frontier

More and more often, carbon dioxide and other fluids are being injected underground. Now, a new field station will allow researchers to track and monitor them in a controlled situation, with an emphasis on what happens near the surface

BY **CORINNE LUTTER**
Member & Internal Communications Coordinator

In a remote field near Brooks, grasslands roll into a blue Alberta sky. Sure, the bucolic prairie scene is lovely to look at. But Dr. Don Lawton, P.Geoph., FGC, FEC (Hon.), is more interested in what happens below the surface — 300 to 700 metres below, actually. And the work he's shepherding, as Director of the Containment and Monitoring Institute (CaMI), could soon have implications for the entire planet.

The three quarters of a section of land, about two hours southeast of Calgary, will soon be home to the Containment and Monitoring Institute's (CaMI) new field research station. A first in Canada, the station is being developed by the University of Calgary and CMC Research Institutes, Inc. Working in real-world conditions, researches in academia and industry will be able to develop and field test new technologies that track and monitor carbon dioxide and other fluids that have been injected underground.

Subsurface activities, including carbon storage, hydraulic fracturing, steam assisted gravity drainage (SAGD) and cyclic steam stimulation, are under increasing scrutiny from regulators and the public. There is an urgent need to better understand potential containment risks in both natural and engineered systems, says Dr. Lawton, CaMI's Director. "We need to improve monitoring technologies so that we can assure the public of fluid containment and conformance," says Dr. Lawton, also a U of C professor of geophysics.

CMC is investing $4.4 million to get the station up and running, and has applied for another $5 million in grants for further expansion. Considered a non-profit business, CMC is connected to a global network of expert researchers. The organization is developing a series of institutes providing research and development services to clients that want to reduce industrial greenhouse gas emissions. CaMI is the first of these. A top priority is to move new carbon capture and storage (CCS) technologies from the laboratory to the field — and this will be a main area of research at the station.

Dr. Lawton points out that in recent years the Government of Alberta has invested $1.2 billion in CCS projects as part of its pledge to reduce greenhouse gas emissions. But the industry is young and there's much to be done.

"There's no difficulty with small-scale fluid disposal. It's been going on for years related to acid gas and waste water disposal. But at a large scale we need to demonstrate, through advanced monitoring technologies, that we can prove beyond a reasonable doubt that the injection of CO_2 is behaving as predicted and is going to stay in the reservoir," he says. "The containment issue is probably the most important one for the public and those people living in areas where CCS projects will be undertaken in the future."

Oil sands and shale gas companies will also benefit from the field research station, particularly those that inject steam and other fluids deep underground to aid in fossil fuel extraction through technologies like SAGD and hydraulic fracturing. But

FIELD CREWES
Kevin Hall, P.Geoph., helps gather baseline data for seismic monitoring. He's the Project Technical Manager with the Consortium for Research in Elastic Wave Exploration Seismology (CREWES) at the University of Calgary, which assisted with seismic work.

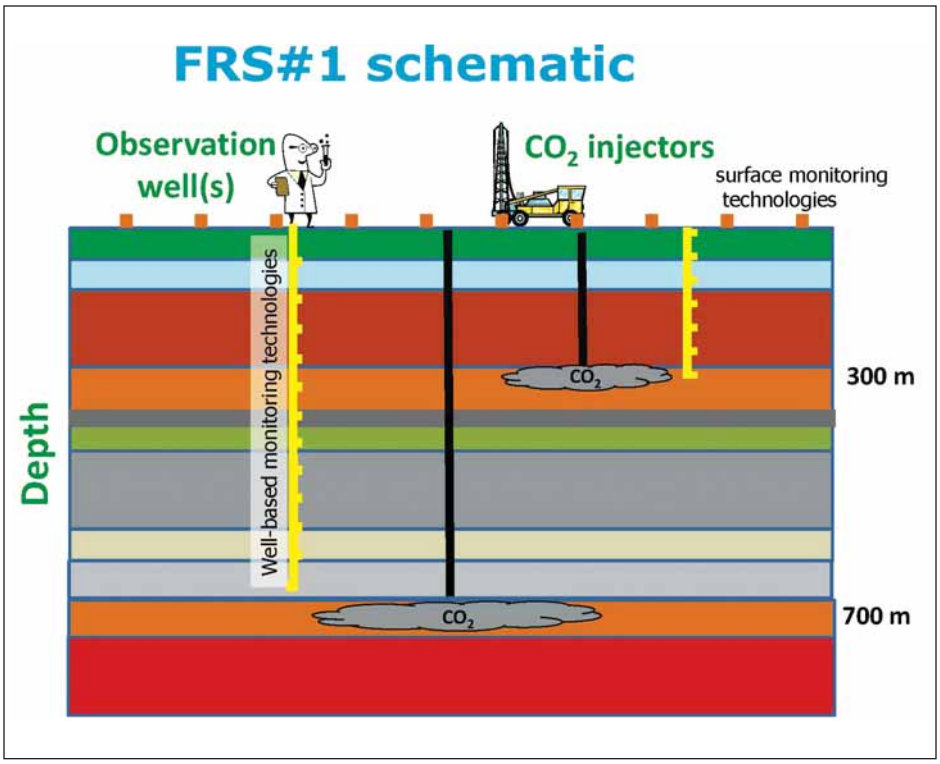
-photo courtesy CMC Research Institutes, Inc.

will these production techniques result in unexpected leakage of petroleum or other subsurface fluids into overlying rock formations, shallow aquifers, the ground surface or the atmosphere? Research undertaken at the station will develop monitoring technologies to investigate these concerns. It will seek solutions in areas such as

- steam chamber containment and effectiveness
- tertiary/enhanced petroleum recovery
- characterization of hydraulic or natural fractures
- groundwater protection
- integrity of legacy wells
- fugitive emissions from oil and gas production
- acid gas or other fluid disposal
- induced seismicity risk analysis and mitigation

As sophisticated technologies for production move into the field, a more detailed understanding of what's happening in the subsurface is required. For industry, a significant business driver is risk mitigation and risk management.

"We're looking at all aspects of monitoring for injected fluids and containment issues in general," says Dr. Lawton. "If we can come up with monitoring technologies that can be used during production to provide early warning that there is a containment issue, that would be of great value."



SUBSURFACE RESEARCH
CaMI's field research station will be a unique opportunity for researchers and industry to develop, refine and calibrate monitoring systems and technologies in the shallow subsurface.
-graphic courtesy CMC Research Institutes, Inc.

OFF THE LAB BENCH AND INTO THE FIELD

Since it was founded in 2009, CMC has developed a $22-million portfolio of academic-led research projects looking at ways to reduce industrial greenhouse gas emissions. Its efforts are collaborative, linking more than 30 universities and research organizations from across and beyond Canada. But a big obstacle has persisted.

"The key issue is: How do we reduce barriers to get technology off the lab workbench and out into the field?" says CMC's Managing Director Richard Adamson. "We identified the bottleneck as being cost-

effectively managing uncertainty in that process. Real field work is needed to integrate, adapt, translate and prove new technologies so that industry and others can make appropriate choices about either investment or technical pathways."

To address the challenge, CMC is looking to develop up to five research institutes — CaMI is the first. Others will be located in Alberta or across the country, focusing on other industry challenges.

"We are looking at prioritizing the first five institutes. CaMI is well along the way. The CO_2 Capture and Conversion Institute is in the process of being formed. And the three that follow are still being prioritized," says Mr. Adamson. "We're building a very strong team that can manage and execute projects, drawing from our global network of discipline experts, to address specific challenges."

As an independent facility where technologies can be developed, improved and transferred to practice, the field research station is unique in Canada. Other facilities are evaluating CO_2 storage at depths greater than 2,000 metres, but CMC's field research station will test technologies in the shallow subsurface. This will allow researchers to develop technologies to detect fugitive gases that may have escaped deeper containment reservoirs — before they research the surface. It's also the only site globally that allows researchers to determine the detection threshold of gas-phase CO_2 in the subsurface, to help in the development of early detection systems. (In deep storage sites, CO_2 is in a liquid phase.)

> "We need to improve monitoring technologies so that we can assure the public of fluid containment and conformance."
>
> **DR. DON LAWTON,** P.GEOPH, FGC, FEC (HON.)
> *Director, Containment and Monitoring Institute*

REAL-WORLD OPERATING CONDITIONS

The search for a perfect location for the field research station took about three years. Around a dozen sites were considered, but the property near Brooks ticked the right boxes.

Reasonably remote, it has no sensitive wildlife habitat, no other nearby industrial development or heavy truck traffic causing vibrations in the area, no power lines to interfere with rigs or other electromagnetic equipment, and no pipelines right-of-ways to contend with. Plus it has the geology suited for the project.

"There's one existing gas well still producing on site. Otherwise it's pretty much virgin territory," says Mr. Adamson.

Mineral rights under the land and surface rights are both owned by Cenovus Energy Inc., which has provided CaMI with access to those rights for 10 years, with an option to extend for an another 10. In return, CaMI will provide Cenovus with access to new seismic and other data it collects at the site.

Local ranchers in the area were consulted prior to development and the feedback was positive. The County of Newell provided a letter of support.

Development of the station started in May with baseline seismic testing. About 1,400 sensors were set up over one square kilometre. High-resolution, 3-D seismic was completed for site design to help identify the best well placements. Baseline sampling of nearby groundwater aquifers and soil were undertaken this summer. Core samples have given researchers a full picture of the region's geology. Cenovus released to CaMI its existing seismic data for the area.

"We're accumulating a library of background data sets for the property that people can use in their research," says Dr. Lawton.

In total, there will be two injection wells drilled onsite, at 300 metres and 700 metres, and at least four observation wells equipped with instrumentation arrays. Schlumberger Carbon Services has been contracted to drill wells and build the infrastructure station. The first injection well is scheduled to be drilled in late September and the second is expected to be in place by mid-2015.

For researchers, the station will be a one-of-a-kind opportunity to test technology in real-world, shallow-zone operating conditions. "We can do lots of modelling and we can do lots of theoretical predictions, but we really need to be doing experiments in the field," says Dr. Lawton.

"We need a field station to monitor for CO_2 in the subsurface, particularly to look at how quickly we can detect it if it migrates out of zone. There are lots of technologies available to find CO_2 in the soil and venting into the atmosphere, but by then it's too late. We need to find any non-conformance earlier rather than later. So that was really the driver for setting up this station."

It will take about two years for the station to be fully operational. Then, about 1,000 tonnes of CO_2 will be injected into the wells annually, having been trucked to the site from local gas plants. The CO_2 may also include small amounts of methane or other tracers. Injection targets are water-filled sandstones within the Upper Cretaceous clastic reservoir formation, with overlying shales or mixed sand and shale forming the cap rocks.

Injection will be on a very small scale when compared to industrial CCS projects like Shell Quest, which will inject more than one million tonnes of CO_2 per year from its Scotford Upgrader. But even at the station's scale, researchers will be able to monitor and evaluate the behaviour and migration of gas plumes, using novel monitoring instruments and techniques.

Within a couple years, CaMI hopes to produce its own CO_2 onsite through a fuel cell — a green energy technology that will also produce clean heat and power for the site.

A MAN WITH A PLAN
Subsurface monitoring technologies need to be improved to build public confidence in activities like carbon storage and hydraulic fracturing, says Dr. Don Lawton, P.Geoph., FGC, FEC (Hon.) He's the Director of the new Containment and Monitoring Institute (CaMI), and he's shown here near Brooks at the site of a field research station being developed.
-photo courtesy CMC Research Institutes, Inc.

TECHNOLOGY INCUBATOR

A trailer at the site will house research facilities. Mr. Adamson envisions that as a key part of making the site a technology incubator.

"Right now, when people are developing new subsurface technologies or testing existing technologies, or refining their methods, it's very hard to find a place for testing. It's hard to find a place where somebody is going to give you access to a well at all," he says. And if you do get access, the company that owns the well may not allow the data to be released.

"So having this space is really helpful for people who are trying to advance some of these novel approaches. They can do test programs under specific conditions so they can validate the performance of new technologies and provide independent performance verification," says Mr. Adamson.

Currently, there are promising technologies at the bench scale that need to be moved into the field and tested to confirm they actually perform the way they're supposed to over time and under different field conditions.

"We can work with them to advance those technologies, or we can work with industry to solve a specific problem. Say they've got an existing technology that almost works, but fails under certain circumstances or needs some refinement; we can also work on that end of it," says Mr. Adamson.

In fact, CaMI hopes that partnerships with industry will help create a revenue stream to support the site and keep it running. Companies could use the site for hands-on testing of their own technologies, or subscribe to see the results of a large range of containment and monitoring experiments.

"We're talking to industry right now. There's interest, but there are no cheques yet. Once we're beyond the build phase,

we'll start getting subscribers," says Dr. Lawton. There's also been interest from CCS and containment research groups from around the world. "Our goals are international," he says.

SCHOOL IS IN

In addition, a hands-on field school is part of the project. CaMI will work with the U of C and other partners to develop training programs on site for graduate and undergraduate students. Commercial training can also be provided for industry scientists, technologists, Professional Geoscientists and Professional Engineers.

Public outreach and transparency is also a priority.

"People can come and visit and understand what goes on in terms of fluid injection and monitoring," says Dr. Lawton. "There's a lot of public concern about injections. The best way to demonstrate to the public how we can monitor and ensure the safety of these programs is by showing people our site."

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Deep Pockets and Perseverance Necessary To Advance Ideas to Commercial Viability

BY **TOM SNEDDON,** *P.GEOL., FGC*
Director of Geoscience & Outreach

Once upon a time long ago (the mid-1980s) in a place far away (Edmonton — well, not *that* far away), I had the opportunity to review research files for a now-defunct institution called the Office of Coal Research (OCR). It was a granting organization bestowed upon Alberta by the National Energy Program.

OCR had two main programs. One was a grant fund intended largely for fundamental science, and the other was a contract fund for directed research. The connection between the two was thoroughly thought through. When a contract project pointed to a need for fundamental physics, mathematics or chemistry, a call for proposals went to the research institutions deemed competent to perform the basic research.

Most of the contract money went to advancing the engineering that underpins the coal industry. It supported the improvement and development of products, coal processing technology, and mining operations. Three major projects involved geophysics. These were called *Development of Geophysical Methods for Coal Exploration in Alberta, Surface Geophysical Coal Research Project 1984 to 1986*, and *Geophysical Borehole Logging Handbook for Coal Exploration*. The Alberta Oil Sands Research and Technology Authority (AOSTRA) picked up the same basic research to apply it to the oil sands.

While doing behind-the-scenes work to facilitate research, I became aware of the process of doing applied research in general. Searching around, I discovered that many people knew of the process in some detail, although there was a fair amount of variability in how it was applied. Looking further, I couldn't find any published how-to manuals or textbooks on the process at all. There probably was literature — but these were the days before the World Wide Web and the internet itself was primitive.

I embarked on a meta-research (research-on-research) project based on the agency files I had available to me. I published a paper on it at a long-forgotten environmental research forum in Banff and went on to other things.

More recently, on May 29, 2013, the Alberta Securities Commission (ASC) published rules for reporting and classifying resources measurement results from experimental projects, along with a policy for demonstrating commercial viability. These are

- 51-101 CP (Companion Policy)
- CSA Staff Notice NI 51-327
- ASC Staff Notice 51-702

Amendments to the Canadian Oil and Gas Evaluation Handbook (COGEH) were published by the Society of Petroleum Evaluation Engineers (which owns the copyright for COGEH) shortly thereafter. After I talked with ASC staff, it became clear to me that there wasn't a good understanding on the part of the exploration and development community about what the overarching process is for developing a new technology. A need existed to help people understand how you get from a Great Idea through the steps to Established Technology, then to arrive at the Holy Grail itself — Demonstrated Commercial Viability, as required by the ASC rules.

The outcome was collaboration between me and David Elliott, P.Geol., FGC, who had recently retired from the ASC. Our idea was to fill the gap with some basic information until something more formal could come down from ASC staff. Entitled *Defining Tight Oil Resources and Reserves for Public Disclosure*, our paper was presented by Dr. Elliott to the Tight Oil Congress in 2013. Briefly, the items below describe the process.

- Bright ideas emerge by the thousands, but only one per cent find their way into the laboratory where the basic science is done. If the idea has promise, it is promoted to bench scale testing — about 10 per cent of the one per cent make it this far. Laboratory projects generally cost less than $10,000 and take from a few months to two years to perform. They involve small amounts of materials, although the equipment involved may be quite sophisticated. The projects are usually performed by scientists at universities or government research institutions, with little or no engineering support. Ideas may be free, but testing them can get expensive quickly
- Bench-scale testing is intended to prove the concepts involved on an intermediate scale. Cost is about $1 million and testing could take two or more years to perform. A moderate level of engineering support derives scale factors and arrives at preliminary economics on what a larger-scale project would look like. Again, only about 10 per cent of projects pass this screen. This is sometimes called the proof-of-concept stage. To move up requires patient angel investors and government money
- Preproduction pilot testing is costly to design, build and run, and it's time consuming to do properly. Costs are in the order of $100 million to $300 million or more, including capital and

operating costs. Execution takes two to five years and involves a lot of engineering talent for construction, design revision and development of full project costing. Only about one in three projects succeeds to the point that it can proceed to pre-commercial demonstration. Moving to the next step means no more government funding is available and patient capital is rare. Hence, this in-between stage for an idea is sometimes called the Valley of Death

- Pre-commercial demonstration requires a lot of money (where have you heard that before?) and must show commercial viability over at least five years. It is subject to continuous improvement and refinement by a team of experienced engineers, and it must exhibit a high level of public information disclosure if investors are to be convinced. Data are somewhat sparse on success at this stage, but the ratio is likely around one in three

Applying this process specifically to clever new ways to recover petroleum or natural gas from previously unproducible formations thus takes

- Two years to clear the laboratory
- Two years to clear bench scale testing
- Five years to clear preproduction pilot testing
- Five years to be proven commercially

This suggests a minimum of 14 years from great idea to industrial-scale process. Add in funding delays that are typically two years between each stage, and the process is out to 20 years. Real-world examples of technologies that have actually been successful are the Clarke Hot Water Process (32 years to commerciality); Cyclic Steam Stimulation (25 years) and Steam Assisted Gravity Drainage (approaching 25 years since the early AOSTRA work). So let's say actual elapsed time is around 25 years before commercial success. Full cycle costing would be

- Lab scale: $100,000
- Bench scale: $10 million
- Pilot scale $300 million
- Demonstration: $55 million to $1.75 billion for a 30,000-barrel-per-day, SAGD pre-commercial demonstration (Alberta Energy Regulator, as reported in *Oilsands Review*, August 2014)
- Total cost: $1 billion to $2.75 billion

Total revenue to payout is left to the reader to determine, since product value changes from day to day. A fast stab at $80 per barrel for a 30,000-bbl/d demonstration would show $876 million in revenue per year, leading to capital recovery in two to three years — not including cost of capital and operating costs.

In a moderate-risk environment, the viability of the technology means operating and maintenance costs are a measure of the efficiency of the technology in adding to the corporate bottom line. More detail on the economics of discovery through product sale can be found in a series of articles that appeared in *The Reservoir* between September 2011 and January 2012 by Colin Yeo, P.Geol., FGC, FEC (Hon.), and Lionel Derochie, P.Eng., entitled *Understanding Reserves and Resources.* (Mr. Yeo is the current Past-President of APEGA.)

A FEW CONCLUSIONS

- Research is relatively cheap and fast but risk is high
- Development is relatively expensive and takes time, but exhibits reduced risk
- Commercial viability is difficult to prove and time consuming but contributes directly to profit (if it works)

Less obvious, but a real motivator, is the opportunity to change the game through innovation. Having overcome the risks and challenges puts the innovator ahead of the competition and jump starts productivity within the company. The trick is to keep the lead by constantly improving productivity by a constant flow of innovation. A break in the stream of novel technologies defaults ground to the opposition.

The expressions spring forward and fall back remind us to change the time on our clocks and watches. The words take on a new meaning, however, when it comes to bringing new ideas into the market place.

Questions or Comments about this or any other geoscience issue?

Contact Tom Sneddon, P.Geol.
403-262-7714 or tsneddon@apega.ca

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Provider Spotlight: Heritage Education Funds

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Due to compounded growth within a group Registered Education Savings Plan (RESP), the earlier you start to save, the better.

An RESP is an investment vehicle used to help save for a child's post-secondary education. Major advantages include access to government grants, such as the Canada Education Savings Grant (CESG), and tax-sheltered investing until the plan matures. (Please note that all grant explanations in this article are subject to some conditions.)

The lifetime contribution limit for a beneficiary is $50,000 in tax-sheltered savings. The basic CESG will match up to 20 per cent of your contributions to a maximum of $500 annually ($1,000 in CESG if there is unused grant room) to a lifetime limit of $7,200. Children born to or adopted by Alberta residents may also have access to the Alberta Centennial Education Savings Plan grant and are entitled to up to $800.

Choose the RESP provider that best suits your needs. Take your time comparing the advantages of different types of RESPs.

If you want information about Heritage Education Funds, an APEGA group benefit, please visit HeritageRESP.com/APEGA, or contact Gordon Branden, Dealing Representative, at 403-256-2598, Gordon_Branden@HeritageRESP.com.

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APEGA Discipline Committee Order

Date: February 7, 2014 Case No.: 13-004-SO

IN THE MATTER OF THE ENGINEERING AND GEOSCIENCE PROFESSIONS ACT AND IN THE MATTER OF THE CONDUCT OF MR. SAO HOANG, P.ENG.

Editor's Note: *The PEG* publishes all APEGA Discipline Committee decisions that include findings against Members. Names and other identifying information are included unless the decision recommends otherwise. Decisions are published almost verbatim; they are reproductions of regulatory records and therefore subject to only minor editing.

The Investigative Committee of the Association of Professional Engineers and Geoscientists of Alberta (APEGA) has conducted an investigation into the conduct of Mr. Sao Hoang, P.Eng. with respect to the inspection of property at 56 Cimarron Estates Green in Okotoks, Alberta.

AGREED STATEMENT OF FACTS

As a result of the investigation, it is agreed by and between the Investigative Committee and Mr. Sao Hoang, P.Eng. that:

1. Mr. Sao Hoang, P.Eng. was a professional member of APEGA, and was thus bound by the APEGA Code of Ethics, at all relevant times.
2. Mr. Hoang is a principal of Bravura Holdings Inc. ("Bravura"), which held a valid Permit to Practice at all relevant times.
3. Al Randall ("the Complainant") is the owner of a unit ("the Unit") in a housing development at 56 Cimarron Estates Green, Okotoks, Alberta.
4. In May 2009, the Alberta New Home Warranty Program ("ANHWP") conducted an inspection of the Unit and issued a report stating that the Unit did not pass inspection because 1) the final clearance between the stucco cladding of the Unit and final grade was less than 200 mm, or approximately 8 inches, along the exterior west side and 2) the lot grading was insufficient such that there was either no slope or the slope away from the foundation was negative, resulting in no positive drainage of water away from the foundation wall.
5. Article 9.28.1.4 of the *Alberta Building Code* requires that stucco "shall not be less than 200 mm above finished ground level except when it is applied over concrete or masonry." This is to prevent water from the ground splashing onto the stucco and seeping behind it. The stucco on the Unit is not applied over concrete or masonry.
6. Appendix A of Bylaw 16-10 ("the Bylaw") of the Town of Okotoks, which applies to the Unit, requires that the front and rear lot gradient be a minimum grade of 2% to create positive drainage of water away from the foundation wall.
7. In September 2010, the Builder engaged Bravura to provide an opinion on a detail that had been implemented on twelve feet of the north (rear) wall of the unit in question for the purpose of protecting the framing portion of the home where the separation between the finished grade and the untreated lumber failed to meet the minimum 150 mm requirement as specified in ABC 9.15.4.6.
8. The sketch and associated details provided to Bravura Engineering by the builder indicated that the composition of the exterior stucco system included a liquid based water proof membrane. The plans also specified a sump assisted drainage tile system at the base of the north frost wall.
9. Mr. Hoang states that at the time, he was retained, the builder did not provide him with a copy of the report referenced in paragraph 4 above, nor did Mr. Hoang make any inquiries with respect to ANHWP's involvement.
10. On September 1, 2010, a Bravura staff member conducted a site visit of the Unit and observed that the Builder had installed a row of paving stones along the north foundation wall, and that the clearance between the top of the paving stones and the stucco cladding was approximately 4.5 inches along the north wall.
11. Following the September 1, 2010 site visit, Bravura issued an opinion to the Builder titled "Foundation Protection Review" dated September 9, 2010 ("the Opinion"), which was stamped by Sao Hoang. It recommended that the existing paving stones along the north foundation wall be removed and replaced with a 12" x 12" trench filled with 20-40 mm wash gravel that was separated from the grass area with pressure-treated wood board.
12. The Opinion made no mention of improving the grading of the lot, nor did it deal with drainage of water from the recommended trench.
13. The Opinion stated that if the above was carried out, this "will provide an adequate drainage of rain water in accordance with the requirements of the Alberta Building Code 2006."
14. The Builder carried out the remediation work recommended in the Opinion, including building a trench filled with rock along the north foundation wall with no drainage.

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15. On November 29, 2010, Bravura issued a letter ("the Letter of Acceptance") to the Builder, stamped by Sao Hoang. Although Bravura had initially only been retained to inspect the north foundation wall, and not the west foundation wall, the Letter of Acceptance made reference to both the north and west foundation walls, and stated the following:
"This letter confirms the site review of the foundation wall protection at the above noted address.

On November 15, 2010, a site inspection was performed to review the installation of the foundation wall protection on the back of the house in accordance with the Bravura engineering Letter dated September 9, 2010.

The installation detail mentioned on the Bravura Eng letter stated above was also applied on the west wall of the house where the exterior concrete foundation wall is extended less than the minimum required distance above the finished ground level (Alberta Building Code 2006- Article 9.15.4.6).

Based on this review we consider that the foundation wall protection in the locations as stated above, has been installed in accordance with our specifications and will perform to the intent of the Alberta Building Code 2006.

Despite the Letter of Acceptance, the Unit did not conform with the requirements of the Alberta Building Code or the Bylaw in that 1) the clearance between the top of the washed rock and the stucco cladding of the Unit was considerably less than 200 mm in the remediated areas; and 2) there was not positive drainage away from the foundation on the west wall as the lot grading was unchanged and then newly built trench with no drainage now created a place for water to pool along the foundation."

16. Despite the Letter of Acceptance, the Unit did not conform with the requirements of the Alberta Building Code or the Bylaw in that 1) the clearance between the top of the washed rock and the stucco cladding of the Unit was considerably less than 200 mm in the remediated areas; and 2) there was not positive drainage away from the foundation on the west wall as the lot grading was unchanged and then newly built trench with no drainage now created a place for water to pool along the foundation.

17. On March 16, 2011, Mr. Randall met with Mr. Hoang onsite at the Unit and outlined his concerns with regards to the violations of the Alberta Building Code and the Bylaw.

18. It was subsequently determined that the liquid based waterproof membrane specified on the information initially provided had not been installed on Mr. Randall's unit.

19. In a letter dated May 16, 2011, Bravura retracted its Opinion and, by implication, the Letter of Acceptance.

20. Mr. Hoang subsequently admitted that he did not calculate the potential surface water collection within the trench nor did he have the necessary skill and formal training in surface water drainage to adequately deal with the issues at the Unit.

CONDUCT

In endorsing and issuing the Opinion and the Letter of Acceptance, Mr. Hoang failed to ensure that Mr. Randall's residence, the Unit, complied with Article 9.28.1.4 of the *Alberta Building Code*, thereby exposing Mr. Randall to the risk of water damage from improper design or construction, contrary to Rule of Conduct #1 of the APEGA Code of Ethics.

In endorsing and issuing the Opinion, Mr. Hoang failed to interpret properly Article 9.28.1.4 of the *Alberta Building Code* and the Bylaw, thereby demonstrating a lack of skill in the practice of the profession of engineering, contrary to Section 44(1)(d) of the *Engineering and Geoscience Professions Act* and a breach of Rule of Conduct #2 of the APEGA Code of Ethics.

ORDERS

On the recommendations of the Investigative Committee, and by agreement of Mr. SAO HOANG, P.Eng. with that recommendation, following a discussion and review with the Discipline Committee Case Manager, the Discipline Committee hereby orders that:

1. Mr. Hoang receive a letter of reprimand.

2. That Mr. Hoang sign an undertaking to refrain from engaging in professional practice that involves surface water drainage in any manner, without the supervision of a professional engineer experienced in the field, for a period of two years from the acceptance of this order.

3. That Mr. Hoang successfully complete, at his own cost, the Alberta Safety Codes Council course 100076 — Building, Groups A&B, Level 1, Introduction to the Alberta Building Code, ABC 2006 within 1 year of the acceptance of this order.

4. That Mr. Hoang successfully complete, at his own cost, the Alberta Safety Codes Council course 100097 — Building, Group A, Building Envelope within 2 years of the acceptance of this order.

5. That, should Mr. Hoang fail to successfully complete the required courses in the time specified, his membership in APEGA be suspended until such time as he does successfully complete the courses.

6. That details of this matter be published in *The PEG* magazine, with names.

Approved this 7th day of February, 2014

GERALD CARSON, *P.ENG.*
Case Manager

APEGA Discipline Committee Decision

Date: April 9, 2014 Case No.: 12-015-FH

IN THE MATTER OF THE ENGINEERING AND GEOSCIENCE PROFESSIONS ACT AND IN THE MATTER OF THE CONDUCT OF JOHN WILLIAM CLARK, P.ENG.

Editor's Note: *The PEG* publishes all APEGA Discipline Committee decisions that include findings against Members. Names and other identifying information are included unless the decision recommends otherwise. Decisions are published almost verbatim; they are reproductions of regulatory records and therefore subject to only minor editing.

This matter came up for hearing before a panel of the APEGA Discipline Committee (the Panel) on April 15, 2013 in Edmonton, Alberta.

CHARGES

The notice of hearing, dated May 8, 2012, contains the following charges brought by the Investigative Committee against John William Clark:

1. In or about August, 2010, you accepted an assignment from Baron Real Estate Developments to conduct a structural inspection of a commercial building located at 12325 Mount Lawn Road in Edmonton, Alberta, to determine whether the concrete slab-on-grade floor would be able to support the storage of 16,000kg single-axle hydrovac trucks. Your structural inspection was deficient in one or more of the following respects:

a. It attempted to predict future performance of the slab based on past performance;

b. It ignored flexural stress and/or shear stresses;

c. It attempted to predict ultimate load capacity of the slab by simply comparing the compressive strength of the concrete to the contact stress applied by the load;

The above noted conduct constitutes unskilled practice of your profession.

2. You undertook the assignment of evaluating the structural capacity of the concrete slab-on-grade, notwithstanding that you lacked expertise in the field of practice.

The above-noted conduct constitutes unskilled practice of your profession or unprofessional conduct in violation of APEGA's Code of Ethics Rule of Conduct #2.

BACKGROUND

The hearing was called to order at 9:00 a.m. on April 15, 2013. Mr. Clark was present and was represented by his legal counsel. The Investigative Committee and their legal counsel were also present.

The charges brought forward by the Investigative Committee relate to engineering services provided by Mr. Clark (Clark) to Baron Real Estate Developments (Baron) in November, 2010, with respect to a property located at 12325 Mount Lawn Road, Edmonton, Alberta. The property in question had recently become vacant after being occupied by a long term tenant. The owner of the property, Mr. Slawsky (Slawsky), retained Clark through Clark's employer, Nichols Environmental (Canada) Ltd., to assess a cast in place concrete floor at the building and ensure its adequacy to serve a potential new tenant.

The previous occupant of the building had used the building to house a large commercial freezer. The freezer occupied one-third of the total building area. Floor construction in the former freezer area consisted of two 4" thick cast in place concrete slabs with a 4" layer of rigid insulation in between. This slab was used to support large commercial storage racks, and hard-wheeled fork lifts were used to move material within the freezer.

The potential future tenant intended to use the space to store a variety of rubber tired vehicles, the heaviest of which was a 16,000 kg single-axle hydrovac truck. A condition on the lease agreement included a need to confirm that the hydrovac vehicles could travel on the floor structure without damaging it.

Slawsky retained Clark to obtain core samples of the floor structure and to determine the compressive strength of those concrete cores. Slawsky testified that it was his normal practice to compare the core sample compressive strength results against the inflation pressure of the vehicle tires. It was his understanding that this was an adequate analysis approach to determine the adequacy of a floor structure to support anticipated loads.

Clark obtained the concrete core samples as directed, and summarized his findings in a letter to Slawsky, dated August 17, 2010. This letter included statements as follows:

- That Nichols "was contracted to perform a structure inspection with specific focus on the strength of the floor;"
- That "the corrected compressive strength resulting from the concrete core breaks averaged 42.4 MPa…";
- That "… the largest vehicle having the greatest point load pressure…is a hydrovac truck weighing 16,000 kilograms (GVW), sitting on a single rear axle (total six tires), each having a floor bearing footprint of 0.6 ft2.";
- That "The equivalent point loading pressure of this equipment converts to 350 psi… "
- That "… there is an excess capacity of almost 20 times (i.e. 44.3/2.4 = 18.5)…";
- That the analytical computational evaluation work done for this site is restricted to the actual corrected compressive strengths… "

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Upon receiving this letter, Slawsky came to understand that the floor capacity exceeded anticipated loads with a factor of safety of 18.4. Had this result been closer to a range of 3 to 5, he would have considered additional analysis. He removed the condition on the lease agreement based on the information conveyed in Clark's letter.

Upon obtaining access to the building, the new tenant commenced work on significant renovations which required the services of a structural engineer. Those services were provided by Mr. Brian Kennedy, P.Eng. (Kennedy) As part of his services, Kennedy indicated to the tenant that the floor should be properly evaluated for the new loads to be imparted by the vehicles. Kennedy was provided with Clark's August 17, 2010 letter. After reviewing the letter, and consulting with several of his professional colleagues, Kennedy forwarded a complaint to the APEGA Investigative Committee regarding Clark's conduct.

During the formal hearing, the Panel heard from several witnesses. In addition to Slawsky and Kennedy, the Panel heard from Mr. Dick Walters, P.Eng. (Walters), Mr. Ross Plecash, P.Eng. (Plecash), and Mr. Clark, P.Eng.

Walters was presented as an expert witness in the area of structural engineering and in particular the area of evaluating concrete slabs on grade. Walters' credentials were not contested and he was accepted by the Panel as an expert in this area. Walters testified that:

- Evaluation of an existing structure is the practice of engineering;
- Evaluation of a concrete slab on grade must consider the flexural strength of the floor, and the interaction of the floor with the supporting soil under the expected applied loads;
- The flexural strength of concrete is difficult to determine but that it can be approximated from the compressive strength of the concrete;
- A rudimentary analysis, using such estimates and approximations represents the absolute minimum standard of care;
- Notwithstanding the instructions of the client, it is the responsibility of the engineer to inform the client of what is required to properly perform an analysis;
- A complete analysis must be performed before arriving at a conclusion regarding the expectation that a slab on grade will perform adequately under expected loads.

Many of Walters' statements resonated with the Panel. He testified that a concrete slab does not fail in compression; generally speaking, the compressive strength will always be adequate. Walters indicated that the issue is not a matter of how strong the concrete is, but, rather, how strong the floor is. He pointed out that a structural engineer must rely on the experience of a geotechnical engineer to determine the properties of the foundation, as the slab is dependent on the grade for its structural integrity. Finally, he expressed his opinion that the slab in question was complex and, therefore, worthy of more involved analysis.

Plecash testified as to the process involved when the Investigative Committee receives a complaint about a professional member. Part of this process includes reviewing the member's application for membership. Plecash testified that Clark was granted membership in APEGA as a Professional Engineer based upon his surveying and petroleum expertise to that point in time.

Clark testified:

- That, in his work at Nichols, he works regularly with structural engineers, and is familiar with the soil parameters they require to complete their designs;
- That previous cores from other areas in the building had been obtained prior to this assignment, and that he had access to the results of those core samples;
- That, in addition to obtaining the core samples, he completed several other tasks in his evaluation of the floor, including a visual examination of the floor which revealed no signs of distress, some localized soil testing involving a sledge hammer and a short length of 20M reinforcement, and a review of the original construction drawings;
- That he considered all of this information in evaluating the floor;
- That he did run flexural checks;
- That he utilized various references, charts and analytical approaches as provided and prescribed by the American Concrete Institute;
- That he consulted with several structural engineers in the course of his evaluation;
- That his August 17, 2010 letter was "not up to his usual standard", and that he chose to present the pressure calculation to demonstrate and articulate the factor of safety present;
- That several months after the fact, with the assistance of a structural engineer, a finite element analysis program was used to analyse an 8" concrete slab on grade under the same load and soil conditions as the slab in question, with a resulting factor of safety of 2.8.

At the hearing, the Panel was also presented with a considerable number of documents. Included in those documents was Clark's response to the APEGA Investigative Committee's Notice of Investigation dated March 3, 2011, and a transcript of the interview that the Investigative Committee panel conducted with Clark, dated September 22, 2011.

The Panel noted that, in his March 3, 2011 response, Clark repeated the calculation he provided in his report to Mr. Slawsky. At the hearing, Clark testified that this letter was "not a stellar response" because he was upset at being in the process.

The Panel, upon reviewing the Investigative Committee panel interview transcript, noted that Clark felt that he was unprepared to argue and described the interview as "hostile" which caused him to "shut down" and not respond appropriately. Nevertheless, the transcript from the interview had Clark confirming that he had not done "any other design analysis and also calculations".

FINDINGS AND REASONS

Charge 1

The Panel found the evidence of Walters to be highly credible as an unchallenged expert

witness. In summary, Walters described a relatively sophisticated process whereby the flexural strength of a concrete slab is properly determined and compared to the flexural stress expected to be imparted by the loads expected to be applied. Comparison of compressive strength of the concrete to expected applied pressures is not an adequate method of assessing a concrete slab on grade.

It was clear to the Panel from Slawsky's testimony that Clark had met the requirements of his client. Slawsky received an analysis of the "core breaks" that he asked for. He clearly understood business risk and was willing to accept the business decision that he made. In fact, in two years of operation subsequent to Mr. Clark's work, the Panel believes that the slab is performing well.

However, the level of comfort ascribed by Clark in his November 17, 2010 letter was in error: The factor of safety against failure was closer to 2.8, much less than the 18.4 indicated. While the actual factor of safety was still well within acceptable limits, Mr. Clark did not provide Slawsky with the opportunity to review his tolerance of that risk. In fact, Slawsky gave evidence that, had the safety factor been "3 to 5 times", he would have wanted further analysis. By not completing an adequate analysis of the floor, Clark did not meet the expectations of his client.

Clark did demonstrate, at the hearing, some understanding of the analysis required to evaluate a concrete slab on grade. However, the Panel is of the belief, based upon the documents produced and issued by Clark prior to the hearing, that he did not employ the proper processes and procedures to properly assess this concrete slab on grade floor at the time of his assessment and prior to issuing his letter of August 17, 2010. The testimony provided by Walters is considered by the Panel to be a concise summary of the proper approach in assessing a concrete slab on grade. Further, the Panel is of the belief that, at minimum, some consideration of the flexural stress that would develop in the slab under the new operating conditions would be necessary to complete even a rudimentary review of the floor. Clark did not meet this minimum standard.

With regard to the specific allegations in Charge 1, the Panel finds that Clark did accept an assignment to conduct a structural inspection of the concrete slab on grade floor and that the inspection was deficient in the following respects:

- It did attempt to predict future performance of the slab based on past performance.
- It did ignore flexural stress and/or shear stresses.
- It did attempt to predict ultimate load capacity of the slab by comparing the compressive strength of the concrete to the contact stress applied by the load.

As a result, the Panel finds that, in failing to perform a proper structural analysis, Clark's conduct constitutes unskilled practice of the profession.

Charge 2

The question before the Panel with respect to this charge has two aspects: that Clark accepted an assignment outside of his area of expertise, and that he knew or ought to have known that the assignment was outside his area of expertise and accepted it anyway.

Clark presented a significant amount of testimony intended to persuade the Panel that, notwithstanding the content of his November 17, 2010 letter, he performed an adequate analysis of this concrete floor. Clark described a series of tests which he undertook in the building and in the core holes similar to those suggested by Walters. He described consulting several senior structural engineers, although it was clarified under cross-examination that this was for the purposes of understanding the building design.

Clark's description of his approach was confusing and contradictory. He claims to have consulted some of the documents described by Mr. Walters as fundamental to this design "lightly". Yet he also described a process by which he analysed each of the layers independently from "the bottom up" using "geotechnical performance approach".

Walter's evidence was that the appropriate analysis alone could take up to a day. Clark would have the Panel believe that he attended the site, did a thorough inspection of the floor, monitored the coring process, tested the subgrade, reviewed the drawings, completed his analyses, consulted with several structural engineers and wrote his letter, all within a day or two. The Panel does not find Clark's testimony credible on this point, and is not persuaded that Mr. Clark had done anything other than a cursory evaluation of the slab and provided conclusions from an erroneous analysis.

The Panel ultimately found Clark's testimony to be unreliable. If Clark did clearly understand the structural engineering and analysis aspects of this assignment, he had the opportunity to challenge Slawsky's misunderstanding and introduce an appropriate approach to determining the adequacy of the slab to Slawsky. It was Clark's testimony that he was performing this analysis anyway. If that analysis was being performed, Clark could easily have provided a letter describing that analysis process and the resulting factor of safety. Under these circumstances, Clark's November 17, 2010 letter could be considered to have been deliberately misleading.

The Panel is not of the belief that Clark deliberately misled his client. Again, while Clark did demonstrate some understanding of the analysis required to evaluate a concrete slab on grade at the hearing, it is the belief of the Panel that he did not possess this degree of understanding at the time he accepted this assignment.

With regard to Charge 2, then, the Panel finds that Clark undertook the assignment of evaluating the structural capacity of the concrete slab on grade without having expertise in that field of engineering practice. The Panel finds that this conduct constitutes unprofessional conduct, in violation of Rule 2 of APEGA's *Code of Ethics*.

Supplemental Submissions

The Panel received supplemental submissions from counsel representing both the Investigative Committee and Clark. These submissions were intended to inform the Panel regarding various legal precedents on the question of whether a single error, or a single occasion where a lack of professional judgement was exercised, should result in a finding of unprofessional conduct or unskilled practice.

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The Panel carefully considered the arguments presented, particularly the general points that a proven allegation does not necessarily constitute a breach, and that no person is perfect. The Panel acknowledges that we are all potentially guilty of an error in judgement at some point in our professional careers. The Panel is equally aware, however, that an argument consisting of "it only happened once" is not necessarily an adequate foundation to dismiss charges regarding professional conduct.

The Panel notes that the precedents provided include examples of instances where a single act did not result in a finding that an ethical code had been breached. However, the Panel was not provided with information regarding the consequences to those individuals if their actions had been found to have constituted such a breach. For instance, findings of ethical breaches in other professions may result in an individual no longer being permitted to practice their profession. The Panel is aware that this is rarely the case with APEGA; while findings of unskilled practice and/or unprofessional conduct are accompanied by sanctions against the member, those sanctions are generally intended to educate the membership and return the member to good standing. With APEGA, the finding is only a part of the decision to be reached.

Charge 1 concerns the subject of unskilled practice of the profession on a matter of structural analysis. It is understood that the concrete slab in question has performed adequately over the last few years. The fact that no financial or performance loss has been experienced does not excuse the fact that this analysis was not performed correctly. This slab was reported to have a factor of safety of over 18 when, in fact, it had a factor of safety of less than 3. Fundamental structural engineering principles, such as the consideration of flexural stress, were ignored. Failure to consider the fundamental performance criteria of a structure can have catastrophic results, regardless if such a failure is the first omission or the latest in a succession of breaches. On this basis, the Panel finds that a single professional breach with respect to unskilled practice of the profession of engineering, in this instance, can and should result in a finding of unskilled practice.

Charge 2 concerns the subject of unprofessional conduct. It is asserted that Clark's conduct in accepting an assignment outside his area of expertise constitutes unprofessional conduct. In the supplemental submissions, the argument is made that a single proven breach may not necessarily require a finding. However, the cases presented generally involve individuals who have unknowingly contravened codes of conduct.

In this instance, Clark is fully aware of the divisions of expertise within the broad spectrum of engineering practice. His work, and that of his firm, includes providing information to structural engineers regarding the behavior and characteristics of soil to enable those structural engineers to perform their design work. He knows the area of structural engineering exists; he knows that concrete floors are designed by structural engineers; he is not a structural engineer by virtue of his training and education; and by his own admission, he has not otherwise gained expertise by virtue of additional training or experience. Clark accepted a structural engineering assignment despite clear knowledge that it was outside his area of expertise. His actions are not comparable to an individual who inadvertently breaches a code of conduct by virtue of some circumstance not known to them.

Further, Clark wrongly asserts that his analysis was adequate on three separate occasions: in his November 11, 2010 letter, in his response to the Investigative Committee Notice of Complaint, and in his interview with the Investigative Committee panel. These three occasions span a period of 10 months. It is the Panel's view that this behaviour does not constitute a single lapse in judgement, but, rather, a generally held belief of Clark, during this period at least, that he is capable of structural engineering analysis. That belief and the behaviour resulting requires attention and correction.

On this basis, the Panel finds that a single professional ethical breach, in this instance, can and should result in a finding of unprofessional conduct.

ORDERS

Having determined the outcome of the charges, the Panel asked for submissions from both parties for comments regarding sanctions. The parties provided the following written submissions on penalty and, subsequently, on the matter of assessment of costs of the discipline hearing:

- Investigative Committee's submission on penalty dated November 7, 2013;
- Mr. Clark's response submission on penalty dated November 21, 2013;
- Investigative Committee's submission on costs dated December 6, 2013;
- Mr. Clark's response submission on costs dated January 10, 2014;
- Investigative Committee's reply submission on costs dated January 14, 2014.

In its submissions, the Investigative Committee sought Orders that included:

- That a letter of reprimand be issued to Mr. Clark;
- That Mr. Clark pass technical examinations in the field of Structural Engineering;
- That Mr. Clark's authorization to practice structural engineering be limited until such examinations are complete;
- That Mr. Clark pass the Professional Practice Exam within 12 months;
- That Mr. Clark's registration with APEGA be suspended should the above Orders not be met;
- That Mr. Clark pay all costs of the Hearing (subsequently determined to be in excess of $45,000);
- That the details of this matter be published in *The PEG*.

In his submissions, Mr. Clark stated the following;

- That Mr. Clark did not and does not desire to practice structural engineering, and therefore there is no value in an Order requiring him to pass structural engineering examinations before he can continue to do so;
- That the itemized summary of costs provided by the Investigative Committee included costs incurred, in part, by unforeseen delays in the Discipline Hearing process;

- That costs in excess of $45,000 for a one-day Hearing is an excessive amount;
- That Mr. Clark is nearing the end of his professional career.

In its Findings, the Discipline Committee Panel found that Mr. Clark's actions constituted unskilled practice of the profession, and in particular, unskilled practice of structural engineering. The methods of analysis employed by Mr. Clark were not appropriate for the situation, and the conclusions reached by Mr. Clark were therefore erroneous.

The Panel further understood that the analysis of a concrete slab on grade is a complicated matter that includes an understanding of both geotechnical and structural engineering principles. While it may not have been and may not be Mr. Clark's desire to pursue a career in structural engineering, he nonetheless will be required to apply structural engineering principles if he continues to practice in his current field and in his current role. APEGA must therefore be assured that Mr. Clark understands fundamental structural engineering principles, if for no other reason than to ensure Mr. Clark can identify the limit of his technical abilities. This is most easily accomplished through the successful completion of nationally recognized technical examinations.

The Panel found that, in accepting this assignment that he was not technically capable of completing, Mr. Clark was engaged in unprofessional conduct. The Panel is of the view that it is vital that professional members recognize their limits and work within them. Failure to do so compromises the safety of the public and the reputation of the professions. APEGA needs to be assured that Mr. Clark clearly understands the limit of his abilities, but more than that, the implication to the public and the profession should he choose to accept future assignments outside the limits of his abilities. This is most easily accomplished through the successful completion of National Professional Practice Examination.

With respect to costs, the Panel acknowledges that considerable cost can accumulate as a result of the Formal Hearing process. In addition to the investment of both parties in terms of legal advice, and the costs related to the compilation and distribution of documents, there is also the contribution of many volunteer members of APEGA involved in the process. The Panel is of the belief that, as a self-governing profession, APEGA has a responsibility to ensure that the discipline remains fair and transparent, and with that comes a responsibility to incur costs on behalf of the membership to ensure that the process is fair.

The Panel also understands that APEGA is strongly supportive of self-ordering. APEGA's self-ordering process consists of the offending member and the Discipline Committee reaching agreement on a summary of the conduct in question, the Findings resulting from the conduct, and the Orders arising. However, where self-ordering cannot be accomplished, a Formal Hearing process ensues.

Mr. Clark, during the Hearing and in his subsequent submissions, acknowledges that he engaged in conduct that constitutes unskilled practice and unprofessional conduct. Had he come to the same conclusion earlier in the process, the Formal Hearing process, and the costs related to that process could have been avoided.

The Panel acknowledges that a considerable amount of the costs incurred, as outlined by the Investigative Committee, are related to delays and other issues not related to the this Formal Hearing or this Panel. In determining its Orders, the Panel has considered the costs directly relating to the April 15, 2013 on a shared basis.

In arriving at the costs to be ordered, we included the following:

- Mr. Walters' expert witness costs;
- One-half of the Investigative Committee's costs for the April 15, 2013 hearing date and subsequent submissions;
- The Discipline Committee's costs for the April 15, 2013 hearing date and review of subsequent submissions.

Based on the parties' capacities to pay, we assessed 1/3 of the total of the above, $7,250, against Mr. Clark.

Having given careful consideration to the parties' submissions, the Panel makes the following orders:

1. Mr. Clark shall receive a letter of reprimand.

2. Mr. Clark shall not engage in the practice of structural engineering, under any circumstances, until he has completed one of the following:

a. APEGA Technical Examination 98-Civ-B2, Elementary Structural Design;

b. CIV E 474 — Structural Design II as provided by the University of Alberta;

3. Mr. Clark shall successfully complete the National Professional Practice Exam within 12 months of the date of this decision;

4. Mr. Clark shall pay to APEGA a portion of the costs of the hearing in the amount of $7,250 within 12 months of the date of this decision;

5. If Mr. Clark fails to comply with Orders 3 and 4, his registration with APEGA shall be suspended until he does comply with those orders;

6. If Mr. Clark's registration with APEGA is suspended for failure to comply with orders 3 and 4, and if the suspension exceeds 12 months, then his registration shall be cancelled.

7. This decision shall be published in *The PEG* magazine with Mr. Clark's name.

Dated this 9th day of April, 2014.

MARTY KLAASSEN, *P.ENG.*
Discipline Committee Panel Chair

APEGA Discipline Committee Decision

Date: April 17, 2014 Case No.: 113-002-FH

IN THE MATTER OF THE ENGINEERING AND GEOSCIENCE PROFESSIONS ACT AND IN THE MATTER OF THE CONDUCT OF KEN TILL, P.ENG.

Editor's Note: *The PEG* publishes all APEGA Discipline Committee decisions that include findings against Members. Names and other identifying information are included unless the decision recommends otherwise. Decisions are published almost verbatim; they are reproductions of regulatory records and therefore subject to only minor editing.

These matters came up for hearing before a panel of the Discipline Committee (the Panel) on November 22, 2013 at the offices of the Association of Professional Engineers and Geoscientists of Alberta (APEGA) in Calgary and Edmonton, Alberta, via video conference. Both the Investigative Committee and Mr. Till were represented by counsel.

CHARGES

The charges that have been brought by the Investigative Committee against Mr. Till, as contained in the formal notice of hearing, are as follows:

1. That on or about March 15-18, 2011 Ken Till, P.Eng. evaluated proposals in response to a request for proposals ("RFP") and recommended a proposal by "Blue Rock Builders Ltd." that was non-compliant with the RFP without reporting adequately, or at all, on one or more of the following non-compliant aspects of the proposal:
   - **a.** "Blue Rock Builders Ltd." was not incorporated and could not have entered into a legally binding and enforceable contract at the time its proposal was recommended, contrary to section 9.0 of the RFP;
   - **b.** The "Blue Rock Builders Ltd." proposal did not include any documentation of a Quality Control Manual or Program as required by the Capabilities Questionnaire in Schedule 3 of the RFP;
   - **c.** The "Blue Rock Builders Ltd." proposal did not indicate that Blue Rock Builders Ltd. held a Certificate of Recognition from Alberta Employment and Immigration, as required by the Capabilities Questionnaire in Schedule 3 of the RFP;
   - **d.** The "Blue Rock Builders Ltd." proposal did not enclose any documentation to support its responses to the HSE Questionnaire, as required by Schedule 6 of the RFP.
2. On or about March 16, 2011, prior to finalizing his recommendation to accept the "Blue Rock Builders Ltd." proposal, Ken Till P.Eng. met privately with Suzanne England knowing that she was married to Thomas England, the CEO of "Blue Rock Builders Ltd." or that she was director or shareholder of Blue Rock Builders Ltd., or all of these, and participated in a conflict of interest by doing one or more of the following:
   - **a.** Engaged in a teleconference between himself, Suzanne England and a competing proponent for the project during which detailed pricing information was requested from the competing proponent;
   - **b.** Engaged in a teleconference between himself, Suzanne England and Thomas England of "Blue Rock Homes" during which detailed pricing information was requested in support of the "Blue Rock Builders Ltd." proposal;
   - **c.** Discussed the competing proponent's proposal and the "Blue Rock Builders Ltd." proposal with Suzanne England;
3. On or about November 2011-October 2012, Ken Till, P.Eng. failed to comply with the APEGA Investigation Panel's request for production of documents contrary to section 49(1) of the *Engineering and Geoscience Professions Act,* and in particular failed to respond to the following requests for production:
   - **a.** Documentation tracking the date and time of pick-up and the date and time of delivery of the proposal documents for each project proponent;
   - **b.** Notes or minutes of any meeting between Ken Till, P.Eng. and Ron Lanthier regarding the inability of a third party engineering firm to evaluate the proposal documents;
   - **c.** Notes or minutes of any meetings between Ken Till, and Ron Lanthier regarding detailed pricing information obtained from the project proponents;
   - **d.** Documentation supporting Ken Till's evaluation of the proposals submitted by each project proponent.

It is further alleged that the conduct described above constitutes unprofessional conduct as defined in section 44 of the *Engineering and Geoscience Professions Act,* R.S.A. 2000, c.E-11.

AGREED STATEMENT OF FACTS AND ADMISSION OF UNPROFESSIONAL CONDUCT

At the outset of the hearing, the Investigative Committee and Mr. Till jointly submitted an Agreed Statement of Facts and Admission of Unprofessional Conduct, attached to this decision as Schedule A.

FINDINGS AND REASONS

Having heard from counsel for both parties, and having had the opportunity to consider the agreed statement and the admission, the Panel delivered its decision orally at the hearing, finding that Mr. Till's conduct constituted unprofessional conduct with respect to charges 1 and 2, but dismissing

charge 3. Herein are the Panel's reasons for those findings.

Charges 1 and 2

The Panel finds that Mr. Till's conduct constitutes unprofessional conduct. The Panel agrees with the findings and the sanctions given by the Investigative Committee. Both the Member and the Investigative Committee have agreed to these findings and sanctions. The Panel agrees that the facts fully support the findings. While it may not have been a contractual obligation to disclose a conflict of interest, in this case there was an ethical and moral obligation to do so.

Charge 3

The Panel unanimously dismisses charge number three. The facts of the case have been agreed to by all parties and these facts are simple and straight forward. However, we conclude these facts do not support a finding of unprofessional conduct. The following reasons are given.

Mr. Till was interviewed by the Investigative Panel on October 31, 2011. It was not suggested that Mr. Till was uncooperative or acted unprofessionally during the interview. While it is unquestionable that a professional has an obligation to cooperate fully with his professional association in all matters associated with his conduct, these agreed facts do not show any unwillingness to cooperate.

The interview was recorded and Mr. Till asked the Investigative Committee to send him a copy of the recording but it was never sent. Mr. Till was asked to provide certain items to the Investigative Panel which he did not do until asked again about one year later. Perhaps the reason for the delay was simply that Mr. Till was waiting for the copy of the recording which he never did receive.

When Mr. Till was asked again on October 19, 2012 for these items, he responded promptly and provided these items twelve days later on October 31, 2012. It is not unreasonable to assume that since the Investigative Panel seemed to be in no hurry to provide the recording, they were not in any hurry to receive the requested items from Mr. Till. It could be a reasonable assumption that the Investigative Panel simply forgot to send a copy of the recording to Mr. Till and that Mr. Till simply forgot to provide the requested items to the Investigative Panel.

We do not know why Mr. Till failed to promptly provide the requested items when first asked, nor do we know why the Investigative Committee did not provide the copy of the recording. There is no evidence on Mr. Till's part of any desire to frustrate the process or of any unwillingness to cooperate. The fact that Mr. Till provided the requested items when reminded should indicate that it was his intention to cooperate and should rule out any suggestion of unprofessional conduct.

One could ask, "At what point in time would the failure to comply with a request become unprofessional conduct?" A delay of one year seems like a long time but what about six months or three months? This becomes very arbitrary and in the absence of a clearly defined time line it is almost irrelevant.

Finding Mr. Till guilty of this charge would have significant repercussions. While it is a professional responsibility for our members to cooperate with APEGA, it is a responsibility of APEGA and its agents to have fair dealings with its members.

In our view, if the circumstances suggest the Member is not cooperating, the length of time is a factor in drawing inferences, but is not determinative of the matter. It is one circumstance in a total course of conduct. We prefer to look at all of the circumstances and judge accordingly.

As a result of the above reasons we dismiss charge number three. We did not reject the admission lightly. We rejected it to protect the member and the profession.

ORDERS

Having received the Panel's oral findings regarding the charges, counsel for Mr. Till and the Investigative Committee submitted an amended Joint Submission on Penalty, attached as Schedule B. In light of the fact that the Panel found Mr. Till guilty of charges 1 and 2, but not of charge 3, counsel for the parties revised the amount of the fine from $2,500 to $1,000.

The Panel has carefully considered the joint submission, and it has applied the principle of so-called "ball park justice" that other APEGA Discipline Committee panels have followed. As an encouragement to self-sanctioning, we will accept the parties' recommendation if it is "in the ball park."

The Panel also expresses the view that when crafting recommended sanctions, the parties should seek to ensure that sanctions are remedial and relate closely to the facts. It was not clear to the Panel how a course in construction law addressed the breach of ethics that lies at the heart of this matter.

Nevertheless, we accept the joint recommendation and adopt it as our own and order as follows:

1. Mr. Till shall pay a fine to APEGA in the amount of $1,000 within 60 days of the Discipline Committee Panel's decision;
2. Within 18 months of the Discipline Committee Panel's decision, Mr. Till shall successfully complete the course "Construction Contract Law" offered by Merit Contractors Association which includes tendering law in the course content;
3. Within 18 months of the Discipline Committee Panel's decision, Mr. Till shall successfully complete the APEGA Professional Practice Examination;
4. If Mr. Till fails to comply with any of items 1, 2 or 3, above, his APEGA registration and authorization to engage in the practice of engineering shall be suspended and remain suspended until he has complied with items 1, 2 and 3, above.
5. Details of this matter will be published in *The PEG* magazine with Mr. Till identified by name.

Dated this 17th day of April, 2014

GERALD CARSON, *P.ENG.*
Discipline Committee Panel Chair

APEGA Discipline Committee Order

Date: April 25, 2014 Case No.: 14-001-SO

IN THE MATTER OF THE ENGINEERING AND GEOSCIENCE PROFESSIONS ACT AND IN THE MATTER OF THE CONDUCT OF MR. GURPREET GILL, P.ENG., AND CONSULTECH ENGINEERING LTD.

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The Investigative Committee of the Association of Professional Engineers and Geoscientists of Alberta (APEGA) has conducted an investigation into the conduct of Mr Gurpreet Gill, P.Eng. ("Mr. Gill") and Consultech Engineering Ltd. ("Consultech") with respect to alleged errors contained in several inspection reports and acceptance letters issued by Mr. Gill for the Town of Beaumont, Alberta, as well as allegations of intellectual property theft and copyright infringement surrounding the details of a tall wall design belonging to IB Engineering Ltd.

AGREED STATEMENT OF FACTS

As a result of the investigation, it is agreed by and between the Investigative Committee and Mr. Gill that:

BACKGROUND

1. At all relevant times Mr. Gill was a professional member of APEGA and bound by the *Engineering and Geoscience Professions Act* (the "EGPA") and the APEGA Code of Ethics.
2. At all material times Consultech held a valid Permit to Practice and was bound by the EGPA and the APEGA Code of Ethics.
3. Mr. Gill holds a NAIT diploma in Civil Engineering Technology (1999), a B.Eng. in Civil Engineering from Lakehead University (2001), and an M.Eng. in Geotechnical Engineering from the University of Alberta (2010). He is employed by Opus Stewart Weir Ltd. (formerly Stewart Weir & Co.) as a Geotechnical Engineering Manager, as the President of Consultech and the Civil Manager for GP Engineering. Mr. Gill serves as Responsible Member for all three firms.

Tall Wall at 6215-60 Street in Beaumont, Alberta

4. On or about December 20, 2011, Consultech was retained to provide a compliance letter in relation to a residential home under construction at 6215-60 Street in Beaumont, Alberta (the "Home"). The request was for an inspection and compliance letter for the as-built tall wall in the Home.
5. The tall wall was an exterior wall and constructed in a stacked-wall configuration.
6. On or about December 20, 2011, Mr. Gill issued a professionally-authenticated compliance letter, on behalf of Consultech, indicating that the construction of the tall wall was acceptable and adequate to support the imposed loads.
7. On January 6, 2012, another professional engineer visited the Home and inspected the tall wall framing. This engineer determined that the tall wall framing was inadequate. The stacked-wall configuration allowed for a hinge point in the middle of the wall where the only resistance to potential wind-loading was the strength of the nails at the hinge.
8. The other engineer, in consultation with the builder, determined that the tall wall could be suitably reinforced by installing sheathing on the inside of the wall, overlapping both sides of the hinge joint, a solution that was implemented.
9. On January 17, 2012, Mr. Adam Bednarski, a Safety Codes Officer for the Town of Beaumont, wrote to APEGA to complain about Mr. Gill's conduct in relation to the compliance letter he issued on behalf of Consultech.
10. When asked, Mr. Gill was unable to provide a satisfactory explanation to the Investigative Panel as to why he considered the wall to be safe. Mr. Gill should not have issued the compliance letter for the as-built tall wall in the Home.

Tall Wall Design for Trail Building Supplies

11. On or about August 29, 2012, Mr. Gill issued a tall wall design to Trail Building Supplies Ltd. for assembly and erection.
12. Mr. Allan Yucoco, P.L.(Eng.) reviewed the design, found that it was approximately 12" too short, and requested Mr. Gill to submit a revised design.
13. Mr. Gill submitted a revised design on August 30, 2012.
14. Mr. Yucoco reviewed the revised design on August 30, 2012, and found that it was still deficient. The design involved a lintel but the lintel lacked sill plates, the drawing lacked connection details for the wall top plate, and the wall did not incorporate a step-down as per the requirements of the home plan.
15. Mr. Gill was requested to, and on August 30, 2012 did provide a sheet of connection details marked with Consultech's name, Consultech's APEGA Permit number and contact information. Mr. Gill indicated that the details were typical connection

details, identical to those used by other engineers and he specified that certain of the details, #2 and #6, were to be used.

16. Mr. Yucoco noted that detail #2 was not applicable to the design in question and its use would be inappropriate. Mr. Yucoco ultimately re-designed the tall-wall so that it could be properly constructed.

17. Mr. Yucoco felt that Mr. Gill's design demonstrated a lack of skill in the design of tall walls and Mr. Yucoco wrote to APEGA to lodge a complaint about Mr. Gill and Consultech.

18. Mr. Gill's tall wall design was deficient in several respects: it was initially too short, it lacked sill plates, it lacked connection details for the top plate, and it omitted a step-down as per the Home plans.

Misappropriation of Intellectual Property

19. Mr. Yucoco examined the connection detail drawings that Mr. Gill had provided for the tall wall design for Trail Building Supplied Ltd. on August 30, 2012. Mr. Yucoco noted that the drawings were very similar to engineering drawings previously prepared by Mr. Bogdan Iancu, P.Eng. Mr. Yucoco contacted Mr. Iancu about this and Mr. Iancu examined the connection detail drawings.

20. Mr. Iancu determined that the connection detail drawings Mr. Gill had submitted on August 30, 2012 were identical to his own drawings that he regularly used.

21. Mr. Iancu then wrote to APEGA to lodge a complaint about Mr. Gill's use of his connection detail drawings without permission.

22. During the investigation, Mr. Gill provided APEGA with a copy of a connection detail drawing and indicated that he had obtained the drawing he provided on August 30, 2012 from Zytech Building Systems Ltd. and that he had used the drawings with permission.

23. The connection detail drawing Mr. Gill provided to APEGA in response to Mr. Iancu's complaint was different than the connection detail drawing Mr. Iancu provided with his complaint.

24. Mr. Gill had used Mr. Iancu's connection detail drawings on August 30, 2012 without permission.

General

25. Mr. Gill asserted to the Investigation Panel that all of his tall wall designs were done in accordance with the Alberta Housing Industry Technical Committee document, "Guidelines for the Construction of Residential Tall Walls, Revised April 2008." (the "Guidelines")

26. Mr. Gill was interviewed during the Investigation Panel's investigation. Mr. Gill was unable to satisfactorily answer questions from the Investigation Panel about the design of tall walls using the Guidelines.

27. In June 2013 at the Investigative Committee's request, Mr. Gill undertook a "Tall Wall Design and Detailing Exam" administered by a structural engineer. Mr. Gill was unable to achieve a passing grade of 75% on the exam.

CONDUCT

28. In accepting the as-built construction of an existing tall wall when he was unable to provide a satisfactory explanation for why the wall was safe for the potential wind-loading, Mr. Gill demonstrated a lack of skill in the practice of the profession of engineering.

29. In producing a design for a tall wall that was inadequate in that it was too short, lacked sill plates, omitted a step-down required by the home plans and omitted connection details as required by the Alberta Building Code, Mr. Gill demonstrated a lack of skill in the practice of the profession of engineering.

30. Additionally, in failing to supply connection details in his tall wall design as required by the Alberta Building Code, Mr. Gill violated Rule of Conduct #4 of the APEGA Code of Ethics.

31. In accepting assignments to assess the as-built construction of tall walls and to design tall walls without adequate knowledge and skill, Mr. Gill violated Rule of Conduct #3 of the APEGA Code of Ethics.

32. In representing the work of another professional engineer, specifically the tall wall connection details produced by Mr. Bogdan Iancu, P.Eng. as his own, Mr. Gill violated Rule of Conduct #3 of the APEGA Code of Ethics.

33. Mr. Gill also failed to hold paramount the safety and welfare of the public in that the ultimate occupants of the developments in question would be unaware of any problems with the wall construction until a problem potentially arose. Mr. Gill thus failed to hold paramount the safety and welfare of the public as required by Rule of Conduct #1 of the APEGA Code of Ethics.

34. The aforementioned conduct tends to harm the honour, dignity and reputation of the professions and their ability to serve the public interest and thus Mr. Gill's conduct violates Rule of Conduct #5 of the APEGA Code of Ethics.

ORDERS

On the recommendations of the Investigative Committee, and by agreement of Mr. Gurpreet Gill, P. Eng. with that recommendation, following a discussion and review with the Discipline Committee Case Manager, the Discipline Committee hereby orders:

a. That Mr. Gill shall receive a letter of reprimand;

b. That Mr. Gill shall write a letter of apology to Mr. Bodgan Iancu, P.Eng., for applying Consultech's name and APEGA Permit number to connection details produced by Mr. Iancu.

c. That Mr. Gill shall not practice in structural engineering without supervision until he has completed the examination, course, and period of supervision described in items (d) and (e), below. Without limiting the generality of the foregoing, Mr. Gill shall not engage in inspecting, analyzing, verifying, certifying, approving or

CASE NO.: 14-001-SO CONTINUED

designing structural elements described in sections 4.1, 4.3 and 4.4 of Part 4 of the Alberta Building Code, including but not limited to tall walls, trusses, beams, joists, teleposts and other structural elements used in residential or commercial construction.

d. Mr. Gill shall remain subject to the restrictions described in item c, above until such time as he has:

i. successfully completed the APEGA Professional Practice Examination;

ii. successfully completed a University-level engineering course in structural analysis and design, with said course to be taken in-person (not by correspondence or on-line), and has provided proof of successful completion to APEGA; and

iii. satisfactorily completed the period of supervision described in item (e), below.

e. From the date of this Order, and for a period of one (1) year following Mr. Gill's successful completion of the course described in item (d)(ii) above, Mr. Gill shall only practice structural engineering as described in item (c) above, under the supervision of a structural engineer. That supervisor shall provide quarterly reports to APEGA respecting all projects Mr. Gill has worked on, at Mr. Gill's expense. Mr. Gill may submit the name or names of supervisors he wishes to work with, and the Investigative Committee will consider the suitability of those candidates. The final selection of a supervisor will be made by the Investigative Committee. Should the quarterly reports submitted by the supervisor demonstrate a lack of skill in the practice of structural engineering on the part of Mr. Gill, the period of supervised practice will be extended to two (2) years.

f. Mr. Gill shall provide APEGA with a list of the locations of all tall wall designs that he has stamped prior to this Order; and

g. That the details of this case be published in the *PEG* magazine, with names.

h. For greater certainty, nothing in these orders suspends or restricts Mr. Gill's ability to practice geotechnical engineering in accordance with his qualifications and competencies, nor suspends his ability to practice structural engineering on the terms set out above.

Approved this 25th day of April, 2014

BRUCE ALEXANDER, *P.ENG.*
Case Manager
APEGA Discipline Committee

APEGA Discipline Committee Order

Date: May 1, 2014 Case No.: 14-003-SO

IN THE MATTER OF THE ENGINEERING AND GEOSCIENCE PROFESSIONS ACT AND IN THE MATTER OF THE CONDUCT OF [PROFESSIONAL ENGINEER A]

Editor's Note: *The PEG* publishes all APEGA Discipline Committee decisions that include findings against Members. Names and other identifying information are included unless the decision recommends otherwise. Decisions are published almost verbatim; they are reproductions of regulatory records and therefore subject to only minor editing.

The Investigative Committee of the Association of Professional Engineers and Geoscientists of Alberta (APEGA) has conducted an investigation into the conduct of [Professional Engineer A] (the "Member") with respect to allegations of unskilled practice and unprofessional conduct, relating to inadequate drawings created by the Member for the construction of an addition to a fire hall for [Alberta Municipality A].

A. COMPLAINTS

1. The Member has engaged in unprofessional conduct that was detrimental to the best interests of the public and placed the public at risk, contrary to Section 44(1)(a) of the *Engineering and Geoscience Professions Act* ("Act") and Rule of Conduct #1 of the APEGA *Code of Ethics* ("Code"), in that he designed an addition to [Alberta Municipality A] fire hall and failed to design that addition as a post-disaster building, as defined in Part 4 of the Alberta Building Code, instead relying on Part 9 of the Alberta Building Code.
2. The Member has engaged in unskilled practice that displayed a lack of knowledge and competency, contrary to Section 44(1)(d) of the Act and Rule of Conduct #2 of the Code, in that he was unaware that the fire hall addition should have been designed pursuant to Part 4, and not Part 9, of the Alberta Building Code.

B. AGREED STATEMENT OF FACTS

As a result of the investigation, it is agreed by and between the Investigative Committee and the Member that:

3. At all relevant times the Member was a professional member of APEGA and bound by the Act and the Code.
4. The Member holds a Civil Engineering degree from [University A]. The Member is currently employed with his own engineering firm, [Company A], located in [Alberta Municipality B].
5. The Member and his firm were retained by [Alberta Municipality A] to provide a set of plans for an addition to the [Alberta Municipality A] fire hall. The Member provided the requested plans bearing his stamp.
6. An individual working for [Alberta Municipality A] provided those plans to a former colleague of the Member, [Professional Engineer B], and expressed concern that the drawings were inadequate for the intended purpose of providing a quotation. The plans appeared to lack sufficient detail.
7. [Professional Engineer B] reviewed the plans stamped by the Member and noted several deficiencies in the design. Specifically [Professional Engineer B] identified that the plans did not include mention of snow drift caused by higher new construction adjacent to the existing building, did not include live or dead loads used for the design, did not mention the Importance Category for the building, did not include climatic data, did not include specifications for construction materials and did not include comments or connection details regarding the new addition and connection to the existing building. As a result of those deficiencies [Professional Engineer B] reported the matter to APEGA for investigation.
8. An Investigative Panel conducted an interview of the Member. During that interview the Member freely acknowledged that:
   - **a)** He was not aware that the fire hall addition should have been designed pursuant to the requirements for post-disaster buildings, as described in Part 4 of the Alberta Building Code. The Member had instead designed the addition pursuant to Part 9 of the Alberta Building Code. He admitted that was an error.

     A fire hall is a public structure dedicated to public safety, as described in Part 4 of the Alberta Building Code. A post-disaster building means a building that is essential to the provision of services in the event of a disaster, and is therefore subject to more rigorous design requirements, such as increased importance factors.
   - **b)** The fire hall design did not, in fact, meet the requirements of a post-disaster building. The Member was presented with STANDATA 06-BCI-020 Post-Disaster Housing, Emergency Response Vehicles and Personnel, which outlines, defines and clarifies post-disaster buildings. Parts 4.1.7.1 and 4.1.6.2 of the Alberta Building Code indicate that the importance factors for post-disaster buildings increase from 1.0 to 1.25, effectively increasing wind and snow loads by 25%.

     The Member designed a tall wall for the fire hall. The wall was designed with 2x8 dimensional lumber. With

CASE NO.: 14-003-SO CONTINUED

the required 25% increase of the wind and snow load the wall studs were adequately designed, however window columns, garage door headers and garage door columns, which were part of the tall wall, were inadequately designed.

9. In further response, the Member has fully cooperated with the APEGA investigation and:

a) Admitted that the fire hall design was not his best work, and taken steps to improve his practices by hiring additional engineers to assist him and implementing a peer-checking process for his work;

b) Taken full responsibility for his actions and expressed remorse for his unskilled and unprofessional conduct; and

c) Has provided the Investigative Panel with additional samples of his structural design work, which the Panel found to be adequate.

C. CONDUCT

The Member freely and voluntarily admits that his conduct constitutes unprofessional and unskilled conduct, and that the Complaints set out above are admitted and proven. The Member has therefore engaged in unprofessional conduct that was detrimental to the best interests of the public and placed the public at risk, contrary to Section 44(1)(a) of the Act, and Rule of Conduct #1 of the Code, in that he designed an addition to the [Alberta Municipality A] fire hall and failed to design that addition as a post-disaster building, as defined in Part 4 of the Alberta Building Code, instead relying on Part 9 of the Alberta Building Code.

The Member has further engaged in unskilled practice that displayed a lack of knowledge and competency, contrary to Section 44(1)(d) of the Act and Rule of Conduct #2 of the Code, in that he was unaware that the fire hall addition should have been designed pursuant to Part 4, and not Part 9, of the Alberta Building Code.

Section 44(1) of the Act states:

44(1) Any conduct of a professional member, licensee, permit holder, certificate holder or member-in-training that in the opinion of the Discipline Committee or the Appeal Board

(a) is detrimental to the best interests of the public;

(b) contravenes a code of ethics of the profession as established under the regulations;

(c) harms or tends to harm the standing of the profession generally;

(d) displays a lack of knowledge of or lack of skill or judgment in the practice of the profession, or;

(e) displays a lack of knowledge of or lack of skill or judgment in the carrying out of any duty or obligation undertaken in the practice of the profession

whether or not that conduct is disgraceful or dishonorable, constitutes either unskilled practice of the profession or unprofessional conduct, whichever the Discipline Committee or the Appeal Board finds.

Rules # 1 and # 2 of the APEGA Code of Ethics state:

1. Professional engineers and geoscientists shall, in their areas of practice, hold paramount the health, safety and welfare of the public and have regard for the environment;

2. Professional engineers and geoscientists shall undertake only work that they are competent to perform by virtue of their training and experience.

D. ORDERS

On the recommendations of the Investigative Committee, and by agreement of the Member with those recommendations, following a discussion and review with the Discipline Committee Case Manager, the Discipline Committee hereby orders that:

1. The Member shall receive a letter of reprimand;

2. The Member shall successfully complete an Alberta Building Code 2006 or 2012 course, acceptable to the Investigative Panel; and

3. The details of this case be published in the *PEG* magazine, without names.

Approved this 1st day of May, 2014

TIM CARTMELL, *P.ENG.*
Case Manager

IN MEMORIAM

The Association received notice of the deaths of the following Members between May 1 and July 31.

Life Members

AIE, Edward, P.Eng.

ANDERSEN, Earl, P.Eng.

ANTONIO, Harry, P.Eng.

BATEMAN, William Maxwell, P.Eng.

BULAT, Gordon Andrew, P.Eng.

DAVIS, Jack, P.Eng.

ENGMAN, Alwon Sidney, P.Eng.

HUGHES, Ralph, P.Eng.

KEIR, Robert William, P.Eng.

MEEK, Kenneth St Clair, P.Geol.

MILES, Bruce, P.Eng.

PERRY, Dick, P.Eng.

RICHARDS, Clinton Dale, P.Eng.

RONICKER, Frederic, P.Eng.

ROUTLEDGE, Peter, P.Eng.

SIX, Ivan Mearns, P.Eng.

STANTON, Michael, P.Geol.

TAXBOCK, Ferdinand, P.Geol.

VERES, John, P.Eng.

ZAKOWSKI, James, P.Eng.

Other Professional Members

DOIG, Russell G, P.Eng.

FRENCH, Rodney, P.Eng.

OLIVER, William, P.Eng.

PANKRATZ, Arthur, P.Eng.

REGALBUTO, Mel, P.Eng.

SIDDIQUI, Muhhamad, P.Eng

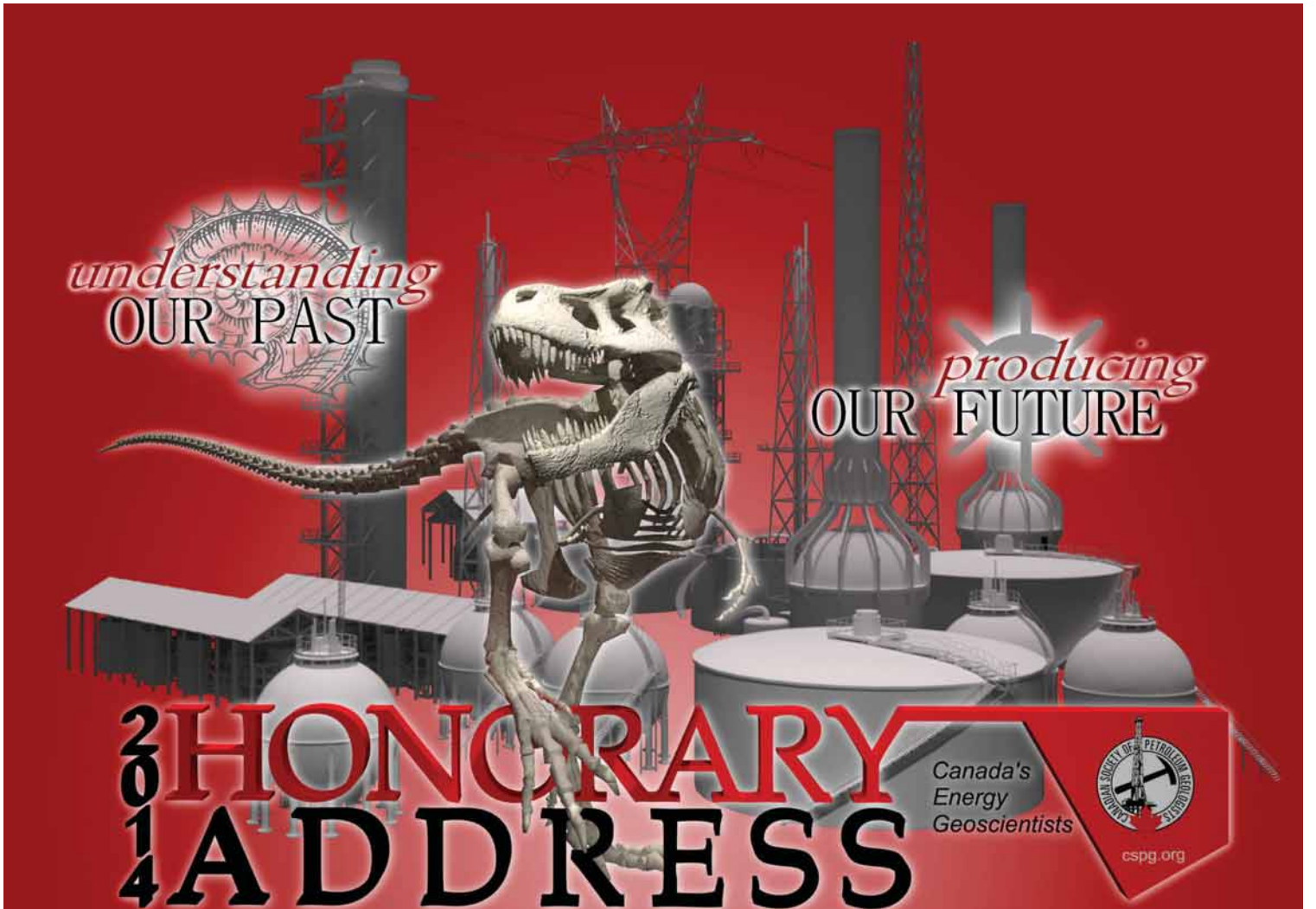
STEEDMAN, R. T., P.Geol.

SWANSTON, H.W., P.Eng.

WALLACE, Garnet, P.Geol.

WEBB, Brad, P.Eng.

WILLIAMS, Floyd, P.Eng.



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HOSTED BY CBC RADIO'S DOUG DIRKS

Scott W. Tinker
Director, Bureau of Economic Geology
University of Texas

François Therrien
Curator of Dinosaur Palaeoecology
Royal Tyrrell Museum

EPCOR CENTRE's
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205 8 Ave SE, Calgary, AB

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Students: $15 ($20 at Door)
Children (12 and under): FREE

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THE CSPG WOULD LIKE TO THANK ALBIN HEYLE FOR THEIR CONTRIBUTION

5 not-so-true ideas about life insurance

(and how to get your facts straight)

1 Employer benefits are enough

Employers usually provide life insurance that's 1–2 times your salary. Is that enough for your family? If you change jobs, will you be able to take your coverage with you?

1–2 times your annual income is usually provided by employers

7–10 times your annual income is often cited as the rule of thumb for coverage amount[1]

2 Optimists need not worry

Plan like a pessimist — hope for the best but prepare for the worst — especially when going through a life-changing event.

- Marriage
- Mortgage
- Children
- New job

3 It's complicated

How much insurance is right for you? It depends on your situation. Here's a formula you can use to figure it out:[2]

A - (B + C + D + E) = Insurance amount

- **A** = Your family's **assets** and income
- **B** = Your family's monthly **budget** needs
- **C** = **Costs** associated with your death
- **D** = **Debts** to be paid off
- **E** = **Exceptional expenses** (e.g., education costs)

4 They're all the same

Not in this case. Only the **Engineers Canada-sponsored Insurance Plans** are created specifically for engineers. *They are not available to the general public!*

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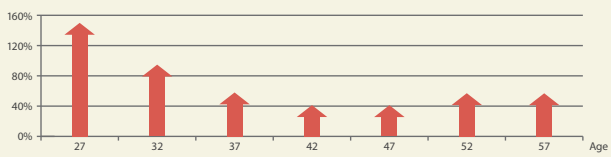
5 The lowest price is right

Many advertised rates may seem low at first. But see how the average rate of our 3 lowest-priced competitors **exceeds** our rates over 15 years.[3] For example, a 32-year-old male non-smoker who buys $100,000 coverage from them would end up paying **95% MORE** over 15 years.



[1] http://money.cnn.com/retirement/guide/insurance_life.moneymag/index11.htm [2] www.gailvazoxlade.com/articles/just_in_case/how_much_insurance.html [3] LifeGuide® Release 2013.7A

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API 653 *Tank Inspector Exam Preparation for November 2014* **Exam application deadline is September 5, 2014**	October 6-11 Edmonton
ASME VIII, Division 1 *Code Design Requirements for Pressure Vessels*	October 14-17 Calgary
API RP 571 *Damage Mechanisms of Fixed Equipment in the Refining Industry*	October 28-31 Edmonton
ASME B31.3 *Introduction to Process Piping Design and Canadian Regulations*	November 4-7 Calgary
ASME Section IX *Welding Codes and Metallurgy for Carbon/Alloy Steels* **Covers Alberta Welding Examiner Paper 2 & 4**	November 25-29 Calgary
API 510 *Pressure Vessel Inspector Exam Preparation for September 2014* **Exam application deadline is November 21, 2014**	December 8-13 Edmonton
ASME B31.3 *Materials, Fabrication, Inspection, and Testing Requirements*	December 16-19 Edmonton
CSA W178.2 Level 1 *Exam Preparation including ASME B31.3 Code Exam* **Approved for Welding Inspection Exam Exemption**	January 5-10, 2015 Edmonton
API 579-1/ASME FFS-1 *Fitness for Service*	January 6-9, 2015 Edmonton
CSA W178.2 Level 2 *Exam Preparation including ASME VIII-1 and IX Code Exam* **Approved for Shortened Welding Inspection Exam**	March 16-21, 2015 Edmonton