Radar Probes Ice • Membership Renewals Due • Registration Interviews Go Global • Volunteer Program Enhanced

JOURNAL OF THE ASSOCIATION OF PROFESSIONAL ENGINEERS AND GEOSCIENTISTS OF BC

NOVEMBER/DECEMBER 2015

Innovation

New President Takes Charge

Energy, Compost and Opportunities from Organic Waste

Solar Field Transforms Mountain Mine Site

PM41065271

DIAMOND PRECAST CONCRETE

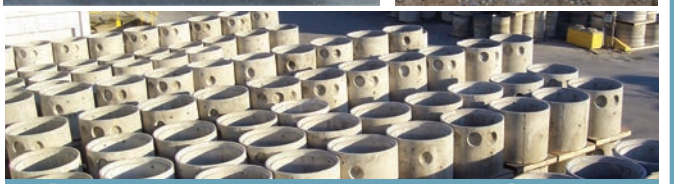
Manholes
Valve Boxes
Meter Boxes
Sump Basins
Parking Curbs
Catchbasins
Municipal Castings
Lawn Drains
Roadway Trench
Oil Interceptors

A23.4 - 09
ASTM C478

PLATINUM
2009 EDITION

Meets all MMCD Platinum Requirements for Manholes and Catchbasins





diamondprecast.com/mmcd

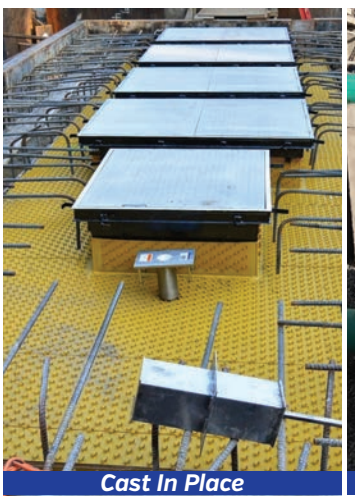
PREDL systems

THE MANHOLE LINER EXPERTS

Stops H_2S Corrosion, Infiltration and Abrasion

Concrete Protective Liners for ALL Collection Systems


Rehab


Cast In Place


Precast Manholes


Custom Applications


Precast Chambers


Precast Vaults

Predl Precast Partners

1. Terrace Redi-Mix, Terrace
2. Grosso Pre-Cast, Williams Lake
3. Kemp Concrete, Kamloops
4. Kon Kast Products, Kelowna
5. Tri-Kon Precast, Cranbrook
6. Dan's Pre-Cast, Duncan
7. Diamond Precast, Burnaby
8. S.Okanagan Products, Osoyoos

predl.online@predlsystems.com predlsystems.com 604-415-9944

Innovation

NOVEMBER/DECEMBER 2015 (VOLUME 19 NUMBER 6)

contents

features

news

ON THE COVER:
Dr. Michael Wrinch, P.Eng., FEC, assumes the presidency of APEGBC for 2015/2016. Story, page 16.
PHOTO: WENDY D

departments

18
Extraction ducts and fans atop Harvest Energy Garden's percolator.

Professional Engineers and Geoscientists of BC

Collaboration and Common Goals

Dr. Michael Wrinch, P.Eng., FEC
President

president@apeg.bc.ca

As I approached my new position during the past few weeks, I asked myself fundamental questions about the engineering and geoscience professions. I spoke to members and read about significant engineering and geoscience accomplishments through history.

What I learned was humbling and inspirational.

Just a few examples of how our professions have made a difference over the millenia include: first-known use of stone columns to support a building in Imhotep's 4,000-year-old Egyptian pyramids; Filippo Brunelleschi's first-of-a-kind dome that spanned the 44-metre hole in the roof of the Florence's Renaissance cathedral, the Santa Maria del Fiore; the workhorse of the modern world, the induction motor, which Tesla developed in the 19th Century; discovery of plate tectonic theory in 1959; and the discovery, capture, processing, and use of fossil fuels.

Feats of engineering and geoscience have lead humankind to prosperity.

Unlike the examples listed above, our work is often invisible. Yet, it is everywhere.

Today, we face many of the same challenges our predecessors encountered. Rocks still fall. Atoms still move. Chemicals still react. It may seem logical that we can carry on as before.

But things are not what they once were, and they won't remain as they are tomorrow or the next day. We now have markets, medicine, machines, and cities of millions. Our systems are now interconnected and highly complex, and we now know so much more.

We have made this happen.

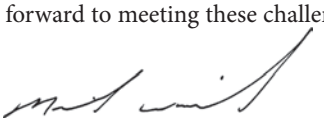
The government recognizes that our role as guardians and creators of our physical infrastructure—which now includes digital and biological infrastructure—is difficult. We will be challenged. As individuals, we may struggle, even falter. In doing so, we risk serious harm and damage to the public.

As a profession, how do we ensure the highest standards of public welfare, safety, and well-being are met? The tools of regulation and licensure were established to set the bar of excellence high and to screen to a high standard to deliver on this challenge.

This is our duty. It is our duty to protect the public, because we are often the last line of reason between disaster and marvel. One of the key roles of APEGBC is to support its members as they deliver on this promise to the public and to help ensure this duty is met. Whether you use a stamp or not, every decision you make as an engineer or geoscientist enables change.

We must work together, collaborate with our partners, listen to our stakeholders, and have the courage to make hard decisions. But most importantly, as an integrated team of professionals, councillors, public representatives, and staff, we must trust each other, be accountable for and to each other, engage in dialogue, and respect our differences towards achieving our common goals.

The next year is going to be exciting. It is my honor and privilege to be this organization's president at this time. I look forward to meeting these challenges with you to achieve our goals.



NOVEMBER/DECEMBER 2015 VOLUME 19 NUMBER 6

Innovation

Association of Professional Engineers and Geoscientists of BC
Suite 200 - 4010 Regent Street, Burnaby, BC Canada V5C 6N2
Tel: 604.430.8035 Fax: 604.430.8085
Email: apeginfo@apeg.bc.ca Internet: apeg.bc.ca
Toll free: 1.888.430.8035

Advertising material should reach the publication by the 5th of the preceding month (e.g., January 5 for the Jan/Feb issue).
Advertising Contact: Gillian Cobban Tel: 604.929.6733
Email: advertising@apeg.bc.ca

Design/Production: Fusion FX Design & Marketing Inc
Printed in Canada by Mitchell Press Ltd on recycled paper

Subscription rates per issue $4.50; six issues yearly $25.00. Annual subscriptions of Association members are apportioned from membership dues in the amount of $15 per member (rates do not include tax).

Innovation is published six times a year by the Association of Professional Engineers and Geoscientists of British Columbia. As the official publication of the association, *Innovation* is circulated to members of the engineering and geoscience professions, architects, contractors and industry executives. The views expressed in any article contained herein do not necessarily represent the views or opinions of the Council or membership of this association.

Submission Guidelines: *Innovation* encourages unsolicited articles and photos. By submitting material to *Innovation*, you grant Innovation a royalty-free, worldwide licence to publish the material in *Innovation* magazine; and you warrant that you have the authority to grant such rights and have obtained waivers of all associated moral rights. Innovation reserves the right to edit the material for length, clarity and conformity with our editorial guidelines (apeg.bc.ca/innovation-editorial) and is under no obligation to publish any or all submissions or any portion thereof, including credits.

ISSN 1206-3622
Publications Mail Agreement No 40065271. Registration No 09799.

Return undeliverable Canadian addresses to Innovation,
Suite 200 - 4010 Regent Street, Burnaby, BC V5C 6N2.

US Postmaster: Innovation (ISSN 1206-3622) is published bimonthly for $25.00 per year by the Association of Professional Engineers and Geoscientists of British Columbia, c/o US Agent-Transborder Mail, 4708 Caldwell Rd E, Edgewood, WA 98372-9221. Periodicals postage paid at Puyallup, WA, and at additional mailing offices, US PO #007-927. POSTMASTER send address changes (covers only) to Innovation, c/o Transborder Mail, PO Box 6016, Federal Way, WA 98063-6016.

Letters to the editor containing your views on topics of interest are encouraged. Opinions expressed in Letters to the Editor are not necessarily endorsed by APEGBC. Letters can be emailed to editor@apeg.bc.ca.

In Memory of Elbert Stanley Reid, P.Eng., B.A.Sc. '51

This is to alert APEGBC members to the recent passing of Elbert Stanley Reid, P.Eng., B.A.Sc. '51 on July 5, in Duncan, BC.

Born in Chilco, BC, in 1923, Bert attended school in Vanderhoof, graduating in 1941. He joined the RCAF and was assigned to the Pathfinder Squadron, leading bombing missions over Europe. In 1945, Bert enrolled in Forest Engineering at UBC and, after obtaining his degree, started a career in consulting at T&H Engineering and Forestry in Vancouver. Under Bert's guidance, T&H carried out two of the largest industrial forest engineering projects undertaken in BC, one of which pioneered the use of helicopters to transport and re-supply field crews.

In 1961, Bert and Jim Collins, P.Eng., founded Reid, Collins and Associates (RCA). The first years for the company were tough, so Bert accepted a long-term assignment to a U.N. Development Programme/Food and Agriculture Organization forest engineering study in Ecuador. Bert uprooted his family for five years in Quito, while RCA, under Collins, expanded its domestic consulting capabilities. Returning to RCA in 1969, Bert focused on international business development and project management. When he retired in 1985, RCA had grown into one of the largest forest engineering consulting companies in the world. Bert continued independently consulting until the mid-1990s.

Bert had a courteous and easy-going personality and a fine sense of humour, not above playing gentle pranks on colleagues. His business dealings were always honorable and fair; in a word, he was a gentleman.

L. Gary Kenwood
Vancouver, BC

Student Members Shine

A project designed by current and past APEGBC student members has recently won third place at the 2015 Water Environment Federations Annual Technical Exhibition.

Current student member Allison Matfin and former student members Clayton McBride, Maureen Long, and Brendan Vissers, along with fellow engineering student Stephanie Wall, designed an anaerobic waste-water digester for the City of Kelowna. The large silo that attracted judges' attention allows micro-organisms to break down sewage in an oxygen-free environment to produce methane, which is then used as a source of clean, renewable energy. Kelowna is considering the design for future use.

The team placed third among 10 teams competing at the exhibition. The five students are studying environmental engineering at the University of Northern British Columbia.

The Water Environment Federation is a not-for-profit technical and educational organization with 36,000 individual members and 75 affiliated member associations representing water-quality professionals worldwide. Its annual conference and technical exhibition is the largest conference of its kind in North America.

Quebec Self-Regulation Under Review

Over the last few years, Quebec's engineering regulatory body, the *Ordre des Ingénieurs du Québec* (OIQ), has been undergoing a number of challenges. Members rejected several proposed fee increases, and challenges were made to their mandatory professional liability insurance, continuing professional development (CPD) program, governance practices and other issues. As a result, the government ministry responsible for OIQ, the *Office des Professions du Québec* (the Office), entrusted two officials to conduct a complete review of the association.

Describing the situation as a "crisis at the Ordre," the government reviewers made 21 recommendations, and OIQ is now developing an implementation plan. Among the list of recommendations are specific items that cover fee setting, board governance, compliance with CPD and ethics, professional practice investigations (which are being increased to 4,000 per year), and committee structure.

Additional notes:

1. At OIQ, investigations and discipline are managed through an arms-length body called the Syndic which is wholly funded by OIQ, but under separate administration and governance.
2. The current fee base at OIQ is $310 plus mandatory ancillary fees and taxes, totalling $427. The reviewers recommended that this fee was insufficient and needed to be increased.

The reviewers concluded: "Without strict follow-up and the guidance of the Office, we believe that the current unease within the Ordre will persist for a long time."

Concerns over self-regulation for any professional engineering regulatory body have strong implications for all self-regulation in Canada. For provincial engineering and geoscience regulators across the country, there are compelling lessons to be learned from the situation faced by OIQ in Quebec.

The complete French version of the report is available on the website of the *Office des Professions du Québec*. An English-language translation is available at apeg.bc.ca/News/Articles/Quebec-Self-Regulation-under-Review.

Smart. Choice.

For 38 years, Nilex's engineered, technically advanced geosynthetic materials have provided customers with choices and alternatives to conventional construction methods for less money.

Smart, environmentally conscious solutions used in road building, Mechanically Stabilized Earth walls for grade changes, erosion and sediment control, water management and containment.

Nilex. Smart. Choice.

nilex.com

NILEX
CIVIL ENVIRONMENTAL GROUP

Membership Renewals Due

It's time to renew your APEGBC membership or licence for 2016. The association recently sent out renewal invoices to members and licensees.

The *Engineers and Geoscientists Act* requires renewals by January 1. After this date, late fees are applied to overdue payments. As of March 1, 2016, members and licensees not yet renewed are struck off the register.

The January 1 deadline also applies to members who submit their 2016 renewal invoices to their employers for payment.

How to Renew

Members and licensees may renew their memberships:

- Online, via the APEGBC member portal at apeg.bc.ca
- By mail, by mailing a copy of your invoice and your method of payment to: APEGBC, 200 – 4010 Regent Street, Burnaby, BC V5C 6N2. Please allow sufficient time.
- By faxing a copy of your invoice and payment to 604.430.8085.

Resignations

Member and licensees who wish to discontinue their APEGBC memberships are advised to resign prior to January 1 to avoid being liable for membership renewal fees. Resignation can be tendered through the online member portal or by contacting APEGBC.

Professional members who wish to re-apply for APEGBC membership are subject to the association's Return to Practice Policy. Members-in-training who re-apply must comply with APEGBC's Reinstatement Policy. The outstanding annual membership fee, late fees, and associated administrative fees must also be paid.

Financial Assistance

Members unable to afford the membership fees may apply for:

Fee reduction: APEGBC allows access to reduced annual fees based on an "active income" threshold or a medical condition that renders the member or licensee unfit for work. Information is available via the online renewal process or on the back of the membership renewal invoice.

Fee deferral: Applications for deferral or waiver of 2016 annual fees due to hardship are confidential and must be made to APEGBC's Director of Registration and Licensing. Information is available at apeg.bc.ca/go/deferfees/.

Information

Billing amounts and balances:
Tel: 604.412.4859; billing@apeg.bc.ca

Online payment support:
Tel: 604.412.4887; support@apeg.bc.ca

Changes in status or registration:
Tel: 604.412.4856; register@apeg.bc.ca

2015 Council Election and CPD Bylaw Vote Results

Your 2015/2016 Council: (from left, front) Bob Stewart, P.Eng., Dr. Michael Wrinch, P.Eng. FEC, Dr. John Clague, P.Geo. FGC, FEC (Hon.), (2nd row) Cassandra Hall, P.Eng., P.Geo., Kathy Tarnai-Lokhorst, P.Eng., FEC, Caroline Andrewes, P.Eng., Scott Martin, P.Eng., (3rd row) David Harvey, P.Eng., Struct.Eng. FEC, Ana Fernandes, CIM, FCSI, Richard Farbridge, P.Eng., Chris Moser, P.Eng., (back row) Ken Laloge, CPA, CA, TEP, Tajdin Mitha, LLB, Dr. 'Lyn Anglin, P.Geo. Missing: Dan Campbell, P.Eng., Carol Park, P.Eng., John Turner, P.Ag.

Voting for the APEGBC council election and Continuing Professional Development bylaw ratification ballot opened August 26, 2015 and closed at noon on October 2, 2015. The vote was conducted primarily by electronic ballot with paper ballots available to members upon request. This year, 28% of eligible voting members and licensees cast a ballot for the council election and bylaw ratification.

More information about the election and bylaw vote is available at apeg.bc.ca/About-Us/Our-Team/Council.

The results of the vote for the 2015/2016 Council are as follows:

President
Dr. M.C. (Michael) Wrinch, P.Eng., FEC
(by acclamation)

Vice President
R.P. (Bob) Stewart, P.Eng.

Immediate Past President
Dr. J.J. (John) Clague, P.Geo. FGC, FEC (Hon.)

Councillors Elected
C.L. (Cassandra) Hall, P.Eng., P.Geo.
D.I. (David) Harvey, P.Eng., Struct.Eng., FEC
S.J. (Scott) Martin, P.Eng.
C.R. (Chris) Moser, P.Eng.
K.V. (Kathy) Tarnai-Lokhorst, P.Eng., FEC
R.K. (Richard) Farbridge, P.Eng.

Continuing
C.J.E. (Caroline) Andrewes, P.Eng
Dr. C.D. ('Lyn) Anglin, P.Geo.
D.E. (Dan) Campbell, P.Eng.
C.L. (Carol) Park, P.Eng.

Government Appointees
Ana Fernandes, CIM FCSI
Ken Laloge, CPA, CA, TEP
Tajdin Mitha, LLB
John Turner, P.Ag.

Council Election Vote Results

Total Eligible Voters 24,733
Ballots Received (electronic) 6,854
Ballots Received (paper) 24
Percentage Returned 27.8%
Ballots Spoiled 1

Bylaw Ratification Vote Results

A total of 6,829 members, representing 27.6% of eligible voters, cast a ballot in the CPD bylaw vote. Of these, 43.96% voted in favour of the bylaw. As bylaw ratification requires a two-thirds majority, the amendment **did not pass**.

Bylaw 19 - Continuing Professional Development
Total votes 6,829
In Favour 3,002 (43.96%)
Opposed 3,827 (56.04%)

Council election and bylaw vote scrutineers were Paul Blanchard, P.Eng., FEC, FGC (Hon.), John Watson, P.Eng., FEC, FGC (Hon.), and Bill Gilmartin, P.Eng., FEC, FGC (Hon.).

Annual General Meeting in Review

APEGBC's 96th Annual General Meeting was held October 17, in Kelowna, BC. Delegates included 108 members and licensees, and 54 guests and members-in-training.

The association's 2014/2015 President Dr. John Clague, P.Geo., FGC, FEC (Hon.), chaired the meeting. After viewing greetings from the BC Government, Clague reviewed Council's role. A motion to approve the meeting agenda was carried.

Parliamentarian Eli Mina reviewed the meeting rules. A motion to approve the meeting rules was carried.

Clague then introduced and recognized the volunteers and contributors who give their time and expertise to enhance the guidance and standards available to members. He also thanked the association's past presidents, deans of BC's educational institutions, student representatives, and officials of other associations.

Clague noted that the minutes of the 2013 AGM were printed in the *2014/2015 Annual Report*, with copies available at the meeting registration desk. A motion to approve the minutes of the 2014 AGM was carried.

Election and Bylaw Vote Results

APEGBC's Chief Scrutineer, Paul Blanchard, P.Eng., FEC, FGC (Hon.), explained the process applied for the 2014/2015 Council election and bylaw vote. Blanchard stated that he and his fellow scrutineers were satisfied that the election and vote were conducted in a confidential, fair and impartial manner.

Council election and bylaw vote results were announced (see previous page). A motion to destroy the paper and electronic ballots for the Council election and bylaw vote at the end of three months was carried.

Annual Report Presented

Clague and CEO and Registrar Ann English, P.Eng., reported on APEGBC activities and achievements for 2014/2015. Councillor and Audit Committee Chair Ken Laloge, CP, CA, TEP, reviewed the association's financial statements, reported on the results of the audit, and affirmed the committee's view that the financial statements and notes contained in the *2014/2015 Annual Report* fairly and accurately represent the association's financial dealings for the year ending June 30, 2015.

After each presentation, Clague, English, Laloge, and APEGBC Finance staff responded to questions from delegates.

The assembly then passed a motion to appoint PriceWaterhouse Coopers LLP, Chartered Accountants, as APEGBC's auditor for the new fiscal year, ending June 30, 2016.

Greetings from Geoscientists Canada and Engineers Canada

Geoscientists Canada President George Eynon, P.Geo., and Engineers Canada President Digvir Jayas, P.Eng., brought greetings to the assembly.

In Memoriam

The assembly observed a minute of silence to remember association members who had passed away during the previous year. Commemorative booklets containing the names of these members were provided.

Presentation on Corporate Practice

President Designate Michael Wrinch reported on engineering and geoscience corporate practice in Canada (see page 34).

Motions

Members and licensees presented motions for consideration by Council:

Motion 1: That Council consider publishing in the financial reports the total compensation (the sum of salaries and benefits) for all staff who receive over $100,000 per annum, as well as their reimbursed expenses.

Carried

Motion 2: That Council consider adopting a policy, via a directive to the Discipline Committee, that Special Costs no longer be charged to prosecuted members, and that the cost be in accordance with civil litigation rules, with the costs to be fixed by the Registrar of the Supreme Court, at the request of either the association or the prosecuted member.

Ruled Out of Order, and withdrawn

Motion 3: That Council consider recommending to the Discipline Committee that no further fines be imposed on prosecuted members.

Withdrawn

Motion 4: That Council consider the inclusion of territorial acknowledgement in all meetings.

Carried

Motion 5: That Council consider withdrawing its request to the Government of British Columbia for an amendment to the *Engineers and Geoscientists Act* that would require all council members to take an oath of office, whereby, if a council member were found to have breached the oath, they could be removed by two-thirds majority vote of the remaining members of council.

Defeated

Motion 6: That Council consider increasing its transparency and accountability to members, whereby all members may access the association's website, in an easy and timely way, in order to view all agendas and supporting materials of Council meetings that are deemed "open."

Carried

Motion 7: That Council consider revising the current voluntary CPD tracking guidelines and the online system to better reflect the simplified tracking as recommended by the CPD committee.

Carried

2015/2016 Council Induction

President Clague introduced the president for the 2015/2016 Council, Dr. Michael Wrinch, P.Eng., FEC. Wrinch took the oath of office, introduced Council for 2015/2016, and presented the Gold Foil Life Member disc to Clague.

Signing of MOU

President Wrinch introduced the Memorandum of Understanding between APEGBC and the Association of Consulting Engineering Companies of BC. The MOU was signed.

Clague announced the association's 2016 Annual General Meeting in Victoria, BC, on October 22, 2016, and adjourned the meeting.

2015 Annual Conference

Build Your Value in a Competitive World

Beautiful fall weather and sunny skies provided the backdrop for APEGBC's 2015 Annual Conference and AGM. More than 700 delegates gathered at the Delta Grand Okanagan Conference Centre in Kelowna for two days of professional development and networking, followed by the association's 96th annual general meeting.

An outstanding group of volunteers coordinated 10 professional development streams, which focused on topics that address many significant issues facing the engineering and geoscience professions. This year's streams included: Engineering and Geoscience in the Resource Sector (Victoria Stevens, P.Geo.), Municipal Engineering (Kimberly Wong, P.Eng.), Environmental Engineering and Geoscience (Elizabeth MacLanders, P.Eng.), Management (Stephen Horsman, P.Eng.), Young Professional (Felix Menu, P.Eng.), Structural (Meagan Harvey, P.Eng.), Better Business (Garrett Hamilton-Smith, P.Eng.), Energy Efficiency and Renewable Energy (Mehrzad Tabatabaian, P.Eng.), Climate Change (Mark Porter, P.Eng., Struct.Eng.), and APEGBC (Craig Merkl, P.Eng.).

In addition to professional development sessions, APEGBC hosted meetings of the branch representatives, the Student Advisory Committee, DEGIRS, and a Past President's forum. Attendees toured the tradeshow hall and surrounding area, which featured 38 exhibitors.

The Association of BC Forest Professionals (ABCFP) and APEGBC presented the 2015 Forest Engineering Award of Excellence on Thursday morning, which honored Herbert W. Argent, P.Eng., posthumously for his contributions and leadership in forest engineering. Thursday and Friday's keynote programs provided delegates with inspiration and insight. Communication expert Rhonda Victoor kicked off Thursday morning with advice on how to connect for effect through high-performance networking. At the Friday luncheon, adventurer Bruce Kirkby shared stories from his Himalayan travels, along with tips to practice mindfulness and maximize productivity in our daily lives. Thursday evening focused on adventure, as Parks Canada Senior Underwater Archaeologist Ryan Harris spoke about the Franklin Expedition and his involvement in the discovery and the state-of-the-art technology used to locate HMS *Erebus*.

Andy Mill, P.Eng., Struct.Eng., FEC, returned as master of ceremonies for the President's Awards Gala on Friday evening to the delight of a sold-out crowd of APEGBC members and industry guests. Minister of Agriculture, the Honourable Norm Letnick, MLA for Kelowna–Lake Country, brought greetings on behalf of the BC government. Throughout the evening, short videos profiled each award recipient and their accomplishments and contributions to society (youtube.com/apegbc1/), and awards were given to: Garth Kirkham, P.Geo., FGC: C.J. Westerman Memorial Award; Dr. Duncan Wyllie, P.Eng.: R.A. McLachlan Memorial Award; Dr. Dan Moore, P.Geo.: Meritorious Achievement Award; Meiric Preece, P.Eng.: Meritorious Achievement Award; Ken Putt, P.Eng., FEC, FGC: D.C. Lambert Professional Service Award; Selena Wilson, P.Eng.: Young Professional Award; Dr. Perry Adebar, P.Eng.: Teaching Award of Excellence. Geoscientists Canada also presented the Canadian Professional Geoscientists Award to APEGBC member Doug VanDine, P.Eng./P.Geo, FEC, FGC.

APEGBC volunteers were thanked for their dedication and service to the association following the AGM at the Recognition Luncheon. Committee awards and honourary memberships were also presented (page 12).

Outgoing President Dr. John Clague, P.Geo., FGC, FEC, (Hon.) was acknowledged for his contributions and dedication to Council as president for the 2014/2015 term at both the Saturday lunch and Friday's Stripped Gear Ceremony.

APEGBC wishes to thank our exceptional sponsors, exhibitors, speakers, and conference delegates for their participation and support in making this year's conference a resounding success.

Thank You to Our Sponsors

PLATINUM

Marsh Insurance/
Berkley Canada
Park Insurance/
Northbridge Insurance

GOLD

Great-West Life
Johnson Inc.
Manulife
Singleton Urquhart

SILVER

Aplin & Martin
Applied Science
Technologists and
Technicians of BC
Bull Housser
Metrix Professional
Insurance/XL Catlin

BRONZE

Association of Consulting
Engineering Companies
British Columbia
Dolden Wallace Folick LLP
Mitchell Press

COPPER

UBC Engineer
Co-op Program/
Master of Engineering
Leadership

Delegates take in a professional development session at APEGBC's annual conference (facing page). Ken Wright, P.Eng., pipes award recipients into the President's Awards Gala (above). Doug VanDine, P.Eng., P.Geo., FEC, FGC (left), Geoscientists Canada President George Eynon, P.Geo., and guests enjoy a cocktail reception (at left). Delegates network and interact with exhibitors on the tradeshow floor (left, below).

Auction Raises Scholarship Funds

The APEG Foundation Silent Auction, held during the President's Awards Gala at APEGBC's Annual Conference, raised almost $3,500 for student scholarships and bursaries. The Foundation promotes education in engineering and geoscience through the granting of bursaries and scholarships to students in BC.

The Foundation thanks the following people and companies for donating items to the auction: Accent Inns, Amec Foster Wheeler, Associated Engineering, Aureately Aqua, Caroline Andrewes, P.Eng., CTQ Consultants, Golder Associates, Harlan Kelly, P.Eng., Harry Lee, P.Eng., Prime Engineering, Schneider Electric, Simon So, P.Eng., SNC Lavalin, Spencer Behn, Tim Smith, P.Geo., Eng.L., YVR.

Award recipients take the stage at the President's Awards gala (top). Young Professional Award recipient Selena Wilson, P.Eng., and Dr. John Clague, P.Geo., FGC, FEC (Hon.) (at left).

APEGBC Recognizes Contributions

Every year, APEGBC thanks members and engineering and geoscience organizations for their contributions to the association and its goals with a series of awards and honours. At the 2015 Annual Conference, 2014/2015 President Dr. John Clague announced the following awards:

President's Awards

This year's President's Awards recipients have made a difference in their respective professions, careers or communities.

The awards include the C.J. Westerman Memorial Award (Garth Kirkham, P.Geo., FGC), R.A. MacLachlan Memorial Award (Dr. Duncan Wyllie, P.Eng.), Meritorious Achievement Award (Dr. Dan Moore, P.Geo.), Meritorious Achievement Award (Meiric Preece, P.Eng.), D.C. Lambert Professional Service Award (Ken Putt, P.Eng., FEC, FGC), Young Professional Award (Selena Wilson, P.Eng.), Teaching Award of Excellence (Dr. Perry Adebar, P.Eng.).

Information and videos about the winners can be viewed at apeg.bc.ca/News.

APEGBC Sustainability Award

This award recognizes a project that exhibits sustainable practices and exemplifies the APEGBC Sustainability Guidelines. The SunMine solar power project received the 2015 APEGBC Sustainability Award. SunMine transforms a former mine site in southeastern BC into a 10.5-megawatt solar power plant that sets a new standard for generating solar energy. See page 22 for a feature about the SunMine project.

APEGBC Environmental Award

The APEGBC Environmental Award recognizes APEGBC members and their firms for outstanding contributions towards environmental protection, environmental enhancement, and/or sustainable development. The winner of the 2015 APEGBC Environmental Award is the Harvest Energy Garden, a Richmond-based compost-processing facility that turns the Metro Vancouver region's organic materials into clean energy and compost. See page 18 for more information about Harvest Energy Garden.

Editorial Board Award

The association's journal, *Innovation*, relies on the contributions of members from all disciplines to help enrich each other's knowledge of engineering and geoscience. George Liu, P.Eng., received the association's 2015 Editorial Board Award for an article he wrote for *Innovation*, entitled, "Terrestrial Laser Scanning."

Mentor of the Year Award

The APEGBC Mentoring Committee recognizes an outstanding mentor in the APEGBC mentoring program. This year, Victor Goncalves, P.Eng., received this award for demonstrating excellence in leadership and support of future professional engineers and showing dedication and commitment throughout his mentoring relationship.

Honourary Memberships

APEGBC's Council may confer honorary membership in APEGBC to an individual who, while not a member of our association, has made significant and sustained contributions to engineering and geoscience. This year, Council recognized the following individuals:

- Dr. Ken Spencer, for his exemplary support of the engineering profession and science education.
- Michael Waberski, BCLB, for his dedicated service to the association and the professions of engineering and geoscience.
- Col. Chris Hadfield, for his contributions to the field of engineering and to science and engineering outreach.

George Liu, P.Eng., receives the 2015 Editorial Board Award. Bottom: Councillor Ana Fernandes congratulates new APEGBC Honorary Member Michael Waberski (right).

Manulife Bank

Outsmart your debt.

At Manulife Bank, we have created a solution to help Canadians manage their debt more effectively, allowing them to get out of debt sooner and potentially saving thousands of dollars in interest. That's smarter banking. Discover Manulife One today.

Sponsored by:
engineerscanada
ingénieurscanada

Visit **manulifeone.ca/engineerscanada** or call **1-877-765-2265** for more details on a special offer for Engineers and Geoscientists.

APEGBC's Council of elected members and government representatives meets throughout the year to conduct the business of association governance.

SEPTEMBER 11, 2015

Professional Geoscience Mobility Agreement Extended
Council approved an extension of the Professional Geoscience Mobility Agreement. This will allow professional geoscientists registered in BC or Ontario to perform short-term work in either province, provided they are professionally registered in either province until October 8, 2018. This approval is subject to agreement by the Association of Professional Geoscientists of Ontario. The agreement will be reviewed in 2018.

Retention of Women in the Professions
Council approved a plan for continuing APEGBC's efforts in support of the retention of women in the professions. The plan outlines next steps for Council in this area, including work on development of best-practice guidelines, recruitment, data collection, and partnerships. The work includes a review of budget considerations for 2016/2017 and seeks further direction from Council on specific items.

2014-2017 Strategic Plan Update
Council received information on progress towards achieving the goals indicated in the 2014–2017 Strategic Plan and reviewed targets for Year 2 of the plan. Significant progress was seen on many Year 1 targets. Council approved all but two of the Key Performance Indicator (KPI) targets presented for Year 2 of the Strategic Plan. Council will discuss the two remaining KPIs—demonstrating financial prudency on a consistent basis and increasing the number of women in the professions—at a future meeting. Information on the strategic plan and progress to date is available at apeg.bc.ca/strategic-plan/.

2015 AGM Meeting Rules Approved
Every year, the Governance Committee reviews the meeting rules for APEGBC's Annual General Meeting and presents them to Council for approval. Council approved the proposed 2015 AGM Rules, including a change to increase the time members are entitled to speak from two to three minutes.

APEGBC Annual Conference and AGM Special Guest Policy Reviewed
APEGBC's Special Guest Policy provides parameters for the number of complimentary event tickets offered and expenses covered for all special guests attending the annual conference and AGM. Following a request from the Division of Engineers and Geoscientists in the Resource Sector, Council created a working group of councillors to review the policy and submit recommendations to Council. The review will consider provisions for special guests and associated budgetary considerations.

Legislative Implementation Task Force Policies Approved
Council approved the Policy for Referral of a Complaint File by the Registrar to the Practice Review Committee and the Policy for Closure of a Complaint File by the Registrar. The policies were created in consultation with the Legislative Implementation Task Force and will help guide APEGBC's complaint process. The Policy for Referral of a Complaint File by the Registrar to the Practice Review Committee outlines subject matter areas and risk factors that should be considered prior to referring a complaint to the Review Committee. The Policy for Closure of a Complaint File by the Registrar outlines considerations about the nature of the complaint that should be deliberated upon.

Limited Licence Bridging Pilot Project Approved
Engineering licensees have academic qualifications other than an engineering degree and take professional responsibility within a clearly defined scope of engineering work. Council approved a policy providing engineering licensees with a clear path to meet APEGBC's academic requirements and attain a P.Eng. designation. A pilot project to evaluate the policy will be launched and operate until June 2016. A report will be brought to the Registration Committee in August 2016 to review progress and findings.

Looking to Exempt Policy Threshold Decreased to Five Years
Council approved changes to lower the experience threshold from seven to five years in the Policy on Looking to Exempt Interviews. The interviews provide an alternate means to confirmatory or qualifying exams for APEGBC to assess the qualification of experienced candidates for professional registration. The change brings APEGBC into alignment with best practices in Canada.

Climate Change Update
Members of the Climate Change Advisory Group presented the Climate Change Report to Council. Council reviewed and approved a feedback letter that will be signed by the President and sent to the BC government. The feedback letter is APEGBC's response to the BC Ministry of Environment's Discussion Paper on Climate Leadership Plan, released for broad consultation with stakeholders and the public. APEGBC's feedback letter highlights efforts related to climate change that are underway and planned by APEGBC.

Relevance and Engagement, APEGBC Programming
APEGBC Council continued to assess the relevance of association programming. APEGBC programs are important to the association's regulatory role and also serve to deliver value to members. Council decided to discuss the topic of member engagement at a future meeting.

Successful Audit for 2014/2015
The 2014/2015 audit of the association's finances was completed without any issues noted, and Council approved the financial statements for the year. PriceWaterhouse Coopers reviewed several key areas and found that the financial statements were presented fairly in accordance with Canadian audit standards and Canadian accounting standards. The financial statements are published in the *2014/2015 Annual Report*, at apeg.bc.ca/Resources/News-and-Publications/Annual-Report.

Next Steps for Branding Initiative
APEGBC Council approved two name options to be explored in relation to an updated association brand. Although APEGBC's legal name would remain

unchanged, the operating name could be modified as part of APEGBC's branding update.

OCTOBER 15, 2015

ASTTBC Professional Practice Guide
Council approved the ASTTBC (Applied Science Technologists and Technicians of BC) Guide to Professional Practice – Electrical Technology Services for Building Projects, as well as updated terms of reference for the ASTTBC–APEGBC Joint Board, revising the quorum criterion.

OCTOBER 17, 2015

Inaugural 2015/2016 Council Meeting
President Dr. Michael Wrinch, P.Eng., FEC, opened the meeting, marking the start of the 2015/2016 Council year. The 2015/2016 Council signed the Oath or Affirmation of Office in the presence of past councillors and staff.

APPOINTMENTS

Advisory Task Force on Corporate Practice
John Turner, P.Ag.
Scott Martin, P.Eng.

ASTTBC-APEGBC Joint Board
Andy Mill, P.Eng., Struct.Eng., FEC
Colin Smith, P.Eng., FEC, FGC (Hon.)
Kathy Tarnai-Lokhorst, P.Eng., FEC

Audit Committee
Dr. 'Lyn Anglin, P.Geo.
Dan Campbell, P.Eng.
Ken Laloge, CPA, CA, TEP
Tajdin Mitha, LLB,
Carol Park, P.Eng.

Board of Examiners
Frank Mucha, P.Eng.
Kevin Oldknow, P.Eng.

Building Codes Committee
Tim Brown, P.Eng.
Tim Ryce, P.Eng.

Climate Change Advisory Group
Chris Moser, P.Eng.

Discipline Committee
David Ricketts, P.Eng., FEC

Executive Committee
Caroline Andrewes, P.Eng.
Dr. John Clague, P.Geo., FGC, FEC (Hon.)
Ana Fernandes, CIM, FCSI
Bob Stewart, P.Eng.
Dr. Michael Wrinch, P.Eng., FEC

Fairness Panel
Phil Sunderland, P.Eng., FEC, FGC (Hon.)

Foundation Nominating Committee
David Harvey, P.Eng., Struct.Eng.
Ken Laloge, CPA, CA, TEP,
Tajdin Mitha, LLB,

Geoscience Committee
Cassandra Hall, P.Eng., P.Geo.
Dr. 'Lyn Anglin, P.Geo.
Dan Campbell, P.Eng.

Governance
Dr. John Clague, P.Geo., FGC, FEC (Hon.)
Tajdin Mitha, LLB
John Turner, P.Ag.
Scott Martin, P.Eng.
Chris Moser, P.Eng.

Investigation Committee
Allan Dakin, P.Eng., FEC
Troy Issigonis, P.Eng.

Mentoring Committee
Sanjay Chandok, P.Eng.

Nominating Committee
Dr. John Clague, P.Geo., FGC, FEC (Hon.)

OQM Committee
Michael Olmstead, P.Eng.

Professional Practice Committee
Richard Farbridge, P.Eng.
Scott Martin, P.Eng.

Registration Committee
Richard Farbridge, P.Eng.
Cassandra Hall, P.Eng., P.Geo.
David Harvey, P.Eng., Struct.Eng., FEC
Kathy Tarnai-Lokhorst, P.Eng., FEC

Sustainability Committee
Nelson Lee, P.Eng.

Technical Review Board
Adam Lubell, P.Eng.

Dr. Michael Wrinch, P.Eng., FEC

The Professions Make the World a Safer, Better Place

Monique Keiran

Photo: Wendy D Photography

When APEGBC's President for 2015/2016 was seven years old, his mother made a deal with a local TV repair shop to drop off unfixable TVs for him to take apart. It was a dream come true, and at that moment, Michael Wrinch—not yet P.Eng., FEC—knew he wanted to be a TV repair man.

A decade later, however, his career choice was not well received by his parents.

"It was suggested that I consider engineering, where I could design the TVs," Wrinch says. "I protested the idea of going to university, so my mother got me my first, real job. For the summer, I worked at the local fish factory, where I cleaned the chimneys and delivered fish guts to the fish fertilizer-processing company. After two summers, I retired from the factory and promptly applied to go to university."

In the middle of his engineering degrees, obtained from Memorial University of Newfoundland and the University of British Columbia, he took a year off to travel. "I spent time volunteering for Mother Theresa in Kolkata, India, and came to realize how lucky we Canadians are. We don't worry about food, water or our health… in fact, we don't have to worry about much at all. I saw things that are unimaginably sad, but I also

'We are saving the world, one schematic at a time.'

witnessed some incredible, hard-working, dedicated people trying to improve the lives of some very disadvantaged people. They never gave up and had a philosophy to help the world, one person at a time, and it was working."

He says he returned to university believing "if everyone gave just a bit of their time to a few things every day, we could change the world for the better."

Today, Dr. Michael Wrinch, P.Eng., FEC, works as an electrical power systems engineer and designs safety, critical control, and energy delivery systems at the consulting company he founded, Hedgehog Technologies.

"I like to say, 'We are saving the world, one schematic at a time.'"

A member for 13 years, Wrinch volunteered with many APEGBC committees and also served on Council twice before being elected Vice President in 2014. Here, he talks about his role and general priorities during the coming year.

What do you foresee to be the most pressing issue facing APEGBC and members?

The most pressing issue facing the association and members is how fast the world is changing.

For example, we need to understand how our professions can better embrace increasing cultural and social diversity, such as women in engineering and geoscience. How global changes, such as offshoring of engineering services or other groups seeking practice rights, impact our ability to protect the public. What about consideration of national licensure?

These are examples of potential issues related to licensing and public protection that lack easy answers. However, by being nimble and open to change, we will be better positioned to manage them appropriately.

To that end, this coming year, Council will work to help current and future members become known for the highest standards of practice, to further the association being regarded as a valued partner to members and industry, and to advance our regulatory leadership to remain relevant.

Describe your vision for your term as APEGBC president.

I believe, as engineers and geoscientists, our job is to make the world a safer and better place. Our duty is to protect the people of British Columbia and anywhere else where BC engineers and geoscientists work. At APEGBC, our purpose is to create an environment where the highest standard of practice for our infrastructure and products is met, while ensuring they are safe, long lasting, and forward thinking.

APEGBC needs to continue developing an environment that enables BC engineers and geoscientists to operate, excel and be considered among the best in the world.

During your term as Vice President, you met with and talked to many members. What did you learn?

I found many members feel an increased need for greater transparency about the association and what it does for them. As a Council, there is a concerted effort to augment engagement and communications to members; I hope to further and add to these initiatives by Council and APEGBC staff.

I found some members question the finances of the association. I spent significant time looking over the finances and plan to further enhance how information about such things as core operational costs and benefits of various program is communicated to the membership. This will support more meaningful, evidence-based discussion and decisions and, in the end, lead to greater confidence that our dues are being used appropriately.

I also found many members have busy jobs and family lives, and haven't much time to think about the association or the professions' future. I hope to work with Council to create a team of forward-looking professionals to help the professions evolve.

How will you apply that during your term as President?

I believe that being president is about building strong, motivated teams of councillors and staff to focus on solving the key, long-term strategic issues facing the professions. These issues are determined and decided upon through knowledge-based analysis. This supersedes any personal agenda, including mine.

As a team, Council will look at the key issues and make decisions about the highest-impact needs, in order to serve the professions in the long term.

2015/2016 APEGBC President Michael Wrinch describes:

His communication style: Clear and direct. I try to understand the perspective of who I am communicating with, but I will not sugarcoat problems.

His leadership style: Collaborative, inclusive and open. I believe strong teams of motivated, smart people make for big changes. Council is comprised of some amazing people—you voted them in: thank you—and I hope to leverage that talent to continue to better the profession.

His personal style: At work, I like to keep things collaborative and focus on outcomes.

His professional goals: As a professional, I strive to help clients, members, and the public any way I can. I try to develop and advance the strengths of team members, and keep an open mind to learn from those around me.

His professional philosophy: Trust your team, seek clarity, and don't be afraid to admit your limitations.

His take on the skills/experience he brings to the role of APEGBC president: I believe in team building and that the knowledge of an integrated team multiplies over the knowledge of individuals. I ask questions, seek understanding, and strive to achieve measurable outcomes. ⊠

THE *NEW* BLACK GOLD

With Harvest Energy Garden, Organic Waste Generates Opportunities

Tom Ruffen

Aerial photo: Opus DaytonKnight

The Harvest Energy Garden in Richmond, BC, is the first processing plant of its kind in North America. It uses dry-fermentation high solids anaerobic digestion technology to process mixed food and yard waste to create nutrient-rich compost and renewable, carbon-neutral electricity. Owned and operated by Harvest Power Canada Ltd., the facility entered full production in April 2013, using technology developed by Grossman Ingenieur Consult GmbH (GICON), based in Dresden, Germany.

Anaerobic digestion is the breakdown of organic material by microorganisms in the absence of oxygen. It is the basic process by which organic matter decomposes in a landfill, and it generates methane gas as one of the final products of decomposition.

The GICON technology mimics the breakdown that would occur in a landfill by placing the material in an enclosed environment where oxygen is not allowed to enter.

"The organic waste breaks down quickly in an optimal environment, and it gives off large amounts of biogas, which is a combination of methane and carbon dioxide," says Seamus Frain, P.Eng., Senior Project Manager for Opus DaytonKnight, the coordinating consultants on the project. "The biogas is cleaned and combusted to generate electricity that is fed into the power grid."

The biogas is combusted to create 8 million kilowatt-hours per year of carbon-neutral renewable electricity.

The solid residue from the processed waste is composted, and produces more than 17,000 tonnes per year of nutrient-rich, commercially marketable compost. The high-quality soil product benefits local industries, including turf and vegetable growing, horticulture, and market gardening.

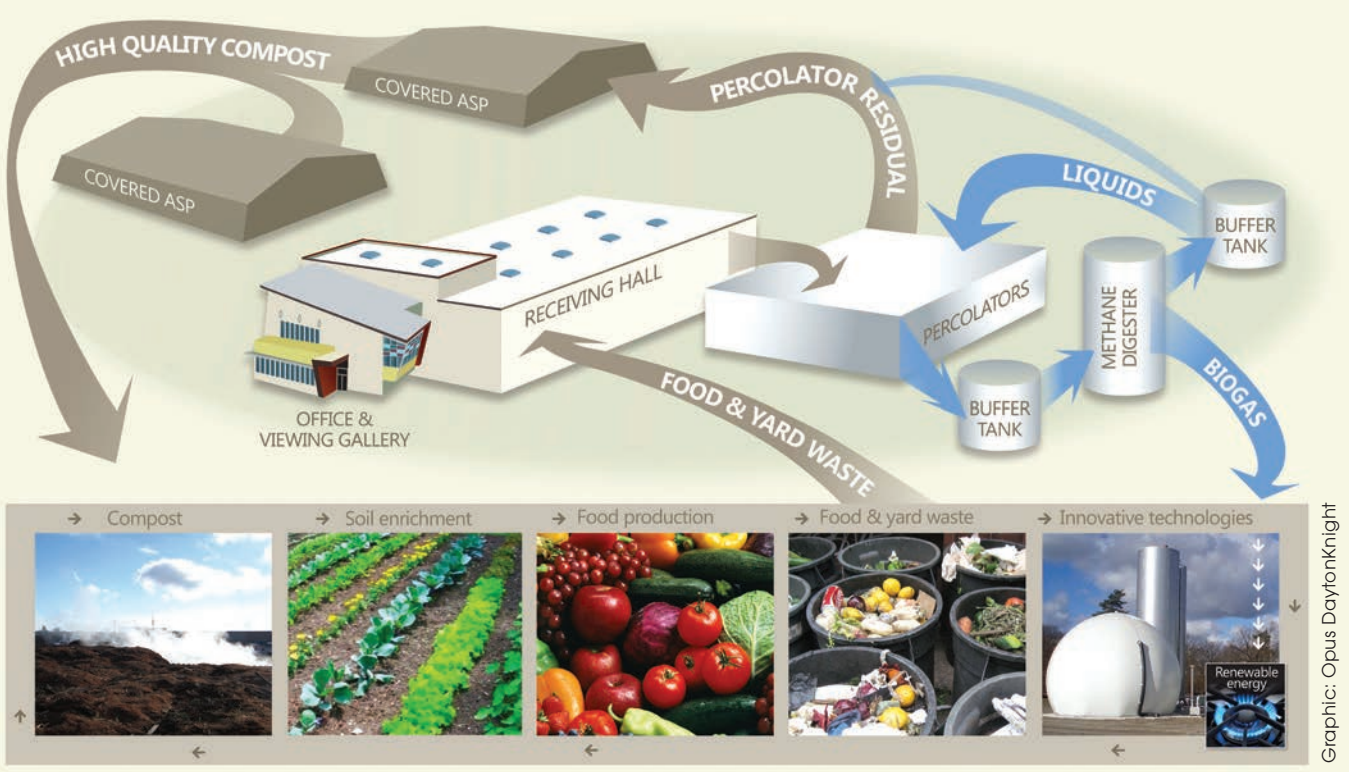
The Harvest Energy Garden reduces greenhouse gas emissions of 23,000 tonnes of carbon dioxide-equivalent per year, says Frain. "Because the waste is recycled and re-used in the area where it is produced, it dramatically lowers transportation costs for businesses and haulers and, by reducing the amount of organic material reaching the landfill, it reduces the potential odour pollution and groundwater contamination associated with landfills."

Beginnings

In 2009, Harvest Power acquired Fraser Richmond Soil and Fibre, one of the largest composters in North America. Harvest Power's decision to deploy a high solids anaerobic digestion technology was driven by Metro Vancouver's stringent new standards. The regional government implemented an organics disposal ban as part of the Regional Organics Strategy to achieve 70% waste diversion from landfills, effective July 2015. The ban is projected to divert more than 265,000 tonnes of organic material—mainly food waste—from landfills annually. Each year, Metro Vancouver transports more than 400,000 tonnes of municipal solid waste to a landfill in Cache Creek, 350 kilometres away.

"The planning for the Harvest Energy Garden began four to five years ago as we started to look at this high-strength organic waste stream that was going to be coming," says Ashwani Kumar, P.Eng. (Ont.), Harvest Power's Vice President of Engineering. "We needed to find the technology to deal with it."

A number of technologies already existed to process high-strength solid waste. All of them were developed in Europe,



Graphic: Opus DaytonKnight

Harvest Energy Gardens (facing page), in Richmond, BC, processes food and yard waste in the Lower Mainland. Using European technology translated to local conditions and standards, the facility generates 8 million kilowatt-hours of biogas-derived electricity and more than 17,000 tonnes of marketable compost each year.

Photos: Opus DaytonKnight

Harvest Energy Garden mimics organic decomposition in landfills. The percolator where waste is hydrolyzed and acidified, and the soluble organics are recirculated (recirculation pump system, left), the buffer tanks and digester tank (right) provide environments where anaerobic microbes break down the waste and release methane.

and all are variations on the same theme of how the material is digested anaerobically.

GICON, says Kumar, had an innovative process that "allows green waste and food waste to be digested simultaneously, with no prerequisite for contamination removals."

Process

At Harvest Energy Garden, yard and food waste is tipped into a receiving hall for processing prior to being fed into the anaerobic digestion process. The food waste is shredded to break open bags, boxes and other containers. Plastic bags, boxes and large contaminants are removed, and the remaining material is blended and stockpiled for placement into large percolators. Each of the 10 percolation tunnels is thirty metres long, four metres wide, and five metres high. Percolation prepares the materials for rapid digestion at the next stage.

The organic material is hydrolyzed and acidified to produce volatile fatty acids. Kumar says, "The hydrolyzed and acidified materials become soluble and are washed out with the percolate. These soluble organics are collected and recirculated for two weeks. Part of this percolate is stored in a hydrolysate buffer tank. In Stage Two, this percolate is further anaerobically digested in a fixed-film digester tank by methane-forming organisms. Most of the biogas is produced in this stage."

Planning and Building

Opus DaytonKnight worked with GICON to adapt the mechanical and electrical design, and was the main sub-consultant to GICON on the process as the design was developed and translated from European standards. GICON was the lead designer and did the process engineering. The German-based HERMOS provided the instrumentation and control and electrical engineering.

"We needed to surround GICON with local firms who could understand and interpret GICON design and put it into the format of construction-ready drawings and specifications," says Kumar. "It takes a big team to introduce a new technology."

The team included Pottinger Geharty Limited, which handled the Environmental Assessment, First Nations consulting, air emissions permit, and subsurface methane investigation. LMDG Building Code Consultants reviewed and interpreted the Life Safety and Fire Protection codes review and interpretation. Thurber Engineering acted as the geotechnical engineer on the project, ISL Engineering as the site civil engineer, and CH2M Hill provided the value engineering. DA Architects created the architectural design of the visitors' centre and served as architectural consultants for the biogas energy plant. Maple Reinders Inc. functioned as the construction manager and general contractor, and Weiler Smith Bowers Consulting Structural Engineers served as the project's structural engineers.

"The whole structure is made up of various components, so there's not one typical construction scheme in the building," says Kevin Lemieux, P.Eng., Struct.Eng., a Principal of Weiler Smith Bowers. "The green energy centre is a typical two-storey office building. There's also a receiving hall and the percolator structure where they let the waste compost. There are service rooms, mechanical rooms, underground trenching tanks, and there are some large steel tanks and concrete holding tanks outdoors, as well. The percolator structure had to be carefully designed, because there's the requirement for it to be gas-tight."

Lemieux says the project's components and complexity meant five types of concrete were required. "There were many discussions back and forth with the concrete experts to come up with a high-performance concrete specification."

A key engineering issue concerned the building site itself, which is located one kilometre from the Fraser River.

"The soils in the area are river sand overlain by organic silt, with various depths of fill on top," says Kumar. "Soils at our site are even worse, because they are overlain with a peat layer up to one metre thick, with wood waste over that that is up to two metres thick, and fill soil over that of uneven quality. Alternate foundation designs were examined and, ultimately, piles were selected with different combinations of steel, reinforced concrete, and timber options."

Results

The Harvest Energy Garden project has received many honours, including the **2015 APEGBC Environmental Award**. The project has created long-term employment opportunities and sustainable business practices that make local companies more competitive. Having such a facility in the region means that food waste is no longer considered garbage in Metro Vancouver, and waste haulers face stiff financial penalties for bringing loads containing more than 25% organic waste to a transfer station.

With Harvest Energy Garden providing an efficient and economically viable method of processing mixed yard and food waste, British Columbia's Lower Mainland has now embraced a greener future by reducing landfill deposits while producing valuable compost and renewable alternative energy from its household and municipal organic waste.

Food waste—once an environmentally and economically expensive problem for BC's Lower Mainland municipalities—has become a valued resource. ⊠

Photo: Opus DaytonKnight

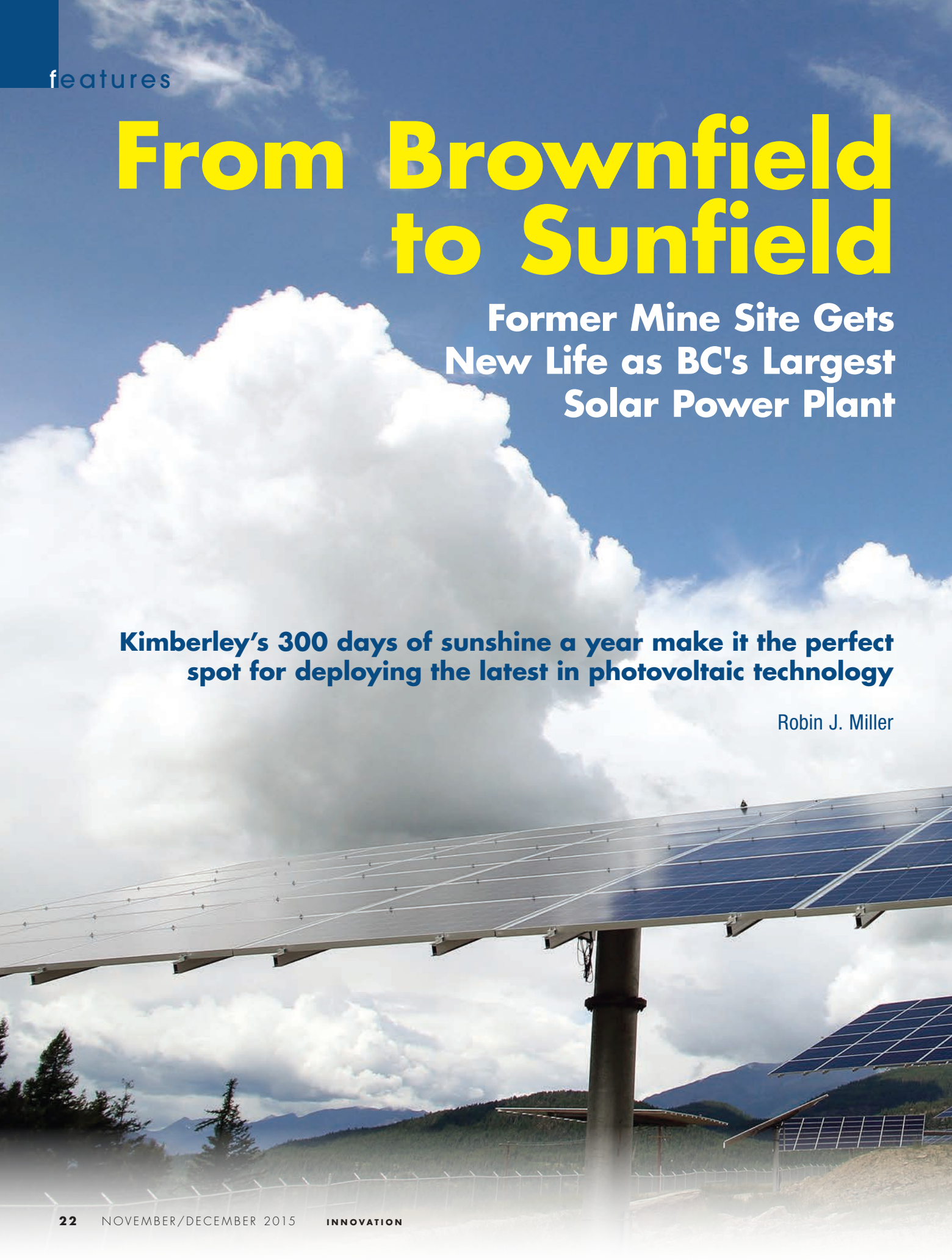
Opus DaytonKnight, the project's main sub-consultant, helped adapt Harvest Energy Garden's mechanical and electrical design. The company's project team included (from left) Seamus Frain, P.Eng., Goran Vranic, P.Eng., Bengul Kurtar, P.Eng., Harlan Kelly, P.Eng., and Tjandra Tjondrotekodjojo, P.Eng.

From Brownfield to Sunfield

Former Mine Site Gets New Life as BC's Largest Solar Power Plant

Kimberley's 300 days of sunshine a year make it the perfect spot for deploying the latest in photovoltaic technology

Robin J. Miller



Most people visit Kimberley for the snow; now, perhaps, they'll visit for the solar power.

On June 22, 2015, the city flipped the switch on the 4,032 solar-cell modules mounted on 96 trackers that make up SunMine, the first redevelopment of a former industrial site into a solar plant in Canada, and BC's largest-ever solar project. It's also the first solar project in BC to sell power to the BC Hydro grid, and the first and only solar plant owned and operated by a Canadian municipality.

That's a lot of firsts, but get ready: there are more.

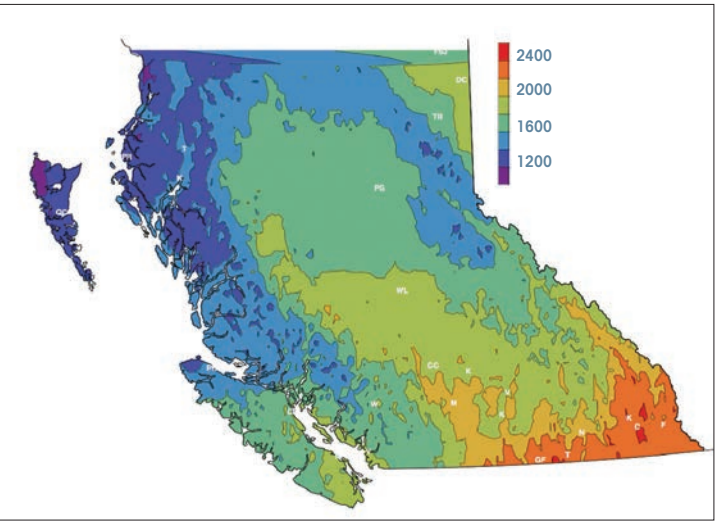
SunMine is also the first Canadian solar project actively supported by a mining company. Located in the southeastern Rockies, Kimberley's growth as a city was largely due to a small band of prospectors who, in the late-1800s, discovered what would later be named the Sullivan Mine. It was the largest lead and zinc mine in Canada for much of the last century and the largest underground mine in Canada entirely within city limits.

When the Sullivan Mine was decommissioned by its owner, Teck Metals Inc., in 2001, after more than 90 years of operation, the 4,000-hectare mine site included just over 1,000 hectares of "brownfield" or disturbed land. While Teck successfully worked to reclaim it, the disturbed land, by law, can only be used for certain limited purposes.

Fortunately for Kimberley, Michel de Spot, P.Eng., president and CEO of Vancouver-based non-profit EcoSmart Inc., thought there might be another use for this particular hillside. He had noted that the region gets more than 300 days of sunshine every year. In 2008, he approached both Teck Resources and Jim Ogilvie, Kimberley's mayor at the time, with a proposal: why not turn the brownfield into a solar field?

"We team up with industry and government to develop projects that further sustainability, particularly renewable energy," says de Spot about EcoSmart. "We could see that this site could work for a solar field—it gets a great amount of sunshine, one of the highest amounts in Canada—so we contacted Teck and the Kimberley mayor and council. Teck paid for a business case study that showed how much energy a solar photovoltaic plant could produce and how much could potentially be returned to the city in revenue. The council got behind the project 100%—they were super supportive—but I also can't say enough about Teck. They not only provided the city with the land and access to their infrastructure, they also helped fund the project. No other mining company has done that, ever."

"Teck is committed to supporting sustainable, vibrant communities in the areas where we operate even long after actual mining has ended," says Teck's Manager of Legacy



Kimberley, BC, typically sees a lot of sun throughout the year, with average solar energy yields for the area reaching up to 2,400 kWh/kWp per year. Those sunny skies provided opportunity to transform the decommissioned Sullivan Mine site into a 1.05-MW solar plant. Map: 2-Axix Mounting. Contour Map ® EcoSmart 2014. Photos: City of Kimberley

Properties Bruce Donald. "SunMine is a great example of that, and we're proud to be contributing to the long-term prosperity of Kimberley."

Teck's support helped tip the balance, says Kevin Wilson, economic development officer for the City of Kimberley. "Creating SunMine was an idea that fit with the entrepreneurial spirit of this city. No one else has done this in Canada, so it sends a message that this is a community willing to take risks. But we also needed to show the people here that it was a responsible idea, too."

After several more years spent working with EcoSmart to refine the original business plan, negotiate project ownership, and develop a detailed project plan, the city then asked Kimberley's 6,700 residents for approval to borrow $2 million to support SunMine's development. An impressive 76% of respondents voted yes. Kimberley then went on to work out agreements with Teck, which contributed $2 million, EcoSmart, which added a further $1 million through the provincial government's Innovative Clean Energy Fund, the Columbia Basin Trust and the Southern Interior Development Initiative Trust, and make an arrangement with BC Hydro for selling the energy produced to the BC power grid. Only then was the city was ready to move forward with design and construction.

Elroy Switlishoff, P.Eng., of Jetson Consulting, acted for Kimberley as the "owner's engineer" throughout the planning, design, and building stages. He says, "We actually benefited from the amount of time it took to get to the construction phase, which didn't get underway until the summer of 2014. The initial design used a central inverter for the solar trackers, but new technology came along, and we ended up using a dual-axis tracking system that takes advantage of sunlight throughout the day—the trackers move to follow the sun, providing as much as 38% more energy than a fixed system—with distributed inverter technology, which is both less expensive and more efficient. Instead of one big DC-to-AC converter the size of a garden shed, we have a bunch the size of wheelbarrows, closer to the panels. One converter failing is not as big an issue, and we can maintain them more easily."

Other innovations include a software system that receives updates every 15 minutes from the 32 wheelbarrow-sized inverter stations so "we can see in an instant how much electricity each inverter is producing, and whether a group of panels is dirty or otherwise not working quite as well as it should," says Switlishoff. "I can bring up all that information, plus the production numbers for the entire system, on my cell phone, and we can get out to fix any problems faster."

Even more significant is SunMine's 1,000-volt DC string configuration that Switlishoff calls "a step change" in solar facility configuration.

SunMine's solar panels are configured to allow up to 21 panels to be strung together, generating up to 1,000 volts instead of the usual 600 volts, and using less copper wire and electrical equipment. Photo: City of Kimberley

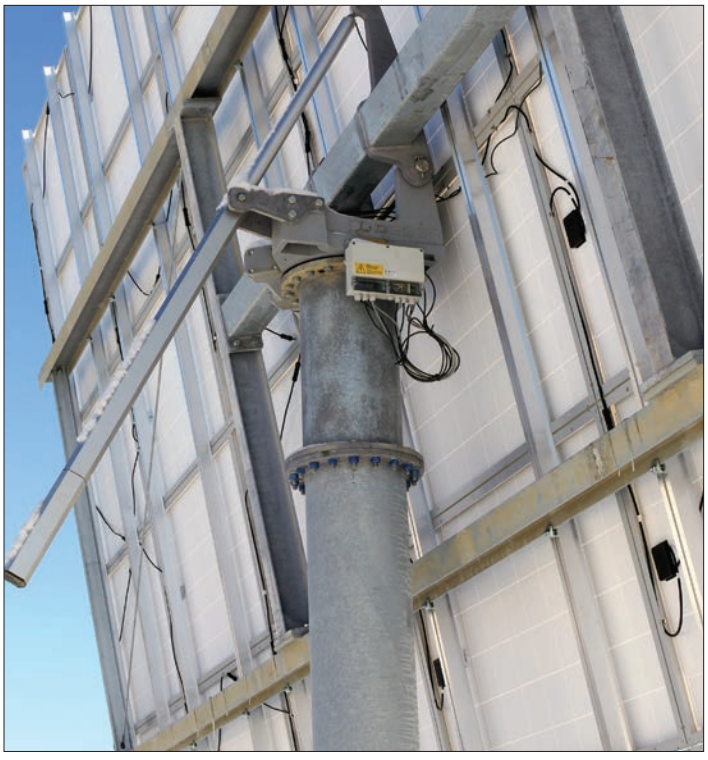
"Each solar panel puts out a certain amount of voltage," he says. "This configuration strings panels together head-to-tail to get 1,000 volts instead of the usual 600 volts. It's much more efficient, because we can string together more panels—as many as 21 panels—with fewer strings."

And fewer strings mean the 1,000-volt configuration is also less expensive, because the project requires less electrical equipment and less copper.

However, even with the best new technology in place, there was still at least one substantial hurdle to clear before the solar plant could finally go live.

"SunMine is a 1.05-megawatt solar plant," says Switlishoff. "It's BC's largest solar plant and only utility-scale solar farm, and BC Hydro's interconnection process was not well suited to address the unique requirements of this project. They are a very capable group, but it was new ground for them, and it took time and patience to work out the details."

Since SunMine began generating power last June, "a little later than intended, but pretty well on budget and on design," says Switlishoff, "it has exceeded expectations and is producing above its design production targets."



A dual-axis tracking system (left) that adjusts each panel's position to face the greatest amount of sun throughout the day generates up to 38% more solar energy than fixed-panel systems, and small DC-to-AC converters located close to the panels (below) cost less than using one central converter, are easier to maintain, and increase system flexibility, resilience and efficiency. Photos: City of Kimberley

As a result, the City of Kimberley is receiving a tidy $1,000 a day from BC Hydro for its contributions to the provincial power grid. Those contributions equal about enough electricity to power 200 BC homes. Enough land and transmission capacity remain to generate as much as 200 megawatts of additional solar power, if and when BC Hydro is prepared to take it.

SunMine and its owner are now basking in the attention the project has received from around the province. Not only did SunMine win the **2015 APEGBC Sustainability Award**, which recognizes engineering and geoscience contributions to the well being of human life and ecosystems, the Union of BC Municipalities also presented the City of Kimberley with a Community Excellence Award for Leadership and Innovation in Green Initiatives, while Clean Energy BC named it Community of the Year. And there may well be more awards—and even more visitors to Kimberley—in the future.

"Somebody had to be first," says Kimberley's Kevin Wilson. "We have demonstrated that it is possible for a municipality to do this. We hope it's one more reason for people to invest in us, to visit, or even to relocate here." ⊠

CRYSTAL CLARITY

Radar Devices Reveal Secrets Hidden in Ice

Krista Zala

Researchers collect under-ice lake data amidst freezing winds on Williston Lake, BC, and encounter a glacier-melt stream on Kaskawulsh Glacier, in the Yukon (inset). Photos: Advisian/Worley Parsons, and Laurent Mingo, P.Eng. (inset)

The postwar commercial availability of radar technology revolutionized flying and opened up the skies to aerial exploration. In the 1950s, a series of unexpected crashes in Greenland—where pilots coming in to land hundreds of metres above rock were unaware of the glacier metres below—revealed ice's transparency to radar. Since then, engineers have developed technologies to gauge a glacier's depth and sketch profiles of its many and varied layers.

Ice-penetrating radar is typically a ground-penetrating radar system tweaked to detect ice features. For glacier surveys, it's achieved by dropping the frequency to 20 MHz or less and adding a correspondingly long antenna.

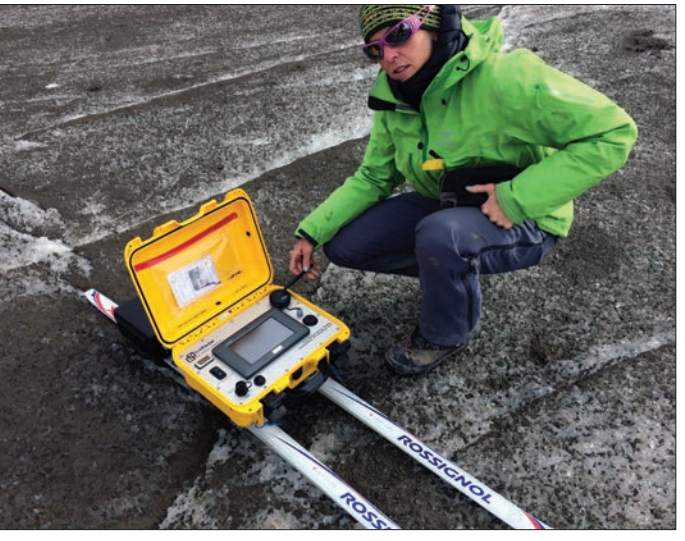
A surveyor might place an ice-penetrating radar device on a sled hooked to a skier or vehicle for quick roving surveys in safe terrain, strap it onto two modified skis when crevasses and other hazards necessitate a walking pace, or fasten it to one spot for a time-series recording. What follows are a few examples of how such technologies developed by APEGBC members are used across Canada to reveal information within and beneath ice.

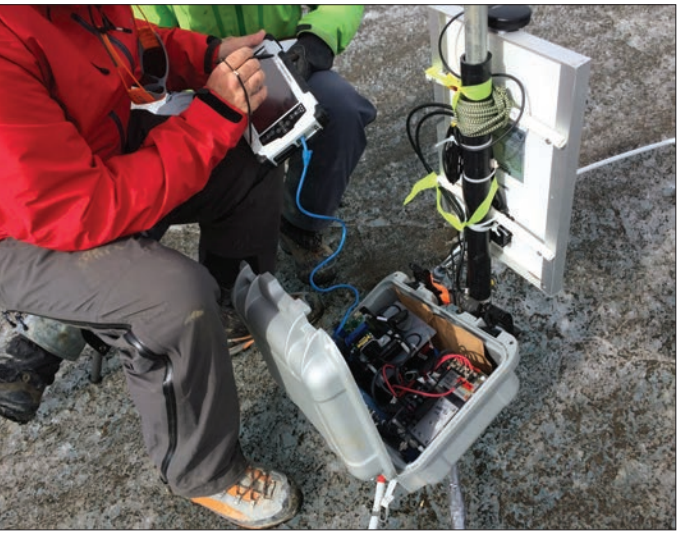
Glaciers

For years, Simon Fraser University researcher Gwenn Flowers has studied hydrological activity of glaciers in the Yukon's Kluane National Park.

"Glacier behaviour has implications for sea level, local water resources, hydro power, agriculture, and habitat," Flowers explains. By studying "how water flows under the ice and how

A roving radar system, receiving unit and embedded processing unit (top) can be strapped to sleds, skis or vehicles. A stationary device (bottom) is attached to sleeves over poles that are anchored in glacier ice to follow surface melt as the ice recedes. Photos: Laurent Mingo, P.Eng.





the drainage system influences ice sheet dynamics, we can learn more about how glaciers will likely respond to climate change."

During the spring thaw, meltwater fills an enormous chamber in the Kaskawulsh Glacier. An ice wall dams the chamber until summer's rising warmth and pressure break it. Such outburst floods, commonly known by the Icelandic word *jökulhlaup*, can be hazardous to any infrastructure or people downstream.

Flowers has used roving ice-penetrating radar developed by Laurent Mingo, P.Eng., at Blue System Integration since 2008. This year, she planned to map the dam and record a time-series that documents hydrological change where the drainage tunnel was estimated to run. Such an investigation required a fixed-point sensor to record for days—perhaps weeks. That is, she needed a fully automated system.

Building a remote, stationary, automated ice-penetrating radar presented challenges for Mingo. The valley's 80km/hr wind gusts could disturb radar antennas' positions and solar panel orientation, and the system had to be anchored such that it followed the daily surface melt downward as the ice receded. To secure all parts and their respective orientations, the team used a set of poles drilled into the ice, fitted with long PVC sleeves. Anchoring the radar system to the sleeves allowed it to inch down the immobile poles as the glacier surface melted. This kept the system in continual contact with the ice surface. Mingo also modified the roving radar software to operate as stationary radar, and redesigned the radar transmitter to operate at low-power consumption when in sleep mode.

For six weeks, and until retrieval, the system awoke every four hours, sent a few hundred radar pings over a few hundred milliseconds, recorded and formatted the data, then shut down—all within five minutes.

Flowers' team recovered the system in September 2014 and found that internal reflection through the ice plummeted. The water chambers within had emptied three days after they left. In future research, Flowers would like to install stationary radar around the ice dam, ideally year-round, to measure it filling and draining.

Ice Islands

The stationary radar's success caught the attention of Carleton University researcher Derek Mueller and his doctoral student Anna Crawford. They study ice islands—relatively thin, tabletop-like icebergs hundreds or thousands of metres across. The islands calve from ice shelves and drift past Ellesmere and Devon islands, into Baffin Bay and down the Labrador coast.

"Knowing how ice islands and icebergs deteriorate offers valuable information to the transport industry," says Mueller. Modeling their degradation "helps set the limit of all known ice, a crucial point for ship traffic off Newfoundland, because insurance rates drop once a ship is clear of that limit."

Typical icebergs are notoriously dangerous to work on because they may roll anytime, but ice islands don't roll as readily. Both kinds of formations pose threats to ships and structures, and both are ephemeral. For these reasons, the scientists proposed placing a remote, stationary ice-radar device on an ice island. The device needed two-way communication capabilities and had to record and send data daily throughout the year.

Because the opportunity to deploy the device came in October, Mingo had to address problems arising from cold, snow, and darkness.

"If NASA had to do it, they'd get 200 engineers to make it in three days, and it wouldn't matter if it cost them a billion or two dollars," he says.

Mingo equipped his device with an iridium modem, enabling it to push daily measurements to the researchers via satellite communications until the ice island melts away. He designed solar panels to work no matter which way the ice island faced.

Just before this edition of *Innovation* went to press, Crawford was on the Canadian Coast Guard research vessel *Amundsen* near Baffin Island. She helicoptered over to a 14-km^2 ice island with a small team of helpers and spent six hours setting up Mingo's ice-radar device and a small climate station. As expected, the device has sent data every day since deployment.

"We're delighted that everything went so smoothly, thanks to good engineering, planning and team work," says Mueller.

Year-round Freshwater Shipping Routes

Freshwater bodies present their own challenges to shipping. Williston Lake, created by the 1968 W.A.C. Bennett dam, parallels the Rocky Mountains for 250 km in northern BC. The valley bottom was flooded without being logged, turning the submerged trees into a navigation hazard. Still, mining company Canadian Kailuan Delhua (CKD) saw potential in shipping coal from the nearby proposed Gething Project. Year-round production (and thus shipping) meant CKD needed to know the lake's bathymetric, or depth, profile before considering the feasibility of winter navigation with an icebreaking ship.

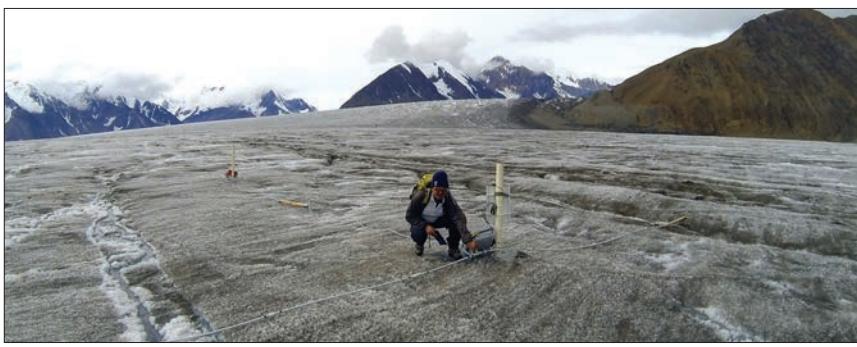
Adding to the risk of year-round shipping, in winter, thickening ice decreases lake depth, and water is drawn down in preparation for the spring melt.

Under the technical direction of Paul Bauman, P.Eng., Chris Slater, P.Geo., led a geophysical survey team from Advisian (a part of the WorleyParsons Group) in March 2011 to collect bathymetry data using an array of ground-penetrating radar systems.

"Williston Lake is ridiculously windy," says Slater. "It's a man-made lake with very steep sides." The topography funnels the wind across the lake.

Bracing themselves against winds strong enough to blow helicopters across the ice, as well as –40°C temperatures, they surveyed west from the W.A.C. Bennett Dam along the Peace Reach, then south along the Parsnip Reach to the town of Mackenzie, using Argo tracked, amphibious vehicles to tow the radar systems on with "inhouse-designed and -built sleds.

Over two weeks, the team mapped routes where water was at least 8 m deep under the ice to be confident of ships clearing bottom year-round.



Every four hours, for six weeks, the radar system stationed on the Yukon's Kaskawulsh Glacier awoke, pinged the ice, recorded and formatted the data, then shut down. Photos: Laurent Mingo, P.Eng.

Ice Roads

Ground-penetrating radar serves a different purpose on drier ground.

"Canada is this country where well over one-third of the country is covered in wetland—in the northern portion, it's about two-thirds," says Bauman.

Northern Canada's extensive wetlands limit access to many northern towns—which is why it can cost $20 for a jug of milk. "Many communities are only accessible by planes, boats, or winter roads," says Bauman. "When the muskeg freezes, they can get supplies in."

After freeze-up, supplies are trucked in over ice roads at a fraction of the cost. The drastically cheaper transport compels people to push use of the roads to the limit, from the very first to the very last possible day. Not surprisingly, changing climate is shrinking the ice-road season.

Using ground-penetrating radar, Chris Slater, P.Geo., of Advisian (a part of the WorleyParson Group) leads a survey team to collect bathymetric data from Williston Lake, in northeastern BC, and map routes where water under the ice is deep enough to permit year-round shipping. Photos: Advisian/WorleyParsons

The conventional means to gauge and monitor thickness involved drilling holes in the road, but the practice takes time and can miss thin sections. It also isn't feasible to conduct along the length of the road. Instead, Advisian's radar system can either be towed behind a truck or snowmobile or, in sketchily thin stretches, pushed ahead of the vehicle. With a display screen located in the vehicle cab, the driver can map ice thickness, in real time, at 80 km/h.

Permafrost

Lately, Advisian is applying its ground-penetrating radar to mapping discontinuous permafrost. Resource development and extraction in the warming north has led to increased pipeline development in the region. However, removing tree cover and opening terrain to build pipelines and extract resources hastens permafrost melt, which can increase risk of collapsing pipelines and oil spills in remote wilderness areas.

"If a company is building a pipeline, they must assume the worst-case scenario," says Bauman. "We assume permafrost eventually will degrade, and we will engineer and design accordingly. [Companies] want to know how long the permafrost region is and how thick it is."

Mapping the extent and thickness of permafrost is critical to the design and engineering of safe and reliable pipeline systems.

Applying radar to glaciers, ice islands, lake ice, muskeg, and permafrost helps us understand how these ice-scapes change throughout the year, as seasons change. It helps us protect infrastructure, communities, the environment, and economies in regions where cold and ice present challenges. ⊠

APEGBC Continuing Professional Development

Personal Investment. Professional Commitment.

Construction Projects Contracts, Bidding Administration Logistics and Claims Avoidance

November 23–November 25, 2015; Vancouver, BC

This authoritative course sets the standards for construction administration, field management, and claim avoidance. Participants will examine the principals of project-administration procedures from the viewpoint of a resident project manager or project engineer on a construction or engineering project. This course will also cover Construction Projects Contracts and Bidding Logistics.

Leading with the Brain in Mind

November 23, 2015; Vancouver, BC

You will learn how to understand the five elements of a brain-friendly model to collaborate with and influence others successfully, modify your own and other people's behavior to minimize negative and maximize positive emotions towards an event, and integrate goal setting with brain science to influence workplace productivity.

Fundamentals of Power System Protection

November 23–November 26, 2015; Vancouver, BC

Day 1: Short Circuit Analysis of Power Systems. Day 2: Overcurrent Protection of Power Systems. Days 3 & 4: Fundamentals of Transmission, Generation and System Protection. The course is intended to introduce the subject of power-system protection to enable engineers to understand techniques of applying and setting protective relays. It will cover short-circuit analysis, symmetrical components, overcurrent protection, distribution-system protection, differential protection, and transformer protection.

SCADA & Remote Monitoring Systems

November 23 & 24, 2015; Vancouver, BC

We often have limited exposure to one of the areas of SCADA (supervisory control and data acquisition), but need to better understand other components of SCADA systems. This tutorial starts at a very high level and dives into key issues and features of various SCADA systems. At the end of this two-day tutorial, participants should have an in-depth understanding of all key features and challenges of SCADA systems.

OQM Training Session

November 23, 2015; Vancouver, BC

APEGBC's Organizational Quality Management (OQM) Program serves as a tool to improve the quality management of professional engineering and geoscience practices at the individual and organizational level. This voluntary program offers certification to participating organizations. OQM offers organizations employing APEGBC professionals the opportunity to implement or adapt in-house quality management policies and procedures consistent with the requirements of the *Engineers and Geoscientists Act* and Bylaws.

Petroleum Refining and Processing: A Crash Course

November 26 & 27, 2015; Vancouver. BC

This course presents an overview of the petroleum-refining and -processing industry, including the feedstock properties, product slate, and the processes used to convert crude oil and intermediate streams into desirable products. The basics of hydrocarbon properties and products quality are discussed. Each processing unit is explained, including equipment description and selection basics, operating conditions, process parameters, catalyst, utilities, feedstock and products quality.

Marketing and Selling of Professional Services

November 27, 2015; Vancouver, BC, and Webinar

This workshop has been shown to be an extremely powerful and practical learning experience for all people who deal directly with customers and clients. It explores four critical face-to-face core communication competencies, focusing on techniques in four key areas: 1. Questioning strategies and techniques that uncover vital buying motives; 2. Presentation skills that optimise persuasiveness; 3. Securing commitment without using high-pressure, manipulative techniques; and, 4. Negotiating tactics that create win–win, margin-maintaining outcomes.

Fundamentals of Project Management

November 30-December 2, 2015; Vancouver, BC

This workshop equips engineers new to their first jobs, and those with a few years' experience who want to transition from a technical position to a project leadership role, with the tools, skills, behavioral attributes, and competencies needed to manage complex design and construction projects. Using lectures, discussions, and case studies, the focus is on practical applications and techniques for immediate implementation and project results. Participants learn "what" to do, "how" to do it, and "why" they need to do it, because a leader is one who knows the way, goes the way, and shows the way.

Methods for Predicting Metal Leaching and Acid Rock Draining Potential

December 1, 2015; Vancouver, BC

This seminar provides an introduction to the subject for scientists and engineers involved in any projects that require management of waste rock to address water-quality effects from runoff. Basic principles are discussed, with a focus on site-specific approaches rather than recipes. As the day progresses, attendees work in teams on several workshops to apply learnings. Each workshop is following by a class discussion.

Hands-on Physical Modeling of Hydrotechnical Phenomena: Application and Interpretation

December 2 & 3, 2015; Vancouver, BC

The course offers engineering fundamentals of physical modeling for hydrotechnical projects with the following objectives: to become familiar with the applied theories of scale modeling for hydrotechnical projects (river, coastal, hydraulic structures, and hydromechanics); to determine when scale modeling should be performed, versus field, analytical, and numerical methods; to interpret the results of physical modeling; and, to avoid common pitfalls in physical modeling of hydrotechnical phenomena involving interaction of water with sediment and/or structures.

Law & Ethics Seminar

December 2 & 3, 2015; Hyatt Regency Hotel, Vancouver, BC

Learn about the points of Law and Ethics critical to your practice as a Professional Engineer or Geoscientist. This seminar provides an overview of occupational health and safety, employment law, practical law, the professions, practice review, APEGBC's discipline and enforcement process, code of ethics, and case studies.

Advanced Project Planning, Scheduling, and Control

December 3 & 4, 2015; Vancouver, BC

This workshop is designed to provide professionals with the knowledge and tools to improve their skills and capabilities to properly plan and control all project tasks on time and within budget.

Call for Presenters

Are you an expert in your field who would like to contribute to the future of engineering and geoscience? APEGBC is actively seeking members to present on a variety of topics. For more information, please visit apeg.bc.ca/Events/Seminar.

For a complete listing of events or for more information, visit apeg.bc.ca/prodev/events or contact APEGBC Professional Development at 604.430.8035 or 1.888.430.8035.

Professional Engineers and Geoscientists of BC

Registration Interviews Go Global

APEGBC requires many candidates applying to register as professional or licensed engineers or geoscientists in BC to demonstrate their experience and knowledge to a panel of experienced professional members. For engineering or geoscience candidates living abroad, this has long meant applicants had to travel to BC to be interviewed onsite.

That model changed recently. In July, the APEGBC interview panel, located in Burnaby, BC, remotely interviewed four applicants located in London, U.K.

"Several applicants from one company in London contacted us," says APEGBC Associate Director of Engineering Admissions Mark Rigolo, P.Eng. "It seemed a good opportunity to explore alternative, modern communication technologies for conducting remote interviews."

APEGBC staff located and rented use of a facility in London that provided secure audiovisual and telecommunications capabilities, and contacted two London-based APEGBC professional engineers who agreed to volunteer as the interviews' invigilators in London. Their role was to check the applicants' documents and verify their identities.

"We found we didn't lose any quality by doing the interview remotely," says Rigolo. "We were able to assess the quality of the applicants' answers to our questions, and the quality of the applicants' reactions to the questions just as effectively as when we interview onsite."

Three of the applicants proceeded to become registered with APEGBC, while one application is ongoing.

The trial sets the stage for APEGBC to conduct more interviews remotely, when demand, secure facilities and technology, on-the-ground APEGBC invigilators, and scheduling permit.

Next up is a remote interview with applicants in Doha, Qatar, with another BC-to-London interview scheduled thereafter.

About 50% of APEGBC candidates for registration are interviewed, often because their applications contain unclear documentation.

Five Computer-based Professional Practice Examination Sessions Scheduled for 2016

APEGBC will be holding its online Professional Practice Examination five times in 2016.

The association moved from its paper-based exam to a computer-based system starting with the October 2015 session. The new system helps streamline the testing process and takes advantage of the greater flexibility computer exams offer. It also allows APEGBC to schedule the exam more frequently.

In past years, when the exam was paper-based, it usually took place only four times each year, restricted in large part by the logistics of administering the labour-intensive format.

The next exam takes place between January 11–13, 2016.

If you have questions regarding the new exam format, contact the APEGBC Manager of Examinations. More information about the Professional Practice Examination is available at: apeg.bc.ca/Become-a-Member/Professional-Practice-Examination.

Looking-to-Exempt Threshold Adjusted

APEGBC recently adjusted its policy for exempting internationally trained engineering applicants from taking some or all of the association's qualifying or confirmatory examinations. The Looking-to-Exempt policy now requires internationally trained applicants to demonstrate a minimum of five years of overall, relevant experience.

Previously, such applicants needed a minimum of seven years of experience to be considered eligible for a Looking-to-Exempt interview.

These applicants' qualifications may be assessed through interviews by APEGBC experience reviewers in order to determine whether technical examinations are necessary.

Other requirements for internationally trained applicants remain the same. They must have graduated from a degree-granting engineering or applied science program deemed by Engineers Canada to be equivalent to BC engineering or applied science university programs. They must provide both documentation of their work experience and appropriate references. They also must have direct experience that has been reviewed and approved by APEGBC's Director of Registration or at least one member of the appropriate APEGBC experience-review panel.

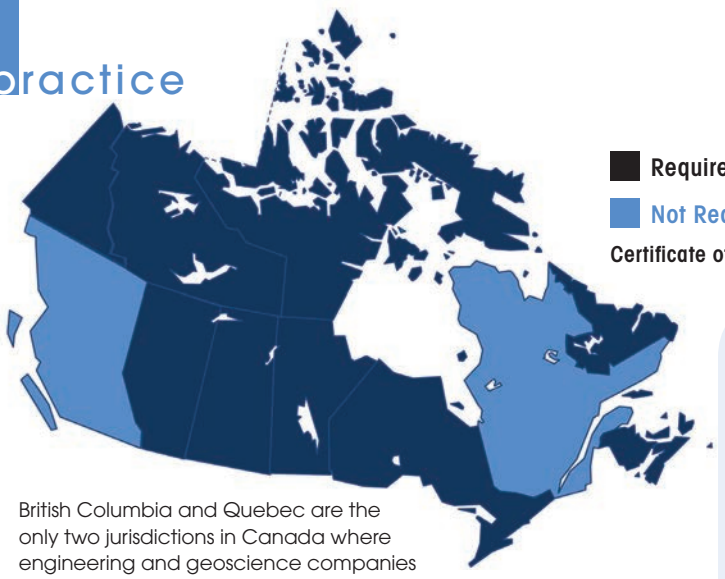
This is the second time APEGBC has adjusted the policy's experience-threshold requirements. Previously, the association required internationally trained applicants to have 10 years of relevant North American engineering experience. When that threshold was lowered to seven years in 2010, provision was made for the policy change and its results to be monitored and revisited.

"Other Associations across Canada (APEGNB, PEO and APEGS) already have a five-year threshold for Looking-to-Exempt," says Associate Director of Engineering Admissions Mark Rigolo, P.Eng., "so adopting this policy would bring APEGBC into alignment with some of the best practices in Canada."

With the new experience threshold in place, internationally trained applicants with at least five years of engineering experience in Canada or the U.S. who meet the other requirements may be brought before the registration committee for exemption from examinations. Applicants with at least five years of experience, but fewer than five years of experience in Canada or the U.S., may be eligible for a Looking-to-Exempt interview if all their references are positive, and include at least two in-discipline professional engineering references and at least one professional engineering reference from a supervisor.

Internationally trained applicants who receive two or more negative references are required to take the examinations assigned by the registration committee to demonstrate or confirm their qualifications.

Applicants who qualify for Looking-to-Exempt consideration as a result of the change in the years-of-experience threshold and who have failed an association examination remain ineligible for the "looking to exempt" review until he or she successfully completes the failed examination. Applicants who have been assigned examinations and have not yet completed them may be eligible for consideration under the Looking-to-Exempt policy if the candidate has not failed an examination, formally withdraws his or her original application within 12 months of the examination assignment letter, and pays an application fee—equal to the current full application fee—for the new assessment. ⊠



British Columbia and Quebec are the only two jurisdictions in Canada where engineering and geoscience companies remain unregulated.

Early Council discussions about corporate-practice regulation in BC began with the Closkey Commission, which reviewed the Station Square Mall collapse in Burnaby. Since then, the issue has re-emerged periodically and whenever major incidents involving engineering or geoscience in BC occur.

In 2012, APEGBC responded to the need for providing quality management support to engineering and geoscience businesses by launching the Organizational Quality Management (OQM) program. Through the voluntary program, the association assists organizations in helping their professional-member employees meet the quality management requirements under the *Act* and bylaws.

With a successful model for organizational quality assurance operating in BC, the question now facing APEGBC is whether more can be done to ensure public protection.

APEGBC to Examine Support of Corporate Practice

When the Mount Polley dam breached in August 2014, an issue discussed by APEGBC councils many times in recent decades resurfaced: the regulation of engineering and geoscience corporate practice in BC. Council has begun examining this complex issue again to determine whether the association should pursue regulatory authority for corporate practice.

Since its inception in 1920, APEGBC has been responsible for maintaining standards of entry and practice for individual professionals. The *Engineers and Geoscientists Act* contains provisions for the association to issue certificates of authorization—licences issued to allow individuals and businesses to provide professional engineering or geoscience services. However, nothing in the *Act* prevents companies from operating without such certificates.

In fact, BC and Quebec are the only jurisdictions in Canada where engineering and geoscience organizations remain unregulated. Other Canadian jurisdictions regulate organizational practice through certificates of authorization or similar permits to practice. Some jurisdictions regulate all companies that provide engineering and geoscience products and services, whereas others are restricted to certain sectors—for example, consulting.

British Columbians appear to support corporate regulation. In a recent public opinion survey, 81% of respondents believed that regulating engineering and geoscience firms was an important function of APEGBC[1]. The matter is also raised regularly by members and organizations that look to APEGBC to ensure that practitioners and companies within various sectors meet the same quality assurance standards.

The association's primary mandate of public protection remains central to its consideration of the issue. Also key is ensuring individual members' and industry's perspectives are heard. To meet these requirements, Council has established an Advisory Task Force on Corporate Practice that will guide the process of concept development and member and stakeholder consultation. The Task Force will comprise APEGBC members and licensees and industry representatives, including government, manufacturing, construction, the Association of Consulting Engineering Companies BC (ACEC-BC), and others.

After considering all input, the Task Force will deliver a final recommendation to Council.

Consultation Timeline

Consultation will begin in 2016, with a goal of creating meaningful opportunities that enable members and stakeholders to provide informed input to the Task Force and Council. Consultation opportunities will be communicated to members, on a dedicated section of APEGBC's website, at apeg.bc.ca/corporatepractice. Summaries that identify key themes, concerns, challenges, and opportunities will be presented to Council regularly.

The Task Force will also examine the history of the issue, associated legislation, and successful aspects of existing regulatory models in Canada and elsewhere.

Concept development and consultation are expected to take up to 10 months.

Council's goal is to consider the recommendations of the Task Force at the end of 2016. It will decide then whether APEGBC should pursue authority for corporate regulation—and if so, within which sectors.

More Information

A dedicated section of the APEGBC website has been launched to communicate all information on this issue. Please visit apeg.bc.ca/corporatepractice to learn more.

1. Insights West Public Opinion Survey 2014. Question: From the list below, please rate the importance of APEGBC's current and potential responsibilities. "Regulate firms offering professional engineer and geoscientist services to the public to ensure they have qualified professionals and standards for quality assurance." 81% ranked this as important.

DECLARE YOUR HOURS

Declare your 2015 voluntary continuing professional development hours. You may declare compliance by checking the CPD Compliant box and entering the total number of hours completed for the year on the annual membership renewal form or through the online membership renewal process.

APEGBC's new President, Dr. Michael Wrinch, P.Eng., FEC, (left, standing) and CEO and Registrar Ann English, P.Eng., (left, sitting), and ACEC-BC Board Chair Ken Wiecke, P.Eng., (right, standing) and President and CEO Keith Sashaw signed the memorandum of understanding between the two associations.

Agreements Signed with BC Associations

At the 2015 Annual General Meeting, APEGBC renewed its memorandum of understanding with the Association of Consulting Engineering Companies British Columbia (ACEC-BC). The two associations agree to continue cooperating for the good of the engineering and geoscience professions, maintain open dialogue on common interests, inform and consult with each other to maintain public interest and confidence in the professions, and identify common approaches compatible with APEGBC's regulatory mandate.

The associations review the agreement every three years.

In September, APEGBC signed a new memorandum of understanding with the Association for Mineral Exploration British Columbia (AME BC), the lead association for the mineral exploration and development industry in British Columbia. Under this agreement, the two associations will cooperate to increase the prestige and esteem of professional geoscience and engineering, express unified positions on matters related to the practice of the professions, and work together on areas related to professional practice and development.

For information on the memorandum see: apeg.bc.ca/apegbc-amebc-mou.

Photo © pnrwa, via flickr and Creative Commons

Building Act Sections Applied

The Province of British Columbia is bringing sections of the *Building Act* into force. Among other administrative and legislative matters, the sections apply:

- The definitions in the *Act*;
- The Minister's authority to set building regulations;
- Local authorities' powers to continue to administer and enforce provincial building regulations;
- The Minister's authority to enter into an administrative agreement with an external organization to administer the qualification requirements for building officials; and,
- The continuation of the Building Code Appeal Board under the *Act*.

Other sections of the *Building Act* will be brought into force in phases, the timeline for which is still being determined.

The Province anticipates the sections of the *Act* that set qualification requirements for building officials will be brought into force in 2016.

For information, see www.gov.bc.ca/buildingact.

If you have questions about the *Building Act* or its implementation, contact building.safety@gov.bc.ca. ⊠

Trends in Complaints

Series Explores Trends in Complaint Files and Possible Solutions

The APEGBC Legislation, Ethics and Compliance department has identified a number of recent trends in the types of complaints filed against professional engineers and geoscientists. Over the next while, *Innovation* will feature articles discussing the trends, ethical issues, and standards of practice involved. The articles will also advise APEGBC professionals how to avoid similar complaints and to protect the public interest.

The *Code of Ethics* Requires Respectful and Professional Communication

Efrem Swartz, LLB, APEGBC Director, Legislation, Ethics and Compliance

There are multiple controversial development projects in the province that require the involvement of professional engineers, professional geoscientists and licensees, including limited licensees ("APEGBC professionals"). Many of these projects inflame public opinion and spark fierce debate. Some APEGBC professionals provide consulting services to the proponents of the projects, while others act for citizens groups or environmental organizations that oppose the developments.

Last year, APEGBC received a number of complaints involving APEGBC professionals who make unprofessional comments or inappropriately criticize other APEGBC professionals. The incidents typically arose in the course of debate over controversial development projects. The communications often began as differences of opinion over a technical matter, but devolved into personal attacks against the integrity or professional competence of another APEGBC Professional. The unprofessional remarks were made in writing, in the media, or at public venues, such as town meetings.

APEGBC recognizes that the majority of members treat each other with respect. However, incidents of unprofessional communication directed towards other APEGBC professionals negatively affect the public perception of the engineering and geoscience professions and give rise to complaints to APEGBC. The complaints typically fall into two categories:

1. **Members Making Hostile Comments About APEGBC Professionals.**
   Particularly in regards to environmental or climate change issues, a few members have crossed the line between professional criticism regarding technical matters and have made personal attacks against other members.

2. **Members Making Unfounded, Alarmist Claims About Projects.**
   Alarmist, exaggerated or unsubstantiated remarks about the dangers of projects or issues can cause unjustified concern among the public.

In some cases, only one party acted unprofessionally. In other cases, both parties strayed. Transgressions include:

- Circulating or publishing inappropriate, non-technical critiques of projects;
- Making exaggerated statements that mislead and alarm the public about possible dangers in projects or issues;
- Including personal comments irrelevant to the scope of a technical review within reports;
- Presenting personal views as professional opinions, and;
- Including derogatory, personal remarks about other APEGBC professionals in correspondence copied to government officials or members of the public.

In several instances, the APEGBC Investigation Committee issued letters of recommendations to the APEGBC professionals involved, emphasizing that the content of their communications should improve.

APEGBC's Position

APEGBC encourages scientific debate that is based on evidence and the application of one's professional training. Such debate is essential to the advancement of scientific understanding and is necessary for our society to make informed choices on development.

At the same time, APEGBC professionals must adhere to the *Code of Ethics*. Principle 7 of the *Code* requires APEGBC professionals to treat each other with "fairness, courtesy and good faith," and "accept, as well as give, honest and fair professional comment." This precludes APEGBC professionals from making rude or hostile remarks about each other. The Guidelines to the Code of Ethics states that:

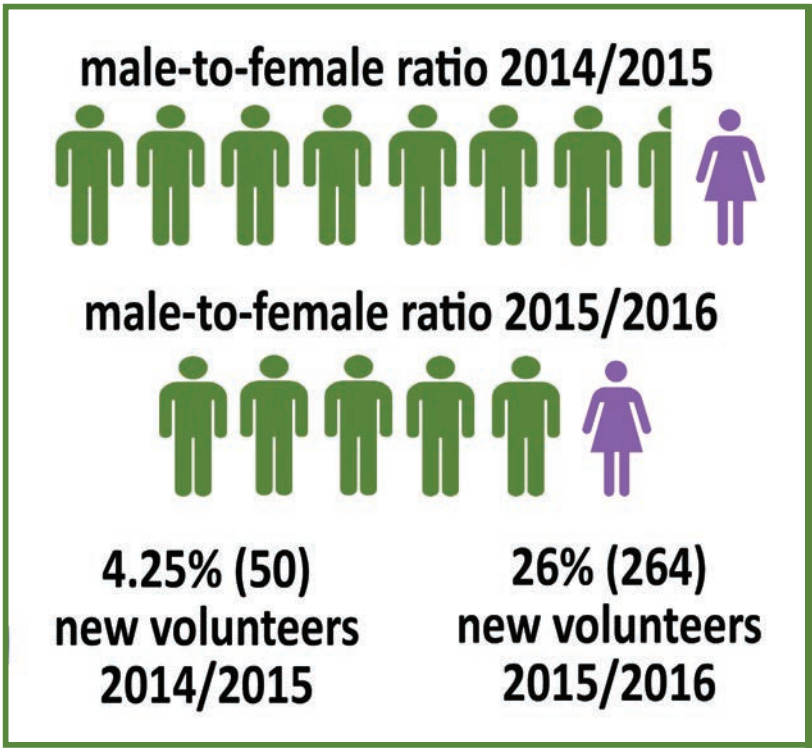
> *Members should not maliciously injure the character or the prospects of business of another member or other individual, being as careful with a colleague's reputation as with their own. Unless convinced that responsibility to the community demands it, they should not express professional opinions that reflect on the ability or integrity of another person or organization.*

In addition, Principle 3 of the Code states that APEGBC professionals must "provide an opinion on the professional subject only when it is founded upon adequate knowledge and honest conviction." As such, APEGBC professionals must refrain from making comments outside of their training and experience and must not make exaggerated statements.

Personal attacks by professionals against professionals—especially those made in public or to third parties—reflect poorly on the attacker and on the engineering and geoscience professions as a whole, and ultimately undermine the public's confidence in the professions. Such incidents serve the interests of neither the public nor the professions.

Next Steps

APEGBC acknowledges that staying calm and in control can be challenging when discussing projects or issues that affect one's core personal values. The association will explore opportunities to remind and educate members about requirements and expectations for respectful, professional exchange of ideas and viewpoints in conflict situations.



Association Enhances Volunteer Program

Emiline Willson

From the association's beginnings in 1920, dedicated volunteers have been at the heart of APEGBC's work as the self-regulating body for BC's engineers and geoscientists. Currently, approximately 1,300 volunteers play a part in every aspect of the association—from registration to education and setting and upholding practice standards. Because of engaged participation from our membership, APEGBC contributes real value to society.

In exchange, our volunteers feel a true sense of satisfaction in knowing they are giving back to the professions of engineering and geoscience. They contribute their knowledge and ideas, learn from one another, and expand their professional networks.

Whether it's reviewing registration applications, judging at science fairs, speaking in schools, sitting on committees, or acting as a mentor in the APEGBC mentoring program (to name a few possibilities), every position results in valuable experience and contributions.

"Volunteering with APEGBC allows me to inspire the next generation to follow their dreams and make a positive change in the world," says Derek Bartley, EIT, who volunteered at the APEGBC booth during Science World's Around the Dome celebration in September. "It also allows me to give back to the people and communities that influenced me."

Over the past year, APEGBC has enhanced its volunteer management program to engage and support its volunteers. We have updated the association website and now use social media to inform members about how to get involved and the different opportunities available.

We put a new, simplified and centralised application process in place online to increase accessibility and ease of use. Members and licensees can now apply directly to an available position if they choose. We continue to make general online application forms available for those who don't see an opportunity of interest available at the time, but wish to be considered.

"The online volunteer application system has helped us in many ways," says Hamid Ghanbari, P.Eng., and Chair, Richmond/Delta Branch. "The system has helped us to reach a wider range of applicants and recruit both members and non-members for branch positions and events as well as events of our partner organizations—for example, recruiting judges for annual Greater Vancouver Science Fair and assistants and judges for the annual Kwantlen Science Challenge."

The enhancements have not only demonstrated results through feedback, they have significantly increased the number of applications, the number of new volunteers, and the number of female volunteers. New volunteers are volunteers who had not previously volunteered with the association in any capacity.

Developing new and enhancing current skills is something members also find is a benefit of being an APEGBC volunteer. As we expand the association's volunteer management program, we will provide training and development opportunities to volunteers. As well, based on the feedback received during a focus group and survey of APEGBC volunteers last year, we are currently developing a recognition program. We look forward to further supporting our volunteers in effective and meaningful ways.

With the variety of opportunities to explore interests, contribute expertise and network, we encourage members who have never volunteered with APEGBC to get involved. For more information, visit apeg.bc.ca/For-Members/Volunteer. ⊠

IN MEMORIAM

The Association announces with regret the passing of the following members:

D.M. Blake, P.Eng. Completed APEGBC Exams '81

B.R. Boardman, B.A.Sc. Toronto '53

H.G. Burke, P.Eng. M.B.A. UBC '71, B.A.Sc. UBC '67

L.H. Burpee, P.Eng. B.A.Sc. Toronto '25

Z.W. Celler, P.Eng. Mgstr. Inz. Tech. U. Warsaw '74

J.B. Gildersleeve, P.Eng. B.A.Sc. UBC '81

T.D. Groves, P.Eng. B.A.Sc. UBC '31

S.F. Hamilton, P.Eng. B.A.Sc. UBC '49

H.A. Hutchinson, P.Eng. B.E. Canterbury '61

K.F. Kangas, P.Eng. E.M. Michigan Tech. U. '46, B.S. Michigan Tech. U. '30

M.S. Layton, P.Eng. B.S. Brigham Young '81

E.E. Pelens, P.Eng. B.E. Sask. '56

L. Prochazka, P.Eng. Inz. Tech. U. Liberec '66

E.S. Reid, P.Eng. B.A.Sc. UBC '51

R.M. Rutherford, P.Eng. B.Com. Concordia '51, B.Eng. McGill '38

K. Soros, P.Eng. B.A.Sc. UBC '49

G.J. Stastny, M.Sc. Alberta '70, Inz. Tech. U. Brno '63

M.F. Sterling, P.Eng. B.A.Sc. UBC '60

H.W. Stoyko, P.Eng. B.Sc. Sask. '85

R.R. Suzak, B.A.Sc. UBC '65

A.G. Tanner, P.Eng. B.A.Sc. UBC '47

W.N. Wray, B.Eng. McGill '54

LIFE MEMBERS

The following members have been granted Life Membership under Bylaw 10(c1)

P.J. Abley, P.Eng. B.Sc. Leeds '68

G. Balachandran, P.Eng. Ph.D. Waterloo '74, M.A.Sc. Waterloo '71, B.Sc.Eng. Peradeniya (Ceylon) '66

R.T. Banting, P.Eng. B.S. Michigan Tech. U. '72

R.J. Bulloch, P.Eng. B.Sc. Manitoba '68

R.K. Chan, P.Eng. B.A.Sc. UBC '67

D.A. Chang, P.Eng. M.B.A. UBC '80, B.A.Sc. UBC '68

K.P. Chih, P.Eng. B.S. Polytech. U., Brooklyn '72

R.A. Clark, P.Eng. B.Sc. Alberta '78

B.D. Clements, P.Eng. H.N.D Hatfield Polytech. '69, O.N.C Southgate Tech. '65

S.G. Coffin, P.Eng. B.A.Sc. Waterloo '71

W.C. Cooke, P.Eng. B.A.Sc. UBC '70

J.A. Cormie, P.Eng. M.P.A. Alaska, Fairbanks '94, B.A.Sc. UBC '70

D.J. Cummings, P.Eng. B.A.Sc. UBC '76

J.H. Davis, P.Eng. B.Sc. Calgary '76

J.R. Forsythe, P.Geo. B.Sc. UBC '68

R.F. Frindt, P.Eng. Ph.D. Cambridge '63, B.Sc. Alberta '60

B.R. Fulton, P.Eng. B.A.Sc. UBC '69

M.S. Giles, P.Eng. H.N.C. Wimbleton Tech. Coll. '66

T.E. Gill, P.Eng. H.N.D. Hendon Coll. '65

S.C. Gower, P.Geo. B.Sc. UBC '70

J.A. Gregson, P.Eng. B.A.Sc. UBC '78

P. Hanak, P.Eng. B.A.Sc. UBC '76

M.A. Helal, P.Eng. Ph.D. Tech. Nova Scotia '91, M.Sc. Al-Azhar '78, B.Sc. Al-Azhar '75, B.Sc. Ain Shams '68

E.J. Hickin, P.Geo. Ph.D. Sydney '71, B.A. Sydney '66

N.A. Kasmani, P.Eng. B.Sc. St. Andrews '63

E. Kim, P.Eng. Ph.D. Manitoba '80, M.Sc. Manitoba '73, B.Sc. Seoul '67

D.W. King, P.Eng. M.Sc. Manchester '71, B.A.Sc. UBC '69

D.A. Koers, P.Eng. Ph.D. UBC '79, Ir. Delft U. Tech. '67

C.H. Leippi, P.Eng. B.Sc. Alberta '69

J. Licaros, P.Eng. M.S. National U., Philippines '70, B.S. National U., Philippines '68

W.R. Lloyd-Jones, P.Eng. B.A.Sc. UBC '67

J.D. Lovick, P.Eng. M.B.A. Toronto '71, B.A.Sc. UBC '68

S.L. Ludwig, P.Eng. M.S. Michigan '71, B.Sc. Sask. '66

A.H. Ludwig, P.Eng. B.A.Sc. Sask. '66

B.W. McGorman, P.Eng. B.A.Sc. Waterloo '71

W.E. McIntyre, P.Eng. APEGA Examinations '63

D.K. McMillan, P.Eng. Ph.D. SFU '71, B.A.Sc. UBC '63

R.J. McRae, P.Eng. B.Sc. Manitoba '57

D.W. Messam, P.Eng. B.A.Sc. UBC '77

A.D. Nichols, P.Eng. M.A. UBC '92, B.A.Sc. UBC '69

J.M. Pacheco, P.Eng. B.E. Pune '55

A.R. Parker, P.Eng. B.Eng. Concordia '72

C.L. Radford, P.Eng. B.A.Sc. UBC '68

R.S. Randall, P.Eng. B.A.Sc. UBC '79

T.S. Rogers, P.Eng. B.Sc. UNB '68

S.C. Shepherd, P.Eng. B.A.Sc. Toronto '62

L.H. Sladen, P.Eng. B.A.Sc. UBC '68

W.R. Smyth, P.Geo. Ph.D. Memorial '73, M.A. Trinity Coll. '71, B.A. Trinity Coll. '68

J.G. Stewart, P.Eng. B.Sc. Manchester '69

M.K. Strachan, P.Eng. B.Sc. Glasgow '67

A.N. Thorn, P.Eng. B.Sc. Alberta '72

C.W. Timms, P.Eng. B.A. Cambridge '67

E.H. Varju, P.Eng. B.A.Sc. UBC '74

J.L. Wells, P.Eng. B.E. Canterbury '68

E.R. Wrankmore, P.Eng. H.N.C. Borough Polytech. '64

NEW MEMBERS

PROFESSIONAL ENGINEERS

S. Abbas, P.Eng. B.Sc. Eng. Baghdad '76

Y. Abu-Renneh, P.Eng. B.Eng. Damascus '93

T.J.H. Addison, P.Eng. B.Sc. UNB '07
H. Akhlagh-Nejat, P.Eng. M.A.Sc. Ryerson '09, B.Sc. Tehran Islamic Azad, South '99
M.R. Ali, P.Eng. Ph.D. Nagasaki '11 , M.Eng. Nagasaki '08, B.Sc. Bangladesh Inst. Tech. '97
N.G. Anderson, P.Eng. B.Sc. Alberta '88
L. Arbet, P.Eng. Dipl. Donetsk Tech. U. '87
T. Austrins, P.Eng. B.Tech. Ryerson '91
J.E. Babineau, P.Eng. B.A.Sc. UBCO '11
L.D. Baker, P.Eng. B.A.Sc. UNBC '08
F. Bauer, P.Eng. Dr. Montanu. Leoben '10, Dipl. Ing. Montanu. Leoben '07
M. Beaulieu, P.Eng. B.Ing. Laval '07
S. Blais, P.Eng. B.E. Tech. Supérieure Que '01
N.A. Bonham, P.Eng. M.Eng. UBC '88, B.A.Sc. UBC '85
W.J. Bos, P.Eng. B.Eng. BCIT '11
M.A. Bose, P.Eng. B.Sc.Eng. Alberta '98, Dipl.Eng. NAIT '93
J.R. Bosma, P.Eng. B.Eng. Alberta '10
M. Botero Echeverry, P.Eng. Ing. Pontifical Bolivariana '01
T.J. Brar, P.Eng. B.A.Sc. UBC '11
J.D.N. Buote, P.Eng. B.Eng. Dalhousie '12
S.D. Bushell, P.Eng. B.E.Sc. Western '10
C.R., Carlstrom P.Eng. B.Sc. Alberta '11
J.G.S. Chan, P.Eng. B.Sc. Manitoba '08
N. Chavoshi, P.Eng. M.Sc. Khaajeh Nasir-e Toosi U. Tech. '99, B.Sc. Amir Kabir U. Tech. '91
Y. Chen, P.Eng. M.Eng. UBC '09, B.Eng. Acad, China Aerospace Ind. '07
R.W. Chen, P.Eng. B.A.Sc. UBC '08
K.K. Ching, P.Eng. B.A.Sc. UBC '05
M. Comeau, P.Eng. B.Ing. Polytech. Montréal '94
M.A. Craig, P.Eng. B.Eng. Lakehead '07
M.B. Cristofoli, P.Eng. B.A.Sc. UBC '07
C.E. Currie, P.Eng. B.Sc. Calgary '99
S.A. Curry, P.Eng. B.A.Sc. UNBC/ UBC '11
T.F.D. Dajani, P.Eng. B.Eng. Dalhousie '07
Y. Dakir, P.Eng. Dipl.Ing. Ecole Nat. Ind. Minérale '96
P.E.S. Dawson, P.Eng. B.Sc. Guelph '00
J. DeLuca, P.Eng. B.A.Sc. Toronto '98
A.N. Dempsey, P.Eng. B.E. Dublin Inst. Tech. '07
A. Di Filippo, P.Eng. B.Sc. McMaster '95
K.L. Dixson, P.Eng. B.Sc. Alberta '10
M.B.W. Ducharme, P.Eng. B.Tech. BCIT '13, Dipl. SAIT '08
T.J. Dueckman, P.Eng. B.A.Sc. UBC '11
J.C.S. Ermitanio, P.Eng. B.Sc. Manitoba '12
G.J. Evans, P.Eng. B.Sc. Calgary '03
J.L. Farr, P.Eng. B.Tech. BCIT '13, Cert. Ryerson '08, B.Sc. Guelph '06
M.J.D. Fedoruk, P.Eng. B.Sc. Calgary"97
C.T. Flury, P.Eng. M.Sc. Alberta '12, B.Sc. Alberta '09
M.J. Foster, P.Eng. B.A.Sc. UBC '11
T.J. Fox, P.Eng. B.Sc. Calgary '03
S. Frenette, P.Eng. B.Ing. Sherbrooke '11
M. Gelito, P.Eng. B.S. St La Salle '95
M.C. George, P.Eng. B.E. Auckland '04
A.R. Giesbrecht, P.Eng. B.A.Sc. UBC '11
L. Gilbert, P.Eng. B.Ing. Tech. Supérieur Que '05
A.D. Gilliss, P.Eng. B.Sc. UNB '09
K.B.N. Grant, P.Eng. B.Eng. BCIT '12
M.M. Grenke, P.Eng. B.A.Sc. Windsor '11

T.A. Grgic, P.Eng. B.A.Sc. UBC '09
M. Hakakzargar, P.Eng. B.Sc. Sharif U. Tech. '89
P.L. Hanevy, P.Eng. M.Sc. Calgary '96, B.Sc. Calgary '92
X. Hao, P.Eng. M.A.Sc. UBC '11, B.Eng. Beijing U. Posts Telecomm. '09
W.S. Harvey, P.Eng. B.A.Sc. UBC '80
S.N.P. Hasham, P.Eng. B.A.Sc. UBC '11
U.U. Hassan, P.Eng. B.Eng. McMaster '11
J.M. Hildebrand, P.Eng. B.Eng. Lakehead '03, Dipl. Tech. Red River Coll. '01
H.C. Hon, P.Eng. B.A.Sc. UBC '10
S.P. Hosseini, P.Eng. M.Eng. UBC '12, B.A.Sc. UBC '10
P. Hosseini, P.Eng. M.Eng. UBC '12, B.A.Sc. UBC '10
C.D. Hryhoruk, P.Eng. M.Sc. Manitoba '94, B.Sc. Manitoba '92
A.O. Idris, P.Eng. Ph.D. Toronto '13, M.Sc. Arab Acad. Sci. Tech. '07, B.Sc. Arab Acad. Sci. Tech. '02
N. Irvani, P.Eng. B.Eng. Sharif U. Tech. '95
A.G. Ismail, P.Eng. Ph.D. Dalhousie '12, M.S. USC '02, B.Eng. Tech. Nova Scotia '99
O.A. Jan, P.Eng. B.A.Sc. Ottawa '00
J. Jariwala, P.Eng. B.Sc. Gujarat '95
P. Jilavi, P.Eng. B.Sc. Iran U. Sci. Tech.'95
S. Jilavi, P.Eng. M.B.A. VIU '12, B.Sc. Iran U. Sci. Tech. '01
N.R. Jolly, P.Eng. B.Sc. Manitoba '07
Y. Ju, P.Eng. Ph.D. Tianjin '96, M.Eng. Tianjin '88, B.Eng. Tianjin '83
E. Karim, P.Eng. B.Sc. Bangladesh U. Eng. Tech. '93
M.A. Kathrada, P.Eng. B.Sc. Natal '74
M.P. Kavanagh, P.Eng. B.Eng. Memorial '10
N.P. Keast, P.Eng. B.Sc. Guelph '07
M.N. Kinakin, P.Eng. B.Eng. OIT '11, B.Sc. UBC '06
D.N. Kushner, P.Eng. B.Sc. Calgary '11
S.T. Lamson, P.Eng. Grad.Dipl. Monash '84, B.Eng. Monash '77
E.M. Lascano, P.Eng. M.Sc. U. Philipines '96, B.Sc. Tech. Inst. Philippines '90
M. Lavoie, P.Eng. B.Eng. Sherbrooke '08
M.J. Learn, P.Eng. B.A.Sc. UBC '08
D.L. Lee, P.Eng. B.Eng. McMaster '03
B. Li, P.Eng. M.A.Sc. UBC '11, B.A.Sc. UNBC '09
W. Li, P.Eng. B.A.Sc. UBC '10
A.T.B. Lip, P.Eng. B.Sc. Manitoba '03
R.E. Lizotte, P.Eng. B.Sc.Eng. Alberta '03
J.F. MacLean, P.Eng. B.Eng. Tech. Nova Scotia '94
N. MacPherson, P.Eng. B.Sc.Eng. UNB '09
C.S. Malcolmson, P.Eng. B.A.Sc. UBC/UBCO '11, Dipl.Eng. Camosun '08
J.M. Martin, P.Eng.,GIT B.A.Sc. UBC '09
G. Martin-Gavlas, P.Eng. B.Eng. McGill '12
J.R. Martinuk, P.Eng. B.Sc. Calgary '76
J.D. Mauchan, P.Eng. M.Eng. Royal Mil. Coll. '03, B.Sc. Queen's '00
A. Messenberg, P.Eng. M.A.Sc. UBC '10, B.Sc. Tel Aviv '03
L.A. Millington, P.Eng. M.Sc. Queen's '12, B.Sc. Eng. Queen's '11
T. Mita, P.Eng. B.Eng. Kyoto '98
M. Mivehchi, P.Eng. Ph.D. Tehran Islam. Azad, Cent. '01, M.Sc. Tehran Islamic Azad, Cent.'96, B.Sc. Amir Kabir U. Tech. '92
A.S. Mohamed Hussein, P.Eng. M.B.A. Argosy '09, B.S. CA State, Long Beach '06
H.M. Mohammed, P.Eng. B.Eng. Lakehead '07
M. Muhunthan, P.Eng. M.Sc. Surrey '08, B.Sc. Eng. Peradeniya (Ceylon) '02
M.R. Murphy, P.Eng. M.A.Sc. UBC '13, B.S. UWA, Seattle '08
J. Muthuraku Guruswamy, P.Eng. M.S. S. Dakota Sch. Mines Tech. '08, B.E. Anna '06
R.C. Nagge, P.Eng. B.Eng. Lakehead '05
D.S. Neele, P.Eng. B.Eng. Ryerson '08
B.Y. Ng, P.Eng. B.A.Sc. UBC '79
D. Nguyen, P.Eng. B.A.Sc. UBC '96
J.T. O'Dea, P.Eng. B.Eng. Canterbury '08
E.L. Pacaigue, P.Eng. B.A.Tech. SAIT '06, M.E. Polytech. U. Philippines '00, M.E. U. Philippines '91, B.S. Feati '81
T.K.S. Pagenkopf, P.Eng. B.Sc. Calgary '98
N.S. Patrola, P.Eng. B.A.Sc. UBC '09
J.C. Paulino, P.Eng. B.A.Sc. Toronto '06
E. Paulsen, P.Eng. M.Eng. Stellenbosch '08, B.Eng. Stellenbosch '01
J.C. Pearson, P.Eng. M.B.A. UVic '12, B.Eng. UVic '10
Y. Perreault, P.Eng. B.Eng. Sherbrooke '89
J.F. Peters, P.Eng. M.E. Toronto '92, B.Eng.Mgmt. McMaster '87
K.L. Petterson, P.Eng. B.Sc.Eng. Queen's '12
S.M. Qoreishi, P.Eng. Ph.D. Laval '13, M.Sc. Tehran '05, B.Sc. Tehran '02
A.J. Quinn, P.Eng. B.Eng. Canterbury '02
C.T. Rabbitt, P.Eng. B.Eng. Carleton '10
E.L. Raison, P.Eng. B.Sc. Alberta '11
A.E. Ramirez, P.Eng. Ing. Corp. Occident Autonomous '97
G. Rezaei, P.Eng. M.Eng. UBC '10, B.A.Sc. UBC '08
D. Richard, P.Eng. Ph.D. Laval '04, M.Eng. Laval '00, B.Eng. McGill '98
S.B. Ridgway, P.Eng. B.Sc. Calgary '94
R.J. Robertson, P.Eng. B.Eng. UVic '03
Y. Romanova, P.Eng. B.Eng. Almaty Pwr Eng. Inst. '80
A. Sadr, P.Eng. Ph.D. Tokyo '04, M.Sc. Tehran '96, B.Eng. Tehran '95
A. Saeed, P.Eng. Ph.D. UNB '13, M.Eng. Asian Inst. Tech. '04, B.Sc. Punjab '00
C.K. Sahota, P.Eng. M.Eng. UBC '09, B.A.Sc. UBC '08
A.K. Sahu, P.Eng. M.E. Mumbai '04, Dipl. Inst. Eng. India '01
P.M. Sails, P.Eng. B.A.Sc. UBC '11, Adv.Dipl. Camosun '09, Dipl. Camosun '08
A. Samadi, P.Eng. M.Eng. Waterloo '04, M.Sc. Shahid Beheshti '92, B.Sc. Tehran '89
B.D. Schmidt, P.Eng. B.Sc. Calgary '10
N. Schumacher, P.Eng. B.A.Sc. UBC '06
S. Shahriary, P.Eng. M.Eng. Montreal, '07, M.Sc. Sharif U. Tech. '96, Dipl. Khaajeh Nasir-e Toosi U. Tech. '93, B.Sc. Khaajeh Nasir-e Toosi U. Tech. '91
A. Shakibaeinia, P.Eng. Ph.D. Regina '11, M.Sc. Amir Kabir U. Tech. '06, B.Sc. Shahid Bahonar U. Kerman '04
L.M. Sierra Salazar, P.Eng. M.Sc. Royal Roads '12, Ing. Antioquia Sch. Eng. '99
J.A. Smith, P.Eng. B.A.Sc. Windsor '91
J.E. Snyder, P.Eng. M.A.Sc. Queen's '11, B.Sc.Eng. Queen's '08
G.S. Sohal, P.Eng. M.Eng. Thapar Inst. Eng. Tech. '03, B.Eng. Tech. Guru Nanak Dev Eng. Coll. '01
S. Soleimani Vafa, P.Eng. Ass.Cert. BCIT '11, B.Sc. Tabriz '96
H.L. Solomon, P.Eng. M.Eng. Toronto '76, B.A.Sc. Toronto '74
G.R. Somerton, P.Eng. B.Eng. Carleton '80
W. Suttipisetchart, P.Eng. M.Eng. Kasetsart '00, B.Eng. Kasetsart '88
W. Tao, P.Eng. Ph.D. UBC '06, M.Sc. Beijing Normal '90, B.Sc. Shaanxi Inst. Tech. '84
A. Tatari, P.Eng. M.A.Sc. Waterloo '06, B.Eng. Ferdowsi U. Mashhad '97

A.A. Taylor, P.Eng. M.Sc. Aberdeen '10, B.Tech. Ladoke Akintola U. Tech. '04
K.Y. Toring, P.Eng. B.S. Clarkson '90
M.G. Treacy, P.Eng. B.E. Cork Inst. Tech. '01
T.U. Trussler, P.Eng. B.A.Sc. UBC '10
G.W. Tuchlinski, P.Eng. B.Eng. UVic '10
C. Tueros Yance, P.Eng. Ing. U. Nacional Centro Peru '01
A. Vertolli, P.Eng. B.Tech. Ryerson '84
C.E. Vink, P.Eng. B.Eng. Dalhousie '12, B.Sc. Memorial '08
O. Wade'e, P.Eng. Cert. Ryerson '11 M.Sc.Eng. Saddam '00, B.Sc.Eng. Saddam '97
G. Wang, P.Eng. M.Sc. Harbin Inst. Tech. '91, B.Eng. Harbin Inst. Tech. '88
J. Weaver, P.Eng. M.Eng. UVic '11, B.Eng. Birmingham '07
N.C. Widish, P.Eng. B.Sc.Eng. Calgary '01
G. Wilkinson, P.Eng. B.A.Sc. Waterloo '75
W.W.P. Yan, P.Eng. B.A.Sc. UBC '11
Q. Ye, P.Eng. M.Sc. Southwest Jiaotong '92, B.Eng. Xi'an Jiaotong '89
J.M. Yeung, P.Eng. M.A.Sc. UBC '74, B.Eng. McMaster '71
G.S.F. Youssef, P.Eng. B.Sc. Ain Shams '09
P.C. Yue, P.Eng. B.A.Sc. UBC '06
F. Zhai, P.Eng. B.Eng. Xi'an U. Tech. '95
S.Y. Zheng, P.Eng. B.Sc. Northeast Forestry '90
R. Zohar, P.Eng. B.A.Sc. UBC '11

PROFESSIONAL GEOSCIENTISTS

S.L. Barroso, P.Geo. M.Sc. Waterloo '15, B.Sc. UVic '05, Dipl.Tech. Camosun '01
E.J. Black, P.Geo. B.Sc. UBC '04
M.A. Casola, P.Geo. B.Sc. SFU '10, Ass. Dipl. Douglas Coll. '07
C.J. Doornbos, P.Geo. B.Sc. Alberta '05
D.A. Fursevich, P.Geo. M.Sc. UBC '98, B.Sc. UBC '96
L.D. Goodhue, P.Geo. M.Sc. Western '06, B.Sc. Western '03
G.R. Hensold, P.Geo. M.Sc. SFU '11, B.Sc. Western WA '04
J.L. Hermanson, P.Geo. M.Sc. SFU '14, B.Sc.UVic '09
C.T. Pacholko, P.Geo. B.Sc. Calgary '04
J.S. Powers, P.Geo. M.Sc. Calgary '94, B.S. FL Atlantic '86
M.W. Simpson, P.Geo. M.Sc. SFU '12, B.Sc. SFU '05
R.A. Stewart, P.Geo. B.Sc. Lakehead '94
C.E. Trotter, P.Geo. M.Sc. UBC '02, B.Sc. McMaster '99
S.T.Y. Wing, P.Geo. B.Sc. Calgary '10

NON-RESIDENT LICENSEES

J.C. Carvajal Uribe, P.Eng. Ph.D. UBC '11, M.S. Nat'l Autonomous U. Mexico '01, Ing. Ind. U. Santander '96
J.M. Conrad, P.Eng. B.S. Washington State '93
D.C. Cotton, P.Eng. M.Eng./M.Sc UCO, Boulder '12, B.S. CT '83
B.E. Croft, P.Eng. Ph.D. Southampton '09, B.E. New South Wales '03
G.L. Kaechele, P.Eng. B.S. Georgia Inst. Tech. '07
J.R. Leavitt, P.Eng. B.S. Brigham Young '78
P.J. Lee, P.Eng. M.B.A. Central Queensland '08, B.Eng. New South Wales '01
S.D. Miller, P.Eng. M.S. Washington State '88, B.S. Washington State '86
M.R. Pierepiekarz, P.Eng. M.S. IL, Urbana-Champaign '85, B.S. IL, Urbana-Champaign '84
M.R. Rakowski, P.Eng. M.A.Sc. Queen's '11, B.Sc.Eng. Queen's '08
J.E. Robinson, P.Eng. B.S. Drexel '73
A.L. Rodriguez Madrid, P.Geo. M.Sc. UBC '14, B.Sc. Ind. U. Santander '05
J.S. Tebbe, P.Eng. M.B.A. Mass, Lowell '13, B.S. Missouri, Rolla '92
T.J. Tipton, P.Eng. B.S.C.E. Seattle '07
T.J. Treloar, P.Eng. B.Eng. Adelaide '11
C.A. Werts, P.Eng. M.S. Stanford '91, B.S. San Jose State '88

LIMITED LICENSEES

B.C. Fingarson, Eng.L. Dipl.Tech. BCIT '79
S.E. Kelly, Eng.L. Cert. Calgary '11, B.A.Tech. SAIT '00, Dipl.Tech. SAIT '96, B.Sc. Red River Coll. '91

MEMBERS-IN-TRAINING

ENGINEER

E.E. Aimienwanu, EIT M.Eng. UBC '15, Postgrad.Cert. Heriot-Watt '11, B.Eng. London, South Bank '09
F. Alapour, EIT M.A.Sc. Toronto '15, M.Sc.Eng. Amir Kabir U. Tech. '13, B.A.Sc. Amir Kabir U. Tech. '10
O.A.M.H. Alharras, EIT M.A.Sc. UBC '15, B.Eng. Loughborough '13
W.H. Alison, EIT B.Eng. UVic '11
N.M. Andrews, EIT B.A.Sc. UBCO '13
M.W. Andreychuk, EIT B.A.Sc. UBCO '15
D.M. Aoki, EIT B.A.Sc. UBCO '15
C. Arabacioglu, EIT B.Eng. Concordia '09
W.H. Au, EIT B.A.Sc. UBC '14
G.K. Baglole, EIT B.Sc.E. UNB '12
M.J. Barrett, EIT B.A.Sc. UBC '15
N.E. Baugh, EIT B.A.Sc. UBC '15
G. Baumann, EIT M.Eng. École Polytech. Montréal '15, Ing. Catholic Asuncion '11

D.F. Benavides Aguirre, EIT B.Sc. Calgary '14
M.F. Bhatti, EIT B.A.Sc. UBC '15
D.M. Biesenthal, EIT B.S.E. Walla Walla '12
G.M. Black, EIT B.A.Sc. UBC '15
R.C. Booher, EIT B.A.Sc. SFU '11
F.C. Borch, EIT B.Sc. Alberta '15
J.P. Borsellino Sepulveda, EIT B.A.Sc. UBC '15
J. Brown, EIT B.A.Sc. UBC '15
C.B. Brown, EIT B.Eng. Lakehead '15, Dipl.Civ.Eng. Tech. Camosun '10
D.A. Buba, EIT B.Eng. Nigeria '85
S.B. Buchanan, EIT B.A.Sc. UBC '15
T.C. Campbell, EIT B.Eng. UVic '15
N.S. Caros, EIT B.A.Sc. UBC '14
K. Casaverde Moreano, EIT B.E. Minn. State, Mankato '12
J.A. Cegnar, EIT B.A.Sc. Waterloo '15
S.C. Chan, EIT B.A.Sc. Ottawa '15
C.Y. Chang, EIT B.A.Sc. UBC '10, B.Sc. UBC '06
L. Chen, EIT M.A.Sc. Toronto '15, B.A.Sc. Toronto '13
J. Chen, EIT Ph.D. UBC '15 , M.A.Sc. UBC '10, B.A.Sc. UBC '08
M. Cheraghishirazi, EIT M.A.Sc. UVic '15, B.A.Sc. Tehran '11
W. Chow, EIT B.A.Sc. UBC '15
P.C. Cornwell, EIT B.Eng. BCIT '15, Dipl. Tech. BCIT '08
S.F. Crowley, EIT M.Eng. UBC '12, B.Sc. Eng. Guelph '07
P.M. Dantes, EIT B.A.Sc. SFU '15
S.J. Ddamba, EIT M.A.Sc. Waterloo '12, B.Sc. Makerere '06
K.A. de Haan, EIT B.A.Sc. UBC '13
J.C. De Luca, EIT B.Eng. UVic '14
D.J. deSousa, EIT B.A.Sc. UBCO '15
P.M. Docherty, EIT B.A.Sc. UBC '15
M.J. Donohoe, EIT B.A.Sc. UBCO '15
A.J. Dunlop, EIT B.A.Sc. UBC '15
S.A. Dyer, EIT B.Eng. UVic '15
G.J.C. Dyer, EIT B.Eng. UVic '15
B.A. Elphick, EIT B.A.Sc. UBC '15
A. Emrani, EIT M.Sc. Tehran Islamic Azad '12, B.Sc. Kashan Islamic Azad '08
N.S. Erdle, EIT B.A.Sc. UBC '15
A.J. Farnham, EIT B.Eng. UVic '13
H. Fernando, EIT B.E. New South Wales '11
M.P. Flynn, EIT B.A.Sc. UBCO '15
J.C. Foster, EIT B.A.Sc. UBCO '15
G.M. Gane, EIT B.A.Sc. UBC '15
W. Gao, EIT M.Eng. UBC '15, B.Eng. Chongqing Jiotong U. '13
E.E. Gaspard, EIT B.A.Sc. UBCO '15
J.R. Gavidia Alas, EIT B.Eng. UVic '15
A.V. Gill, EIT B.Eng. UVic '15

membership

J.T. Goldthorp, EIT B.Sc. Alberta '14
M.T.H. Golke, EIT B.A.Sc. UBC '15
J.V. Gonzales Bernales, EIT B.A.Sc. UBC '15
T.J. Granberg, EIT B.A.Sc. UBCO '15
Q. Guan, EIT B.S. Montana Tech. '15
B.W. Guo, EIT B.A.Sc. UBC '15
A.E. Gutierrez, EIT B.S. Polytech. U. Philippines '95
G.B. Haffner, EIT B.Sc. Calgary '10
K. Haji Hajikolaei, EIT Ph.D. SFU '15, M.Sc. Sharif U. Tech. '10, B.Sc. Amir Kabir U. Tech. '07
I.A. Hamilton, EIT B.S. Kentucky '15
J. Han, EIT B.Eng. McGill '14
G.R. Hartman, EIT B.A.Sc. Waterloo '15
P. Hawker, EIT B.Eng. UVic '15
S. He, EIT B.A.Sc. UBC '15
M.J. Heinrick, EIT B.A.Sc. UBCO '15
B.M. Helenurm, EIT B.A.Sc. UBC '15
J.R. Henderson, EIT B.A.Sc. UBC '11
R. Hindle, EIT B.A.Sc. UBC '15
P.J. Holdom, EIT B.E. Canterbury '09
J.D. Hooge, EIT B.Eng. BCIT '15, Dipl.Tech. BCIT '11
J. Huang, EIT B.A.Sc. UBC '15
K.D. Jones, EIT B.E. New South Wales "11, Dipl.Tech. SAIT '06
M.M. Kawam, EIT B.A.Sc. SFU '14
E. Kee, EIT B.A.Sc. UBC '15, Dipl. Langara '08
B.E.E. Keeble, EIT B.Eng. Dalhousie '14
B.H. Keizer, EIT B.A.Sc. UBCO '15
K.F. Kruse, EIT B.Sc. Alberta '15
M.W. Kudla-Hooper, EIT B.S.E. Walla Walla '14
S.D. Kwekkeboom, EIT B.A.Sc. UBC '14
C.P. Lagan, EIT M.Eng. Bradford '12
D.W. Lam, EIT B.Sc.E. Queen's '10
K.J. Langen, EIT B.Sc.E. Sask. '15
M.R. Lee, EIT B.Eng. BCIT '14
J. Lee, EIT B.A.Sc. UBC '15
T. Lee, EIT B.Eng. Tech. Supérieure Que. '13, B.G.S. Dawson Coll. '07
E.M.H. Li, EIT B.E.Sc. Western '14
J. Liu, EIT M.Eng. Xi'an U. Tech. '09, B.Eng. North China Inst. Wtr Cons. Hydro. '06
C. Liu, EIT B.A.Sc. UBC '15
J. Mak, EIT M.Eng. BCIT '15, B.A.Sc. Waterloo '13
S.M. Malik, EIT M.Eng. Ryerson '15
M.J. Marganelli, EIT B.Tech. BCIT '14, Dipl.Tech. BCIT '04
K.V. Martin, EIT B.S. Montana Tech. '14
A.A. Martins, EIT B.Eng. BCIT '14, Dipl.Tech. BCIT '12
O. McHugh, EIT B.Sc. U. Coll. Dublin '08, M.E. U. Coll. Dublin '10
B. Mepe, EIT B.E. Tech. Supérieure Que. '15
B. Milad, EIT B.A.Sc. SFU '14

V.H. Morrison, EIT B.A.Sc. UBCO '15
A. Mumeni, EIT B.Eng. UVic '15
K.M. Munn, EIT B.Sc. UNB '13
S.S. Muscroft, EIT M.Eng. UBC '14, B.A.Sc. UBC '13
N. Naderi, EIT B.A.Sc. UBC '15
A. Naidu, EIT M.Sc. UNB '08, B.Sc. UNB '05
M.P. Neiman, EIT B.Sc.E. Queen's '15
R. Nocos, EIT M.Eng. UBC '15, B.A.Sc. UBC '14
C.N. Noel, EIT, B.A.Sc. UBC '15
S.J. O'Connor, EIT B.A.Sc. UBC '15
C.P. O'Rourke, EIT B.Eng. Memorial '15
V.A. Patel, EIT B.A.Sc. UNBC/UBC '14
A.L. Philip, EIT B.A.Sc. SFU '15
D.E. Prajea, EIT B.Sc. Calgary ' 14
O.J.A. Pringle, EIT M.Eng., Bath '15
A. Prohoroff, EIT B.A.Sc. UBCO '15
R.A. Promnitz, EIT B.Sc. Queen's '12
B.P.W. Quaite, EIT B.Eng. UVic '15
J.R. Radke, EIT B.A.Sc. UBC '15
H. Rahman, EIT M.Eng. UVic '15, B.Sc.Eng. Bangladesh U. Prof. '10
A.G. Rashid, EIT B.A.Sc. UNBC/UBC '15
J.H. Roberts, EIT B.A.Sc. SFU '13
K.E.M.H. Robitaille, EIT B.Ing. Laval '15
J.A. Rodriguez, EIT B.Eng. UVic '15
A. Sarwar, EIT M.Sc. Chalmers Inst. Tech. '12, B.Sc.Eng. Punjab '06
C.P.A. Schellenberg, EIT B.S. Montana Tech. '15
A.K. Schultz, EIT B.A.Sc. UBC '15
S. Sefidkar-Dezfouli, EIT M.A.Sc. SFU '14
X. Sha, EIT B.A.Sc. Toronto '15
N.B. Simon, EIT B.A.Sc. UBC '15
P.H.H. Slangen, EIT Ph.D. UBC '15, M.Sc. Delft U. Tech. '08, B.Sc. Delft U. Tech. '06
X. Song, EIT B.A.Sc. UBC '15
Y. Song, EIT M.A.Sc. Toronto '14, B.E. Xi'an Jiaotong '12
D.A. Steinbach, EIT B.Eng. UVic '15, Dipl. Camosun '12
J. Stoll, EIT B.A.Sc. SFU '15
Z. Sun, EIT M.A.Sc. McMaster '14, B.Eng. Shandong '12
M.P. Taylor, EIT M.Eng. Manchester '07
J.P.R. Teschner, EIT B.A.Sc. UBCO '15
R.P. Teyber, EIT B.Eng. UVic '15

L.A. Timmermans, EIT B.Eng. UVic '13
A.P.F. van den Hurk, EIT B.A.Sc. UBCO'15
R.R. Vasandani, EIT B.Eng. UVic '15
M. Verigin, EIT B.Sc.E. Queen's '15
K.G. Vurzinger, EIT B.A.Sc. UBC '15
C.T.E. Walker, EIT B.Eng., Portsmouth '15, Fndtn Degree Portsmouth '07
J.K. Webber, EIT B.A.Sc. UBCO '15
M.B. Wilkinson, EIT M.Eng. UBC '14, B.Sc. Queen's '09, B.Sc.E. Queen's '08
R.F. Wirch, EIT B.A.Sc. UBCO '15
G.M. Wong, EIT B.A.Sc. UBC '15
J.D. Wong, EIT M.Eng. UBC '15, B.A.Sc. UBC '14
T. Wong, EIT B.A.Sc. UBC '15
S. Wu, EIT B.A.Sc. UBC '15
K. Yeganeh, EIT B.A.Sc. UBC '15
Y.R. Yu, EIT B.A.Sc. UBC '15

GEOSCIENCE

T.R.E. Bruderer, GIT B.Sc. UNB'02, Dipl. Tech. BCIT '99
M.M. Fentabil, GIT Ph.D. UBCO '15, M.Sc. Ben Gurion U. Negev '09, B.Ed. Alemaya U. Agriculture '03
T.P. Kleineberg, GIT M.Sc. RWTh Aachen '14
K. Larson, GIT B.Sc. UBC '14, A.Sc. Kwantlen Polytech. '10
D. Luo, GIT B.Sc. Toronto '14

REINSTATEMENTS

L.G. Afonso, EIT
A. Biner, P.Eng.
R.C. Bowyer, P.Eng.
L.V. Bucuroiu, P.Eng.
J. Cho, EIT
J.J. Cote, EIT
A.J. Dallas-Dutka, P.Eng.
P.C. de Montreuil, P.Eng.
G.W. Devine, P.Eng.
J.D. Harvey, EIT
B. Jashnivand, P.Eng.
M.Y. Khalid, EIT
W.T. Kwasnicki, P.Eng.
G. Li, EIT
J. Lu, EIT
I.D. Manshadi, EIT
T.L. Matchim, P.Eng.
L.J. Mayell, P.Eng.
D.R. McElhanney, P.Eng.
E.A. Munroe, EIT
G. Murat, EIT
L.S. Nyantahe, EIT
R.O. Petanca, P.Eng.
N. Rayudu, EIT
D.W. Slack, EIT
T.A. Sloan, EIT
J.D. Tod, P.Eng.
Y. Wu, P.Eng.

NOVEMBER 30, 2015.
APEGBC INFORMATION SESSION FOR INTERNATIONALLY TRAINED ENGINEERS AND GEOSCIENTISTS
Burnaby, BC
Information: bpl.bc.ca/events/apegbc-seminar-for-foreign-trained-engineers-and-geoscientists

DECEMBER 4, 2015.
BURNABY/NEW WEST BRANCH BREAKFAST "TRANSMISSION CONNECTIONS"
Burnaby, BC
Information: apeg.bc.ca/Events/Events/2015/BN1DEC15

DECEMBER 6, 2015.
DAWEG DECEMBER 6TH MEMORIAL AND HOLIDAY SOCIAL
Vancouver, BC
Information: apeg.bc.ca/Events/Events/2015/DA1DEC15

JANUARY 25–28, 2016.
MINERAL EXPLORATION ROUNDUP 2016
Association for Mineral Exploration BC
Vancouver, BC
Information: amebc.ca/roundup

JANUARY 28, 2015.
2016 TRANSPORTATION CONFERENCE
Vancouver, BC
Information: info@acec-bc.ca

JANUARY 29–30, 2016
2016 APEGBC ANNUAL CURLING BONSPIEL
Vancouver, BC
Information: ddesrochers@dns.org

MARCH 2016.
NATIONAL ENGINEERING AND GEOSCIENCE MONTH 2016
Information: apeg.bc.ca/NEGM

MARCH 30–31, 2016.
INTERNATIONAL CONFERENCE ON GEOTECHNICAL RESEARCH AND ENGINEERING (ICGRE '16)
Prague, Czech Republic
Information: icgre.org

APRIL 12, 2016
OQM CERTIFICATION TRAINING SESSION
Duncan, BC
Information: apeg.bc.ca/Events/Events/2016/16APROQ2

APRIL 19, 2016
OQM CERTIFICATION TRAINING SESSION
Trail, BC
Information: apeg.bc.ca/Events/Events/2016/16APROQ1

MAY 1–3, 2016.
44TH BC WATER & WASTE ASSOCIATION ANNUAL CONFERENCE & TRADE SHOW
Whistler, BC
Information: www.bcwwa.org/events/annual-conference.html

MAY 1–4, 2016.
CIM 2016 CONVENTION
CANADIAN INSTITUTE OF MINING, METALLURGY AND PETROLEUM
Vancouver, BC
Information: convention.cim.org/en/Vancouver/2016/Home

MAY 15–18, 2016.
ADVANCING SOCIETY THROUGH ELECTRICAL AND COMPUTER ENGINEERING 29TH ANNUAL IEEE CANADIAN CONFERENCE (CCECE 2016)
Vancouver, BC
Information: www.ccece2016.ieee.ca

JUNE 5–8, 2016.
ANNUAL CONFERENCE
CANADIAN INSTITUTE OF TRANSPORT ENGINEERS
Kelowna, BC
Information: cite7.org/Kelowna2016

AUGUST 27–SEPTEMBER 4, 2016.
35TH INTERNATIONAL GEOLOGICAL CONGRESS
Cape Town, South Africa
Information: www.35igc.org

OCTOBER 2–6, 2016.
GEO VANCOUVER 2016
CANADIAN GEOTECHNICAL SOCIETY 69TH ANNUAL CONFERENCE
Vancouver, BC
Information: mzergoun@thurber.ca; alougheed@thurber.ca ☒

Your next building can impact more than just the skyline.

Looking for new ways to build better?

If you're in the very early stages of designing a commercial, institutional, or multi-unit residential building, our New Construction Program can provide energy modeling funds to help you identify energy-saving measures that will lower operating expenses and increase the value and marketability of your building. Plus, you may qualify for additional incentives on the energy-saving measures.

For more information visit **bchydro.com/construction**
or call **604 552 4713** or **1 866 552 4713**

BC Hydro
Power smart

B15-193