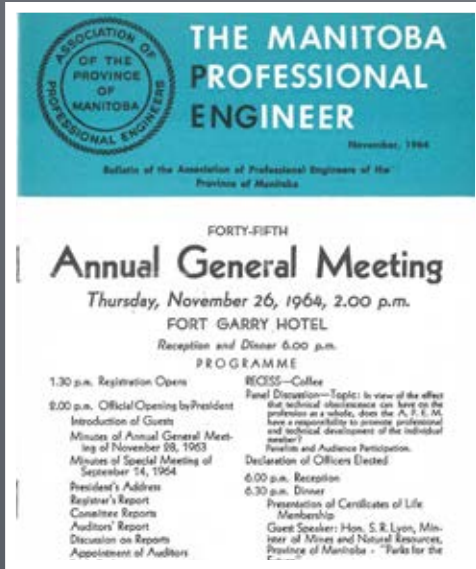


THE KEYSTONE PROFESSIONAL

SPRING 2022

THE OFFICIAL PUBLICATION OF ENGINEERS GEOSCIENTISTS MANITOBA



THE MANITOBA PROFESSIONAL ENGINEER
November, 1964

Bulletin of the Association of Professional Engineers of the Province of Manitoba

Forty-Fifth
Annual General Meeting
Thursday, November 26, 1964, 2.00 p.m.
FORT GARRY HOTEL
Reception and Dinner 6.00 p.m.

PROGRAMME

1.30 p.m. Registration Opens	RECESS—Coffee
2.00 p.m. Official Opening by President	Panel Discussion—Topic: In view of the effect that technical obsolescence can have on the profession as a whole, does the A. P. E. M. have a responsibility to promote professional and technical development of the individual member?
Introduction of Guests	Refreshments and Audience Participation.
Minutes of Annual General Meeting of November 28, 1963	Declaration of Officers Elected
Minutes of Special Meeting of September 14, 1964	6.00 p.m. Reception
President's Address	6.30 p.m. Dinner
Registrar's Report	Presentation of Certificates of Life Membership
Committee Reports	Guest Speaker: Hon. S. R. Lyon, Minister of Mines and Natural Resources, Province of Manitoba - "Fuels for the Future"
Auditors' Report	
Discussion on Reports	
Appointment of Auditors	



The Manitoba Professional Engineer
bulletin 85
June



Manitoba Engineering Makes an In at NASA Langley Research Centre




The official publication of Engineers Geoscientists Manitoba
THE KEYSTONE PROFESSIONAL
Spring 2022

Centennial
ANNIVERSARY ISSUE



INSIDE

THIS ISSUE

New Year, New Look for
The Keystone Professional

30by30 Initiative Update

National Engineering and
Geoscience Month

Happy 5th Birthday to the
Arab Members Chapter

**A NEW LOOK FOR
THE KEYSTONE
PROFESSIONAL**

SPRING 2022

Published by Engineers Geoscientists Manitoba
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B. Phillips, P.Eng.(SM), FEC - Experience Review
C. McDonald, PhD - Finance
G. Cook, P.Eng.(SM), FEC - Heritage
R. Herrmann, P.Eng., FEC - Indigenous Professionals Initiative
J. Paliwal, P.Eng., FEC - Nominating
A. Pawlikewich, P.Eng., FEC - Public Interest Review
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C. Otto, P.Eng. - STEP Chapter

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SEND CHANGE OF ADDRESS TO:

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PRESIDENT'S MESSAGE

ALLAN SILK, P.ENG., FEC

GOVERNANCE REVIEW

The new Council year has started. As promised at the 2021 Annual General Meeting, governance review has been at the forefront of discussion. This process started last year when a request for proposal was sent out and four governance consultants responded. That process was put on hold due to the COVID-19 pandemic, and after a year of virtual meetings, Council was willing to proceed.

The best way to proceed would be to invite all the consultants in to make their presentation to Council and senior staff. Council would then decide which consultant they felt comfortable moving forward with. Since we were unable to meet in person, Council agreed to the next best thing - to have the Executive Committee review the proposals and host virtual meetings with the consultants who responded to the RFP. Once that is complete, the Executive Committee will report back to Council.

What does a governance review address? Section 9.1 of the Act states the authority of Council; "The council shall exercise, in the name and on behalf of the association, any and all of the powers, authority and privileges conferred on the association by this Act or any other Act and, without restricting the generality of the foregoing, the council shall govern the association and administer its affairs". There is also a second part in Section 9.2 which is as important. "The council may delegate to a committee any power, authority or duty granted to or imposed upon the council under this Act, including, without limiting the generality of the foregoing, the powers, authority and duties granted to or imposed upon the council under Part 10, and where a committee exercises any power or authority or performs any duty delegated to it under this subsection, the provisions of this Act apply mutatis mutandis to any act or decision of the committee as though it was the act or decision of the council." The essence of governance is accepting the authority of 9.1 and delegating through the CEO, the authority to administer a significant amount of the affairs of the Association. As Council is still responsible for the work that is delegated, monitoring provisions are required.

Not all the affairs of the Association are delegated by Council. Council has decided to maintain control of the discipline/investigation, finance, registration, and continuing competency functions. This work is done by Committees of Council whose members



are appointed by Council and who are responsible to Council.

Council uses a formal governance model developed by John and Miriam Carver called Policy Governance®. I personally believe that it has developed some practices that have been very helpful to Council. The main concern that I have, and other past presidents that I have spoken with have, is that Policy Governance® does not seem to contemplate a Council that has legislative duties under a government act. However, the Carver system did institute in Council a method of formal delegation and monitoring and this has been very helpful over the years. Our Act does give authority to Council to do everything. However, I would not envy the Council that tried to take that on. Delegation and monitoring are central to any governance system.

I am looking forward to this review and look forward to receiving the work of the consultant. If you have any questions or concerns, please send me an e-mail at President@EngGeoMB.ca.

CEO'S MESSAGE

G. KOROPATNICK, P.ENG., FEC, CEO & REGISTRAR

WORKING REMOTELY

Have you been working remotely for the past two years? Most people I speak with are still working from home, and a few have headed back to the office with trepidation. Some employers are holding off until the Omicron variant has passed through before making a decision. The Winnipeg Downtown BIZ estimates that only about 20% of the workers in the downtown Portage and Main area have returned. That doesn't sound like "back-to-the-office" to me.

HYBRID

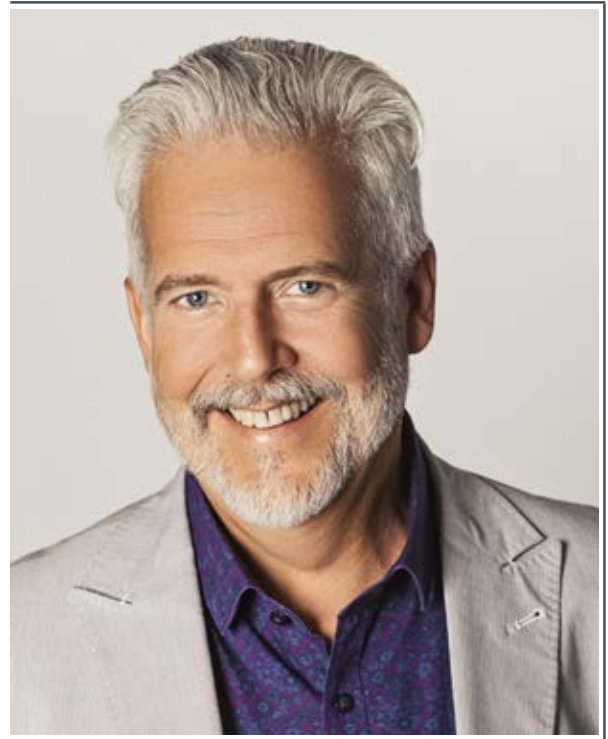
The word "hybrid" has been used to describe many things affected by the pandemic. The word means: a thing made by combining two different elements; a mixture. Does your job have a hybrid office? For most people I know, their offices used to be addresses away from home. But since the pandemic, many employers have allowed workers to choose a hybrid office arrangement, with some days at the main office location and the remaining days at home.

What is the impact of this new hybrid office model? Some are at the office, while others are working remotely from home. Some like it, while others don't. Loss of culture is a concern for employers. For example, some people who returned to their formal office have experienced a "ghost town." Fewer co-workers on site, half-empty parking lots, and no one in the lunchroom during break times. If you're one of these workers - does it make you feel alone? Will this change of workplace culture be long-lasting or just temporary?

STUDENTS

It occurred to me while speaking to an administrator in the Price Faculty of Engineering that students beginning their engineering studies in 2020 have never attended an in-person lecture. That's two years of online lectures! No one thought the pandemic would force such a protracted interruption to learning. Back in the beginning of the pandemic, I thought we might be "locked-down" for one month. Then restrictions were lifted, then put back on, then lifted again and then came Delta followed by Omicron.

Within engineering and geoscience there is a requirement for site visits and field work. However,



WILL THIS CHANGE OF WORKPLACE CULTURE BE LONG-LASTING OR JUST TEMPORARY?

much of the work is "information-based" and can be done digitally on a computer, tablet, or mobile device via a remote connection like VPN or Wi-Fi. Remotely working employees can have a big impact on the bottom line. For the major employers with hundreds or thousands of employees, the reduced need for office space and the corresponding lower rent and utility bills are tempting. But what if the company culture suffers? Does productivity and profitability suffer too? No one wants that.

WORK-LIFE BALANCE

I see one major benefit in allowing employees to work remotely. Working from home makes life easier. Job duties are not easier, but getting them done seems easier. For example, one commentator said “The very best thing about remote work is, if you have to work late, you don’t have to stay late.”¹ Further benefits include not commuting, not paying for lunches, coffees, parking, or dry-cleaning. Sure, the social cost is less time spent kibitzing with co-workers in the staff kitchen, but there is a trade-off. One person I spoke to estimated saving 75 minutes every morning and another 45 minutes each evening because of the ability to log-in and work remotely from home. That’s two hours of time reclaimed for other activities like getting more sleep, fitness, hobbies, family activities, or simply slowing down. Is the elusive “work-life balance” now possible because of working remotely?

We won’t be fully out of the woods on COVID-19 for another year or two. Although some say they want to return to the pre-pandemic way of working, I don’t think that’s going to happen. The emotions associated with this issue will come up going forward, forcing some decisions by both employers and employees. In my opinion, COVID-19 has given a wake-up call to society. Many have proven over the last two years that job duties can be effectively done from remote locations like home, the cabin, cafés, and almost anywhere. I recognize that some jobs can’t be done remotely; for example, the trades and service workers can’t stay home. Their duties require “hands-on” activities.

IS THE ELUSIVE “WORK-LIFE BALANCE” NOW POSSIBLE BECAUSE OF WORKING REMOTELY?

COPING

Whether you’re working remotely, attending classes online, or doing a hybrid arrangement, I hope you’re coping. Moreover, I hope you’re not suffering any serious side effects. I know some are. The EngGeoMB website has a listing of support services and resources that may be helpful at this time. If you need help, follow this link:
www.EngGeoMB.ca/SupportServices.html

Your feedback is invited and welcomed. If you have any thoughts on anything you read in *The Keystone Professional*, please email me at GKoropatnick@EngGeoMB.ca.

Have a great day!

Bonnie Myhre quoted in the New York Times,
“Coronavirus Briefing: What happened today”,
October 21, 2021

VOLUNTEER WITH THE ASSOCIATION

Engineers and geoscientists are members of self-regulated professions. One of the many benefits of this is that we have the ability to make a direct impact on the profession by getting involved with volunteering.

See current volunteer opportunities on our website
www.EngGeoMB.ca/Volunteer.html



MANITOBA

TRAILBLAZERS

JAY FERCHOFF, P.ENG.

Both Jay's father and older brother are professional engineers. He was drawn to the interesting work the profession offers by seeing firsthand the work people encountered in the field. He graduated from the University of Manitoba in 2008 and has been working at Bell MTS ever since. A key focus of Jay's work is applying artificial intelligence to automatically detect and correct service quality issues on customer routers - the idea being that everyone wins when a problem can be solved before anyone even notices it. Following the acquisition of MTS by Bell, he has been heavily involved in integrating the former MTS network into the nationwide Bell network. More recently, Jay has also spent time investigating some of the manual processes used within the company and developing automation widgets to improve the way teams work and the speed with which they can deliver services to customers. Jay believes the best part about his job and the profession at large is the way that each day brings new challenges and new problems to solve.



DR. MICHELLE GAUTHIER, P.GEO.

Dr. Michelle Gauthier grew up visiting the Rocky Mountains each summer, collecting a sandbox full of rocks. She is fascinated by how landscapes form and change, and after spending the summer of her grade 11 year as a university assistant with the University of Alberta's Women in Scholarship, Engineering, Science, and Technology (WISEST) program, she jumped into her own bachelor's degree in geology. As a summer student, Michelle was exposed to the study of past glacial landscapes and decided to explore this more in her graduate studies at the University of Victoria and University of Waterloo. She has worked in three provinces and three territories, and now works as a Quaternary Geologist for the Province of Manitoba. She collects baseline data on surficial sediments and reconstructs when, where, and how the paleo-ice sheets crossed Manitoba. Her research has been applied to mineral exploration, land-use planning, infrastructure development, and hazard susceptibility. Outside of work, she is involved as a parent coach and board member for the Building Emotional Awareness and Mental Health (BEAM) program and believes in encouraging a work-life balance.



PATRICK LEGASSÉ, P.ENG.

Patrick has recently become a fully registered member with Engineers Geoscientists Manitoba. A graduate from the University of Manitoba's mechanical engineering program, he has a particular interest in metals and other engineering materials. Patrick began working at Manitoba Hydro as a summer student in 2012 and worked in project controls on the Keeyask megaproject as an engineer in training. Last year, he had the unique opportunity to assist Shared Health in their efforts to rollout the COVID-19 vaccination program, in part thanks to project management and software skills acquired through his engineering experience. He is currently part of a team at Manitoba Hydro that works to ensure the safety and reliability of the province's natural gas system.



DO YOU KNOW A MANITOBA TRAILBLAZER? SUBMIT THEM TO BE FEATURED IN THE KEYSTONE PROFESSIONAL!

The Manitoba Trailblazers feature was created to highlight the talent and unique engineering and geoscientific work being done by members and practitioners of the Association.

If you know someone who deserves to be featured, please submit their information to Engineers Geoscientists Manitoba at Info@EngGeoMB.ca

Please note that all submissions will be vetted prior to publishing.

MEMBER PROFILE

ERIN COOKE, P.ENG.

MEET THE PEOPLE THAT MAKE LIFE WORK BETTER

As a Project Manager for Winnipeg Transit's Bus Electrification Program, Erin Cooke, P.Eng., gets to work on the project of her dreams - literally. Fueled by a passion for problem solving, Erin often continues to navigate solutions even in her sleep. "If, at the end of the day, I haven't solved a problem I'm working on, my brain doesn't let that go. I've definitely had a few nights where I've had weird engineer problems floating around in my dreams". It's this very passion that has landed Erin in the "sweet spot" of her profession, where she balances technology and management with a focus of sustainability and climate change.

WHAT DO YOU GET OUT OF ENGINEERING THAT YOU COULDN'T GET OUT OF ANY OTHER LINE OF WORK?

I like that each day is different. The fact that things rarely go as planned makes engineering exciting. Some days, the issues are technology related; sometimes its people related, but it's rarely repetitive. I also like having the ability to physically point to something and say that's my project, that's what I do.

WHAT'S THE MOST REWARDING PART OF YOUR CAREER?

Knowing that my projects are making a positive impact on the world. Everything I've worked on has solved some sort of problem. Lighter, cheaper, faster, fewer parts, on-time, on-budget, in-scope; the end result is a better product for our customers. As a project manager, I may not be designing the product itself, but I am able to influence change at much larger level. Ultimately, my bus electrification project is going eliminate thousands of tonnes of carbon and particulate matter from our local air, making the city more livable for everyone.



The fact that things rarely go as planned makes engineering exciting.

WHAT ARE THE THREE MOST MEMORABLE PROJECTS YOU'VE WORKED ON?

A company I used to work at was hired by someone who had recently acquired the rights to a trenchless pipe lining system. There was a unit installed on a trailer that worked, but required a lot of training and personal protective equipment to be operated. The project started off simply enough with the goal to develop a slightly larger version with improved safety and automation, but along the way the company was purchased, and the complexity and scope of the project changed dramatically. The vehicle ended up being far too complex to replicate and ultimately was considered a design failure, but through it I learned the value of project management in engineering design. It was the catalyst that sparked my interest in pursuing my Project Management Professional designation, to leave that company and move back to Winnipeg to design zero-emission busses, which ultimately led me to Winnipeg Transit developing a transition to zero-emission bus program. Which of course are my two other most memorable projects.

WHAT DO YOU HOPE THE ENGINEERING AND GEOSCIENTIST PROFESSIONS LOOK LIKE 20 YEARS FROM NOW HERE IN MANITOBA?

I'm thinking engineering, as a whole, is going to evolve a lot over the next 20 years. I hope that the Association continues to evolve with the industry. There seems to be a big push towards sustainability and climate resilience in engineering that I would love to see the Association pick up and add to its professional development program. I completed Engineers Canada's Sustainability in Practise course this year which was amazing and I think something like this should become required learning for current practitioners. I also sincerely hope that 20 years from now we aren't still asking why there aren't more women in the profession. I would really like to see participation in initiatives around returnship and licensing internationally trained engineers accelerate over the coming years. I believe diversity in engineering help brings equity and inclusion to the forefront of design.

ARE THERE ANY ASSOCIATION INITIATIVES THAT YOU ARE INVOLVED IN OR SUPPORT?

I've previously volunteered for the organizing committee for the Manitoba Community for advancing Women in Engineering, Science, Trades, and Technology (MCWESTT) and Canadian Collation of Women in Engineering, Science, Trades and Technology (CCWESTT) conference which have been supported by the Association, and I've recently joined the Association's Manitoba 2030 Coalition.

WHEN YOU'RE NOT WORKING, YOU CAN BE FOUND...?

At home relaxing with my husband and dog. Probably watching TV, reading a book, or cooking a nice meal and enjoying a bottle of wine. Occasionally out playing hockey or soccer.

I sincerely hope that 20 years from now we aren't still asking why there aren't more women in the profession.

A NEW LOOK FOR

THE KEYSTONE PROFESSIONAL

Long-time subscribers of the *The Keystone Professional* are familiar with the publication's evolution over the Association's 100+ year lifetime. What started in the 1950s as *The Manitoba Professional Engineer* later turned into *The Bulletin* in 1976; in 1986, we returned to the publication's original moniker of *The Manitoba Professional Engineer* with a fresher look before it was updated again in 1999 in the wake of *The Engineering and Geoscientific Professions Act* passing in the Manitoba legislature. This change in legislation demanded another, more inclusive name update, which brings us to our current publication, *The Keystone Professional*.

While there is no name change this year, you may have noticed there is certainly a new look! As the Association evolves along with the needs of our members and practitioners, so will *The Keystone Professional*.

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PRESIDENT'S MESSAGE

ALLAN SILK, P.ENG.

GOVERNANCE REVIEW



The new Council year has started. As promised at the 2021 Annual General Meeting, governance review has been at the forefront of discussion. This process started last year when a request for proposals was sent out and four governance consultants responded. That process was put on hold due to the COVID-19 pandemic, and after a year of virtual meetings, Council was willing to proceed.

The best way to proceed would be to invite all the consultants in to make their presentation to Council and senior staff. Council would then decide which consultant they felt comfortable moving forward with. Since we were unable to meet in person, Council agreed to the best thing - to have the Executive Committee review the proposals and host virtual meetings with the consultants who responded to the RFP. Once that is complete, the Executive Committee will report back to Council.

What does a governance review address? Section 91 of the Act states the authority of the Council: "The council shall exercise, in the name and on behalf of the association, any and all of the powers, authority and privileges conferred on the association by this Act or any other Act and, without restricting the generality of the foregoing, the council shall govern the association and administer its affairs". There is also a second part in Section 92 which is as important. "The council may delegate to a committee, any power, authority or duty granted to or imposed upon the council under this Act, including, without limiting the generality of the foregoing, the powers, authority and duties granted to or imposed upon the council under Part 10, and where a committee exercises any power or authority or performs any duty delegated to it under this subsection, the provisions of this Act apply mutatis mutandis to any act or decision of the committee as though it was the act or decision of the council." The essence of governance is accepting the authority of 9.1 and delegating through the amount of the affairs of the Association. The Council is still responsible for the work that is delegated, monitoring provisions are required.

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I am looking forward to this review and any forward to receiving the work of the consultant. If you have any questions or concerns, please send me an e-mail at President@EngGeoMB.ca.



national
**ENGINEERING
AND GEOSCIENCE
MONTH**

As pandemic restrictions continue to affect the outreach and event activities that are usually conducted in-person to celebrate National Engineering and Geoscience Month, the Association, along with many other provincial and territorial regulators from across Canada, have continued to bring many of these activities online at www.exploreengineering.ca/activities.

- **CHART YOUR COURSE (GRADES K-6)**
The Chart Your Course tool can be used to learn more about how children's interests might lead to a career as an engineer or geoscientist.
- **ENGINEERING DESIGN CHALLENGES (GRADES 6-8)**
Using simple materials found at home, get a taste for engineering by building projects that have real-world significance or context.
- **FUTURE CITY EXPERIENCE (GRADES 6-8)**
Design and build a model of a futuristic city . . . on the Moon!
- **DISCOVER THE ENGINEER IN YOU (GRADES 9 TO 12)**
Select the disciplines that are most interesting and navigate a way through a number of trivia-based and problem-based engineering questions.

**WHY ENGINEERING?
HOW TO BECOME INVOLVED IN THE
INDUSTRY | MARCH 16, 2022**

As part of the Association's strategic priority E-5.1: Increasing Indigenous membership, to ensure that practitioners in the professions reflect the diversity of the public, we are partnering with the Assembly of Manitoba Chiefs for an online discussion with the Association's Indigenous Professionals Initiative Coordinator, Nicole Everett, and Randy Herrmann, P.Eng., Director, Engineering Access Program (ENGAP) at the University of Manitoba. Keep an eye on our online events calendar for details www.EngGeoMB.ca/Events.html!

**SPAGHETTI BRIDGE BREAKING
MARCH 23, 2022**

The Association will continue to host our Spaghetti Bridge Building Competition virtually to support educators who enjoy incorporating the building of their spaghetti trusses into their STEM curriculum. If you've always been curious about this event, you'll be able to tune-in online on Wednesday, March 23, 2022, to watch as our professional engineers break the students' spaghetti bridges! The strongest truss in each eligible class wins a prize and a donation is made to Harvest Manitoba based on the strength of the bridges: the stronger they are, the more we donate.

**THERE'S
A PLACE
FOR YOU!**

March is National
Engineering Month!



DEPARTMENT OF EQUITY AND REPRESENTATION

The Manitoba 2030 Coalition welcomed its new Chair, Indra Kalinovich, Partner at Dillon Consulting, along with Co-chair Maria Neufeld, P.Eng., Director of Transmission Operations and Maintenance at Manitoba Hydro. As part of Engineers Geoscientists Manitoba's commitment to increasing the percentage of newly licensed engineers who are women by 30% in time for 2030, the Engineering Changes Lives Provincial Steering Committee, who advises the 30 by 30 initiative, has prioritized research on returnships (the return of practitioners after extended leave, usually maternity and caregiving leave) and its partnership with Engineers of Tomorrow on the Engineer-in-Residence Program (EIR). EIR has expanded nationally to include the pilot program in Manitoba for the 2021/2022 school year.



30BY30 UPDATE

RETURNSHIP RESEARCH FINDINGS

With the help of Probe Research, a survey was distributed to 814 women who were either withdrawn or written off by the Association within the last 15 years. Of those women, 127 responded to the survey. Comprehensive questions were developed in collaboration with Probe Research to gather more descriptive data on why these women have left the profession. Eighteen telephone interviews were conducted by the Association's Director of Equity and Representation, Lisa Stepnuk, EIT, and Assistant Researcher, Lamya Kalah. The interview and survey responses highlighted the following needs.

- To create more targeted engagement and networking opportunities for intern registrants, registrants on caregiving leave, and unemployed designation hopefuls to create a stronger sense of inclusion and community.
- To target communication about Association processes and guidelines including the on-leave category, ProDev abatement for parental leave, and reduced professional practice (including part-time work), return to active practice, and complaints process for harassment.
- To engage executive level and mid-management professional members in strategies to achieve zero tolerance for harassment or discrimination at work. Provide professional development opportunities for members to develop skillsets to successfully address harassment.

The Association has also begun running virtual bi-weekly support co-working sessions for women and gender diverse interns. These sessions have fostered a positive and welcoming space for interns to make steps toward report progression. Potential ways to make the sessions even more engaging are being devised with the hope of being able to implement these plans in future sessions.

ENGINEER-IN-RESIDENCE PROGRAM UPDATE

To gear youth towards STEM fields, the EIR program enriches the education of students by having the expertise of a live, dedicated volunteer engineer in the classroom. These volunteers have created resources and projects tailored to young students that has fostered a uniquely valuable learning experience. Engineers of Tomorrow works with organizations that share the same ideals of making STEM outreach a universally integrated process.

The EIR program uses evidence-based best teaching practices for equitable gender engagement by using the following methods:

- inquiry-based learning;
- teacher involvement;
- hands-on learning; and,
- role-model engagement and interaction, which results in a longer relationship than a one-off presentation.

The Association's partnership with the program has enabled 21 Manitoban elementary and high school classrooms to participate.

Lisa Stepnuk, EIT, also delivered a presentation on countering bias to engineers and teachers at the Manitoban launch event for the program in September. The recommended interventions are the following.

1. Frame STEM as **learned skills** as opposed to inherent talents in math and science.
2. Talk about **social** and **environmental** impacts of engineering.
3. Show images with **people** and **environment**.
4. Show **role models that reflect all students** by giving names of Black, Indigenous, and women of colour, as well as gender diverse engineers to look up to.

Due to the COVID-19 pandemic, the EIR program is being delivered virtually, which has allowed for the growth of volunteers. Even with the challenges of reformatting the program to fit cyberspace, EIR has only seen success with retaining both volunteers and classrooms.

According to the Manitoban EIR report for the month of January, Don Himbeault, P.Eng.(Ret), a former engineer working with a fifth grade class at École Belmont in Winnipeg, is a stellar example of going the extra mile to help others. His methods of teaching have generated a classroom full of inquisitive students wanting to learn more. Don has created custom test apparatuses for each of his lessons and regularly takes input from his students on what topics they are most intrigued by. Fun projects from Don's lesson plans include:

- water bottle rockets;
- cardboard windmills;
- crash test barriers; and,
- newspaper and towel building.

The "Library of Lessons" is an online tool for volunteers like Don to upload their own lesson plans and resources that can be accessed and shared across classrooms. The EIR Librarian, Sandy, is currently working on adding to the number of available lessons on the platform. With the help of a volunteer high-school student, a more user-friendly way to convert all the EIR lessons is well under way.



Registration for the 2022/2023 school year program will open this spring.

Watch the Association's E-News Notices for opportunities to be an EIR and share your excitement for the profession with Manitoba students!



**ENGINEERS
GEOSCIENTISTS
MANITOBA**

2021 STUDENT WRITERS SCHOLARSHIP WINNER

RISK VERSUS REWARD: MANITOBA'S NUCLEAR ENERGY INDUSTRY

BY B. REMPEL

Fragmented public opinion of the risks of nuclear power have existed in Manitoba since the establishment of Whiteshell Laboratories in the early 1960s [1]. With the Cold War looming, Manitobans viewed their newfound share in nuclear energy either as the incitement of immense risk or the gain of a valuable new industry. Ultimately, an attitude of innovation took precedent, and Pinawa, Manitoba, proudly performed research in the field of nuclear energy for over twenty years. This division of opinion mirrored the debate that recently swept across the prairies [2,3], over the agreement Canadian Nuclear Laboratories (the current operator of Whiteshell Laboratories; originally the Whiteshell Nuclear Research Establishment) signed in order to host a Small Modular Reactor (SMR) [4]. Pinawa may soon gain the chance to continue its legacy of nuclear research if it is chosen as the site for the demonstration of SMR technology.

In 1962, Manitoba became a major location for research in the field of nuclear energy, with a focus on reactor safety and risk management of worst-case scenarios. Canadian General Electric was awarded a contract to design and construct the 60 MW. Whiteshell Reactor- 1 (WR-



1), and looked to leverage their contract to modify Canada's existing CANDU reactor technology. The acquisition of the contract was not without its challenges, as early researchers faced a threefold increase in budget due to design complications. The modified CANDU reactor technology also used largely untested organic coolant, presenting significant financial risk should the design prove to be faulty or unusable. Nevertheless, CGE's design was

approved in April of 1962, and Manitoba soon boasted novel nuclear energy technology as part of its unique allure [5].

On November 1, 1965, WR-1 achieved criticality (i.e., attained a self-sustaining nuclear reaction). Operators attributed its smooth start-up and commissioning period to the lower vapour pressure of the organic coolant, which permitted a higher output temperature at a lower

operating pressure. This design supported the production of electricity at higher efficiencies, with reduced pressure-vessel requirements and maintenance costs—a promising prospect. A significant design feature that allowed Whiteshell to be the site of extensive research was the reactor’s five experimental fuel loops—including an external loop with the capability to handle full-size fuel channels and assemblies. These loops allowed for the study of fuel behaviour at normal and extreme conditions, which was subsequently used to establish safe operating limits. Further areas of research involved advanced fuel cycles, thermal hydraulic safety, and 3D modelling of deformations in the pressure tubes.

As is the case with all experimentation, errors occurred—a coolant-oil leak resulted in the leakage of 2,000 liters of coolant into the Winnipeg River, although it dissipated to negligible levels a short distance downriver; a fuel-bundle failure resulted in a six-week shutdown. Additionally, other experiments—later established to be beyond operating limits—employed power ratings so high that central melting of the uranium oxide fuel pellets occurred [5]. These hazards did not discourage engineers and scientists from continuing the work they set out to accomplish, understanding that without risk a greater understanding of technology could not be achieved.

After over two decades of research and development contributions, the WR-1 reactor was retired on May 17, 1977 [5]. A deferred decommissioning strategy is being implemented to reduce risks placed on workers and allow radiation to dissipate [1]. In discarding the historical reactor, Manitoba has moved its

focus away from research and discovery in the field of nuclear energy, transitioning back to trusted renewable energy sources. Still, the reduction of risk should remain in tension with the prospect of innovation.

While the full breadth of the WR-1 reactor’s purpose may only be achieved in the next two years with the completion of decommissioning, the commercial and scientific potential of the field of nuclear energy remains compelling. As more than three quarters of the industrially developed world’s nuclear plants are now over twenty-five years old [6], the process of shutting down and decommissioning plants from the Cold War era is likely to only accelerate. Nuclear energy currently comprises 10% of global energy generation, second only to hydroelectricity as a source of low-carbon electrical energy [7]. The decline of legacy reactors creates a need for development of efficient and flexible reactor technology to supplant the vacuum left behind. In contrast to large reactors, the business case for small modular reactors (below 300 MW) has improved substantially in the last decade [8]. Reduced capital cost and factory-built advantages are buoyed by the technology’s ability to match energy demands, its relative ease of transport, and the larger operating safety margin [8, 9, 10]. In particular, remote northern communities may benefit immensely from this modular implementation. Many rely on burning diesel fuel for energy generation, and renewable energy solutions, such as wind or solar, do not address their immediate need for off-grid, reliable electricity. A conservative estimate gives SMRs a three-to-five factor of reduction in electricity price for such communities [10], which

would mean the realization of an increased quality of life stemming from district heating, access to internet, and water purification [10, 11]. These promising numbers should not dissuade careful examination of the difficulties and risk that will be faced when pursuing this research, as with any nascent technology. Current public concerns of these communities in the face of nuclear technology relate to safety, nuclear waste management, and lack of knowledge—areas that were the focus of WR-1 in its era of operation [1], which are now being expounded in its termination.

The growing demand for clean, reliable, and affordable energy in the face of climate change has been echoed countless times in the nearly half-century since WR-1 ceased to operate—as sentiment continues to grow, time is running out. However, parroting words is a far cry from enacting measurable change. The hard work and ingenuity of the community that surrounds Whiteshell Laboratories near Pinawa, Manitoba, ought to be dusted off and assumed by future engineers. Small modular reactor technology is a risk we should take, if not for the sake of pursuing innovation, then for the possible rewards of success.

Bronwyn Rempel is a mechanical engineering student enrolled at the University of Manitoba, pursuing a thermofluids stream. She gained marked interest in nuclear energy following a research project on nuclear waste management.

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ENGGEOMB 2022 STUDENT WRITERS AWARD

The EngGeoMB Student Writers Scholarship is intended to encourage student members of Engineers Geoscientists Manitoba to engage with the Association's quarterly magazine, *The Keystone Professional*. Students can submit articles they have written on a topical issue subject related to engineering and geoscience. One student is selected and awarded a bursary that can be used towards their engineering and geoscience studies as well as having their article featured in *The Keystone Professional*.

For more information, visit:
www.EngGeoMB.ca/Scholarships.html.



GEOLOGY AND SOCIETY

ENVIRONMENTAL CONTAMINANTS

BY R. REICHEL, P.GEO.(SM), FGC



Many of the members and practitioners of Engineers Geoscientists Manitoba work in the environmental field and are familiar with the issues of environmental contaminants. This essay is for those of you who are not closely familiar with environmental contaminants, but who might want to know a bit more.

Environmental contaminants are defined as substances detrimental to human or environmental receptors. These contaminants can be found in the soil, water, and air. These contaminants can reach a receptor via ingestion, inhalation, or through physical contact. The effects of contaminants can range from acute to chronic poisoning and can lead to impairment of health or death.

Let's look at some examples.

ORGANIC CHEMICALS

Organic chemicals are the most common environmental contaminants found in environmental investigations. This is a function of the wide use of petroleum hydrocarbons in our modern world. Many organic chemicals are poisons at high concentrations. As well, chronic exposure to low concentrations of petroleum hydrocarbons can lead to many health problems,

including an increased risk of cancer. Fuel storage facilities can, and frequently do, leak product. Most (>80%) of the sites in Manitoba that are affected enough by contaminants to be a concern to the Contaminated Sites Program are impacted by fuels, primarily motor fuels, but also aviation fuels and heating oil.

Another common hydrocarbon contaminant comes from the use of trichloroethylene (TCE) and tetrachloroethene (also called perchloroethylene or PCE) in dry-cleaning operations. Although spills of TCE & PCE occasionally happen, the most common cause of contamination from dry-cleaning fluids comes from the exhaust of the operation. The exhaust discharged by the dry cleaners contain TCE & PCE vapours. These are heavier than air and thus they tend to drop to the ground. Over time, there can be a substantial accumulation of dry-cleaning fluids in the soil.

Pesticides can be particularly nasty contaminants since they are designed to kill living things. Some, such as dichlorodiphenyltrichloroethane (DDT), are persistent in the environment and will bioaccumulate, i.e., increase in concentration as they are passed up the food chain. While DDT has been banned due to its deleterious effect on creatures in the ecosystem, thousands of pesticides, herbicides, etc. are currently in use. Spills at storage or manufacturing sites are

another source of contamination from pesticides. Wood treatment facilities that use creosote and pentachlorophenol (PCP) can also contaminate soil and groundwater via spills.

One class of hydrocarbons that have caused a lot of trouble are polychlorinated biphenyls (PCBs). PCBs were used extensively in electrical applications because of their dielectric properties, remarkable stability and resistance to fire. However, their very stability causes them to bioaccumulate in the ecosystem. Almost everyone carries some PCB in their fat, and in some cases this can cause cancer.

INORGANIC CHEMICALS

The most common inorganic chemicals that cause us problems include salts, nutrients, and heavy metals. Easily soluble in water, road salt and nutrients can cause trouble with surface runoff and groundwater. The trouble comes from concentration. Small amounts of road salt are innocuous and, in low concentrations, fertilizers are beneficial. In larger amounts, road salt can kill roadside vegetation and runoff containing nutrients can have severe effects on downstream aquatic ecosystems. Algal blooms in Lake Winnipeg have been blamed on high nutrient load from agricultural runoff and municipal sewage discharges. An extreme example of this effect is the so called “dead zone” at the mouth of the Mississippi River. Draining a substantial portion of the United States, including thousands of municipalities and millions of acres of farm land, by the time the Mississippi reaches the Gulf of Mexico, it carries toxic concentrations of nutrients that create a large zone in the ocean where few organisms can survive.

Heavy metals are used in a wide variety of industrial processes and consumer products. The most common exposure to heavy metals, such as lead and cadmium, comes from contact with pigments, such as white lead in paints and yellow cadmium in housewares. Lead and mercury exposure can also come as the result of past or current industrial practices. From the 1930's until the early 1980's tetraethyl lead was a common gasoline additive and was subsequently a common air pollutant, especially in urban areas. Mercury used in the production of chlorine bleach via the chloralkali process at paper manufacturing plants commonly leaked mercury into water bodies. The mercury was taken up by fish and the people who ate the fish were affected by mercury poisoning. Minamata, Japan, and Grassy Narrows, Ontario, are two notorious examples.

The main effect of heavy metals on organisms is to interfere with the operation of the central nervous system.





PATHOGENS

Pathogens such as viruses, bacteria, and multicellular parasites are most commonly transmitted by contaminated drinking water but they can also be transmitted via fresh food and even dust containing fecal matter. Failure to adequately treat municipal sewage and purify drinking water supplies can lead to outbreaks of various enteric diseases. In some parts of the world, they are a leading cause of debilitating disease and death. That we are largely free from these pestilences is a tribute to the multigenerational work of water and sewage treatment engineers who designed and built our sewer and water infrastructure. If we fail to maintain this infrastructure, we can expect a return of the ancient pestilences of cholera, dysentery, and typhoid fever.

RADIOLOGICAL CONTAMINANTS

Ionizing radiation sources include naturally occurring radionuclides and artificial radioactive materials. Exposure to ionizing radiation from radioactive materials can lead to cancer, and in acute exposures, death from radiation disease.

Nuclear power plants create nuclear waste. Other sources of nuclear waste include medical and industrial applications of radioactive isotopes. Disposal of nuclear waste presents an ongoing headache from the problem.

Natural occurrences of highly radioactive material are rare but traces of radioactive materials are common in a variety of bedrock. Radon gas is a common contaminant that results from radioactive decay of radium. Radon is an odourless, colourless, radioactive gas. Radon coming from the bedrock beneath Manitoba commonly finds its way into our basements. Exposure to radon can increase the risk of lung cancer. Good ventilation significantly reduces radon exposure.



Raymond Reichelt, P.Geo.(SM), FGC is a retired environmental geologist who also writes a weekly blog on geology.

NEWS+NOTES

INTRODUCING THE SOFTWARE, TECHNOLOGY, AND EMBEDDED PRACTITIONERS (STEP) CHAPTER

Last year, a new Association Chapter was created to give members and practitioners who specialize in the fields of software and technology an opportunity to meet with like-minded individuals. The intent of the group is to promote technical issues and skill amongst those in the software and embedded communities. The STEP Chapter focusses on the practice of engineering and technology development and promote standards of excellence and cooperation.

Stay tuned for the Committee Spotlight feature in the Summer issue of the *The Keystone Professional* for more on the STEP Chapter!



CERTIFICATE OF AUTHORIZATION RENEWALS ARE NOW OPEN

Companies that hold a Certificate of Authorization to provide engineering or geoscience services in Manitoba must renew annually.

Certificates of Authorization are currently renewing for the period of May 1, 2022, to April 30, 2023. Renewal notices have been mailed to the listed authorized designate.

All companies who hold a Certificate of Authorization must submit their renewal payment by April 8 or complete a cancellation form. Renewal payments may be made online.



NOTICE

Under *The Engineering and Geoscientific Professions Act* and the Association's Discipline By-law

This is Notice that on December 22, 2021, John Friesen, P.Eng., was issued a reprimand following the Association receiving his consent that a conviction be registered against him on a charge of conduct unbecoming a member, in accordance with section 46(1)(b) of *The Engineering and Geoscientific Professions Act*.

The conviction arises out of Mr. Friesen's failure to adequately confirm the ownership of numerous monuments he believed had been abandoned in an open field before transferring them to his own property. Upon learning that the monuments were the property of another individual, Mr. Friesen fully compensated this individual for these monuments.

In addition to the reprimand, Mr. Friesen has agreed to complete the Ethics, Technology and Engineering program through the Eindhoven University of Technology.

Grant Koropatnick, P.Eng., FEC
CEO & Registrar

NEWS+NOTES

HAPPY FIFTH BIRTHDAY TO THE ARAB MEMBERS CHAPTER!

The Arab Members Chapter celebrated their 5th birthday on January 19, 2022. The event was virtual and was well attended by Association President Allan Silk, P.Eng., CEO & Registrar Grant Koropatnick, P.Eng., and many members, guests, and students.

During the event, two student bursaries were announced as being awarded to two students as part of the role of the Chapter to support engineering students. The event concluded with a contest and some prizes were given away to winners.

The Arab Members Chapter was officially approved by Council on January 19, 2017. It started with four members and today the chapter membership has reached 237 (including lay members).



SAVE THE DATE FOR THE 18TH ANNUAL MAKING LINKS ENGINEERING CLASSIC

The 2022 Making Links Engineering Classic will take place at Quarry Oaks on June 16, 2022!



Stay tuned for more details about the event, including team registration and sponsorship information. In the meantime, please direct any questions to Events Coordinator Gemma Keatch at GKeatch@EngGeoMB.ca.

Details can also be found on our website at www.EngGeoMB.ca/Events.html#Event2550



ASSOCIATION LAUNCHES NEW STUDENT ACHIEVEMENT AWARD

2022 marks the launch of a new Student Achievement Award, intended to recognize an individual or a team of undergraduate engineering or geoscience students for their groundbreaking project or thesis.

Nominated projects will be assessed on their innovation, impact, complexity, and feasibility, with \$1000 being presented to the winner(s).

Nominations are accepted until Friday, May 6, and further information about the award can be found on the Association website.



2022 PROJECT DONATE ENGINEERING CHALLENGE

Canadian Blood Services is once again asking engineering firms to roll up their sleeves to save a life by participating in the 2022 Project Donate Engineering Challenge, taking place from March 1 to 31.

Over the pandemic, Canadian Blood Services recorded a significant drop in blood donations due to venue cancellations and other unforeseen issues. As hospitals resume procedures that were put on hold for COVID-19, they are adding more blood donation appointments to meet patient needs. Now, more than ever, blood donors are needed to help fill every available appointment.

Nationally, less than 4% of eligible Canadians donate blood. Locally in Winnipeg, less than 2.6% of eligible people donate blood. Having Engineers Geoscientists Manitoba members join Canadian Blood Services' Partners for Life program will help bring that statistic up while helping provide patients the blood and blood products they need to either give them a better quality of life, or even save a life. The only way Canadians receive the blood they need is because of generous donors. Bringing in a group from your workplace is a great way to fulfill your social responsibility commitments as an organization and a way to provide an opportunity to do meaningful team building during the pandemic.

Appointments must be booked in advance as Canadian Blood Services are unable to welcome walk-in donors in our centres at this time. Canadian Blood Services may provide LifeBus transportation for up to five people to and from the clinic on William Ave. To book an individual donation appointment, download the GiveBlood app or visit www.blood.ca. We hope you will join in the annual Project Donate Engineering Challenge as we once again rally the engineering sector in Winnipeg to save lives!



Am I eligible?

Let's find out! If your response is a "yes" to the following statements, you may be able to donate. Please note that final eligibility is determined by a Canadian Blood Services representative at the time of your appointment. Learn more about the eligibility requirements at blood.ca/am-i-eligible



I have not had a tattoo or piercing in the last 3 months.
If you have, please come back after three months



I have not been pregnant or had a baby in the last six months.

17+

I am over 17 years old.



I have not resided in the UK, France or Saudi Arabia from 1980 to 1996? Or Western Europe from 1980 to 2007?



I have not travelled outside Canada or the continental USA in the last 12 months.
If you have, please check country list



I am not taking prescription medications.
(please check acceptable prescription list or call 1 888 2 DONATE before continuing)



I weigh more than 110 lb.



I have not had a cleaning or a filling in the last 24 hours or dental surgery in the last 72 hours.

MEMBER PROFILE

NOVEMBER, DECEMBER, JANUARY

WELCOME NEW MEMBERS

S.S.M. Abdelmaksoud
N.K. Abraham
B. Alae
A. Alizadeh
S. Amankwah
J.N. Antunes
W. Aolari
G.J. Arevalo
X. Arongna
G.K. Bazinet
N.J.J. Bily
S.G. Blonski
A.P. Bondy
S.J. Boudreau
S.J. Boyle
S.G. Bundrock
C.A. Camara
B. Castillo
M.L. Cerami
L. Chandonnet
M. Chatzini
T. Chen
T.R. Chep
J. Chung
S.M.Y. Daboue
J.C. Dale
J.R. De Baets
G.S. Dhesi
K.J.O. Duhaime
A.K. Duhault
C.R. Dziedzic
C.P.J. Einarson

H. Ferrari
R. Ferrera
E. Gabour
L. Gagnon Bernier
K.A.T. Garland
J.M. Gasmio
J.T. German
A. Gholizadeh
A. Ghosh
C.M. Gibbons
R. Giovannetti
F.R. Gomez
I.L. Griffin
M. Hakimfaalesfahani
K.T. Harker
A.M. Hawrysh
M.A. Hnatiuk
D.W. Holmes
K.K. Holmes
K.E. Hopkins
A.L. Hoy
B.J. Hunt
Q. Jin
S.A. Kelso
M.A. Kennedy
M.N. Khan
V. Khoshdel
W.A. Klein
Q. Li
S. Li
T.D. Linney
M.J. Lipinski

P.N. Logan
C.C.C. Luk
S.G. Magnusson
M.R.H. Mahmoud
D.J. Malhiot
J.J. May
P.E. McInnis
B.W.J. McKay
I.L. Mendes
P. Milbers
R. Mirheydari
S.M. Mirmoezi
W.A. Morse
V. Nadarajah
M.A. Nasher
R. Mirheydari
S.M. Mirmoezi
W.A. Morse
V. Nadarajah
M.A. Nasher
A.N. Ozum
M.S. Pace
J.B.S. Partaker
M. Pawluk
H.F. Peerbuccus
Z.G.S. Pion
M.D. Pitz
N. Ramasawmy
S.M.H. Refaat
B.P. Riege
T.J. Rittaler
J.P. Rivard

Z.T. Saizarbitoria
A. Salam
D.S. Sandhu
D.L. Sankar
E.L. Schinkel
R.A. Scott
K.L.M. Sebastian
S. Shaikh
A.W.J. Skorpad
L.F. Smith
G.A. Strange
Sobarzo
A. Strike
N.J. Strilaeff
J.L. Tarko
J.E. Taylor
A. Therrien
C.R. van Besouw
S.R. Vanderwees
T. Verma
J.M. Ward
L.A. Weeden
J.S. West
D.J. Wiebe
M.D. Winer
G.K. Wong
Y. Wu
M. Yang
Z. Yassi
A. Zaitchenko
Y. Zhou

CERTIFICATES OF AUTHORIZATION

Acius Engineering Ltd.
ATI Telecom International, Company
BGIS Global Integrated Solutions Canada LP
Brandt Developments Ltd.
Cenovus Energy Inc.
Crux Subsurface Canada Ltd.
Diamanti Engineering Ltd.
DMC Mining Services Ltd.
Ducks Unlimited Canada
EnGlobe Corp.
Friggstad Engineering Ltd.
G.S. Dhesi & Associates Ltd.
Hitachi Energy Canada Inc.
IDEA Group Inc.
Industrial Technology Centre
Keystone Environmental Ltd.
KGO Group Ltd.
Lightfoot Geoscience Inc.
London Mah & Associates Ltd.
Loyal Fire Protection Corporation
Matix Lumber Inc.
Matrix Solutions Inc.
Montrose Environmental Group, Ltd.
Northwest Hydraulic Consultants Ltd.
Objective Engineering Inc.

Paterson & Cooke Canada Inc.
Pilisk Geosturctural Inc.
Rivard Engineering
Rowan, Williams, Davies & Irwin Inc.
RPS Energy Canada Ltd.
Seberras Professional Services Ltd.
Shield Consulting Engineers Ltd.
Shoemaker Consulting Engineers, Inc.
Strumec Inc.
TetraGen Robotics Inc.
Tigris Engineering Inc.
Westinghouse Electric Company LLC
Winnipeg Structural Engineering Inc.
Worley Canada Services Ltd

IN MEMORIAM

Edward John Faraci
Terence Colin Gibbs
Charles Gustav Kunze
Marcelo Jose Lubocki
David Lawrence Trueman

INTERNS

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M.M. Abdulghani
A. Abraham
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M.O. Adegbenro
T.B. Adeniji
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LICENSEES

J.Y. Wang

CLOSING NOTES

M. GREGOIRE, P.ENG., FEC

GOOD CHARACTER

Before an applicant can become registered with Engineers Geoscientists Manitoba, they are tasked with demonstrating that they are 'of good character'. After becoming registered, practitioners may be disciplined if they are found guilty of 'conduct unbecoming'. What do these terms mean, though, and how are they defined?

Recently, Engineers Geoscientists Manitoba's Investigation Committee approved the adoption of the Good Character Guideline. This guideline will likely prove to be fundamental for practitioners and committee members alike, when tackling the tricky concepts of 'good character' and 'conduct unbecoming'.

As discussed in the Winter 2021 Closing Notes article, most people equate the term 'professional misconduct' with a violation of the Code of Ethics. However, a violation of the Code of Ethics is only one type of professional misconduct. Another key component of professional misconduct is an action that would be considered conduct unbecoming. In contrast with the Code of Ethics, conduct unbecoming also covers actions that a practitioner undertakes outside their practice.

Now, with the publication of the Good Character Guideline, practitioners will be able to get a better understanding of the core principles pertaining to this concept, which is common across all regulated professions. In addition to the traditional paper-based format, Engineers Geoscientists Manitoba has also developed an e-learning module for practitioners to learn about good character (see the box to the right). In both versions, actual case studies are provided to improve the reader's comprehension.

Through these resources, Engineers Geoscientists Manitoba's practitioners will see that, like other practice guidelines, the objective is not to set unrealistic goals. Instead, it confirms what the vast majority of people would expect; that some actions are worthy of sanctioning. Examples include issues related to crimes of moral turpitude, gender-based discrimination, and submitting false information when applying for registration.

I emphatically encourage everyone to try the e-learning module on Good Character. It allows for a great understanding of this ever-evolving topic.



E-LEARNING MODULES

Last fall, Engineers Geoscientists Manitoba released its first ever e-learning modules as part of a long-term project. This project aims to allow the Association to proactively aid all practitioners in ensuring that they act and practice in a professional manner that protects the public. The first two modules were:

- Introduction to Professionalism, and
- Code of Ethics

More recently, the next two modules were released. These are:

- Good Character, and
- Using ProDev

All four modules can be accessed by logging into your Online Profile through the Engineers Geoscientists Manitoba website, then by clicking Learning Modules Under the Quick Links box on the left side of the screen.

Development on these modules is on-going, with two more scheduled to be released later this year.

As always, I appreciate comments and discussion about standards issues. If you'd like to talk about the above topic or any other area of concern, please do not hesitate to contact me at: **MGregoire@EngGeoMB.ca**.



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