

# THE KEYSTONE PROFESSIONAL

Summer 2007

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2007 CONSULTING ENGINEERS OF MANITOBA  
AWARDS OF EXCELLENCE

## A DEVILLISH PROBLEM

### Electronic Seal Why?



Publications Mail Agreement Number 40062980

Association of Professional Engineers and  
Geoscientists of the Province of Manitoba  
[www.apegm.mb.ca](http://www.apegm.mb.ca)



# THE KEYSTONE PROFESSIONAL

Summer 2007

Published by the Association of Professional Engineers and Geoscientists of the Province of Manitoba

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- The Communications Committee would like to hear from you.
- Comments on your newsletter can be forwarded to us through the Association office. Members are also encouraged to submit articles and photos on topics that would be of interest to the membership.
- Although the information contained in this publication is believed to be correct, no representation or warranty, expressed or implied, is made as to its accuracy and completeness. Opinions expressed are not necessarily those held by APEGM or the APEGM Council.

Front cover photo by Barry Striemer, "Inglis Elevators"  
 The five grain elevators in the western Manitoba town of Inglis were recognized as a national historic site in 1996. This is one of the last row of elevators left in Canada.  
 Barry Striemer is a Winnipeg based photographer concentrating on urban, landscape and nature photography in the digital format. Fine art prints are available of Barry's photographs and he can be contacted via E-mail at [bstriemer@shaw.ca](mailto:bstriemer@shaw.ca)

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FEATURES

Publications Mail Agreement Number 40062980

**POSTMASTER:** Return undeliverable copies to: *The Keystone Professional*, APEGM, 850A Pembina Hwy, Winnipeg, Manitoba, R3M 2M7



Robyn L. Taylor, P.Eng. PMP  
President's  
Message

## ELEVATING OUR PROFILE

**W**hy are there not more students choosing engineering or geoscience over more public professional careers? Certainly we are no less educated than other professionals, we just don't seem to advertise that fact.

Manitoba dentists have a campaign suggesting that the public "Trust Your Dentist". Other familiar slogans include "always caring, always a nurse" or "You know you're a CGA when . . . conventional thinking is not part of the business plan."

This year there are again hundreds of Manitoba grade 4 – 12 students receiving information on our professions through pamphlets and awards from

APEGM at the Manitoba Schools Science Symposium. The Student Networking dinner was a huge success linking prospective businesses with engineering and geoscience students.

The University of Manitoba Students' Society (UMES) is promoting students to join APEGM as student members – we even have an MOU signed. Is this enough? Is soliciting youth gaining our profession any respect or even acknowledgment from the public in general?

APEGM held the first ever Annual General Meeting outside of Winnipeg October 2006 in Thompson, Manitoba, which was a huge success. There are thoughts

that another of our branches could host an upcoming AGM, which would be excellent. Is expanding our presence within the province enough?

What further needs to be done? What are our next steps? Who is our target audience? These are the types of questions that we need to ask if we want to raise the profile of engineering and geoscience professions.

I look forward to your questions and comments, and can be reached by mail or fax via the APEGM office, or by e-mail at [rtaylor@teshmont.com](mailto:rtaylor@teshmont.com). ■

## NOTICE

### Annual General Meeting

The 2007 Annual General Meeting of the Association of Professional Engineers and Geoscientists of the Province of Manitoba will be held on Friday, October 26, 2007, at the Fort Garry Hotel, 222 Broadway, Winnipeg, MB, R3C 0R3 Ph. 942-8251.

### NOMINATIONS FOR ELECTION TO THE COUNCIL

Members of Council whose term of office continues for another year are:

JAMES A. BLATZ, P.ENG.; B.J. (JIM) MILLER, P.ENG.; EDWARD M. RYCKOWSKI, P.ENG.; M. T. (TIM) CORKERY, P.GEO.; BRENDA J. BILTON, P.GEO.; JOHN C. WOODS, P.ENG.

Members of Council whose term of office expires at the 2007 Annual General Meeting are:

ROBYN L. TAYLOR, P.ENG. (Will continue as Past President); W. C. (BILL) GIRLING, P.ENG.; D. D. J. (DON) HIMBEAULT, P.ENG.; B. R. (BOB) MALENKO, P.ENG.;

Those nominated for election to the FOUR PROFESSIONAL ENGINEER positions on the Council are:

W. C. (BILL) GIRLING, P.ENG.; D. D. J. (DON) HIMBEAULT, P.ENG.; B. R. (BOB) MALENKO, P.ENG.; ALAN M. AFTANAS, P.ENG.; IRENE R. MIKAWOZ, P.ENG.; LILLIAN TURABIAN, P.ENG.; MD RAJIB AHSAN, P.ENG.

Those nominated for election to the ONE PROFESSIONAL GEOSCIENTIST position on the Council are:

R.A.S. (RAY) REICHEL

# Engineering Philosophy 101

## ... shaping the “new crop”

*M.G. (Ron) Britton, P.Eng.*

Every spring a “new crop” of graduates emerge from our Faculties of Engineering. They have spent four or more years studying the fundamentals of our profession and are eager to use what they have learned. From the perspective of our professional associations they are now considered to be “academically qualified”.

Our Canadian road to becoming “academically qualified” has been, and continues to be shaped by many influences. Probably the most obvious ongoing influence is the Canadian Engineering Accreditation Board (CEAB).

Our profession, through CEAB, sets out the minimum standard a program must meet in order that its graduates can be considered to be “academically qualified”. These standards change with time, but they remain under the control of the profession in which the graduates, and potential graduates wish to practice.

Historically, total professional control was exercised through what amounted to an apprenticeship system. Training, as opposed to education, occurred as the prospective practitioners worked under the direct guidance of practicing Engineers. Today, this still happens, directly during the EIT period prior to licensing. It also happens indirectly while in school, because of the CEAB insistence that engineering professors, particularly those who teach design classes, be registered.

The French were the first to formalize the separation of training and education. They established unique institutions outside of the universities of the

day in which future engineers were educated in the arts and sciences upon which engineering is founded. This “engineering education” produced graduates who were more inclined to rely on theoretical analysis than those who came to their understanding through apprenticeships.

The Eiffel Tower, the structural frame for the Statue of Liberty, and the Suez Canal all stood out as examples of the need for, and benefit from, a solid grounding in engineering theory. Indeed as the North American engineering profession began to emerge in its own right, this separation of education and training became the preferred model.

In the first half of the 20th century, most professors in Canadian Engineering schools were practicing engineers who taught during the winter, but applied their knowledge in “the real world” during the summer. Classes did address the theory behind the “art and science of engineering” but there was still a decidedly “applied” nature to the programs. Math, science, English and economics were all taught by university professors, but “real” engineering was taught by “real” engineers.

When the space age began in the late 1950s and early 1960s, there was a distinct shift on campus. Ph.D. engineering professors with a focus on research rather than application became the norm. Given

the interests of the people developing and delivering the curriculum, it should come as no surprise that the curricula quickly became more theoretical.

If the curricula change, the graduates from those curricula also change. It can hardly be seen as surprising that

this era also saw the birth of CEAB as the profession began to recognize the need for their input in defining what constituted being “academically qualified”.

No one will argue that there is a need for new graduates to be technically competent within their field in order to be considered “academically qualified”. In today’s society, technical competence requires a greater depth of area specific knowledge than was the case as little as 30 years ago.

But if that “area specific” knowledge becomes too theoretical or too specialized, it becomes less applicable to problems in the workplace.

There is a danger that students spend too much time learning what to do in the absence of either why or how. Recent efforts to encourage industry-based design education within university programs are a response to that danger.

Engineering is, after all, the art of the possible. Engineers create solutions to problems, they do not find answers to questions. This requires a level of inventiveness and a willingness to look beyond singular solutions.

Returning to the French model that underpins today’s Canadian Engineering Education system, a comment in a documentary on the construction of the Panama Canal gives one cause to reflect. This amazing piece of engineering was begun by the French but completed by the United States of America.

In the words of the commentator, “French engineers were restricted by their reliance on calculations. American engineers were more innovative.” Hopefully our new crop of graduates fits more into the later category than the former. ■

“Engineers create solutions to problems, they do not find answers to questions”



Grant Koropatnick, P.Eng.  
Executive  
Director's Message

## DEFENDING THE PROFESSION - AN ENFORCEMENT STORY

**A** PEGM went to court to defend the profession against a Winnipeg business that was not registered to offer engineering services in Manitoba.

I am intentionally leaving out the names after the advice of our legal counsel. However, I want the membership to know that a decision against the defendant was rendered at the Court of Queen's Bench in November 2005 and the appeal was dismissed at a hearing in June, 2006.

### THE DETAILS

A company based in Winnipeg, manufacturing and installing municipal/ industrial automated controls was guilty of offering engineering services without a certificate of authorization. Evidence was presented and the judge agreed that *The Engineering and Geoscience Professions Act of Manitoba* Section 58(2) was unlawfully contravened by the business owner.

It was proven through evidence presented and court testimony, that the company owner (a) registered his business name as being an "engineering consultant" and renewed the name without changing the description of the business, (b) described his business on its front window as being "control systems engineering", (c) had a website describing the business as being "control systems engineering" and, (d) distributed cards describing the business as being "control systems engineering".

### GUILTY VERDICT

At the first hearing, the judge found the defendant guilty and ordered an

absolute discharge. The APEGM counsel asked for a fine to be imposed, but the judge disagreed for two reasons: (1)

it was the defendant's first offense of any kind and (2) the defendant testified that he was told by his former lawyer and a representative from his technical association that he was not doing anything wrong by describing his business as a "control systems engineering firm."

Although neither the defendant's former lawyer, nor the representative from his technical association testified to support the defendant's testimony in that regard, the judge was prepared to accept the defendant's position that he did not think that he was doing anything wrong.

Months later, at the appeal hearing, the judge ruled: "It has been proved beyond reasonable doubt that the accused deliberately and knowingly committed the acts complained of in the charge even though they may have sincerely believed that in so doing, they were not committing any offence – in the result, the appeal is dismissed."

### IT WORKS

Enforcement really works. Because of our actions, the business owner has placed a "Statement of Qualification and Operation" on their company website: "[Our company] does not engage in the practice of professional and/or consulting

engineering, nor is the information supplied by [our company] assumed to be as such. Information supplied by a

“There are 5,500 engineers employed in Manitoba, but only 3,552 are registered”

professional engineer and/or consulting engineer are sealed indicating professional status and associated liabilities and when such services are required by [our company] it is solicited/provided via a subcontractor agreement with an individual/firm having a certificate of authorization from the regional professional engineering association."

It now seems clear to the public of Manitoba, that this firm is NOT providing engineering services.

### NEED FOR MORE ENFORCEMENT

The APEGM council recognizes the need to do more in the area of Act enforcement. It is estimated that there are 5,500 engineers employed in Manitoba, but only 3,552 are registered with our association (StatsCan, CCPE, and APEGM data). This means 35% or 1-in-3 are working without a license to practice engineering.

As a result, the Executive Committee of Council has agreed to allocate funds in the 2007-2008 budget to create a new enforcement officer position. This position will get involved in all sorts of Act enforcement activities, including: contacting persons and firms and making site visits to industries where

*continued on page 11*

# Rules, Rules, and More Rules . . .

S. Sankar, P.Eng.

It seems like life is very complicated these days. Everything, and everyone, is subject to rules, procedures, and it's hard not to get frustrated sometimes.

At APEGM, it may seem as though we are full of rules. We have our Act, Code of Ethics, and Bylaws – and our Manual of Admissions. We are also subject to the policies of Council, Registration Committee, Experience Review Committee, Academic Review Committee, and others. Yes, it seems like we have many Masters – but this is part of being a self-governing organization.

One of our sources of rules – the Manual of Admissions – was not easy to develop. The policies and procedures described therein represent many years of hard work and debate, sometimes heated, by many different APEGM committees and APEGM councils.

Is it a perfect document? No . . . However, developing a perfect document that would apply perfectly to all individuals for all different cases is both unrealistic and impossible.

APEGM is bound to follow the Manual of Admissions, and sometimes this can lead to frustration among members and former members who are trying to reinstate as full practicing members.

How often have we heard the statement: "I've been in the construction business for 20 years – and now you're making me write the Professional Practice test (PPT), and making me send in references?" If you have been retired from APEGM for more than four years – the answer is "yes". Why would you feel that the rules do not pertain to yourself just as much as to someone else?

Sometimes, granted, there are situations where it is difficult, if not impossible, for someone to comply with 'the rules' as stated.

If there are sufficient grounds to believe that you are not able to comply with certain procedures, we will do our best, within the scope of our powers, to make it less difficult for you – especially if you can explain the situation in a calm manner and LISTEN to what we have to say. We're under constraints as well, and 'going ballistic' will not

make things go any faster – not that it happens to anyone of course.

So, what are some of 'the rules' that many members and former members are often NOT generally aware of? These are available in the online section of our Manual of Admissions: [http://www.apegm.mb.ca/practice/policies/MoA\\_Sep\\_2004v20-010107.pdf](http://www.apegm.mb.ca/practice/policies/MoA_Sep_2004v20-010107.pdf). Particularly, section 2.0 - I urge you all to review this section carefully whether you're a current member, a former member or a retired member. Also, if you intend to resign – make sure that you do so in writing – by fax, letter or email. This way, we have something on file for when you decide to come back. Please note also, that if you decide to move to Alberta – we still need official notification of resignation in order for you to be considered 'resigned in good standing'.

If you have doubts or questions, please contact us – preferably before the fact. We DO recognize that extenuating circumstances happen, but we can't do anything if we don't know about it!

The vast majority of the APEGM membership is a pleasure to work with, and we appreciate your work in supporting the profession by serving on volunteer committees, council, and acting as mentors and supervisors of MITs. ■

*continued from page 3, Notice*

Additional nominations may be made by the membership. Nomination forms are available from the Association office. The consent of the nominee must be obtained, and the nominator and six other members must sign the nomination form. **Nominations must be received in the Association office on or before Friday, September 14, 2007.** Each completed nomination form must be accompanied by the nominee's resume, a history of the nominee's Association activities and the nominee's platform (not to exceed 100 words). Forms for the resume are also available from the Association office.

## BY-LAW CHANGES

By-law 17.1 prescribes that any proposal to introduce new By-laws, or to repeal or amend existing By-laws, at a duly convened meeting of the Association must, unless initiated by the Council, be signed by not fewer than six members. Proposals must be given to the secretary at least 45 days before that meeting. In this case the date for the receipt of a proposal is **Wednesday, September 12, 2007.**

## RESOLUTIONS

By-law 5.1.4 prescribes that resolutions put forward at an annual general meeting must be in writing, signed by the mover and seconder, and received by the Secretary no less than 48 hours prior to the commencement of the meeting. Either the mover or the seconder must be present in person or by distance conferencing at the meeting for the resolution to be considered.

*Grant Koropatnick, P.Eng.  
Secretary of Council*



M.G. (Ron) Britton, P.Eng.  
Thoughts On  
Design

## . . . AND CHANGES IN DESIGN EDUCATION

Six and a half years ago I was identified as one of five recipients of a Natural Sciences and Engineering Research Council (NSERC) Chair in Design Engineering.

This was a new NSERC program which was launched to provide a means of increasing, changing, or introducing more design content into engineering education. I cannot say what the proponents of this program had in mind, but with the benefit of increasingly long hind site, I can reflect on its effect on me, and those around me.

The Chairs were awarded through a competition. I submitted our proposal and sat back to see what would happen. Like any time you “win” a competition, my initial reaction was euphoric. That soon led to wondering what I had gotten into. I now held a Chair. The Chair was supposed to introduce change. But change requires a clear vision and an almost infinite amount of cooperation.

I never worried about cooperation because I have spent my career surrounded by forward thinking people. At that stage, however, the vision was, at best, naive but without doubt, very ill defined. As some philosopher once observed, “if you don’t know where you are going, you won’t know when you get there.”

Being the holder of a Chair in a university is a double-edged sword. It provides you with the resources and the time to devote toward a goal. It also creates a very visible

responsibility to make something happen within an institution that changes at a considered, arthritically slow pace.

Without getting into a diary of specifics, suffice it to say that I have been fortunate to be able to surround myself with a group of people who are willing to share my ill defined, fuzzy vision and help me increase its clarity. In my mind, this group has provided me with what I call my “Chair experience”. What has happened, both physically and philosophically, is due to their efforts and their collective imaginations. If I have misunderstood their advice, that is my fault, not theirs.

Like most professors, I hold a Doctor of Philosophy degree. Like most engineering professors, I have never had any formal training or education in philosophy. In spite of that academic inadequacy, the Chair experience has allowed me to develop something amounting to a philosophy of Design Engineering Education.

Most engineering graduates will build their careers on their bachelor’s degree. We must, therefore, provide those graduates with a foundation upon which they can build. Graduates must be technically competent within some field of our all encompassing profession.

In four or more years they must grow from bright teenagers with stars in their eyes to maturing young adults capable

of dealing with the latest technologies. They must understand the scientific base upon which the technologies are founded and the simplifying assumptions that allow the new technologies to come into existence.

But there is more to Engineering than specific technologies, and the education process must help new graduates understand how they fit into the larger world beyond the sheltered environment of the university.

These are the so called “soft skills”. It is necessary, but not sufficient, to be competent in some narrow area of engineering. Graduates need to understand how to work in teams, how to present ideas, how to determine risk, how to accept responsibility and how to contribute within the legal and moral constraints of our profession. These concepts do not fit, and probably should not be the focus of, the specialized department-based instruction.

The existing academic departments are efficient and effective deliverers of the technical competence component of the required education mix. They need to be maintained and strengthened. On the

other hand, the “soft skills” that are universal to the profession can probably be delivered more effectively by an over arching element that allows all

“Education is too important to leave to academics”



The following are brief summaries of some recent local news items which may be of interest to the APEGM membership.

### PROSPECTORS AND DEVELOPERS CONVENTION

The 75<sup>th</sup> annual convention of the Prospectors and Developers Association of Canada (PDAC) took place in Toronto, March 4 to 7, 2007. As usual, it was a mega event with: 17,600 attendees representing over a hundred countries; Toronto Mayor David Miller declaring March 4 to 11 Mineral Exploration and Mining week; presence of personalities like federal minister Monte Solberg and Greenpeace founder Patrick Moore, not to mention Manitoba's very own Mines Minister Jim Rondeau; numerous technical papers; discussion of investment opportunities; and schmoozing amongst the movers and shakers of the mining community. Rondeau took the opportunity to highlight some late-breaking good news about Manitoba mining. The Fraser Institute, the Vancouver based think tank, ranked **Manitoba as the best place in the world** for mineral exploration and development. Their ranking is done on the basis of effects on mining exploration of government policies on things such as environmental regulations, regulatory duplications and uncertainties, taxation, native land claims and political stability. It is not that Manitoba is a pushover in any of these areas, but simply that its policies are reasonable, predictable and transparent, qualities that the industry values. Also, the previous year had been the best ever in Manitoba for mining – value of production soaring to \$2.1 billion and mineral exploration expenditure hitting \$52 million.

(PDAC website and Winnipeg Free Press, March 6, 2007)

### GROUNDWATER TABLE

Through a letter to the editor of The Winnipeg Free Press, Frank Render, P.Eng., made a few clarifications regarding the rise of the groundwater table in downtown Winnipeg that the Free Press had reported earlier, and which we had cited in this column of the last *Keystone Professional*. First, the correct terminology is "aquifer water levels" and not "water table" as reported. The

water table relates to the overburden only. Second, the current aquifer levels have essentially been about the same since the 1980s and the rise is not a recent event. However, these levels are about 4 to 5 metres above the peak levels of the 1960s. Thanks Frank.

(Winnipeg Free Press, March 26, 2007)

### AIRPORT CONSTRUCTION

Construction for the new passenger terminal at Winnipeg's Richardson International Airport has started. This follows the completion of the first phase of the redevelopment of the airport which included a new parkade, initial roadwork and land drainage. The \$300-million, 510,000- square foot terminal is scheduled to open in December 2009.

(Winnipeg Free Press, February 22, 2007)

### BRIDGE AND OVERPASS REPAIR

Premier Gary Doer announced that the Province will spend at least \$261 million over the next five years to repair 63 bridges and overpasses, as a part of the commitment to spend \$4 billion on upgrading roads and bridges over the next decade, most of which are over 40 years old. Included, are a new bridge over the Bloodvein River and an overpass at Highway 59 and the Perimeter.

(Winnipeg Free Press, February 23, 2007)

### ENGINEERING TUITION INCREASE AT U OF M

A long running controversy amongst the University of Manitoba's engineering students regarding a 38.5 percent increase in tuition fees was put to the vote in March. There was a 58 percent turnout, of whom, 64 percent voted in favour of increasing the fee for each credit hour of engineering courses from \$104 to \$144. The proposal still has to pass approval by the board of governors of the university and the Province's Council on Post-Secondary education. The proposed increase would raise about \$1 million annually which would go towards increasing the quality of education through measures such as hiring of additional faculty, upgrading of lab equipment and provision of bursaries for students in financial need.

(Winnipeg Free Press, March 6 and 9, 2007)

### CARGO AIRSHIPS

In an *op ed* piece, Barry Prentice of the University of Manitoba has made a strong case for cargo airships. He contends that all technical challenges – materials, aero-engineering design, weather forecasting and computer-assisted avionics – have been met, but what is now required for airships to become the dominant mode of transport in the North in the 21<sup>st</sup> century is business confidence and policy direction. Other than in the Canadian North, suitable terrains for cargo airships are Alaska, Siberia, the Congo, the Australian Outback and the Amazon, i.e., places in need of year-around heavy-lift capability but lacking transportation infrastructure. In a related development, at a Winnipeg conference on mining in Nunavut, a British airship company, the SkyCat Group, was exploring business opportunities.

(Winnipeg Free Press, February 4, 2007)

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Marie Lemay, P.Eng., ing.  
CCPE CEO's  
Message

## BRIDGING GOVERNMENT AND ENGINEERS: BUILDING ON THE MOMENTUM

Over the past few years, the Canadian Council of Professional Engineers (CCPE) has been increasingly branching out to government in order to directly influence federal public policy. A significant initiative of this effort, our Bridging Government and Engineers (BGE) project, has completed the first year of its implementation phase. As we build on the project's momentum we are moving forward using the best practices developed from lessons learned.

As outlined in my January/February 2006 CEO Message, BGE is a grassroots initiative that links Canadian engineers with their local members of Parliament (MPs). Bridging engineers with key political decision-makers not only builds the federal government's awareness of the engineering profession, but also enables engineers to make a valuable contribution to issues that affect Canadians at large.

We have succeeded in increasing our influence on government, with 80 BGE volunteers having been linked thus far with their local MPs. But there is still much to be done.

We have ambitious plans for the next phase of the project. We will work to continually increase volunteer numbers, to develop volunteer retention strategies, and to motivate volunteers in maintaining ongoing contacts with their MPs.

A number of BGE volunteers have reported enthusiastic responses from MPs and have been working with them

to provide input on topics where CCPE's government relations issues intersect with their parliamentary responsibilities. As such, BGE complements CCPE's significant government relations activities and outputs by forging new relationships and strengthening existing bonds.

The key strength of the program is that the BGE volunteer resides or works in the MP's riding. Having parliamentarians recognize that there are engineers in their constituency - engineers who make positive contributions to society at both the local and national levels - validates the profession in their minds.

By linking engineers with their local parliamentarians we are more effectively getting the voice of engineering heard at the grassroots level. Focusing our communications efforts on local ridings builds the profile of engineers and ensures that the profession can be a part of policy development.

Over the first year of implementation, we updated our BGE training materials, taking into account lessons learned during the pilot project and reflecting the changes in Ottawa's political environment. We received positive responses from volunteers regarding the training presentations and supporting materials that we provide to assist them in maintaining an ongoing dialogue with their MPs.

A new website for BGE volunteers has also been launched, providing an important forum for volunteers to keep up-to-date

with the program and its activities, and providing a platform for volunteers to share success stories. Volunteers are important resources to both CCPE and the profession. We make every effort to support them and to ensure that they have the resources they require.

Being that BGE is a national initiative, CCPE works in partnership with its constituent members to identify suitable candidates to take part in the program. Going a step further, several constituent members have developed their own grassroots outreach programs within their jurisdictions. We are working together, sharing common experiences in order to maximize the lessons learned, to identify the next series of volunteers, and to ensure that there is minimal duplication of efforts.

If you are interested in representing our profession by participating in the Bridging Government and Engineers project, please contact Kevin Machida, Manager, Government Relations, at [kevin.machida@ccpe.ca](mailto:kevin.machida@ccpe.ca)

I urge you to help us build on BGE's momentum. Our BGE volunteers educate the government on issues of importance to both the profession and society, which helps parliamentarians make better-informed policy decisions. By participating in BGE, volunteers are getting the voice of our profession heard on Parliament Hill. ■

# Professional Development & Networking Events

## Business Management Seminar

A. Erhardt, EIT

On February 19, 2007, the APEGM Professional Development Committee, along with the IEEE Winnipeg Section welcomed Carl Selinger to the Niakwa Golf and Country Club for a one-day seminar entitled "Stuff You Don't Learn in Engineering School". Mr. Selinger opened up by introducing himself to everyone, and followed it up by getting all of the attendees to stand up and introduce themselves – an excellent icebreaker and great networking opportunity.

The goal of the seminar was not to focus on the technical aspects of engineering, but to examine the soft skills that are needed, and often required, in our day-to-day activities in the work place. As Mr. Selinger described it, "Technical competency is the core of engineering; the other "stuff" helps you be more effective and happier".

The first area of focus was communication skills – writing, speaking, and most importantly, listening. There are many simple concepts that can be used to help improve these skills; whether it is taking the time to read more in order to improve your own writing skills, practicing a speech in front of a mirror, joining a Toastmasters group, or simply making eye contact and showing interest when involved in a conversation.

After a short break, the seminar continued with discussions on decision-

making and negotiating. Naturally, information and many options need to be considered before any decision can be made. In negotiating, the traditional "split the difference" attitude is often not the best way. However, regardless of the path chosen, it is important to be decisive and confident with the end result.

It was clear that meetings are a key issue to Mr. Selinger. Getting everyone involved in a meeting is necessary, but it is important to respect people's time. Several stories and examples of meetings gone awry were shared and it quickly became clear that the two main keys to a successful meeting are a clear agenda and a clock.

During the lunch break, Karen Mallett, co-founder of The Civility Group, spent some time going over corporate courtesies and etiquette in general. An etiquette quiz was distributed for everyone to fill out, and the attendees were tested on everything from handshakes and introductions, to which fork to use at what time. It was a light-hearted, but beneficial presentation that everyone enjoyed.

The focus of the afternoon was one of self-examination. What can we do to work more effectively with less stress? The first area explored was in setting priorities. The debate of efficiency versus effectiveness was weighed in upon. One theory that Mr. Selinger employs is that if you can do something in three minutes or less, do it!

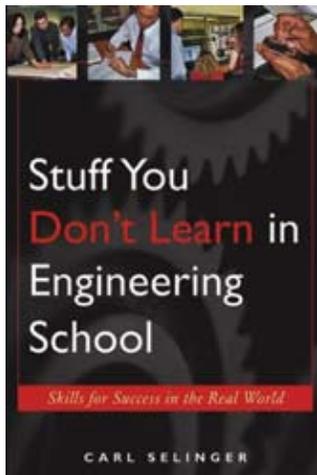
Creativity is an area in which engineers seem to be lacking. It is important to look at situations and problems from different perspectives. Mr. Selinger gave several examples where simple statements from different people inspired innovation and success. "What made you think

of that?" is a simple phrase, but a powerful tool in unlocking ideas.

Prioritizing, creativity, motivation and how to work with others in a way that not only helps us, but helps them as well – these and many more issues were discussed. However, the theme of the discussion was clear: by understanding ourselves, and those who surround us, it is possible to not only get things done, but to excel at them and achieve both success and happiness in our lives.

The presentation by Mr. Selinger was thoroughly enjoyed by all who attended. By mixing in his personal experiences and anecdotes with the ideas and strategies that he wanted to get across, it made the day both educational and enjoyable. He also left a short list of suggested reading that delves deeper into several of the topics that were discussed. He has read each title and left comments to help make a selection that much easier.

Thanks are in order for both Carl Selinger and Karen Mallett for sharing their time, ideas, and knowledge, to not only help us in becoming better professionals, but better people as well. ■



### In Memoriam

*The Association has received, with deep regret, notification of the death of the following members:*

*William Burbidge  
Howard Card  
Theodore Cates  
Steven Gebler  
Paul Kowalyk  
Robert Morris  
Leslie Tough  
Joanne Wong Li*

# Geothermal Energy Solutions

*N. Soonawala, Ph.D., P.Geo.*

**Presentation By  
Brent Laufer**

**February 28, 2007**

Brent Laufer gave a presentation, "Geothermal Energy Solutions in Manitoba", at a breakfast meeting at the Norwood Inn, Winnipeg on February 28, 2007. The talk described geothermal systems in Manitoba, how these systems work, and the benefits of using geothermal for climate control in the commercial, institutional, and residential sectors. The technical aspects of a geothermal system were also discussed.

Brent Laufer is a Geothermal Specialist Distributor & Commercial Representative for WaterFurnace in northwestern Ontario, Manitoba, Saskatchewan, and Alberta. He has been involved in the geothermal industry since 1985. He is president and Chair of the Manitoba Geothermal Energy Alliance (MGEA).

The temperature of the ground is fairly constant below the frost line. The ground is warmer in the middle of winter, and cooler in the middle of summer than the outside air. A single efficient earth-energy system can be used for both heating and cooling, eliminating the need for separate furnace and air-conditioning systems. This system can also heat water at no additional cost.

During winter, an earth energy system uses a series of buried pipes to transfer the heat from the ground into

a building, and converts it into warm air and distributes it through ducts. In summer, the system is reversed and it transfers heat out of the building using the cooler ground as a heat sink.

The system can be in either a closed or open loop configuration, and the loop itself can be either horizontal or vertical. Closed-loop systems circulate a fluid mixture within the buried pipes, while open-loop systems circulate well or surface water. Ground-source heating systems do not create heat through combustion or electrical resistance -- they simply move solar heat that is stored in soil or water from one place to another.

Mr. Laufer briefly described the different types of loops in use: the open, the horizontal (trench type or bore type), vertical, and pond/lake. The vertical loop, consisting of drilled boreholes, constitutes about 95% of the loops in existence. About 200 ft. of bore is required for 1 ton or 12,000 BTU per hour of cooling.

The installation cost of a residential geothermal system is about the same as that of a high-efficiency natural gas furnace. The life expectancy is 10 to 20 years. Operating costs are about 40% of a high-efficiency natural gas furnace.

Benefits to the environment are enormous when ground-source climate control systems are used. Over

its lifetime, a typical system would eliminate greenhouse gases equivalent to those produced by about 2,900 rail cars of coal or 5,300 automobiles.

Mr. Laufer showed a series of pictures of buildings where ground-source climate control systems have been used. These include various houses, the Narrows Lodge on Lake Manitoba, various camps, recycling plants, curling clubs, and churches.

Mr. Laufer finally shared his valuable experience by providing advice on how to start out right in planning a ground-source climate control system. Some of the major considerations are: characteristics of the site, building zone loads and block loads, loop lengths, and type of pump. The thermal conductivity of the ground is an extremely important consideration. A number of pictures of assemblies and loops were shown. Loop sizing software is also available.

In response to a question about regulatory requirements for the industry, Mr. Laufer said that the MGEA is promoting policies and procedures and that there is a standard issued by the Canadian Standards Association.

We thank Brent for a very informative talk and for sharing his valuable expertise and experience. ■

*continued from page 5, Executive Director's Message*

unregistered persons are suspected of practicing engineering and geoscience, presentations to HR managers on the legal requirements for practicing under the Act, reviewing published documents and advertisements for violations, and checking on members of other provinces who are working in Manitoba but are not registered with the APEGM.

We will be looking for a candidate with good background and experience in professional regulation. The qualifications include: a minimum of seven years

experience; a general knowledge of various engineering disciplines with detailed knowledge of provincial and national regulatory requirements for engineering and geoscience.

Must be diligent and precise in their work methodology and be able to interact constructively and effectively with other engineers, lawyers, and lay people in sensitive situations. A strong pioneering spirit to research, design, establish and operate a top quality program on behalf of all members. It would be ideal for

the candidate to be a P.Eng. or P.Geo., but this is not an absolute requirement. Some provincial regulators have hired enforcement officers with a combination of legal background and technical experience.

Your feedback is welcomed. If you have any ideas for this position or know of a potential applicant, please email us at [apegm@apegm.mb.ca](mailto:apegm@apegm.mb.ca). ■

# Professional Development & Networking Events

## Waverley West - Innovative New Suburb or "Same Old, Same Old"

Q. Menec, P.Eng.

On March 13, 2007, a successful gathering of approximately 150 people attended the professional development presentation on the Waverley West Development design at the Viscount Gort Hotel. The presentation was delivered by Mr. Paul McNeil, MCIP, and Mr. Richard Tebinka, P.Eng., of ND LEA, and was structured around a general overview of the project, as well as detailing some of the differences Waverley West is proposed to have versus a typical development.

Waverley West is located in the south west of the City of Winnipeg, bordered by Bishop Grandin Boulevard to the North, Waverley Street to the East, Brady Road to the West, and the Perimeter Highway to the South.

In a project backed by Manitoba Housing Renewal Corporation (MHRC) (43% ownership) and Ladco (35% ownership), ND LEA's role includes providing the Plan Winnipeg application, area structure plan, north-east rezoning, subdivision and neighbourhood plan, and south-east neighbourhood transportation review. Many other consulting firms have also been involved in the process: Stantec for MHRC, Wardrop for Ladco, and KGS Group for Manitoba Hydro.

The Waverley West concept is to provide six neighbourhoods with a town centre. Transportation considerations arising from traffic impact studies and the overall transportation report include the need for

major routes, neighbourhood access, commercial access, and transit design system.

The design solution for major routing is a split-pair routing configuration with a one-way pair in the northern area (separated by the town centre) for Kenaston Blvd. Similarly, Bison Drive has been considered for traversing the development as a one-way pair at the town centre.

Roundabout use to improve the traffic flow is also of prime consideration. Other transportation considerations include transit proximity to residential areas and walkway connections, active transportation design for walking, cycling, & rollerblading, interconnections between neighbourhoods and wider walkways with a complete sidewalk system. These factors all serve to make Waverley West a more accessible, vibrant community.

The first neighbourhood includes around 340 acres, with 1000 units on MHRC lands, and an allowance for over 350 units on lands owned by others, plus a school site. Nearly all

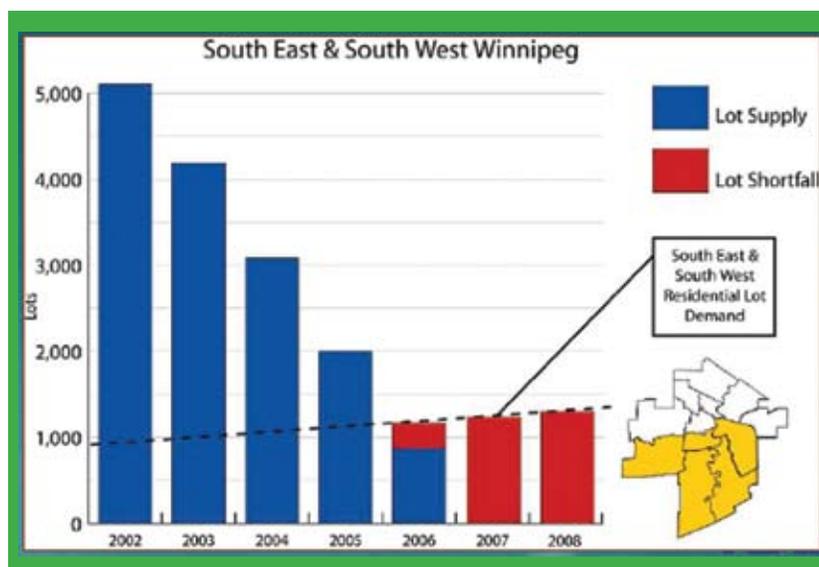
lots are to fall within 200m of a bus route.

Thirty acres of wooded areas, sidewalks on both sides of all streets, and a linear park / pathway system are to provide internal connections to adjacent neighbourhoods and the TransCanada trail.

With reduced front yard set-backs and "wide-shallow" lots, accommodating the sidewalk and expected increase in overall market density, the "walkable" community concept is to extend from the intra-neighbourhood to the inter-neighbourhood areas, such as linkages to Whyte Ridge, Fort Whyte and Assiniboine Park, and to Fort Richmond and St. Norbert.

The Town Centre concept is approximately 120 acres that includes a mix of retail, office, multi-family, regional high school, and regional recreational facility design. An internal street pattern to create a more "fine-grained" fabric with character is planned.

As of March 13, 2007, the north-east neighbourhood plan has been approved, engineering for Stage 1 completed with works tendered, the draft development agreement is under review, and expected construction start date is within weeks. Lots are anticipated to be available for builders by the fall of 2007, with home occupancies to follow in 2008. Waverley West is definitely being designed with the goal to "look" and "feel" different from a typical subdivision designed in the late 1990s. ■



# An Investigation of Canadian Women Engineers: Exploring the Role of Educational Work Experiences in Shaping Career Paths

L.M.K. Melvin, P.Eng.

In the evening on Thursday, March 29, 2007, the APEGM Women's Action Committee was pleased to host approximately 25 guests to hear the presentation, "An Investigation of Canadian Women Engineers: Exploring the Role of Educational Work Experiences in Shaping Career Paths" by Dr. Sandra Ingram, Design Engineering, University of Manitoba, and Ms. Irene Mikawoz, P.Eng. Prairie Regional Office, Natural Sciences and Engineering Research Council, NSERC. The event was hosted in the Lobby Boardroom at Smart Park, near the University of Manitoba.

Dr. Ingram and Ms. Mikawoz's research began in 2005 with the implementation of a two-phase, mixed method study to collect quantitative and qualitative data to investigate the career paths of women engineers in Manitoba.

Firstly, an online survey of both men and woman engineers at four medium to large-scale Manitoba-based companies was conducted. Secondly, follow-up interviews with women engineers were completed to provide qualitative data.

Preliminary analysis reveals that prior work experience for their employers in the form of cooperative or internship programs provides engineers, and particularly women, with a collection of "soft skills" critical to later career success.

Cooperative education has a history of approximately 15 years in the Faculty of Engineering at the University of Manitoba, and exists in the traditional co-op model – alternating school and work terms after second year, or the internship format – a 16 month experience beginning the summer of third year.

Profiles of study participants indicate that cooperative education

and internship programs provide opportunities to make early investments in mentorship, networking, and volunteering.

The development of these skills is crucial for acquiring self-confidence and assertiveness, which in turn improves visibility and promotability in engineering.

Quantitative data reveals that respondents with co-op or internship experience reported more interpersonal support, career support, and rated their mentor's knowledge higher than those without the experience.

A summary of the qualitative analysis indicates that women under the age of 30 who have had co-op experience are confident, focused, and poised for the future. However, these women are already planning to implement adjustments for motherhood, either by modifying work schedules or limiting family size.

This trend is further displayed by women interviewed in the 30-35 years and early to mid-40s age groups. The next phase of the research will delve into differences in career success based on patterns of formal and informal mentorship as well as formal and informal networks, and the impact of gender.

The presentation was a great cornerstone for generating thoughts and ideas. Following the presentation, the attendees divided into three breakout groups to discuss the following questions:

1. Which experience do you think is more valuable to your career success - mentor? network? both? Why?
2. What do you see as more beneficial - informal or formal (loosely organized versus

organization or professionally sponsored events) mentorship? Why?

3. How do you go about getting a mentor? What strategies would you use?

Attendees with varied experiences focused on the questions to spark discussions and generate the following conclusions.

Mentoring is especially important at the beginning of one's engineering career. It is extremely helpful when an experienced person takes an inexperienced co-worker under their wing.

The mentor can also play a key role in assisting to establish one's network, which becomes important later in a career as one requires a greater variety and scope of knowledge and experiences to draw upon. Informal and formal mentoring are both beneficial.

Mentoring aids in learning workplace culture, and can happen between people with various training and backgrounds. However, the responsibility of mentoring requires mutual interest and commitment between the mentor and the protégé.

In conclusion, we appreciate the positive findings of Dr. Ingram and Ms. Mikawoz's initial research and look forward to more outcomes. Formal and informal mentoring is taking place among engineers in Manitoba.

Mentoring plays a key role in developing the soft skills one needs to succeed. Furthermore, we all have an important role to play in shaping career paths for ourselves as well as the career paths of those following in our footsteps. ■

**Presentation By  
Sandra Ingram  
& Irene Mikawoz  
March 29, 2007**

# Professional Development & Networking Events

## Project Risk - A PMI Approach

Q. Menec, P.Eng.

A group of approximately 50 people attended the Professional Development presentation on Project Risk held at the Holiday Inn South on April 11, 2007. The presentation was delivered by Mr. Victor Kolynchuk, an architect with Smith Carter, knowledgeable in the area of project risk and the six aspects of risk management.

The Project Management Institute (PMI) approach is typically used on projects to ensure good project management practice. There are nine PMI knowledge areas including risk and, with risk now being much more visible, a proactive approach to looking at risk is essential. While different people, or groups of people, have different perceptions of risk at different times, it is imperative to examine risk and have an understanding of the six aspects of risk management to obtain some comfort and consistency in assessing risk.

Risk is defined as the possibility of injury, loss, or environmental injury created by a hazard. Risk is a function of probability, severity of consequences, and perception of communication received. The six aspects of risk management include: risk management planning (how to approach and plan risk management activities), risk identification (determining which risks might affect the project), qualitative risk analysis (analysis of risk to prioritize project impacts), quantitative risk analysis (assessing the probability and impacts of risk - estimating effects), risk response planning (developing procedures to enhance opportunities and reduce threats), and risk monitoring and control (monitoring existing risks, identifying new risks, monitoring effects, and taking corrective actions).

Risk management systems include

safety management programs, standards, and mandatory compliance systems for quality assurance (QA), and quality control (QC). Risk management planning needs to match the risk and importance of the project to your organization, and will vary with project stage and amount of information.

It is important to note that lack of risk management can be a project risk. Identification of risk can be obtained through various techniques such as through brainstorming, interviewing, SWOT analyses, checklists, industry norms, cause and effect diagrams, etc. It is from this analysis that qualitative and quantitative analyses can be made.

Qualitative analysis is utilized to prioritize project impacts and guide risk responses whereas quantitative analysis is used to determine the probability of achieving project objectives with the current plan and providing trend analysis. It is with this analysis that appropriate risk responses can be developed to enhance opportunities and minimize threats. Response categories include avoidance, transference, mitigation, and acceptance. It is important to note that transference of risk is often neglected and can typically include assigning specialty consultants to take on the high risk

work of a project. The correct response selection must be appropriate to the severity of the risk, cost effective and timely, realistic within project context, agreed to by all parties, owned by a responsible person, and have specific actions assigned to it.

As the project matures over time, new risks may develop and some anticipated risks may disappear, risk exposure may have changed, and risk triggers may have occurred. Project assumptions should be confirmed and scope changes may require new risk responses or changes to the project plan. Risk monitoring to monitor identified risks and residual risks, and to identify new risks is essential. This monitoring extends to execution plans used to address risks and it is by taking corrective action: choosing alternative strategies, implementing contingency plans, and replanning projects; that effective risk control can be achieved. ■

Presentation By  
Victor Kolynchuk

April 11, 2007



Cochrane Engineering is now part of **GENIVAR**, a leading Canadian firm offering a full range of engineering and environment services. We have over 1,800 employees in some 40 offices across Canada and internationally. GENIVAR is active in Municipal infrastructure, Transportation, Buildings, Industrial, Power and Environment. We are experiencing extraordinary growth, creating a wide range of career opportunities for qualified candidates. Currently our **Winnipeg office** is seeking to fill the positions of:

<b>Water Resources/Hydraulics Engineer</b>	WIN-0702-1
<b>Wastewater Process/Environmental Engineer</b>	WIN-0702-2
<b>Structural Engineer</b>	WIN-0702-3
<b>Transportation Engineer</b>	WIN-0702-4
<b>Land Development / Municipal Infrastructure Engineer</b>	WIN-0702-5
<b>Senior Project Engineer / Water Treatment</b>	WIN-0702-6
<b>Mechanical Engineer</b>	WIN-0702-7

Many career opportunities are presently available. For further information, we invite you to visit the career section on our website. If you are interested in any of the positions, please apply online or send your application by e-mail at: [bill.brant@genivar.com](mailto:bill.brant@genivar.com).

GENIVAR thanks all candidates. However, only those selected for further consideration will be contacted. GENIVAR is committed to equity in employment.

[www.genivar.com](http://www.genivar.com)

# Biofuels Research at the University of Manitoba

Presentation By  
David Levin  
April 25, 2007

N. Soonawala, Ph.D., P.Geo.

At a Professional Development luncheon seminar on April 25, 2007, held at the Holiday Inn South, Winnipeg, Associate Professor David Levin of the Department of Biosystems Engineering, University of Manitoba, described the need for biofuels at a global scale, the challenges of bringing the costs down to the levels of fossil fuels, the different types of biofuels and their biochemistry, what a biofuel industry would mean for Canada, and future research plans of his group.

The main reason behind the current interest in biofuels is that climate change is rapidly progressing and that the future of fossil fuels is uncertain. The atmospheric temperature is 0.7 degree Celsius higher than would be due to purely natural causes, and a sharp upturn in the CO<sub>2</sub> content of the atmosphere in the latter half of the 20th century matches predictions from models that take into account emissions due to industrial activity.

Discovery of new fossil fuel reserves is not keeping pace with consumption

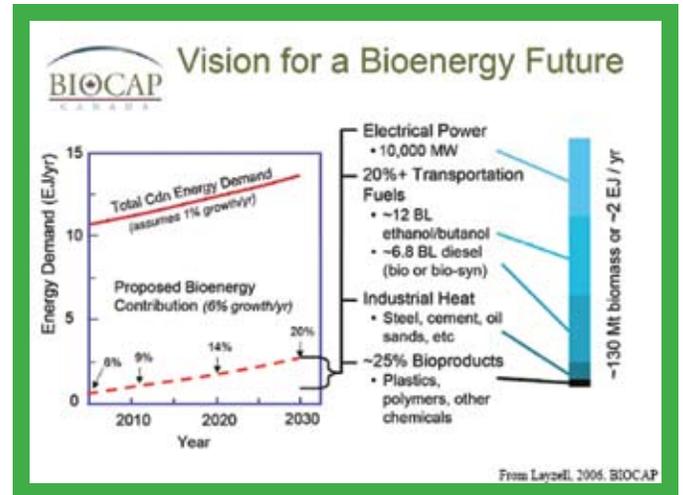
production is stepped up. The cost of fossil fuels at present is generally lower than that of biofuels, but is on the rise and the two would be comparable within the next decade.

A sustainable bioeconomy, i.e., where a nation uses its biological capital (forests, farmlands, and aquatic resources) to produce renewable energy and enhance environmental values, is very appropriate for Canada with its vast forests and farmlands, and low population density. Biofuels have the potential to cut Canada's current CO<sub>2</sub> equivalent release of 780 megatonnes per year by half, and produce 2 EJ per year or about 20 percent Canada's total energy by the year 2030.

The key challenge is to produce biofuels that are price-competitive with fossil fuels. The biofuels that can be made from biomass include biodiesel, which is made from either plant oil or animal fat, or ethanol, methane, and hydrogen, which are produced by fermentation.

The feedstock from which biofuels can be produced include starch-rich grains (corn, wheat), oil seeds (soy, canola), sugar-rich material (sugarcane, beet), or cellulosic material.

A chart showing the costs of various fuels indicated that biofuels are getting competitive with fossil fuels. Gasoline costs \$17 per GJ, while biodiesel costs



\$13.8 per GJ and bioethanol from grain costs \$15.8 per GJ.

In Professor Levin's opinion, biodiesel is the most immediate option for Manitoba because of: feedstock availability, affordable land and labour costs, strong livestock industry, low energy costs, large transportation sector, and a prime location for export.

Biodiesel production has a very favourable energy balance of about 3.2 to 1, i.e., the ratio of energy produced to that consumed in the production process. Currently, 850 million litres of diesel are annually consumed in Manitoba and about 29 billion Canada-wide. It is estimated that Manitoba will produce 85 million litres per year of biodiesel by the year 2010.

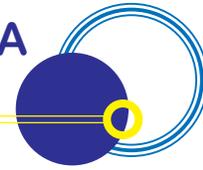
Ethanol has several advantages over gasoline, including better engine performance and reduced emissions. A problem is the rather low efficiency of converting wheat and cellulosic biomass to ethanol, e.g., about 300 L of fuel per dry tonne of feedstock for most cellulosic feeds.

Sugar, starch, and cellulose each have distinct molecular structures which have a bearing on processes for converting the feedstock to fuel. This analysis was a bioscience approach, as opposed to the usual engineering perspective.

continued on page 27

and the reserves have limited life. For example, the Alberta tar sands have a production life around 85 years at the current production rate, which could decrease to a mere 17 years if

# 2007 CONSULTING ENGINEERS OF MANITOBA AWARDS OF EXCELLENCE



**R.G. Rempel, P.Eng.**

Excellence in engineering was celebrated by members and clients of the Manitoba Consulting Engineering industry at the 8<sup>th</sup> Annual Manitoba Awards of Excellence in Consulting Engineering, held at the Winnipeg Convention Centre on April 13, 2007. Winners were announced at a gala dinner attended by over 300 guests including a “who’s-who” of the engineering industry, government and Manitoba’s business community.

Hosted by the Consulting Engineers of Manitoba (CEM), this prestigious annual event recognizes the achievements of consulting engineers in Manitoba, their contributions to society, and serves as a prominent showcase of the industry’s outstanding products and services.

The CEM Awards were hosted by industry favourite and Master of Ceremonies Mr. Peter Jordan, Gemini-award winning television personality with CBC television. Musical performance throughout the evening was provided by the Walle Larsson Jazz Quartet. Elizabeth Murray, “honourary piper” to Queen Elizabeth II, piped in the dignitaries during their entrance to the Awards ceremonies.

Nineteen projects, ranging in size and complexity, were submitted by consulting engineering firms to compete in one or more of six awards categories: Building Engineering,

Infrastructure, Environmental, Industrial, Innovation, and Resource Development.

The collection of projects contending for this year’s Awards ranged from large complex assignments to smaller, yet highly specialized engineered solutions. Overall, the projects represented the consulting engineering industry’s value to clients in maximizing sustainability, value in infrastructure upgrade and renewal, and benefits to society through projects that served sectors including mining, transportation, electric power generation, water utilities, scientific research, post-secondary education, and also facilities dedicated to affordable housing and public recreation.

Judging was conducted by a “Blue Ribbon” panel of esteemed independent industry professionals, chaired by the University of Manitoba’s Dean of Graduate Studies, Dr. Jay Doering, P.Eng.

The judging panel included Barry MacBride, P.Eng., City of Winnipeg; Dr. Doug Ruth, P.Eng., Dean of Engineering, University of Manitoba; Dr. James Blatz, P.Eng., University of Manitoba; Lawrence Ferchoff, P.Eng., Past President of APEGM; Dr. Digvir Jayas, P.Eng., University of Manitoba; Dave Ennis, P.Eng., Manitoba Director for CCPE; Grant Koropatnick, P.Eng., Executive Director and Registrar for

APEGM; Malcolm Symonds, P.Eng., Engineer-in-Residence, University of Manitoba; Tom Moffat, P.Eng., Manitoba Hydro; and Bill Larkin, P.Eng., City of Winnipeg.

Each project was subjected to a critical review and was evaluated in seven key areas: innovation, added value, advancement of technology, technical excellence, degree of difficulty, management of risk, and most importantly, benefit to society.

The prestigious CEM Keystone Award, an overall “Best of Event” award, was presented to the project that best demonstrated the standards of excellence in product and service upheld by the Awards of Excellence Program.

In addition, an individual honour was bestowed in the Lifetime Achievement Award celebrating the leadership, achievements, and contributions of a CEM professional engineer throughout his/her career. The CEM Awards’ title sponsor XL Insurance/Oldfield Kirby Esau presented the Lifetime Achievement Award to Alfred Poetker, P.Eng., in recognition of the exceptional leadership, integrity, innovation, diligence, and unwavering respect for his fellow engineers and the citizens of Manitoba demonstrated throughout 42 years of practice.

The Lifetime Achievement Award Winner also presents the Keystone



Award of Excellence in Infrastructure went to ND LEA Inc. for their work on the Red River Floodway Expansion Project – Temporary Rail Detours Project.

CEM President Roger Rempel (Left), presented this award on behalf of ENCON to the team from EarthTech.

Dean Doug Ruth from the Faculty of Engineering (right) presented the award to UMA's winning team.

Award to the best overall project of the CEM Awards in a given year. Mr. Poetker was selected by CEM to present the Keystone Award in honour of his distinguished record of service to the consulting engineering community. Mr. Poetker presented the Keystone Award to Acres Manitoba Ltd. for their development of a comprehensive field-based data collection program for monitoring the sedimentation and erosion impacts resulting from Manitoba Hydro's Wuskwatim, Keeyask, and Conawapa generating stations.

The CEM Awards of Excellence Program continues to grow and the CEM thanks the Manitoba engineering community for continuing to participate in this showcase and celebration of our industry. Media coverage of the event was provided in the Winnipeg Free Press. The award-winning projects will be showcased further in other public events and locations throughout the next year.

The 2007 Consulting Engineers of Manitoba Awards of Excellence were awarded as follows:

**KEYSTONE AWARD:**

*Firm:* Acres Manitoba Limited  
*Client:* Manitoba Hydro  
*Project:* Wuskwatim, Keeyask and Conawapa Sedimentation and Erosion Physical Environment Monitoring Programs

**AWARDS OF EXCELLENCE:**

*Category:* Infrastructure  
*Firm:* ND LEA Inc.  
*Client:* Manitoba Floodway Authority  
*Project:* Red River Floodway Expansion Project – Temporary Railway Detours

*Category:* Industrial  
*Firm:* Earth Tech (Canada) Inc.  
*Client:* Manitoba Hydro  
*Project:* Brandon Generating Station Cooling Tower Biocide System Replacement

*Category:* Innovation  
*Firm:* UMA Engineering Ltd.  
*Client:* Manitoba Floodway Authority  
*Project:* Twin Red River Floodway Bridges on Trans Canada Highway No. 1 East

*Category:* Environmental  
*Firm:* Acres Manitoba Limited  
*Client:* Manitoba Hydro  
*Project:* Wuskwatim, Keeyask and Conawapa Sedimentation and Erosion Physical Environment Monitoring Programs

*Category:* Resource Development  
*Firm:* J.R. Cousin Consultants Ltd.  
*Client:* Rural Municipality of Victoria  
*Project:* Holland Chlorine Dioxide Disinfection

**AWARDS OF MERIT:**

*Category:* Building Engineering  
*Firm:* Crosier Kilgour & Partners Ltd.  
*Client:* The University of Manitoba  
*Project:* Building for the Future – the University of Manitoba Engineering and Information Technology Centre

*Category:* Infrastructure  
*Firm:* KGS Group  
*Client:* The Jim Burns Family Foundation  
*Project:* The Plaza at the Forks

*Category:* Industrial  
*Firm:* SNC-Lavalin Engineers & Constructors Inc.  
*Client:* Ontario Ministry of Natural Resources  
*Project:* Dorion Fish Culture Station Renovation

*Category:* Innovation  
*Firm:* ND LEA Inc.  
*Client:* S.A.M. (Management) Inc.  
*Project:* Pocket Suites Affordable Housing

*Category:* Resource Development  
*Firm:* KGS Group  
*Client:* City of Winnipeg  
*Project:* Hawthorne Flood Pumping Station

**PERSONAL AWARDS OF RECOGNITION:**

Alfred Poetker, P.Eng. Lifetime Achievement Award

Congratulations to all firms entered in the 2007 CEM Awards Program, in particular to the firms who won Awards of Excellence and Awards of Merit. The CEM would also like to thank its Award Sponsors for 2007:

- Event Title Sponsor:  
XL Insurance/Oldfield Kirby Esau Inc.
- Award Category Sponsors:  
Winnipeg Construction Association  
University of Manitoba Faculties of Engineering and Science on behalf of the Engineering and Information Technology Centre  
Manitoba Hydro  
ENCON Group Inc.  
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Province of Manitoba, Department of Infrastructure and Transportation
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Visit [www.cemanitoba.com](http://www.cemanitoba.com) for more information regarding this year's awards event as well as for further information and photos of the winning projects. ■



Environmental Award of Excellence winners and Keystone Award Recipients from ACRES are shown with their awards and Ms. Rhonda Orr (right), presenter.



Winners of the Resource Development Award of Excellence, J.R. Cousin Consultants and the study team for the Holland Chlorine Dioxide Disinfection Project



Mr. Poetker (2<sup>nd</sup> from left) shown with Mr. Bozzor and Mr. Esau from title sponsor XL Insurance and Oldfield Kirby Esau Inc., Bill Brant of Genivar and Mrs. Linda Poetker.



## Canadian Council Professional Geoscientists Secures Federal Support For Geoscientist Mobility Project

Oliver Bonham P.Geo., CEO of CCPG

**C**CPG - the Canadian Council of Professional Geoscientists - recently secured support of \$140,000 from the Government of Canada (GoC) to assist work to be undertaken over the next 15 months on common entry requirements for registration and on inter-provincial professional mobility.

This project is part of an initiative to assist regulated professions in Canada achieve compliance under Chapter 7 of the Agreement on Internal Trade, and comes out of work of the Forum of Labour Market Ministers and is directly overseen by an inter-governmental working committee - the Labour Mobility Coordinating Group (LMCG) - made up of provincial and territorial representatives.

Termed the "P.Geo=P.Geo" project, this initiative will combine the GoC's investment with in-kind support from both CCPG and CCPG's constituent members to focus on two important phases of work that have been identified as priority by all the participants.

Phase 1 will provide support to the Canadian Geoscience Standards Board (CGSB) - a standing committee of CCPG whose mandate includes CCPG's Recommended Minimum Geoscience Knowledge and Work Experience guideline for registration as a professional geoscientist.

While CGSB is currently in the midst of a five yearly review of this national guideline, the additional

financial support will allow for a more comprehensive exercise than originally planned, such as additional working meetings of CGSB, assistance and guidance from an expert on licensure requirement criteria, and support with editorial and translation services.

In addition to improving the commonly agreed educational requirements for registration as a professional geoscientist, (which embraces the three sub-streams of geology, environmental geoscience and geophysics), the project includes expanding the new guideline to also address core-competencies requirements for entry to the profession.

Phase 2, which will flow from Phase 1, will facilitate work by CCPG and its constituent associations aimed at introducing an improved Inter-Association Mobility Agreement (IAMA), or Mutual Recognition Agreement (MRA), that will document the process for easier and faster transfer of licensure between provinces and territories and thus improve labour mobility for professionals.

In addition to transfer of licensure, Phase 2 will also seek to address the challenging issue of appropriate regulation and licensure mechanisms that might allow for inter-jurisdictional and multi-jurisdictional practice within Canada.

Activities in this phase include additional working meetings of the CCPG's IAMA Task Force, engaging a

professional facilitator and retaining a legal advisor - all aimed at enhancing labour mobility while at the same time ensuring the full protection of the public in each jurisdiction, as required under statute.

Speaking about the announcement, CCPG President Brenda Wright, P.GeoI said "This project will be really beneficial to the self-regulation of our profession, to the constituent associations that register and license our practitioners across Canada, and to the practicing professional geoscientists from coast to coast to coast in Canada, who provide an ever expanding range of highly skilled services to society and our economy".

It has been agreed by CCPG and its constituent associations that having a consistent national set of registration requirements for professional geoscience among all jurisdictions that regulate geoscience in Canada is a vital underpinning of effective licensure and professional self-governance. Establishing consistency around registration, will demonstrate that indeed a "P.Geo=P.Geo" in Canada and will in turn allow CCPG to work with its constituent associations to introduce an improved MRA or IAMA.

Geoscience is a small and often individually specialized field-based profession and the services that geoscientists provide to society can often be required in unexpected places and at very short notice, thus creating a real need for professional mobility

within Canada, while at the same time recognizing the need for the protection of the public and accountability that licensure provides.

In addition to short-term labour mobility needs, geoscientists frequently relocate and transfer their professional licensure within Canada, not just in response to evolving regional demands for skilled professionals, but also to expand their professional experience and overall competency development.

It is also important that youth from across Canada be encouraged to enter the profession and, to that aim, it is critical that the knowledge and experience requirements for licensure be consistent across the country, so that graduates of full university geoscience programs obtained in any one part of Canada are not later faced

with unexpected barriers to registration, licensure, and practice in other parts of Canada.

Ms Wright went on to say "Achieving a consistent national set of registration requirements that also embraces core competencies expectations will also provide the necessary tools to allow the regulatory associations to more equitably consider internationally-trained professionals seeking licensure in Canada, while maintaining agreed minimum standards for registration".

The decision by CCPG to make this project a priority, and to pursue this application for funding, follows from the fact that it fits directly into both ongoing and future plans that CCPG already has in place, and is acting upon, to better address standards for registration and licensure, labour

mobility, and human resources and skills availability challenges facing the profession. This project is also directly in keeping with the mission statement of CCPG – which is "... to develop consistent high standards for licensure and practice of geoscience, facilitate national and international mobility, and promote the recognition of Canadian professional geoscientists".

Work on the P.Geo=P.Geo project has already commenced and a special face-to-face meeting of the Canadian Geoscience Standards Board will take place in Toronto on March 31. Other working meetings and much background work will follow. CCPG will be providing periodic updates on this special project as the work progresses.

More than 7,700 geoscientists are now licensed as professionals in Canada. CCPG is the national organization of the 10 provincial and territorial associations and order that regulate the practice of geoscience in Canada. The member associations comprise seven associations that jointly license engineers and geoscientists and three associations or order that license geoscientists only. There is currently no regulation of the practice of geoscience in Prince Edward Island or the Yukon. ■



Taken at the special meeting of CGSB that took place in Toronto on March 31, 2007. The meeting was the kick off event of the project funded by the HRSDC grant.

*continued from page 7, Thoughts on Design*

specializations to come together and share in this experience.

Not another "department" that picks up the pieces that don't fit into existing departments, but a Centre that facilitates the profession-wide learning our graduates need and allows them to experience something approaching the work-a-day environment in which they will eventually find themselves.

Fundamental to this approach is the consideration that "Education is too important to leave to academics." I'm not certain where I first heard this statement or whom I heard it from. However, I am certain it is a significant truth when considering engineering education. Unlike "liberal arts", Engineering Education has the goal of providing

the theoretical underpinning for a professional career. Therefore, guidance from and cooperation with the "end users" should produce a higher quality outcome.

So, where has the Design Chair taken us? We intend to create a Centre for Engineering Design that will, among other things, facilitate Faculty wide courses that allow students to experience both the thrill and the "drudgery" of design.

This Centre will be the over arching element mentioned above. It will facilitate closer cooperation between "town and gown". It will provide our graduates with a better understanding of their profession and your needs. Hopefully it will prove to be "on the right track". ■

## 2007 AGM Notice

The 88<sup>th</sup> Annual General Meeting of the Association of Professional Engineers and Geoscientists of Manitoba will be held in Winnipeg on October 26, 2007.

AGM activities will include a Professional Development Conference, the AGM Business Meeting, as well as the Awards Dinner and accompanying Dance. A companion program is also being organized for Friday morning. More information will be provided in the Keystone Professional Fall issue and on the APEGM website.

Mark down October 26<sup>th</sup> on your calendar! See you soon!

The AGM Organizing Committee

## Council Reports

Thursday, March 8, 2007

A. Kempan, P.Eng. (Ret.)

The meeting began in the routine way. Council made a few changes and approved a slightly revised agenda. The first meeting item was a presentation by Roger Rempel P.Eng., president of the Consulting Engineers of Manitoba (CEM), a 600-member group of engineers who provide engineering services to the public, was invited to speak by Executive Director, Grant Koropatnick.

Mr. Rempel said CEM was created to enhance the image of consulting engineers, and he saw CEM as a partner with APEGM in engineering image enhancement. He thought consultants needed to improve their image in the government sector, which thought consultants were more costly than in-house staff, but that comparison didn't take into account either the overhead costs of in-house staff or the high costs of liability insurance in the consulting world.

On the human resources side, Mr. Rempel said engineering talent was scarce and retention of staff was a huge problem, particularly in crown corporations and in Alberta. He thought staff retention could be addressed by promoting engineering as a career choice the way that the Certified General Accountants promoted their profession.

Councillor Blatz thought recent publicity about under funding in the engineering faculty wasn't helpful to engineering image enhancement and that engineers needed to speak out on the funding issue. Mr. Rempel said another issue that CEM needed help with was liability insurance, which was very expensive to buy. The presentation ended with Councillor Miller asking how Council could work with CEM. Councillor Blatz thought they could cooperate on media issues, so Council decided to task the Public Awareness Committee to report to Council on how APEGM and CEM could develop a joint campaign and common messages.

Grant Koropatnick presented a one-day format for next year's Annual General Meeting. He proposed making the 2007 AGM a one day affair, complete with a professional development component. He thought APEGM should take a chance on this format, in the hopes that attendance would increase. Council agreed and passed a motion to make the AGM a one day event on Friday, October 26, 2007. The day would include PD sessions, AGM business meeting, lunch with keynote speaker, evening cocktail reception and gala awards dinner with entertainment.

Council has cancelled the de-registration penalty fee of \$300 bucks! De-registration happens when a member is removed from the roster for non-payment of dues. Should that member wish to re-register, he or she must pay a set of fees: membership dues, a late fee, administration fee and the de-registration penalty fee. Also, the returning member must write the professional practice exam and submit a chronological resume showing at least four years of relevant engineering experience in the last eight. Grant Koropatnick said while some might see

the penalty fee as natural justice, it had a negative effect because it raised the re-registration cost by hundreds and was viewed as overly harsh.

In some cases, people were struck off the register because of a simple misunderstanding. For one example, a member might think that transferring to another jurisdiction under mobility would automatically signal to APEGM they are dropping their membership in Manitoba. This is not the case and people who did not renew at the end of the year were removed from membership without knowing it. In a few cases, members have given verbal notification of their intentions, but it was not recorded by APEGM.

Grant Koropatnick said the de-registration fee only generated ill-will and it was best to remove it. There was a slight technical problem with removing the fee; APEGM was obligated to collect it under the bylaws. Since, APEGM sets the fee schedule annually, the fee could be set to zero dollars without a bylaw change. Former Executive Director, Dave Ennis, P.Eng., also supported cancelling the fee, saying applicants considered it excessive punishment. Council agreed and passed a motion to set the fee to zero.

One topic that will be of interest to members is continuing professional development (CPD). After meeting with the Professional Development Committee, Executive Director Grant Koropatnick relayed a request from the committee to Council to create a statement of philosophy about PD; particularly after the 1998 mail-in ballot rejection of the old proposal.

Some good comments came from around the council table: Past President Digvir Jayas, suggested removing the "mandatory" term in the program title and Councillor Blatz said the concept of PD was accepted, but it was the method used in 1998 that was rejected. CCPE Director Dave Ennis thought the previous program failed because of its "draconian" nature and that the membership had changed in the intervening years.

APEGM Director of Admissions, Sharon Sankar was of the opinion that those members who didn't sign the PD declaration with their fees statement either lost it or wouldn't sign on principle, because they thought it insulting to a professional person. On the other hand, Councillor John Woods (who is also a member of APEGGA) completes the Alberta PD forms and finds it easy to do.

Lastly, Council learned that the Canadian Council of Professional Engineers was about to go through a name change. Although the legal name would continue to be CCPE, the organizational identity would be re-branded under the name "Engineers Canada." The CCPE Board of Directors decided a name change was desirable and they went ahead without consulting their constituent member associations.

One association was strongly against the name change (Alberta) while another (New Brunswick) expressed enthusiastic support. Overall, most constituent member associations across Canada (including APEGM) have accepted the decision. Are we ready for "Engineers Manitoba"? Not likely. ■

Thursday, May 10, 2007

A. Erhardt, EIT

After a brief lunch, Vice President Tim Corkery called the meeting to order as President Robin Taylor was delayed. The meeting began with some minor agenda additions along with some revisions to the minutes from the previous meeting. After the formalities were completed, and introductions made, the meeting continued on with the planned agenda.

The first item for discussion was introduced via conference call by Councillor Avery Asher. As the chair of the Ownership Linkage Committee, she reviewed that the committee had send out letters of introduction and information to a variety of groups in Manitoba to date, including the Manitoba Chamber of Commerce and several aboriginal groups. Their hope was to inform these organizations of what APEGM's plans are regarding ownership linkage and invite the groups to come and discuss linkage issues with the committee and council.

At the suggestion of a professional member, the committee also contacted a specific Hutterite colony. The colony declined the invitation from the committee. The committee then decided on contacting a local engineering consulting firm that works with several colonies to get some assistance in gauging interest from other colonies to see if their first attempt was merely a case of misunderstanding the objectives of the committee.

Councillor John Woods also offered up another contact for the committee to pursue. At this time, Council requested that the committee focus on pursuing relations with the groups that they had already attempted contact with, along with trying to contact a group of Hutterites one more time before expanding and seeking out other groups. Council also asked that a list of goals for each individual group be identified in this outreach plan. Following the discussion, Councillor Asher excused herself and promised to return again via telephone later on in the meeting.

Following a quick review of the consent agenda, Hugh Goldie was given the floor to lead Council in another education session regarding Risk Management. Today's session was entitled "Decision Making Processes to Manage Risk". Mr. Goldie identified the types of risks and explained that we are unable to eliminate risk; however, there are steps that can be taken to reduce the impact of negative risk, or enhance the likelihood of upside risk. He provided examples to help enhance the ideas, strategies, and techniques associated with risk management and then led Council through an APEGM applicable exercise to help reinforce the concepts.

The educational session was followed by the items that were up for decision by Council. The first topic was in regards to the Manual of Admissions. Vice President Corkery informed Council that the manual had been revised and was ready for review and fine tuning. Following this, it would be forwarded on to the

Registration Committee for review and then return to Council for the final decision.

The Canadian Council of Professional Engineers had forwarded a draft copy of the latest revision of their Code of Ethics. It had been forwarded to all of the associations with a request for feedback. The one page document is not intended to override any of the regional associations' own Code of Ethics, but it is merely meant as guideline and general indication of the requirements of the regional associations, such as APEGM. The draft was reviewed and approved.

At this point, Councillor Asher rejoined the meeting by telephone to discuss new regional council positions. The debate was whether APEGM should require elected regional council positions as many other professional organizations do. The goal of the regional positions would be to help get a voice from all areas of the province so that council has a broader perspective when making decisions. A change such as this would require changes to Council By-Laws regarding the selection and election of these positions.

In response to the inquiry as to whether or not the chapters themselves had been contacted, according to Councillor Asher, only Dave Ford from the Westman Chapter had responded, and his response was a positive one. Councillor Blatz proposed a motion requiring feedback to the proposal from the four chapter presidents, including asking for additional ways to facilitate interaction from members in these regions with council.

Once the decision items had been completed, Council proceeded on to review the actions from previous meetings that were still incomplete. Executive Director Grant Koropatnick informed Council that an enforcement position had been added into the upcoming budget, with the costs associated from the position to be covered with a minor fee increase for members. He also indicated that we were one of the only associations in Canada currently without an enforcement officer.

The agenda for the next meeting was reviewed and Councillors were assigned to specific monitoring reports. One of the monitoring reports that was to be reviewed was in regards to self-regulation. The reports were unavailable at the time of the meeting; however a heated debate started regarding concerns that several Councillors had about the government making changes to policy which would override our abilities to self-regulate.

It was quickly made clear that the core issue was government relations, and more specifically the lack thereof. It was argued that both APEGM and the government had dropped the ball on the establishment of this relationship. However, it is clear that APEGM needs to be more visible in the public eye, and that the association needs to help people realize the impact and necessity of engineers.

Following a quick self evaluation of Council's performance at the meeting, the meeting was adjourned shortly before 4:00 p.m. The next council meeting is scheduled for June 21, 2007. ■



# A DEVILLISH PROBLEM

A. Kempan, P.Eng.

Joy-riding teenagers in the 1960s wouldn't have guessed that the barren salt flats know as Devils Lake would develop, in the early part of the 21<sup>st</sup> century, into a major irritant between the normally friendly jurisdictions of North Dakota and Manitoba. At issue was a plan to drain water from North Dakota's overflowing Devils Lake into Canadian territory.

In April, 2005, during the height of the dispute Bismarck Tribune writer Frederic Smith said "There should be a way to punish Canada and the province of Winnipeg [sic] for the nasty obstructionism they continue to display toward North Dakota water projects." He didn't mention that the states of Minnesota and Missouri opposed the Devils Lake outlet too, as well as many U.S. ecological organizations. Since then the rhetoric has cooled and given way to diplomacy and negotiation.

## LAKE HISTORY

Devils Lake is North Dakota's largest naturally-formed lake (Lakes Sakawea and Oahe are larger man-made lakes.) The reservoir for Devils Lake formed around 12,000 years ago, following several periods of glaciations when southward advancing ice plowed the land into a natural barrier preventing water flow toward the north. This action also made the Devils Lake reservoir into a closed system, except in periods

of extraordinarily high water levels, when the lake spills into Stump Lake, a much smaller nearby body.

When both Devils Lake and Stump Lake fill to capacity, a natural overflow occurs into the Sheyenne River and ultimately into the Red River. This is a rare occurrence and is believed to have last occurred anywhere from 800 to 1,800 years ago and only four times in the last 10,000 years.

When an overflow does occur it's likely a relatively small one, based on the limited carrying capacity of the Sheyenne. If large volumes of fast flowing water found an alternate route to the Red, these channels would have remained to the present day, and none exist. All this reinforces Manitoba's assertion that water from these two drainage systems separated long ago and should stay separated. It is reasonable to assume the basins have diverged ecologically during that time.

In the 1940s, water levels in Devils Lake were the lowest in recorded history. From the 40s to the early 90s the water rose about 20 feet. During the 90s, waters rose about 23 feet, more than in the preceding 50 years and in doing so they created a monumental flooding problem for the people of North Dakota. As experience has shown, the only certainty about the water is that it's always changing.

## COMPETING VISIONS FOR A DEVILS LAKE OUTLET

In the U.S. an excess or shortage of water usually means the U.S. Army Corps of Engineers, an organization widely reviled by politicians, is called in to assist. The Corps was funded by the U.S. Congress to study the flooding problem as far back as 1990, and after a series of studies and reports, The Corps issued in February of 2002 an initial exhaustive report analyzing the economic, technical, sociological, and environmental impacts of a Devils Lake outlet.

Their solution was the so-called Pelican Lake outlet, a scheme to transfer water at the rate of 300 cubic feet per second (cfs) to the Sheyenne River through a series of channels and pipelines. Pelican Lake, which can be considered a bay of Devils Lake, is the major source of water inflow into Devils Lake. So by diverting water from the source, Devils Lake could be controlled.

But the problem with The Corps solution, critics stated, was that The Corps had been constrained from the start by political manipulation. Instead of allowing The Corps to look for the best solution, North Dakota politicians in Washington insisted on an outlet as the only option when other solutions were more cost effective and had fewer environmental impacts.

Possible alternate solutions might be to simply increase the effectiveness of existing flood control infrastructure by building dikes, dams, and roads higher, by retaining more water in the upper basin, or by simply doing nothing and allowing the lake to contract on its own, as it was very likely to do based on previous history. But all The Corps was authorized to do was consider outlet solutions.

While The Corps conducted its work, the North Dakota State Water Commission (NDSWC) was busily pursuing its own project to divert water from Devils Lake into the Sheyenne River, possibly because of the slow pace of The Corps work. However, the state diversion was even less

appealing to Manitoba, Minnesota, and Missouri than The Corps diversion because the NDSWC diversion would transfer lower quality water directly from Devils Lake instead of fresher water from Pelican Lake.

In July of 2001, NDSWC advertised for proposals for an outlet. In the summer of 2002 the engineering design was completed and by the fall of 2002 construction of phase one of the state outlet was complete. In order to free the state project from scrutiny by the National Environmental Policy Act, North Dakota unilaterally declared that no federal funding was involved, no federal interests were affected, so therefore a NEPA review was not required.

It was the state outlet that became the centre of controversy between Manitoba and North Dakota.

#### **MANITOBA'S CONCERNS**

Manitoba is justifiably proud of Lake Winnipeg as a great freshwater lake supporting 800 commercial fishermen, and 23,000 people who use it as a food source, the majority of that number being Aboriginals. Add to that the numerous recreational uses of the lake, valued at around \$50 million, and it takes little imagination to understand why Manitoba is very sensitive to anything which could jeopardize this gem.

In spite of assurances from people on coffee row in North Dakota, Manitobans weren't comfortable with what could be in the water sent their way. The state outlet would draw water from the "best" part of Devils Lake, but that water was well below the water quality of the Red River or Lake Winnipeg. Devils Lake water had higher sulphate, total dissolved solids (salts), and other materials such as arsenic, boron, mercury, and phosphorus. Also, as the water levels in Devils Lake dropped during drainage, concentrations of these substances would only increase as even lower quality water from other parts of Devils Lake would flow in to replace it.

In addition to the dubious chemical composition of Devils Lake water, another fear for Manitobans was the living organisms which could be transferred, such as fish diseases and other pathogens.

To combat fears about the potential for biota transfer, the NDSWC produced a slide show to "educate" Manitobans. In the presentation they enumerated the other ways that biota was being transferred; by boats, weather, animals, anglers, fish stocking, etc. They stated, quite correctly, that the division between the two basins wasn't perfect and interchange of water did occur naturally.

However, the magnitude and duration of such transfers were anecdotal, and unavoidable, whereas an outlet was a much larger contributor and a preventable phenomenon. So by burying their potential biota contribution in with other questionable sources of biota, they could claim their share was minuscule in comparison, and that the fears of Manitobans were unjustified.

Manitoba was also concerned that a Devils Lake outlet would eventually lead to a Devils Lake inlet from the Missouri River, as envisioned under the Garrison Diversion project. The Garrison Diversion was shelved years before, partly due to Canada's efforts, further proof to North Dakotans that Canada was invariably hostile to their water projects. The concern with Garrison was the same as with any Devils Lake outlet, the transfer of water from one drainage basin to another.

In spite of the damage caused by flooding, Devils Lake had become an important recreational asset to North Dakota, and the state wanted to regulate water levels, not drain the lake completely.

Lastly, Manitoba argued that a Devils Lake outlet wouldn't alleviate flooding in the final analysis, because the state outlet could only lower the lake by a foot annually, at a time when the lake was rising three feet annually.

#### **THE INTERNATIONAL JOINT COMMISSION**

As the Devils Lake outlet project progressed from 2003 to 2005, Manitoba called many times for a reference to the International Joint Commission (IJC), an independent bilateral organization established by the 1909 Boundary Waters Treaty. The IJC's purpose is to prevent and resolve issues relating to the use and quality of boundary waters. Manitoba held that the North Dakota state outlet contravened the Boundary Waters treaty.

In fact, the U.S. government did invite the Canadian government to participate in an IJC reference in 2002 on the Devils Lake outlet. In a letter from Canadian Ambassador Michael Kergin to U.S. Ambassador Marc Grossman, Mr. Kergin declined, saying that it was too early for a reference because a Devils Lake outlet had not been finalized or recommended by the Army Corp of Engineers. Backers of the outlet later would use this refusal as more proof of Manitoba's obstructionism, even though the IJC process is a federal-to-federal exercise and out of the province's jurisdiction, something emphasized over and over by Manitoba Premier, Gary Doer.

#### **OPENING THE GATES**

In 2004, North Dakota leaders thought they'd cleared a major hurdle when then Secretary of State, Colin Powell wrote the head of The Corp, General Robert Flowers, saying that The Corp project did not violate the Boundary Waters Treaty. Mr. Powell did go on to urge them to go the extra distance to assure Canada on the biota issue by conducting a biota survey, with Canada's cooperation.

General Powell's letter was also taken as approval for the North Dakota state outlet, even though the projects weren't

linked. North Dakota Governor John Hoeven went on to say, "Secretary Powell's decision strengthens our effort to move forward with our temporary outlet on Devils Lake. He has now provided additional assurance that an outlet would not violate the (Boundary Waters) treaty and that the water quality downstream will be protected."

As it turned out, Governor Hoeven had misunderstood Secretary Powell's words. An U.S. Department of State official, Paul V. Kelly, later wrote to Governor Hoeven saying Secretary Powell's assurance was only for the proposed Corp outlet, and not the North Dakota state outlet. Mr. Kelly went on to say that North Dakota should not proceed with the state outlet before consulting with the State Department in order to prevent unnecessary conflicts with Canada or its provinces.

Nevertheless, North Dakota proceeded with their state outlet, ignoring Canadian concerns and State Department cautions. Manitobans continued to view North Dakotans as high-handed and North Dakotans continued to view Manitobans as obstructionists. Manitoba withdrew their cooperation with North Dakota on all water-related issues. Manitoba launched several unsuccessful lawsuits to stop the state outlet.

In the summer of 2005 North Dakota opened the state outlet, amid a flurry of diplomatic activity. Apparently the White House had taken notice and was on the case, after intense lobbying efforts by the Canadian government.

This time, Bismarck Tribune writer, Frederic Smith, referred to the head of the Canadian Treasury Board as a "flunky" for diverting Senator Kent Conrad (North Dakota), from what he considered more pressing issues, to discuss a settlement of the outlet dispute.

On August 5, 2005, the Manitoba government issued a press release outlining an agreement between the U.S. and Canadian governments. Premier Doer hailed it as a positive announcement. The North Dakota state outlet would continue to flow, but Canadian concerns over water quality would be addressed by the design and construction of "an advanced filtration and/or disinfection system at the outlet at Devils Lake, N.D.". Before the advanced filter was built, North Dakota would build an interim, 18-foot deep gravel filter before the outlet from Devils Lake outlet began operating. The temporary filter would potentially remove two inches of water from Devils Lake in the next year.

Which country was to pay for the advanced filter, estimated to cost \$20 million U.S., was left to future negotiations. In his customary fashion, North Dakota Governor Hoeven said since the filter was a "feel good" item for Manitoba, Manitoba should pay for it. The comment was both unsympathetic and irrelevant since it was a federal matter in any case.

The agreement also included a reassuring clause, important to Canada, Manitoba and Minnesota, respecting any future inlet to Devils Lake. North Dakota affirmed it had no intentions, plans, or proposals to build an inlet and they affirmed any activity towards that end was a violation of federal law. So it appeared any Garrison Diversion style of project had been scuttled for the foreseeable future.

Another provision in the agreement initiated an immediate bi-national biota survey of Devils Lake. The results of the preliminary survey, released in November, 2005, found no known invasive species in Devils Lake waters, but it did identify four types of blue-green algae and four fish parasites that were not known to be present in Lake Winnipeg or the Hudson Bay basin. The algae was of low concern since it preferred the saline environment of Devils Lake and so wasn't likely

to survive in Manitoba. The quick study did show there were ecological differences between Devils Lake and Lake Winnipeg.

### THE AFTERMATH

After a promising start in 2005, 2006 was both a bad year and a good year for the Devils Lake outlet.

The bad part was that operating the outlet was contingent on a few well-defined state parameters, as it wasn't just a case of opening the tap. It could only operate under open water conditions (no ice), was limited in volume (100 cfs), and it had to meet state-mandated sulphate concentrations. Sulphate levels in the outflow exceeded the 300 milligram per liter (mg/L) limit allowed under the license. (Sulphates can impart an offensive taste to water at concentrations of 850 to 1000 mg/L.) The outlet was shut down almost as soon as it started, because of excessive sulphate levels. Sulphates weren't solely a Manitoba concern since many North Dakota communities drew drinking water from the Sheyenne and high levels impacted them too.

To overcome that problem, the state went before the North Dakota Department of Health to request a change to the sulfate levels, as well as a few other operating parameters. On August 16, 2006, the Department of Health approved a sulphate level increase to 450 mg/L and extended the time the outlet could operate.

The good part of the story was that even without the Devils Lake outlet operating to any significant degree in 2006, water levels on Devils Lake dropped almost two feet by fall, without human intervention, probably due to a dry summer. No one can predict with certainty what the lake will do in the future, but the trend may again turn to a shrinking lake.

Without any prospects for an inlet to stabilize the water, the next water crisis for North Dakota may be a disappearing Devils Lake. ■



# Iron Ring Ceremony

*R. Minhaz, EIT*

The awarding of the engineer's ring has been a symbol of the engineering profession in Canada since "The Ritual of the Calling of an Engineer" was established in 1925.

On March 20, 2007, the spring ring ceremony took place at the multipurpose room of the University of Manitoba. Families, relatives, and friends of engineering graduates gathered to witness their beloved ones getting symbolic recognition for their hard work at school, and accepting their obligation to work for the betterment of society.

It was a festive and exciting environment among the graduates, especially to those whose engineer relative, or friend, flew in from another city to be a ring bearer, making the ceremony a mini family gathering which they will remember fondly in the future.

It was obvious from the conversation of those who had received their ring decades ago, that the ceremony has gone through some major changes, such as becoming a public, instead of private, ceremony.

The ritual suggests that the engineer's ring should be returned to their camp upon retirement or death, and that it is important to make sure that an engineer's ring not be worn by non-engineers or retained simply as a keepsake. The ritual reminds the graduates of their obligation to the public good and to the strong moral tenets that will characterize their professional life.

Though the ritual is symbolic, some argued that the ceremony should still be private. Others think that the language should be changed to reflect current times, while some state that the

overall tone is inappropriate for these enlightened times.

Part of the ceremony included excerpts from some of Rudyard Kipling's work. This choice of literature is based in part on the character of the times, and in part on the desire to reflect certain moral aspirations and thoughts. Those aspirations remain every bit as noble today as they were in 1925, and they reflect a goal to which every engineer should continue to aspire.

The ceremony ended with graduates posing individually or in-group, flashing the ring on the fifth finger of their working hand in front of the camera with a smile on their face. ■



## Encouraging Prospective Engineers & Geoscientists

*J. Rooney, P.Eng.*

The Association, along with 4 companies and 1 government agency, provided Special Awards again this year at the Manitoba Schools Science Symposium (MSSS). We have been doing this now for 18 years consecutively to encourage students to pursue projects that relate to Engineering or Geoscience. The result is heightened

awareness among students of the career opportunities that exist for them in our professions.

The MSSS is the pinnacle of school science fairs in Manitoba and was a great success as always. Over 400 of the best projects from students in grades 4 through 12 appeared at the Symposium which was held at the University of Winnipeg Duckworth Centre. The energy and enthusiasm of the children was infectious, and you could not help feeling more enthusiastic about Engineering and Geoscience after you walked out.

Your APEGM Public Awareness Committee coordinated the prizes and arranged for six members to take the difficult task of deciding which of the projects were the best relating to

Engineering and Geoscience. It should also be noted that a number of our members also took part as judges for the regular MSSS awards. The awards and the winners were:

Many thanks to Crosier Kilgour & Partners Ltd., KGS Group, Maple Leaf Construction Inc., Oldfield Kirby Esau Inc., and Vector Construction Group for donating prizes. Thank you also to KGS Group for offering a \$200 cash prize that ultimately was not awarded due to an administrative error.

On behalf of the Public Awareness Committee, I would like to thank past president, Dr. Digvir Jayas, for presenting the prizes, and our dedicated judges for their time and effort: Richard Bernhardt, Alan Bailes, Trevor Bowden, Jim Prendergast, and Jamison Wedge. ■

# Environmental Excellence in Exploration and Mining

G.S. Lodha, P.Geo.

**P**rospectors and geoscientists working in the mineral exploration industry besides doing simple geological mapping are also involved in trenching, line cutting/ forest clearing (for geophysical surveys and drilling), geochemical soil sampling etc. Once an economically viable ore body is established, this leads to surface excavations, underground mine development, establishment of ore crushing, milling, concentrating, and smelting operations involving mining, mechanical, electrical, and metallurgical engineers.

All these activities disturb the baseline environmental conditions. Ministries of Environment and Natural Resources (Departments of Mines and Geology) at provincial and federal government levels have issued a number of guidelines and regulations to minimize these damages. All exploration and mining companies are required to observe these guidelines and file regular compliance reports regarding these regulations.

A number of organizations, including the Prospectors and Developers Association of Canada (PDAC), have developed or are developing good practice guidelines for sectors or activities within the mineral industry. These represent working standards for the industry and links to them can be found on websites listed below. Some of these links include:

## EXPLORATION

- Exploration best practice guidelines, - Association of Professional Geoscientists of Ontario (PDF)

## DIAMOND DRILLING

- Safe work methods for drilling; drill equipment standards; training manuals - Canadian Diamond Drilling Association

## ENVIRONMENT

- E-3 Environmental Excellence in Exploration - Prospectors and Developers Association of Canada
- Metals in the Environment Research Network
- Tailings facilities management - Mining Association of Canada (PDF)
- Towards Sustainable Mining - Mining Association of Canada
- Environmental Policy - Mining Association of Canada
- Environmental Guidelines - Association of Professional Engineers, Geologists and Geophysicists of Alberta
- Biodiversity and conservation - International Council on Mining and Metals

## MINERAL RESOURCES AND MINERAL RESERVES: DEFINING AND ESTIMATING

- Canadian Institute of Mining, Metallurgy and Petroleum

## NATIONAL INSTRUMENT 43-101 (STANDARDS OF DISCLOSURE FOR MINERAL PROJECTS)

- Canadian Institute of Mining, Metallurgy and Petroleum

## REPORTING STANDARDS AND GUIDELINES

- Canadian Institute of Mining, Metallurgy and Petroleum

A consortium of leading mining and exploration companies requested Prospectors and Developers Association of Canada (PDAC) to lead the development of a tool to assist with the implementation of environmental guidelines in an effective and meaningful way. PDAC, in cooperation with a number of sponsoring companies developed internet based

software to guide and help with the practice of Environmental Excellence in Exploration (E3).

PDAC launched e3 in March, 2003, at which time it was available by subscription. In March, 2004, e3 was offered as a freely accessible site, leading to a substantial increase in usage. This internet based resource offers rapid access to the most up-to-date information on environmental management and community engagement practices for mineral exploration industry.

This resource maintained and serviced by PDAC aims to encourage high standards of environment care and social engagement during mineral exploration. It is a comprehensive, easy-to-use data base of field proven practices compiled from industry sources worldwide. A new registration system implemented at the end of February, 2006, makes it easier for all interested parties to access E3. As of February, 2007, there were 1700 registered users in 40 different countries. Your email address serves as your E3 username, and one is able to automatically request a password after answering few professional questions. The Registration is free and is available at [www.pdac.ca](http://www.pdac.ca) under sub-heading E-3.

The E-3 Committee is made up of volunteers who have experience in the mineral exploration and mining sector. The Committee meets regularly to review and recommend improvements to E3. Additional information on E-3 is available from Philip Bousquet, E3 Manager / PDAC Director, Sustainability at (416)-362-1969 ext. 230 or email: [pbousquet@pdac.ca](mailto:pbousquet@pdac.ca). ■

If you graduated from the Faculty of Engineering at the University of Manitoba within the last 100 years, you are invited to a celebration marking the Faculty's 100<sup>th</sup> birthday!

On Friday, September 14, 2007, the Faculty of Engineering will mark its centennial with a special Wine (Beer) & Cheese Reception in the atrium of the new Engineering & Information Technology Complex.

One of the highlights of the event will be the unveiling of the donor wall commemorating all the generous donors who helped make the EITC possible.

As one of the first faculties founded at the University of Manitoba, the Faculty of Engineering has a rich history. This history will be celebrated on September 14 with a Gallery of class photos and other engineering memorabilia in the New 229. If you have any interesting items you'd like to share and display in the Gallery please call 204-474-9034 or email [amber\\_skrabek@umanitoba.ca](mailto:amber_skrabek@umanitoba.ca).

In preparation for this special event, close to 10,000 letters have been sent to graduates for whom we have mailing addresses. That being said, if you are still in touch with some of

your classmates, please make sure they know about this once in a century event and invite them to come with you. If you haven't already heard about a reunion for your class, you can contact the Alumni Association to see about organizing one. So far 15 different classes are planning reunions!

This party is not only to celebrate the accomplishments of the Faculty

of Engineering just as our new Engineering & Information Technology Complex nears completion. In September, 2007, we will look back over a century of achievements, growth and change as we look forward to exciting times ahead.

As engineering alumni, you are our ambassadors, and we take great pride in all of your accomplishments.

We also recognize we would not be celebrating 100 years of this beautiful new facility without your support.

During our Centennial Celebration on September 14, 2007, we will be unveiling our Donor Wall, which will recognize all the financial gifts that helped to make the EITC possible.

Let me urge you, even if you have never attended a Homecoming event before, you do not want to miss this one! ALL of our alumni are invited home to celebrate with us 100 years of Engineering Excellence at the University of Manitoba. See you in September!

For more information or to register, visit [www.umanitoba.ca/engineering/alumni.php](http://www.umanitoba.ca/engineering/alumni.php).

## Party of the Century!

A.Anderson Skrabek

of Engineering, but also to celebrate YOUR accomplishments as alumni. You are our guests of honour. Please feel free to share your stories with us. You are part of the legacy of our Faculty, and we are very proud of you.

If you come home this September, you will be able to tour some beautiful new facilities. The newly renovated E1 opened last summer, and is as impressive as the brand new E2 building which opened in 2005. These facilities have allowed us to set up more complex laboratories and better equipped classrooms. No more rain buckets in the middle of the halls!

It seems fitting that we are able to celebrate 100 years of the Faculty

*continued from page 15, Biofuels Research*

The feed for ethanol is corn in the U.S. and eastern Canada, and wheat in the Canadian prairies. In 2004, bioethanol output was highest in Brazil at about 16 billion litres, with the U.S. close behind at over 12 billion litres. Manitoba has a potential for a bioethanol production of about 2 billion litres per year.

Biofuel production has huge potential benefits for Canada including: a direct investment of \$7.5 billion per year in farming and forestry, over \$30 billion per year stimulus to the economy as a whole, 100,000 new jobs, improved energy security, and reduction

in greenhouse gas emissions amounting to 70 mT CO<sub>2</sub> equivalent per year.

Some of the issues still under discussion are: whether crops should be used for food or fuel; whether biofuels should have dedicated crops; efficiency of production and energy balance; value of co-products; and sustainable cropping systems and their effect on soil fertility.

We thank Professor Levin for his authoritative discourse on a current topic of great interest. ■

*continued from page 8, Press Clippings*

### EAST-WEST LINK

A positive development regarding the east-west hydro power link between Manitoba and Ontario was the federal government's commitment of \$586 million to Ontario as part of the Canada EcoTrust fund. Ontario is expected to use the funds for the east-west grid, which would help the Conawapa project to go ahead. With the east-west link, it would be possible for Ontario to phase out its coal-fired generating stations, thus reducing greenhouse gas emissions. Manitoba also got \$54 million from the feds through the EcoTrust fund. This money will be used to expand Manitoba's current energy-efficiency programs, develop more bio-diesel plants and increase the power capacity.

(Winnipeg Free Press, March 4 and 7, 2007) ■

# 2007 Annual Celebrity Competition

M.K. Kwiatkowski, P.Eng.

**H**op in the driver's seat for the 2007 Annual Celebrity Design Competition. On Friday, March 2, 2007, three teams of would-be engineers from CBC TV, Global TV, and University of Manitoba Engineering Department were challenged to put their creative talents on the table, and their reputations on the line, to design and build the best rubber band elastic-powered car to win cash prizes for donation to the charity of their choice.

The event began with introductions by Dr. Doug Ruth, Dean, University of Manitoba Faculty of Engineering, followed by a proclamation by Marilyn Brick, MLA for St. Norbert, to formally announce the start of Provincial Engineering and Geoscience



The starting line for the longest distance race

Week (PEGW) in Manitoba. Also present were Robyn Taylor, APEGM President and Bill Brant, President-Elect, Consulting Engineers of Manitoba, who spoke about the continued importance of Engineering in our society.

The start of the competition was marked with introductions of each team to their adoring fans, a declaration by the celebrities as to which charity would benefit from their efforts, and a little insight into their designs.

Each team was provided with the same building kit of basic materials consisting of cardboard tubes, glue, plastic lids, string, dowels, various shapes and sizes of wood, and pop-bottles among other things. Teams were encouraged to use the materials in the kit, but were free to use

anything that they pleased - and they did. Competitors from the U of M filled the stage with all sorts of creations using old LP records, welded wireframes, compact discs, and even a remote control - for steering of course.

Teams brought their completed designs to the contest and entries were to be judged on weight and aesthetic appearance, as well as whose car would travel the farthest or be the fastest to reach the finish line. Special consideration was given to designs that used only the materials provided in the kit.

After a brief weigh-in, an initial inspection of each team's design revealed constructions which were light on engineering design and heavy on artistic interpretation. While the teams sized up their competition, witty trash-talking banter filled the microphone as only celebrities from the media can do. As the commentary continued, more people stopped by to watch the teams compete.

Newcomers Kate Stutsman and Derrick Oliver from Global TV were the first team to put their car on the starting line. After a few broken elastics, their eye-catching car managed a mere 98cm. Technical difficulties forced the premature failure of their car, but they were lucky enough to have bribed a few engineers in their office to design a second car for them to use. This unofficial car traveled much further before coming to a stop. The car later succumbed to a broken elastic and could not compete in

the speed challenge. A student from the U of M was kind enough to lend them his car to use.

Returning competitors Alex Freedman and Crystal Goomansingh from CBC TV were next to line up. After coming in second place last year, this dynamic duo put in extra effort this year to impress everyone. Their lightweight creation traveled over 17m before stopping. This car was also a strong contender for the speed challenge, but was sideswiped by a few other cars that didn't hold their course.

Team U of M, represented by Chris Laing, Don Petkau, and several of their

students had a bit of an edge on the competition. As it were, the scope of this year's challenge is very close to one of the projects studied by the Design Engineering students, and they came out in full force with their many designs. Due to time constraints, it was impossible to test all of the designs, but the large number of entries displayed on stage

was exciting and certainly created a lot of hype for the event.

After much deliberation and a few good laughs, CBC TV was awarded first place and will present their \$600 prize to the Firefighters Burn Fund. Second

place was awarded to Global TV who will donate their \$300 prize to Variety, the Children's Charity. The University of Manitoba's Engineering Department will forward their third place prize of \$100 to Engineers Without Borders.



Team U of M getting their car ready for the obstacle course



Teams at the starting line.

# 2007 Spaghetti Bridge Competition

A.A. Poulin, P.Eng.

On Saturday, March 3, 2007, the 13<sup>th</sup> Annual Spaghetti Bridge Competition was held at St. Vital Mall as part of the annual Provincial Engineering and Geoscientist Week activities. Students of all ages put on their engineering problem-solving caps to take a stab at designing a bridge made of spaghetti to see if they could win prizes for the strongest bridge in their respective grade. The competition was one of many events, and as always, it certainly attracted a lot of attention.



Registration for the Spaghetti Bridge Competition

Students were challenged to design and build a bridge with a minimum span of 300 mm, built only of spaghetti and white glue and weighing no more than 350 grams. The bridge that could withstand the highest load would be the winner.

The competition was open to Manitoba students in grades 1 through 12. Awarded were cash prizes of \$50.00 for each grade winner. There were also two Grand Prizes, of \$200.00 each awarded to the overall winners from the two categories, grades 1-6 and grades 7-12. All prizes were provided by APEGM.

The winners from grades 1 through 6 reached peak loads ranging from 0.61 kg to 112.08 kg. The grand prize for the grades 1-6 category went to a grade 3 student from Winnipeg Mennonite



Brianna Wiebe, Grade 1 - 6 Grand Prize Winner

Elementary School, Brianna Wiebe. This student attempt's last year secured her the grade 2 prize for strongest bridge. This year she was successful with a bridge that broke at 143.7kg (or 316.8 lbs.), beating out a returning champion who was now in grade 6 and not all that far off the strongest of the older grades category!

The strongest bridges from grades 7 through 12 entries reached peak loads ranging from 1.95kg to 156.81 kg; less than 1 kg difference from the grand prize recipient in this category. The grand prize for the grade 7-12 category went to a grade 9 student from Arthur A Leach School, Ryan Murphy, whose bridge broke at 157.64 kg (or 347.54 lbs) and more than doubled his own entry from last year! This bridge also surpassed the efforts of a returning champion.

The returning grade 12 student, Gabriel Nadeau, who had repeatedly been successful in the grades 7 to 12 category grand prize, excitedly and proudly proclaimed to the organizers at registration that he has been accepted as a direct entrant to the University of Manitoba's Engineering Faculty, following his graduation from high school this year. And although he was not successful at retaining the grand prize title this year, he did manage to take home a win for his grade. And if his efforts over the last few years in this competition are any indication, it would



Peak load of 122.34 kilograms



Ryan Murphy, Grade 7 - 12 Grand Prize Winner

seem he looks forward to the challenges ahead and is geared up about engineering.

Although with a total of 75 entries, attendance may have been about average this year, the results certainly were not. The younger grades are coming out strong, slowly but surely catching their older counterparts, and returning

students seem to be improving their designs every year learning from the design, build, and testing process.

Organizers Don Spangelo, P.Eng., Shane Mailey, P.Eng., Lindsay Hume, EIT, and Adèle Poulin, P.Eng. would like to thank APEGM for their continued support of the event. We would also like to recognize the PEGW committee and Peter Roach for their assistance. Of course the day could not be pulled off without the help of our competition-day volunteers, who this year were: Melissa Habok, Don Himbeault, Bin Liu, Somto Okonkwo, and Andrew Redekopp. ■

*continued from page 28, Celebrity Contest*

I would like to extend a special thank you to all of the celebrities for dedicating their time and efforts in making this event a great success. Thanks also to St. Vital Centre for playing host to our Annual Celebrity Competition.

I would also like to thank my fellow PEGW 2007 Celebrity Competition Subcommittee members: Janet Wheatley and Ian McCallister. We would also like to thank Lori Yielding of Superior Technologies Weighing & Controls for volunteering her time and a scale for our use during the competition. ■



# Electronic Seal Why?

R.J. Hamin, P.Eng.

This article is a condensed version of a presentation by Charles Tremblay, Director of Member Services of Notarius, a non profit organization based in Quebec. Additional comments and editing were provided by Ralph Kurth, P.Eng., Teshmont Consultants, and Allan Pollard, P.Eng., Law Society.

APEGM has been studying the Electronic Seal for many years and last year, Council passed a motion to study the implementation of the process of using an Electronic Seal.

The new electronic technologies are here now and being used. It is very difficult to find or imagine any aspect of engineering design that does not use and store data on a computer. The drawings are created, saved, stored and usually printed. They are then stamped and sealed by the engineer. The handling of the paper copy then takes on a life of its own. If the drawing or report could be sealed electronically the costs associated with handling, shipping, courier services, and paper vaults might be able to be avoided.

Security of electronic data is a big issue. It would also be nice to find an implementation that is uniform across Canada and other professional organizations. The technology of a digital signature, based on public and private key infrastructure (PKI) is available. Perhaps APEGM can learn from the Ordre des Ingenieurs du Quebec (OIQ) and its association with Notarius.

The status of e seal in the other Associations is as below:

Province	Acceptance of E Sealing	Professional Status Integrated or E Signatures with Digital Signature
Quebec	Yes	Yes
Alberta	Yes	No
Manitoba	Yes	No
New Brunswick	Yes	No
Yukon	Looking into it	N/A
NWT	Looking into it	N/A
BC	Looking into it	N/A
Saskatchewan	Looking into it	N/A
Nova Scotia	Looking into it	N/A
Ontario	Looking into it	N/A
PEI	Looking into it	N/A
Newfoundland	N/A	N/A

Virtually everyone in any technical field is using some form of electronic data exchange and transaction. Many people and organizations are exchanging documents on a mutual trust basis. The security challenges are: Authentication, Authorization, Non-Repudiation ("I never signed that". Oh yes you did.), Data integrity, and Privacy (proprietary secrets).

Federal law says that electronic signatures are accepted, but how does an organization ensure someone did not just "Cut and Paste" a file with an

electronic signature. The Electronic Signature must be unique to the person and under the sole control of the person, just like your current rubber stamp, must be. The technology must be able to identify the electronic signature to the person and the link between the electronic signature and the document must also protect the document's integrity. Software provided by Entrust or Verisign provide the security of a signature and the originator.

Manitoba has an Electronic Commerce and Information Act, but the wording is very general and detail on how images are reproducible is lacking. Confidentiality is not protected and repudiation seems possible. The Act is silent on the link between data and author and data integrity. This latter aspect is the sole responsibility of the professional organizations and business users.

The method of providing security is to use the Public Key Infrastructure. It provides: Authentication, Non-repudiation, Data integrity, Privacy. The data integrity is preserved by encryption. A Hash code of all the ones and zeros of the document

is created, so even if a space blank space bar is added, that would change the document and be detected. This process works by having a Public Key (decryption or verification key), for a specific registered engineer and a lock or private key only available to that same owner. It is just a password IE a digital key known only to owner like your rubber stamp. Each pair (private and public keys) is unique so that when the private key encrypts, the public key for the owner decrypts, a unique guaranteed result occurs.

In addition to the PKI there is a certificate that links the private key to the owner. This certificate is the authorization confirms the identity of the person. The validating certificate authority could be Notarius, because they are already in business. In the case of Notarius the information is stored on redundant digital server systems, which are backed up in secure vault like buildings. Notarius has 14 servers. The Certificate authority must keep this data for the duration of the legally required time of ten years and in the case of APEGM, 30 years.

The process of signing a document is as follows:

The document is converted to a .PDF format. PDF is a standard file format and not a proprietary format owned by Adobe. It has been accepted as a formal standard by the European Union. The software files are converted to PDF995 format including AutoCad TM files See [www.pdf995.com](http://www.pdf995.com). The file to be signed uses Entrust software to perform the secure signature and link the author to the signature. See [www.entrust.com](http://www.entrust.com).

Finally we have the complete package. The original document is defined by the information contained and is now in a pdf format. The integrity of the document is ensured by creating a "hash" code, so that even one character will change the document. The integrity criteria are: No alteration, i.e. any change can be detected; Integrality, i.e. one part document; Stability and Perennity, i.e. safe to store for a long time; and, Protection

measures (safe from hackers). These are features provided by the services of Notarius, the software certificate using Entrust and file conversion pdf995.

The Notarius connection provides the secure PKI and validates the Engineer is in good standing. There is now a link between the document and the author. This process does not store paper files or electronic documents. That is still the responsibility of the originating organization. This long term storage can be the paper vault, micro fiche, or electronic.

What are the drivers for requiring a digital signature?

Engineering documents must be authenticated by the engineer that created them. A legal document, Title Transfer must be signed and sealed by a lawyer and verified at Land Titles. This is currently achieved two ways: a paper copy or an electronic copy. If the documents are solely computer based, then they must be signed by a digital signature.

The authorization is an essential process. The first step is Identity verification in person or via documented verification. To protect the public this is based on confidence and trust. The confirmation of the link between the identity of the beholder of the private key and his professional status as an engineer can only be done by the Governing body, in our case, APEGM.

The Certification Policy process has Identity Verification process usually in person by an accredited person. The governing body verifies professional status. The governing body manages this process with out having to manage the infrastructure, i.e. the server system. The governing body handles the electronic process the same as currently done for the paper or rubber stamp system. The usual steps are: Initial request, to become an engineer: Renewal each year the fee is paid, Suspension, Revocation for failure to comply, Modification to status (retire), Reassignment move to another jurisdiction, and Request cancellation.

Notarius can provide this service. Notarius, a non profit organization, resulted from OIQ public call for tender. An agreement resulted based on administrative obligations, customer satisfaction obligations and meeting the technical requirements. Notarius offers tried and proven Certificate Authority. They are used by Notaries, Appraisers, Technicians, Land Surveyors, and Engineers.

They are a trusted CA by financial institutions, IT business partners (Bell Emergis) and government recognized. They are dedicated to professionals, as a non profit organization ensuring, cost recovery to maintain viability for the duration of ten years. Notarius fulfills the legal requirements and the professional requirements (and obligation to sign). They can ensure digital signatures are complete and the governing body's mission to protect the public is met.

The costs to provide digital signatures have been simplified to avoid having to purchase a copy of Adobe Professional about \$ 550. The initial fee for Notarius is about \$ 160 and an annual fee of \$ 250. The economics of electronic sealing may depend on whether many paper copies are used. If printing large drawings and courier service is an issue an electronic version may save money. The uptake in OIQ has been slow. For example, if only a paper report has to be signed once per week, it may not be economic to use digital signatures.

A reasonable next stage for the eseaal is a demonstration of the process with about a dozen signing or users of the eseaal. This will help to know: how it works, the costs, the benefits, identification of other users of secure documents, and encryption. The proposal is to have a couple of lawyers, land titles, and land surveyors, a lawyer at CCPE, several engineers in a large corporation, and several engineers in consulting. APEGM would act as the Identity Verification Agent (IVA). After a period of review of the processes perhaps clear economic benefits would lead to greater adoption. ■



## Another Successful Manitoba Robot Games

S.M. Jurkowski, EIT

The 12<sup>th</sup> annual Manitoba Robot Games was held by Science Council Manitoba on March 17 – 18, 2007, at the Audrey Jones Field House (Tec Vec High School). High school students designed and built robots to compete in various events:

**Japanese** (3 kg) and **Mini** (500g) **Sumo Wrestling**, in which two robots face off in a circular arena and try to knock each other off the platform, is perhaps the most popular event. The rules conform to the official FSI All Japan Robot Sumo Tournament rules, to encourage participation in other venues. Categories include tethered, where the robots are controlled by their drivers via cable to a control box, and autonomous, in which the robot

is programmed to act without human intervention.

**Tractor Pull** is a feat of strength competition, in which robots tow a weighted sled along a 24 foot carpeted track. The sled has wheels at the back, a skid at its front, and the weight moves forward at the robot and sled proceed forward, increasing the friction.

**Line Follower** was introduced in 2005, as a challenge to design a robot to follow a black line on a white playing surface. The challenge is to program the robot to handle curves, angles, breaks and intersections in the line, and to complete the path in the shortest time. There is no human intervention in navigation on the courses, except for resetting the robot one length behind in the case that the robot becomes confused or is unable to continue.

**The Super Scramble** requires a robot to accept a payload of one 1" steel ball bearing and deliver it to the other end of a playing field consisting of uneven terrain. Inspired by such projects as

the Lunar Rover and the Mars Global Surveyor, this competition is open to wheeled, tracked, or walking type robots.

All participants should be proud of their accomplishments this year. Particularly strong showings were made by the teams from Churchill High School, Manitoba School for the Deaf, and Crystal Springs School.

Science Council Manitoba also promotes the field of engineering to youth through its Robo-critters workshops, in which children put together a robot from a kit and drive it through a maze to light up a series of targets. The kids can race to see who can complete the maze in the shortest time, or simply have fun driving their robot through the maze. Volunteers are requested to contact the President of Science Council Manitoba, Herb Reynolds at [herb@scmb.mb.ca](mailto:herb@scmb.mb.ca) if interested in acting as a mentor at one of these workshops each year.

For more information about the Manitoba Robot Games or Science Council Manitoba, please see their web site at [www.scmb.mb.ca](http://www.scmb.mb.ca). ■

## Meet Your APEGM Heritage Committee

W.M. Klymochko, P.Eng.

On Tuesday, March 20, 2007, 12 APEGM members and staff answered the call to volunteer on this newly formed committee.

"I am most pleased with the number of volunteers and their exuberance", said Grant Koropatnick, P.Eng., APEGM Executive Director and Registrar, "there is an excellent range of expertise on this committee and I look forward to seeing their results".

Angela Moore, APEGM Events and Communication Coordinator presented to the members of the Heritage Committee, little-known tidbits of our Association history. Some examples are listed below.

The terms of reference for this committee have yet to be finalized, but their mandate will centre on researching and protecting the rich heritage of engineering and geoscience in Manitoba. They will deal with issues such as:

- Identification and priority setting for issues/topics to be handled by the committee;
- Strategies for and action on discovering, soliciting, cataloguing, and preserving material;
- Documentation of significant engineering and geoscience work undertaken by APEGM members both within the province and throughout the world;
- Liaison with others in the province interested in similar material and history; and
- Developing ways to present our heritage to our members and the general public.

The committee looks forward to working for their fellow association members and educating the general public at large. Perhaps there will be an APEGM museum one day. ■

## Fun Facts

### Taken From Past Council Minutes

- In 1923 council was considering suggestions for making the annual meeting more interesting.
- At the annual meeting in 1930 Council was asked to reduce the fees from \$5.00 to \$3.00 because the Association had accumulated \$10,000.00.
- In 1943 membership stood at 215, with 26 members serving in the Armed Forces. At the 1943 annual meeting, the President reported that there were few members in the Association under age 40.

Provided by APEGM Heritage Committee

# The Brown Sheet

## Science and Technology: Implications for Water Management

60th Annual Canadian Water Resources Association (CWRA) National Conference

CWRA is a national organization of individuals and organizations interested in the management of Canada's water resources. The membership is composed of private and public sector water resource professionals including managers, administrators, scientists, academics, students, and users. CWRA has branch organizations in eight provinces and members throughout Canada and beyond.

Date: June 25 - 28, 2007

Location: Saskatoon, Sk

## CDEN/C<sup>2</sup>E<sup>2</sup> 2007 Conference

The Canadian Design Engineering Network (CDEN) and the Canadian Congress on Engineering Education (CCEE) are meeting together for the first time in Winnipeg, MB.

We invite you to join us to discuss issues related to engineering and engineering design. The meeting will feature sessions tailored to the specific interests of each group, but available to all those in attendance.

See <http://cden2007.eng.umanitoba.ca> for more information.

Date: July 22 - 24, 2007

Location: University of Manitoba, Winnipeg, MB

## 18th Hydrotechnical Conference and Symposium

The 2007 conference will continue the tradition of highly successful, biennial, hydrotechnical specialty conferences attracting a broad audience of practitioners, academics, and students with interest in water resources engineering.

The technical program will include a general conference with plenary, parallel, and poster sessions over two days, as well as a one-day symposium honouring Professor Selim Yalin. The symposium will feature a series of invited speakers who will present on topics to which Dr. Yalin has contributed during his distinguished career.

The conference program will offer tours to local sites of interest, as well as various social activities.

See [www.csce.ca/2007hydrotechnical/Default.aspx](http://www.csce.ca/2007hydrotechnical/Default.aspx) for more information.

Date: August 22 - 24, 2007

Location: The Fort Garry Hotel, 222 Broadway, Winnipeg, MB

## Industrial Confined Entry Awareness Workshop

Manitoba Water & Wastewater Association

Presented by Dick Harvey, Rescue Program Coordinator, Manitoba Emergency Services College

This workshop will provide the participants with a better understanding of the issues around working in confined spaces, provincial regulations, and equipment requirements.

See [www.mwwa.net/TrainEduc/Training/ConfEntryWinkler.pdf](http://www.mwwa.net/TrainEduc/Training/ConfEntryWinkler.pdf) for registration and more information

Date: September 12, 2007

Time: 9:00 a.m. - 4:00 p.m.

Cost:

\$159.00 Members

\$185.50 Non-members

Location: Heartland Resort, 851 Main Street North, Winkler, MB

### □ Centennial Homecoming 2007

If you graduated from the Faculty of Engineering at the University of Manitoba within the last 100 years . . . YOU'RE INVITED!

**Date:** September 12 - 16, 2007

The Faculty of Engineering is celebrating 100 years of engineering education and wants everyone to come home and be part of the celebration.

**Location:** University of Manitoba, Winnipeg, MB

- Wine (Beer) & Cheese Reception in the Atrium
- Unveiling of Donor Wall
- Live music and dancing

The New Room 229 will host "The Gallery" class photos, photos of old buildings, other memorabilia, (please send us your submissions)

- Mingle with old friends, make new ones, meet current students and Faculty
- Tours of new (and old!) facilities

To RSVP, get more information on class reunions, or to loan items to the "Gallery", please contact Amber Skrabek at (204) 474-9034 or [amber\\_skrabek@umanitoba.ca](mailto:amber_skrabek@umanitoba.ca).

See <http://umanitoba.ca/faculties/engineering/alumni.php> for registration and more information.

### □ National Professional Practice Exam

Deadline for application September 7, 2007.

**Deadline:** September 7, 2007

Application form available at APEGM website  
[www.apegm.mb.ca/register/geninfo/write2007.pdf](http://www.apegm.mb.ca/register/geninfo/write2007.pdf)

**Date:** October 15, 2007

### □ APEGM Annual General Meeting

New one-day format including Professional Development Conference, AGM Business Meeting, Awards Dinner, and Dance.

**Date:** October 26, 2007

Check the APEGM website for updates; details to follow in the Fall Issue of the Keystone Professional.

**Location:** The Fort Garry Hotel, 222 Broadway, Winnipeg, MB

### □ PHEV 2007 Conference

Canadian Plugin Hybrid Electrical Vehicle Conference Public Forum Presentations by panelists, describing how they see the future of PHEV, will be followed by a Q & A session. The forum will give the public the opportunity to understand the role of PHEV in sustainable transportation and interact with PHEV world leaders.

**Date:** November 1 - 2, 2007

**Cost:**  
\$265.00 Early Bird  
\$355.00 Registration  
\$50.00/day Student

Posters on sustainable energy systems by students, government organizations, and local companies will be on display. Students are encouraged to present their research work during this public forum.

**Location:** The Delta Winnipeg, 350 St. Mary Avenue, Winnipeg, MB

It will provide them with the opportunity to discuss their ideas with industry, government, and academic researchers involved in renewable transportation.

For more information, visit [www.pluginhighway.ca](http://www.pluginhighway.ca).

### New Members Registered February, March & April 2007

A.A. Adedapo	T.H. Dao	S.B. Gagne	C.A. Kopchynski (MN)	W.B. Meadus	B.B. Roberts (ON)
G.H. Archibald	E. De Curtis (ON)	M.R. Gallo (ON)	A.D. Kroeker	G.A. Nelson (AB)	C.R. Rosolowich
C.A. Arias	F. Dubois	PS. Glockner	D.C.S. Kuhn	D.C. Neufeld (AB)	D. Rousseau (QC)
B. Auger (QC)	D. Dumas (ON)	C.D. Gosselin	J.L. Lalonde (QC)	M. Neumann (ON)	M. Sakr (AB)
J.K. Barbosa-Meyer (AB)	D.J. Dyck	A.D. Hachkowski	J.Y.S. Lam (ON)	E.O.B. Ogedengbe (ON)	E.M.L. Searcy (AB)
D.C. Benson	J.G. Dyck	J. Harris	S.D. Larson	M.J. Petrak	D.Y. Solomon
G.G. Burkitt (ON)	T.F. Eberharter	D.T. Harvie (ON)	J.R. Laufers (ON)	C.D. Pippin (SK)	C.L. St-Amour (ON)
T.M. Burnham (ON)	E.M.F.M. El Salakawy	J.A. Hernandez (ON)	D.H. Le (ON)	E.J. Principe (ON)	M.M.J. Stadnyk (AB)
J. Butler (NL)	Y.F. El-Madhoun	J.M. Hildebrand	S. Leclerc (ON)	R.K. Puszynski (ON)	J.M. Tojcic (ON)
M. Capano	D.J. Epa	D.E. Iliescu (ON)	C. Leitold	J. Qu	H. Wang
G.M.F. Charles (NS)	M.K.F. Farag (ON)	J.D. Jenness (BC)	J. Leung	D.A. Quirk (AB)	S.M. Wang
B.L. Cowitz (AB)	L. Filipecki	B.C. Jones	K.W. Marcinyshyn	F.C. Racicot (ON)	K. Weldeab
	D.K.Y. Fu (ON)	K.L. Joshi	M.G. McClelland		B.N. Zoski

### Licensees Enrolled February, March & April 2007

J.P. Nerison (ID)	R.T. Razor (OH)	M.L. Snowden (OK)
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### Members-In-Training Enrolled February, March & April 2007

M.M. Ahsan	M.G. Gobin	M.L. Klassen	J.A. McEwen	J.D. Schellenberg	K.D. Thiessen
H.K. Al-Hadidi	D.J. Hawkes	L.K. Kraynyk	P.J. Nicoll	H.H. Schultz	T.P. Tremblay
G.R. Atmuri	C.O. Iyogun	D.J. Krenz	J.C. Peterson	M.K. Shah	J.P. Watson
A. Berdichevsky	G.A. Jackson	K.K.Y. Leung	D.J. Petrak	B.J. Steele	M.J. Wheatley
P.D. Chicatun (BC)	D.J. Joachim	G. Li	K. Petrov	M.B. Steindel	N.P. Wikstrom
M.I.V. Cohen	N.I. Kaljanac	R.J. Lozowy	J.M. Plohman	B.R.J. Symaka	C.L.V. Williams
D.H. Etbail	V. Kaushik	A. Machynia	S. Rahman (ON)	K.L. Tan	A.E.R. Wolfe
R.T. Garcia	G.M. King	V.M. Maroti	D.A. Roberts	C.J. Taylor	W. Xiao (BC)
G. Glogowski	S.J. Kingsley	J.J. Marshall	J. Sadhak	Y. Tevs	

### Reinstatements February, March & April 2007

R.A. Brown	W.D. Gustafson (AB)
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### Members Deregistered April 1, 2007

Y. Abdel-Aziz	E. Evans	K. Lau	S.M. Pellerin	S. Soscia	A. Dhawan
C.S. Bate	M. Flynn	D.R. Lawrance	F.S. Qie	H. Su	R.T. Goddard
J.G. Bozsik	O.R. Glendon	J.P.A. Lue Choy	S.M. Rastegar	R.G. Wakelin	V.M. Jamadagni
F.D. Brannen	G.A. Harron	M.E. McCartney	W.J. Root	D. Yang	J.E. Kowalski
C. Chung	E. Hrudko	K.L.H. Mills	M.M. Simmons	B. Zaimi	K.M. Persad
G.H. Currie	R.M. Ilagan	D.A. Opseth	J.W. Sinclair	E.D.R. Jones	S.D. Spicer
M.C. Drouin	J.O. Klein	S.T. Pavitt	T.L. Sondresen	J.R. O'Sullivan	M.H. Windsor
R.B. Espey					

### Member Resignations as of April 2007

M. Ali	S.W. Honeycutt	V. Koschik	D. McKenna	B.J. Pullman	G. Scott
A.A. Aziz	F. Jian	P.M. Kreitz	E.S. Mickelson	S.A. Rayman	R. Smith
J.M. Barrett	M.D. Keating	S.A. Lecompter	J. Morris	C. Roberts	R. Tiller
D.A. Clark	J.A. Keller	B.J. Likes	M.G. Napoli	J.S. Robinson	A. Tsisserev
R.J. Clissold	L.C. Kilburn	R.G. McGregor	M. Pairawan	J.W. Rodger	G.R. Wreford
G.K. Holder					

### Member-In-Training Removed from Enrollment April 1, 2007

B. Akintug	J.K. Highmoor	N.A. Kaminski	J.J. Melendez	J.J.A. Sakalauski	D. Tesfamariam
Y. Borovichkova	C.J. Isaacs	Z. Liu	N.L. Morin	M.D. Simpson	P.C. Zuk
M.A. Coolidge	M.T. Jenkins	M.F. Mason	A.K. Punj	A.D. Spencer	

### Certificates of Authorization February, March & April 2007

ART Engineering Inc.	Hannigan Engineering Limited	Power Engineers Inc.
Colt Engineering (Ontario) Corporation	KGS ACRES Ltd.	Ready Engineering Corporation
De Curtis Engineering Limited	Leber/Rubes Inc.	Torgon Industries Inc.
Eascan Industrial Controls & Automation Inc.	Libby Engineering Limited	WorleyParsons Komex
Grey Owl Engineering Ltd.	North Winds Energy Inc.	

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