

Professional Engineer



Canadian Perspective on Mini-Hydro and Energy in the Ukraine

Reprinted from The Canadian Civil Engineer

Walter Muzycska, a design engineer in the Transmission & Civil Department of Manitoba Hydro in Winnipeg, recently returned from Western Ukraine where he spent six weeks working with the Lviv State Administration-Energy and Construction Complex.

Walter was sent as an advisor by The Institute of Public Administration Canada which administers a program called Partners in Progress for the Canadian Bureau for Central and Eastern Europe of External Affairs Canada. Walter used his vacation to pursue this volunteer work assignment.

“It was a tremendous opportunity for me to participate in the rebuilding and democratization of a country”, says Walter. His knowledge of the language and culture helped bridge the usual cross-cultural communication gap.

Walter’s assignment was to show the administration examples of how to prepare economic feasibility studies and proposals for the development of mini hydro-electric generation projects. These

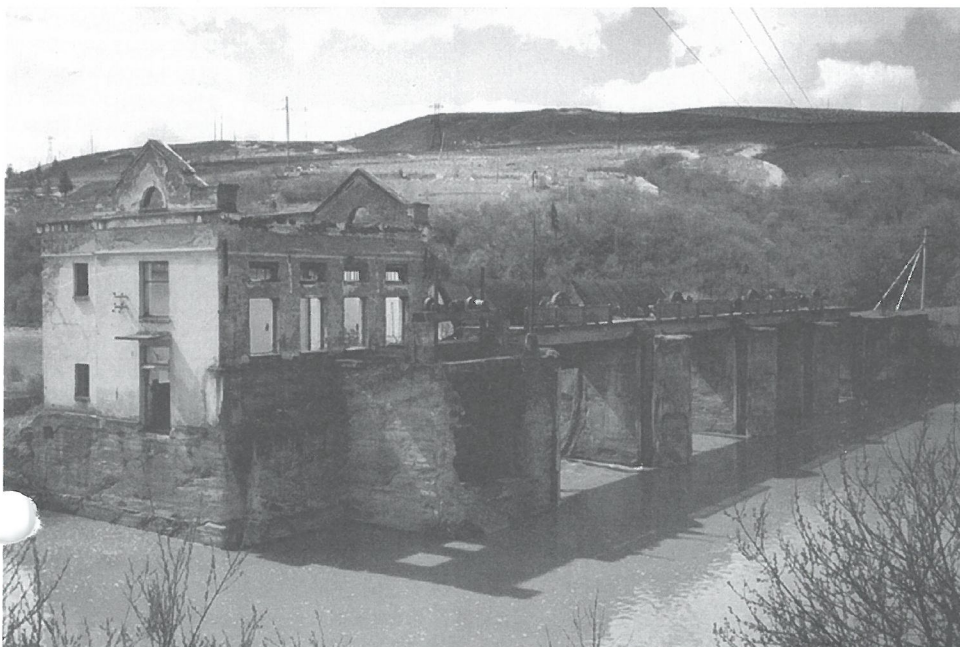
proposals will then be submitted to the World Bank for financial credits. There is an estimated 300 MW of hydro-electric potential on the Tisa River which borders Romania and the Ukraine. There are also hundreds of potential sites where mini and micro-hydroelectric stations could be set up on the small rivers of the Carpathian Mountains.

In addition, Walter explored alternate sources of energy such as wind, bio-gas production, ethanol and canola additives in gasoline.

Walter visited numerous generating stations, among them the Terebla-Rikska Hydro-electric Generating Station near Nukachevo in the Trans-Carpathian region. Completed in 1956, it has a generating capacity of 27 MW. The headwaters are located 180 metres above the plant on the Terebla river. Water is conveyed in a 4 km long rock tunnel, 2 m in diameter, then into a steel penstock (shown at right) to the three turbine units in the powerhouse.



Steel Penstock.



Rukova Hydro-electric Generating Station on the Ilnitsia River.

Another memorable site was the Rukova Hydro-electric Generating Station on the Ilnitsia River near Turka in Southwestern Ukraine. In 1975, during a flood, the spillway gates jammed and the earth dam was overtopped and breached. Eight people downstream of the plant lost their lives.

Walter gained an appreciation of the current state of affairs in Western Ukraine by touring numerous thermal-electric stations. “Thermal-electric generation accounts for about two-thirds of the electrical generating capacity in Ukraine. The present thermal-electric stations are in need of capital repairs”, says Walter. “Turbine parts are aging, boilers are cracking. About 60 percent of the thermal plants are over 20 years old.”

Ukraine suffered a severe energy crunch last winter and could certainly benefit from the many energy-conservation initiatives being implemented in Canada. Walter noted, however, that Ukraine is advanced when it comes to transformer-oil containment systems at their sub-stations and generating stations. “Canadian electrical

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**WE HAVE LOST CONTACT.
MAY WE HAVE AN ADDRESS?**



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Promotional Material Wanted

This Association's Public Awareness Committee would like to establish a collection of photographs of multidisciplinary engineering projects for use in promotional displays, careers symposia, and science fairs.

If you are willing to assist the Committee in its promotion of the engineering profession to the public, by providing a photograph depicting an exciting engineering project, the Committee will assist you in the promotion of your projects!

Please send an 8" x 10" foamcore-mounted photograph, (preferably colour), with a description of the photo content and the name of the donor on the back, to the APEM office. All contributions will be greatly appreciated and will be recognized in the display material. □

Position Wanted

I am a Professional Engineer and am eager to work on environmentally sustainable projects in design, development, analysis or testing. I am a mechanical engineer with eight years experience in the aerospace field (four in design, four in management). If you know of companies looking for someone with my interests/skills, please phone 669-3663 and ask for Andrew. □

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Canadian Engineering Memorial Foundation

Call For Nominations Engineering Memorial Foundation Corporate Award

The 1989 Canadian Engineering Memorial Foundation is now accepting nominations for its "Corporate Award".

The objective of the Award is to recognize and honour companies that have contributed to the promotion and advancement of women engineers. Contributions can be identified in many forms, and are not limited to: activities and programs to attract, encourage, promote and support women engineers within the company; leadership in promoting the role of women in engineering; involvement in community activities to educate all young people about the engineering profession, to name a few.

Consider nominating your company for this Award! Nomination forms are available from Lorelei Scott, 1989 Canadian Engineering Memorial Foundation, 401-116 Albert St., Ottawa, K1P 5G3 (Tel. 613-232-2474, Ext. 241). The deadline for submission of nominations is October 1, 1995. □

ENGINEERS-IN-TRAINING ENROLLED MARCH & APRIL, 1995

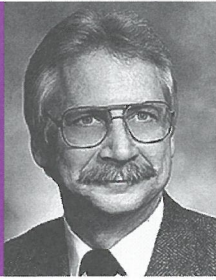
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President's Message

D.G. Osman,
P.Eng.



Our Future Resources

One of the most important resources that must be managed and responsibly developed by society is its human resources. In the engineering profession, like many others, a vital component of those resources is the university graduate. The development of graduates to the point where they stand in readiness for the responsible charge of the practice of engineering is highly dependent on the amount and the quality

of the professional engineering supervision received during the Engineer-In-Training period. However, the reality is that these days, and quite possibly for some time to come, recently-graduated engineers are being forced to accept positions where they are either not doing engineering work or they are doing engineering work without direct supervision and guidance from a professional engineer. The first becomes a concern because of the waste of a highly-skilled resource and the second because of a direct contravention of The Engineering Profession Act. Neither situation is desirable nor acceptable. As a professional

...electronic communications will have a greater influence in the way we perform our engineering work...we must anticipate and be ready to adapt.

association, society expects us to champion the management and development of the graduate engineer. The recently introduced Pre-Registra-

tion Program is a big step in this area. However, it cannot overcome economic reality.

In the case of the graduate engineer doing non-engineering work, the APEM is considering the acquisition of a Bulletin Board System which, among other uses, will have the capability of "advertising" both the availability of positions of engineers, and the qualifications and type of work being sought by an engineering graduate. However, this does not resolve the issue of the graduate engineer doing engineering work without the benefit of a professional engineer directly supervising the work.

This situation is not likely to improve on its own. Looking ahead to where electronic communications will have a greater influence in the way we perform our engineering work, we must anticipate and be ready to adapt. It is reasonable to anticipate that much of the engineering that has traditionally been done in the employer's office will be done at home by both registered engineers and EITs. It will be even more important for the APEM to have a system in place which will accommodate the "mentoring" of the engineers of the future.

The Ordre des Ingénieurs du Québec (OIQ) has had some success in creating meaningful employment opportunities for engineers by promoting their usefulness in small - and medium - sized manufacturing companies. It is also establishing a mentor program for those graduate engineers working virtually alone or without professional engineering supervision.

In Manitoba, the Association has been constrained in the area of mentoring because The Engineering Profession Act requires that all engineering work be done by or under the supervision of a registered engineer. Consequently, although personally rewarding, mentoring requires the assumption of responsibility for all engineering work performed, and can become quite a demand on the professional engineer's time. However, I expect that, if one taps into the flair for innovation that characterizes the engineering profession, there are ways for the profession to responsibly assure the development of this most important resource.

If you have thoughts to share or are interested in being a mentor, I would appreciate hearing from you. □

What Does APEM Do For Me?

By: S.M. Matile, P.Eng.

"Why should I join APEM?" "What does APEM do for me?" "Do I have to become registered if I don't use my seal?"

How many times have you heard these questions? Have you ever wondered, yourself, why you "bother" to maintain your membership?

You probably haven't given the matter much thought. I know I hadn't, until I started working at the Association office. But now, I am called upon weekly to answer questions about what the Association "does" for its members. I don't mind answering these questions of long-time members who may have lost their copies of the Engineering Profession Act and forgotten the self-regulatory nature of the profession; but when the person asking the questions has just completed our entrance "examination"* which is supposed to test his (or her) knowledge of the Engineering Profession Act, the Association's By-laws and the Professional Engineers' Code of Ethics, I am concerned. Clearly, the message that the profession of engineering is regulated by the engineers themselves is not being delivered - not even to those who have just finished studying the very document that legislates the self-regulation!

We, the engineers of Manitoba, are required by law (i.e. the Engineering Profession Act) to regulate the practice of engineering. The regulation of the practice involves, essentially, two elements: ensuring that only persons who are qualified to practise engineering are, in fact, practising engineering; and monitoring the practice of engineering to ensure that it is being done safely, responsibly, ethically, and in the public interest.

The Registration process is the means by which the Association ensures that a person is qualified to practise engineering. The engineers of Manitoba establish the criteria for qualification,

then ensure that everyone who is registered meets those criteria. The engineers of Manitoba are then required, by law, to act as an engineering "police force" and ensure that people who are not registered Professional Engineers are not practising engineering in Manitoba. Further, we are required to investigate complaints against registered engineers and, when necessary, act as judge and jury in instances of alleged professional misconduct.

So why should you "join" APEM? If you wish to practise engineering, you must, by law, be a registered Professional Engineer. Once registered, you, along with the other 3,300 registered engineers in the province, are responsible for regulating the profession and administering the Engineering Profession Act. You do this by serving as a "volunteer" member of a Committee or Council, and by paying dues to hire staff to assume some of the responsibilities. (Obviously, the more work you do, the fewer employees and contractors the Association requires, and the lower your dues!)

What does APEM do for you? Well, not much! APEM exists for the benefit of the public, not the engineers! (Although we do provide salary surveys and guidelines on the ethical use of the seal and various safety issues; and we offer a number of professional development opportunities, as well.)

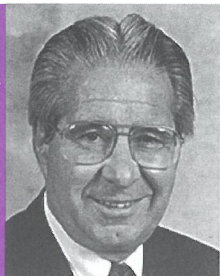
Do you have to become registered if you're not using your seal? You have to be registered if you want to practise engineering, period - whether or not you're using a seal. □

* Note: this article was written in 1993, though not published. On January 1, 1995, the entrance "examination" was upgraded to mandatory attendance at an 18-hour Professional Practice Seminar followed by a closed-book, three-hour Professional Practice Examination.

Graduate Course in Electric Power-System Protection

A course in the protection of electrical utility equipment may be offered in the Fall term of the 1995-96 year at the University of Manitoba, depending on interest. Lectures would be two hours, once a week, for thirteen weeks, followed by student 'presentations' to the class. You need not be registered in an M.Sc. program. If interested, please fax Professor Swift at 275-0261 or phone 452-6776, with your preference(s) as to when the lectures might be held. □

CCPE Chair of the Board's Message



Engineering – A Proud Heritage

By: Dr. Garland E. Laliberte P.Eng.

From the beginning, Canada has been engineers' country. We must live in the only country in the world, declared an editorial in the Royal Bank Newsletter, to have a reference to an engineering work in its constitution. A commitment to complete the Intercolonial Railway linking Atlantic Canada with Upper and Lower Canada was a key provision of the British North America Act.

Another railway, the Canadian Pacific Railway, was needed to link British Columbia with Central Canada, to colonize the prairie provinces and to bind the new nation together. The driving of the last spike in this railway in 1885 marked the successful completion of one of the mightiest engineering challenges ever undertaken. The engineers who masterminded and monitored this great project, and the construction



workers who worked under their supervision with only the technology of the nineteenth century at their disposal, were a breed to be admired.

We can be proud of the central role that our profession has played in building this great nation. Following Confederation, the new Dominion exploded with engineering activity of every known kind. Hydroelectric engineers helped develop Canada's priceless legacy of water resources to give us cheap and reliable energy to drive our industries and to improve the quality of our lives. Through the skills of our mining engineers, Canada's rich mineral resources were turned from rock into valuable processed metals. Their colleagues in the pulp-and-paper industry spurred the harvesting and, in

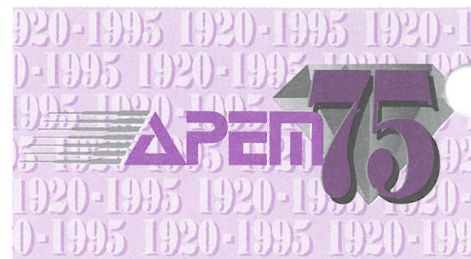
later years, the redevelopment of our vast forests. Petroleum engineers have contributed to our national security by making us essentially self-sufficient in oil and confident of our natural-gas supplies.

The challenges which the geography and the climate of Canada have presented to engineers have produced some uniquely Canadian engineering solutions. Canadian engineers contributed mightily and uniquely in the middle of the twentieth century to the Distant Early Warning Line that was so important to the defence of North Americans. It is not surprising that the world's first and largest manufacturer of snowmobiles is a Canadian firm that has, in recent years, turned its expertise in transportation and manufacturing to other engineering applications world-wide. The best engineering expertise in the world in ice roads resides in Canada. Canadian engineering has put Canada at the forefront of icebreaker technology. The need for access to our northern lakes challenged Canadian engineers to develop short-takeoff-and-landing aircraft that have found applications in many other different situations around the world. This list could go on but suffice it to say that our engineering solutions have been uniquely Canadian but, at the same time, we have shared them with the world.

Since this is my last message as President of the Canadian Council of Professional Engineers, I hope, you'll forgive a little flag-waving for our profession. Many of our constituent Associations are celebrating their seventy fifth anniversaries this year. I want to congratulate them for the fine job

that they have been doing in regulating a profession that has done so much to build Canada and to improve the everyday lives of Canadians.

In closing, I also want to take the opportunity to recognize the work of a Canadian engineer who has contributed significantly to the infrastructure of the engineering profession in Canada. In his own quiet and unassuming way, Don Laplante has contributed more than he realizes to the prestige and the strength of our profession. Don retired from his post as Executive Director of the Canadian Council of Professional Engineers in April. I know that you would want me to thank Don for his contribution to Canadian engineering and to wish him a satisfying and enjoyable retirement. Well done, Don. □



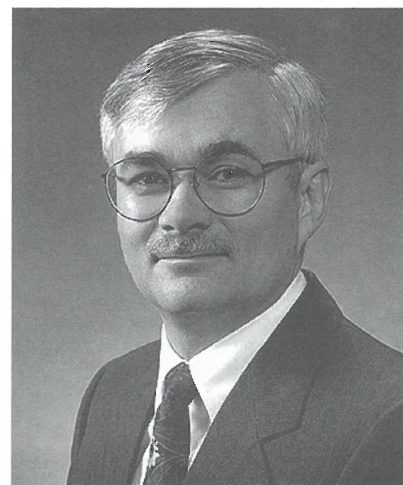
New President at CCPE

As of April 3, 1995, Mr. Daniel Verreault, P.Eng., replaced Mr. Donald Laplante, P.Eng., who retired as Executive Director of the CCPE.

Mr. Verreault will have the title of President following a decision by the Board of Directors that a new image was needed for the Senior Executive because of the enhanced emphasis being placed on public affairs. The current title of President which applies to the senior elected CCPE official has been changed to Chair of the Board.

"It is with great honour and humility that I accept the challenge of the Presidency of the CCPE and I am eager to contribute positively to the process of shaping a strong profession which will benefit every Canadian citizen", said Verreault. He added that although much had been accomplished to enhance the relationship between the engineering profession and society, CCPE would be called to play an even more active role in the shaping of public policy.

Prior to coming to CCPE, Mr. Verreault worked for the Canadian Aviation Maintenance Council as Executive Director, and played a key role in the development of the Council's vision and strategic plans. Mr. Verreault is a 17-year veteran of the aviation maintenance, engineering and regulatory areas. Mr. Verreault was awarded a Bachelor of Engineering (Mechanical) in 1977 and a Master of Public Administration in 1992, both from Carleton University. He is married and has four children. □



Daniel Verreault, P.Eng.

Only The Name Has Changed

In April, 1995, CCPE's Executive Director, Donald Laplante, retired, and the position was re-named "President" and filled by Daniel Verreault. Consequently, the elected position currently held by Garland Laliberte, formerly entitled "President", was re-named "Chair of the Board". (Please see the article entitled "New President at CCPE".)

Volunteer Engineers' Program at U of M

By: G. Morris, P.Eng.

In January, 1995, the Faculty of Engineering at the University of Manitoba initiated the Volunteer Engineers' Program to tap a valuable but under-utilized resource – the volunteer engineer. The objectives of the program are:

- to give students access to local professional-engineering expertise and experience;
- to promote co-operation between the Faculty and the local engineering community; and
- to maintain high-quality programs in the face of continuing budget cuts.

Professional engineers are invited to work as volunteers in the Faculty, supervising design projects and theses, giving guest lectures and seminars, advising on curriculum, supervising tutorials and laboratories, acting as mentors, and promoting the Faculty. The volunteers are provided with parking privileges, travel expenses, etc. and their contributions will be recognized appropriately.

The program began in mid-January, 1995, with a pilot project in the Department of Civil and Geological Engineering. The following are appointed as Volunteer Liaison Officers for the Co-operative Education Program in Civil Engineering:

Merc Corkal, P.Eng.
Ed Klassen, P.Eng.
Edgar Lach, P.Eng.
David Pashniak, P.Eng.
Bob Petri, P.Eng.
Len Pokrant, P.Eng.
Art Sparling, P.Eng.

By mid-February, with the assistance of a staff co-ordinator, the liaison officers began the task of meeting with potential employers of co-op students to promote the program and arrange work-term placements. Their efforts have proven to be highly effective, as all available students were placed for the 1995 summer work-term. The volunteers will conduct student and employer interviews during the work-term, and provide guidance to the students in the preparation of their mandatory work-term reports.

It is anticipated that, during the next year, volunteer liaison officers will be sought for the Industrial Engineering Co-operative Education Program and the Electrical and Computer Engineering Industrial Internship Program.

If you would like to become an engineer volunteer, please contact:

Glenn Morris, P.Eng.
Associate Dean, Faculty of Engineering
University of Manitoba
Winnipeg, Manitoba R3T 5V6
Phone: (204) 474-9809
Fax: (204) 275-3773
e-mail: glenn_morris@UManitoba.ca

Research & Development

APEM Luncheon Meeting, February 23 1995

Automatic Meter-Reading – Erwin Holowick, P.Eng. of IRIS SYSTEMS

By R.J. Hamlin, P.Eng.

The IRIS System for automatic meter-reads (AMRs) is a device that can be used to read water, gas and electric meters at the customer's premise. The system sends signals through a radio-network to a computer at the utility. The utility can then calculate the billing and issue the bill. The AMR system can also receive control-signals to turn loads on and off.

Sensor

The detector is usually opto-coupled to the rotating dial in an electric meter. The sensors are designed to fit into existing meter systems with a minimum of changes. They also have reverse, magnetic-field and tilt-tamper detection. The meters can still be conventionally read. The gas and water detectors are battery powered and good for ten years. The sensor is connected to a radio-frequency transmitter in the 900 Mhz band.

Transmitter/Receiver Radio-Network

The radio-network has a repeater every four to six blocks that picks up the signals from all the meters. The intermediate repeater relays the messages to the master transmitter/receiver. The master repeater covers about 10 square kilometres. The master interfaces with the central computer by a modem or various other wide-area networks.

Computer or Work-Station

The main computer is a UNIX-based system that

handles all the meter-reads. The meter-reads are time-stamped, and co-ordinated to be read at midnight. Also available from each master are 15-minute load-survey data, daily peak readings, and power-outage data.

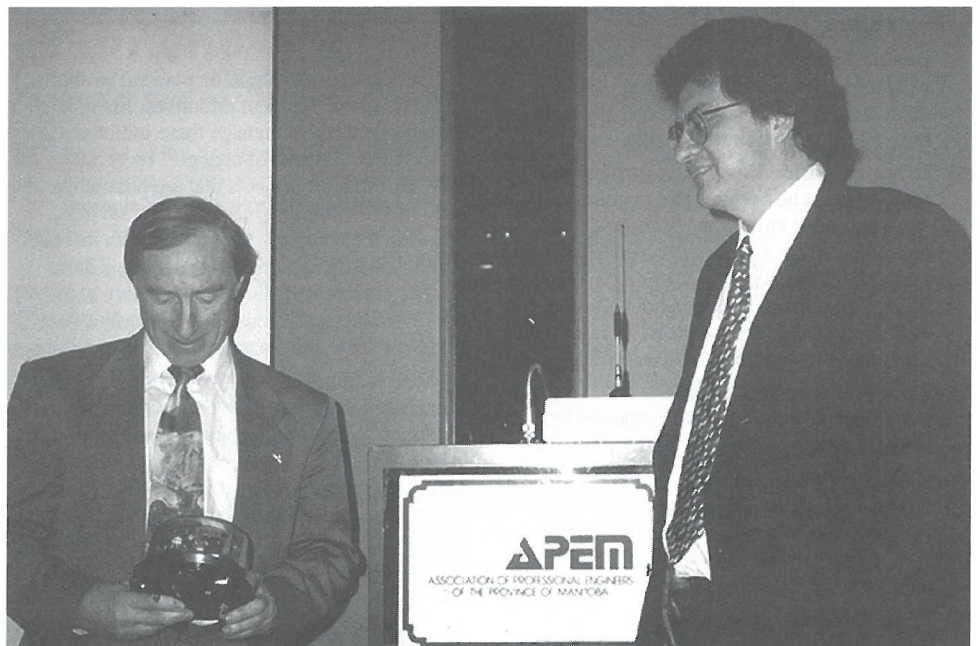
New Applications or Functions Facilitated by this Technology

The data can be prepared and posted for analysis the following morning. The data are used for the normal billing purposes but there are many other applications.

- Improved customer service; final billing without sending a meter reader.
- Better information on when the customer uses energy.
- Identification of peak demands.
- For utilities that have customers who agree to load-control, the system can switch a load off and confirm that it was indeed switched off.
- Time-of-day metering.
- Power-outage reports: location-and-duration reports.

The IRIS Organization

The IRIS company now has 45 staff members. The system and components were all designed here in Winnipeg. Systems have been sold all over North America. □



Bob Hamlin (l) inspects Erwin Holowick's meter.

Global Business Process Re-Engineering

By: R.J. Bruce, P.Eng.

On Thursday, March 16, Steve Russell, P.Eng., of Ernst & Young Management Consultants, discussed Global Business Process Re-Engineering at a breakfast meeting organized by the APEM's Professional Development (PD) committee. Steve has made presentations on management issues at previous PD breakfast meetings. He reviewed his last presentation and used it to set the stage for this one.

He started by presenting the results of an International Quality Study which was ongoing at the time of his last presentation. The objective of that study was to identify "which management practices in business were positively related to success, and are there universal best practices in management that work for all companies in all countries"? Ernst & Young did identify three universal best-practices: 1) Deploying a Strategic Plan that informs all levels of management (and in some cases suppliers & customers) where the company is going; 2) Supplier Quality Certification, such as ISO 9000; and 3) Process-Improvement Methods such as cycle-times and value-added vs non-value-added ratios.

The results of research in Business-Process Re-Engineering (BPR) by Ernst & Young were then presented. This research identified the following *five critical success factors in BPR*: 1) Leadership; 2) Dramatic Vision/Pragmatic Implementation; 3) Complete Integrated Solutions; 4) Speed of Results; and 5) Change Management.

BPR usually involves a radical change in the way an organization does business and "it requires a unique person to lead it, someone with a mission, focus, and sense of urgency for leading wholesale change". This person needs to build a team of like-minded individuals who will be the re-engineering leadership team.

Steve then went on to provide details on the critical success-factors:

- **Leadership** – The BPR project needs the wholehearted commitment of top management and they must communicate the need for the change to the whole organization;
- **Dramatic Vision/Pragmatic Implementation** – It must be in terms that people understand and must answer the following questions "What are the customers' issues and needs?", "Where can the customers' expectations be exceeded or redefined?", "Where can value be added to the business?", "How can the rules of competition be changed?";
- **Complete Integrated Solutions** – Companies must determine how the BPR changes will affect the organization, the people, the processes and the technology;
- **Speed of Results** – Companies should see very significant improvements within three to six months in order to generate and maintain support for the change;
- **Change-Management** – Change has to be aggressively managed throughout the organization using methods such as "activity-based

costing systems" and the "Balanced Score Card" to manage and measure the advantage of process performance".

A company should begin BPR with "a strategic vision driven by a compelling business case that is communicated to all employees" and not by a blank sheet of paper ignoring the current processes in the company. Each of the BPR initiatives should be plotted in a matrix with the elements of the company's strategy on one axis and the factors required to make them successful, (i.e. people, capital, technology, order fulfilment, new product commercialization, gaining new business, products, services) on the other axis. This allows the identification of initiatives that need to be linked and co-ordinated and initiatives that have no links to strategy, and emphasizes the measurement-goals of the re-engineering efforts.

**BPR has two distinct facets:
to make the business processes
more efficient and to make the
processes more valuable in
terms of what they produce.
The focus of the first facet
is to cut costs and remain
operational, while the focus of
the second facet is to improve
the products of the process.**

BPR initiatives should be planned as short-term (12-month) tactical initiatives. Ernst & Young's strategy to manage these initiatives is through their "waves of change", by breaking the BPR into smaller projects that are phased and that become "self-funding" through cost savings, allowing the company to continue with its business while making structural changes. These staged projects also allow the company to incorporate the lessons learned through earlier ones into the ones that follow them.

Steve emphasized the people-issues of BPR, breaking them out into the components of the organization that will implement and support the BPR efforts. These issues must begin with recognizing the corporate climate in which BPR is going to take place and adapting the BPR to this climate. The BPR leadership structure consists of: the Executive Sponsor; the Chief Re-engineering Executive; the Process Owners; the Core Process Teams; and, finally, the Infrastructure Team. These groups have a key role to play in the BPR plan and their involvement should be planned. It

has been found that 90% of BPR failures are due to the ineffective management of people-issues. Six key factors that have been used to overcome fear of change and establish the new values and behaviours for the re-engineered company are:

- **Organizational Structure** – By reducing the number of management layers and by organizing the work into teams, employees are better empowered to make change work;
- **Performance Management** – Evaluations must be timely and linked to business goals and must reward positive, quantum attempts to change and discourage unwanted traditional behaviours;
- **Compensation, Benefits and Rewards** – Employees must be rewarded for taking the lead in implementing new ideas that work towards the re-engineering plan;
- **Education** – It must be delivered as it is needed and must be initiated by the employees as they realize the need to continue and enhance their careers in the re-engineered company;
- **Management Style** – It must recognize that making BPR work depends upon leading the employees from the shop floor using all levers available to management;
- **Communication** – Good company communications will allow BPR to stay on track and inform the organization of its current status.

BPR has two distinct facets: to make the business processes more efficient and to make the processes more valuable in terms of what they produce. The focus of the first facet is to cut costs and remain operational, while the focus of the second facet is to improve the products of the process.

Steve concluded his presentation by discussing some of his firm's leading-edge research into BPR. Some re-engineering should be done first, and some should be done in parallel, depending upon which type of hypothesized business processes they are. His firm has identified three types of BPR factors:

- **Performance Hubs** – These are common and needed by all processes of the business (such as performance management tools);
- **Performance Boosters** – These increase the productivity and profitability of the processes (such as performance-based rewards for middle management);
- **Critical Links** (such as new product design) – These are needed to support other BPR initiatives.

During the question period, Steve described the re-engineering of: a bank's financial process to give better information and reduce cycle time; an engineering drafting section of a local manufacturer to reduce throughput times; and a business in Saskatchewan whose workforce on the shop floor was reduced from 80 people to 65 people to cut costs. □

Engineering Week Begins With Contest

By: G.B Penner, P.Eng.

Reprinted With Permission from Manitoba Hydro's Hydrogram

The Association of Professional Engineers of Manitoba (APEM) kicked off National Engineering week with several contests at Polo Park mall in Winnipeg on Saturday, March 4. School children from across Manitoba were invited to compete in three events; spaghetti bridge building, whizzer racing (small mechanical device built to climb steel wire on a five-degree incline), and a house-of-cards contest.

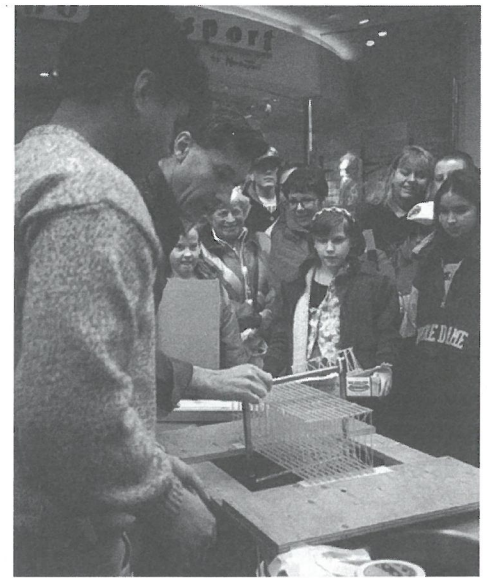
Far and away the most popular competition was the spaghetti bridge contest. The rules for this contest were simple: take 300 grams of spaghetti, 125 ml of glue, and span a 30 cm gap. The bridge that held the most weight took home the grand prize – a 486 IBM-compatible PC donated by Mind Computer Products. Cash prizes were awarded to winners in the other categories.

Several hundred people gathered around the event and many others watched from the second floor of Polo Park. Forty-five teams of students from grades 1 to 12 took their bridges to be tested to failure by engineers, Shane Mailey, Don Spangelo and Glenn Penner. The test setup consisted of a harness made out of copper pipe and a pail filled with sand to provide the weight to crush the bridges.

Grand Prize Winner: Uri Andrejowich, Weight: 19.9 kg; Grades 10-12 category: Tie between Heidi Andrejowich and Mike Fagundes, Weight: 15.5 kg; Grades 7-9 category: Tammy Andrejowich, Weight: 18.5 kg; Grades 5-6 category: Tie between Lindsay Fagundes and Kevin Penner + team, Weight 11.3 kg; Grades 3-4 category: no entries; Kindergarten – Grade 2 category: Chris Moore + team, Weight 8.2 kgs.

Many of the other 38 bridges held loads ranging from 0.9 kg. to 11 kg. However, the most surprising bridge came from the Grade 1 team of Chris Moore and friends finishing seventh place at 8.2 kg., which beat most of the Grade 7-12 bridges by a long shot.

According to organizers, the purpose of this event was to expose children to the field of engineering. In that area this event was a tremendous success and may become an annual event to be held during engineering week. □



House-of-cards competition underway. Top: Volunteer Don Spangelo tests spaghetti bridge.

Proposals for the Engineering Endowment Fund Advisory Committee

Faculty of Engineering, The University of Manitoba

The goal of the Engineering Endowment Fund is to provide support for initiatives that promote excellence and innovation in the Faculty of Engineering.

The purpose of the Engineering Endowment Fund is to provide for the enrichment of programs in the Faculty of Engineering. The fund is not intended to be used for activities or projects that would normally be funded by the operating or capital budgets of the Faculty of Engineering.

Proposals may come from staff, students, and alumni, all of whom are contributors to the Fund. Application forms and instructions are now available from the Dean's Office.

This year, approximately \$70,000 is available for distribution by the committee.

Preparation of the Proposal:

Each application must be typewritten with all sec-

tions fully completed. If the proposal requires the purchase of equipment or services, the applicant(s) must provide recent quotations.

To apply for funding, one copy of the completed application should be submitted as early as possible, but no later than 4:00 p.m. on Friday, November 3, 1995 to:

Irene R. Mikawoz, P.Eng.
Director of Academic Affairs & Student Recruitment
Faculty of Engineering
The University of Manitoba
Winnipeg, Manitoba R3T 5V6
(204) 474-8497

Applications may also be faxed (275-3773).

For requests in excess of \$10,000, the principal applicant may be required to meet with the Engineering Endowment Fund Advisory Committee to discuss the proposal. *Continued on page 12*

Letter to The Editor

I am writing this letter in response to an article I noticed in the February 1995 issue of The Manitoba Professional Engineer. In this day and age of supposed gender equality I find with some dismay that a group called "The Professional Engineers Wives Association" still exists. While I realize that the social advantages of such an organization (ie. networking) are probably beneficial to all APEM members, perhaps renaming the group as "The Professional Engineers Spouses Association" would be more appropriate.

Sincerely,
Christine Novotny, EIT

Council Reports

Tuesday, March 14, 1995

By: C.P. Gray, P.Eng.

AT WHICH COUNCIL DISCUSSES CCPE, ENGAP AND ADDICTION

President-Elect of CCPE, Dr. Garry Wacker of the University of Saskatchewan, sat in on the March 14, 1995 APEM Council meeting for the dual purpose of observing the Provincial Association issues first hand and reporting on CCPE matters. Dr. Wacker reported that a "Vision of the Profession" is being drafted to redefine the role of the profession. Also, CCPE has adopted a five-year strategic plan for international activities including CIDA and NAFTA concerns. As well, CCPE has established a task force to

investigate an international accreditation agreement with countries where no agreement exists, such as France and Germany. As well, CCPE continues to struggle with the engineer's role in environmental issues and the inclusion of geoscientists within CCPE.

Council approved a two-year \$5,000.00 grant to the University of Manitoba ENGAP program with accountability conditions.

Council approved the creation of a Peer-Assistance Program to help members with addiction problems. It was agreed the first step was to find a program leader.

Council approved a new policy for chapter funding, recognizing the fact that members outside the Winnipeg area do not have the same access to the majority of APEM events.

Council received a report from the Investigation Committee.

Finally, Liaison Councillors reported on the activities of the Women-in-Engineering Advisory Committee, the Board of Examiners and the Organization Restructuring Action Plan Committee. □

Tuesday, April 11, 1995

By: W.G. McKay, P.Eng.(Ret.)

AT WHICH COUNCIL REVIEWS THE RELATIONSHIP BETWEEN THE BOARDS OF REGISTRATION AND EXAMINERS.

The meeting of Council commenced promptly at 12:30 p.m. with nine of the councillors in attendance. Councillor Kempan joined later.

The early items of the agenda were quickly disposed of. Financially with the large majority of the fees having been received, it was estimated that being at the three-quarter point of the fiscal year, the year-end will likely close on a break-even position.

The report of the Registration Board was received and at this point matters of registration, additional courses for qualifications and the new professional practice examination for EIT's all came into review. Also the role of each of the three boards, the Registration Board, the Board of Examiners (for academic qualification), and the newer Experience Review Board, (for practical experience) were discussed. The change from two years to four years of practical experience before registration was another factor in the overall discussion. Mr. W. Pawlikewich, Chair of the Registration Board, was in attendance to elaborate on this Board's reaction to a decision by the Board of Examiners on a recent application. As the processes of registration,

examination, experience and practical examinations evolve, some further review and discussion is to be anticipated.

Regarding budgets, Committee programs and new programs were discussed. Mr. Ennis indicated that he is endeavouring to involve committees in the budgeting process of their programs, in order that they may fully appreciate the costs and the values received from their operations. As a computer bulletin board for the Association has been suggested, the mechanics of operation, inter-net, etc., were discussed. It was suggested that this may be a program with which students and EITs could be involved on a voluntary basis, particularly in a staffing capacity. Council has promoted the involvement of the EITs in Association activities, and now has an obligation to be cognizant of the opportunities for EITs to participate.

Council, having recently sent to the membership correspondence and news releases on the item "Head of Civil and Geological Engineering, Faculty of Engineering", deemed that until further developments, its position would be one of observation.

Councillor Britton reported that under changes in the administration program of the Engineering Faculty, the position of the Reference Librarian in the Engineering Library had been closed out, leaving only one librarian in a very heavily over-worked position. There is also the implication that these conditions could lead to the closing out of the entire Engineering Library. Council will lend its support to the rectification of the current situation and to the continued operation of the library.

The meeting adjourned at 5 p.m. □

APEM at the 1995 Manitoba Schools Science Symposium

By: C.A. Nieuwenburg, P.Eng.

Another Manitoba Schools Science Symposium (MSSS) has come and gone, and APEM was there once again to participate. In addition to sponsoring the MSSS Organizing Committee, APEM sponsors awards of one \$500.00 engineering scholarship for the University of Manitoba, and three enrollments in the "Careers In Engineering" session of the University of Manitoba's Mini-University program. Eight volunteer judges and I spent the evening of Friday, April 28 and the morning of Saturday, April 29 at the University of Winnipeg judging (and learning!) about such topics as artificial intelligence, smoke detectors, lamination, oil spills and automobile aerodynamics. After consideration of over 125 projects presented by students from Grades 4-12, we arrived at the following award-winners: the \$500.00 engineer-

ing scholarship was offered to Dinen Subramaniam for his project entitled "Using Evolution to Create Artificial Intelligence"; and the three enrollments to Mini-University were awarded to Mark Grant for his project called "Fire! The Next Step in Smoke Detection"; Alastair Komus for his project entitled "Up Up and Away"; and Tyril Froese for his project called "Automobile Aerodynamics".

These students were presented with certificates during the Major Awards Ceremony on Sunday, April 30. In addition, "Outstanding Achievement Ribbons" were presented to another 18 students to further recognize and encourage their interest in engineering.

Many thanks to judges Terry Armstrong, Richard Bernhardt, Kris Dick, David Grant, Kelly

Hunter, Jim Linnen, Gene Manchur and Brian Trenholm. APEM and I greatly appreciate the tireless effort, enthusiasm and expertise you volunteered while representing your Association. □



Caroline Nieuwenburg presents award at MSSS.

Historic Military Expedition Overshadows Remarkable Northern Engineering Project

By: Robert F. Legget (deceased)

Reprinted from *The Canadian Consulting Engineer*

All engineers who have been engaged actively on construction projects will know well how distracting large groups of visitors to a job can be. Few jobs can have been so seriously interfered with as the building of the Dawson Road in the 1870's.

Dawson Road was the name applied to the improvement of the 430-mile route from the Lakehead to the Red River Settlement. It was Simon J. Dawson, a Scottish-born engineer and surveyor, rightly honoured by the use of his name in this way.

The improvements included two wagon roads: one from the Lakehead to Lake Shebandowan about 50 miles long, and the other from the Lake of the Woods to Selkirk on the Red River, well over 100 miles long. Improvements were also made on the many portage roads and trails at the breaks in the long water route through rivers and lakes. Small steam tugs were implemented to assist with navigation on the larger lakes.

Work started in 1868. In mid-winter 1869-1870, Dawson received instructions to be ready to assist in the passage of a military expedition from the Lakehead to the Red River at the opening of the 1870 navigation season. Two earlier military expeditions to the Red River, in 1846 and 1857, had travelled by sea to Hudson Bay, via the Nelson River, into Lake Winnipeg and finally to the Red River.

Dawson had ordered the necessary boats for the operation by January 1870, and all were delivered in time for the arrival of the troops at Prince Arthur's Landing. Two steamboats, the *Chicora* and the *Algoma*, had been chartered to transfer Colonel Wolseley, the Commandant, and his men from Collingwood to the Lakehead. The *Algoma* arrived safely at the head of the Lakes, but the *Chicora* was halted for a time at Sault Ste. Marie by US authorities, a reminder of the troubled times in which this work was carried out. Dawson had recruited more than 700 experienced river men to man his fleet of boats. Of these, 150 came from the Ottawa River, then at the height of its activity in lumber transport. The remainder came from the Trent and St. Maurice Rivers with smaller numbers from other places in Ontario and Quebec.

Thirty-six boats and six scows had been assembled. About half the road to Lake Shebandowan had been completed. The remainder was passable. The route was shortened by three miles by having the first transfer into boats made at Ward's Landing on the Matawin River instead of at McNeill's Landing on the Lake.

So well-organized were the arrangements made by Dawson, assisted by the military after their arrival, that between June 6 and July 6 no fewer than 101 boats were dispatched from the landing manned by 556 Voyageurs and carrying 471 soldiers with their equipment. These numbers



must be considered with full realization that the water route necessitated no fewer than 70 loadings and unloadings!

The record of the expedition is now a part of Canadian history, but the use of the Dawson Road for part of the journey is all too often forgotten. The 1400 men in the expedition were safely transported to the Red River and back again to the

Lakehead later in the year without accident, a superlative record. Many soldiers became expert in river and forest crafts; all seem to have played their part in the portaging of boats and equipment. Captain Redvers Buller, later a celebrated General, is reputed to have carried as much as 300 pounds at a time.

Continued on page 12

New Vice-President Elected

By: G. Nickel

The Association of Professional Engineers has elected Catherine Stewart, P.Eng. to the position of Vice-President. She is the first woman to hold the position in the Association's 75-year history.

Catherine graduated in 1974 from the Chemical Technology Program at Red River Community College. After graduating, she worked at INCO in Research and Development as well as Plant Process Engineering. She returned to the University of Ottawa in 1982 and graduated Magna Cum Laude with a B.Sc. in Chemical Engineering in 1985. Presently, she is a Senior Metallurgist in the INCO refinery.

Catherine recently received the Red River Community College Distinguished Alumni Award. The award honours graduates of the College who have distinguished themselves in both their chosen profession and the community. The award comes with a long history of contributions that have distinguished her within the engineering profession. Catherine is in her fourth year of serving on the Association's Council. Her leadership in the founding of the Thompson Chapter and service as President on the Executive of that chapter have also been successes.

Catherine has made many contributions to the community. She participated on behalf of APEM in the Prairie Region Forum on Women in Engineering. She has also taken an interest in assisting

in the Association's programs for the development of younger engineers.

In 1993, Catherine served the Canadian Council of Professional Engineers as part of the team responsible for the evaluation and accreditation of the programs in the Faculty of Engineering at the University of Manitoba.

Her commitments to her profession and the community are admired and respected. Catherine Stewart, P.Eng. has proven that she is worthy of the Distinguished Alumni Award. □



Catherine Stewart, P.Eng.

Admissions Update

By: S. M. Matile, P. Eng.

As of January 1, 1995, APEM has a four-year-work-experience requirement for registration. Anyone who was not "grandfathered" under the "two-year rule" by making application for either registration or EIT enrollment by December 30, 1994 must now enroll as an EIT, obtain four years of engineering work experience under the supervision of a registered professional engineer, and complete the Association's new Pre-Registration Program. The Pre-Registration Program requires the EIT to submit semi-annual reports to APEM, describing his or her engineering work experience, professional development/continuing education activities and professional service activities over the past six months; attend the Association's Professional Practice Seminar and pass the subsequent Professional Practice Examination.

A modified Pre-Registration program has also been developed for EITs "grandfathered" under the two-year-work-experience requirement. These EITs are required to submit semi-annual work-experience progress reports, to attend the Professional Practice Seminar and to pass the Professional Practice Examination. If they had

not acquired 18 months' acceptable engineering work experience by January 1, 1995, they are also required to fulfill the Association's one-year requirement for professional development/continuing education and professional service.

As expected, there was a burst of activity late in 1994, as engineering graduates from as early as 1986, right up to the (then impending) February, 1995 graduates, rushed to submit transcripts and application forms to ensure that they would be "grandfathered" under the "two-year rule". APEM's EIT enrollment swelled to over 300!

Early in 1995, we sent information packages to all of the EITs, apprising them of the new requirements, and requesting that they complete progress reports to date on their engineering work experience, professional development/continuing education activities and professional service activities. As those reports are returned, we have been sending information packages to the EITs' supervisors and employers, apprising them of APEM's new requirements, seeking their co-operation with us to ensure that the EITs in their employ obtain the work experience and professional development necessary for registration, and asking them to complete progress reports on the EITs' work experience to date.

Once all progress reports are returned to us, our Experience Review Board reviews the file of each EIT to determine the suitability of the engineering work experience, professional develop-

ment activities and professional service activities described. The EIT then receives notification of the decision of, and any associated recommendations from, the Experience Review Board. The Board reviewed its first EIT file in March, and will be very busy, over the next few months, with over three hundred files still to go!

The Association's first Professional Practice Seminar, facilitated by the University of Manitoba's Continuing Education Division, commenced on May 4. Registration for the Seminar exceeded expectations, and a second Seminar commenced on May 11. Each Seminar comprises six three-hour modules on the subjects of engineering law and professionalism. The examination for both sessions will be held on Thursday, June 22.

To date, acceptance of the new program has been excellent! Several companies are now developing EIT programs based on APEM's requirements; we have received compliments galore on the course notes that were developed for the Professional Practice Seminar; and, already, a good number of registered professional engineers have expressed an interest in attending the Professional Practice Seminar and Examination.

This Association is indebted to the volunteer committee members and professionals who developed the new program, prepared the Professional Practice manual and are now delivering the Seminar and Examination. Thank you all, very much. □

Donald W. Craik Engineering Library Update

Many of you are aware of the predicament facing the Engineering Library and its users: the possible merging of your Library with the Science Library on campus, according to The University's Plan 2000. When the Plan was first announced in September 1994, President Naimark asked for community input on this and other issues addressed by the Plan. APEM Council wrote a letter of concern about the Library situation, especially about accreditation, the erasure of the Donald W. Craik Library and the W.L. Wardrop Reading Room, as well as access by practising engineers. As well, the Engineering student body sent in a petition protesting the move, while many others wrote letters of concern.

In March 1995, the matter was referred to the Senate Library Committee for discussion. The Chair of the Committee, Dr. Kenneth Hughes, Dean of Graduate Studies, is now asking for input into this process again, seemingly unaware of the previous letters and petition. If you wish to have your voice heard about this, please write to Dr. Hughes, 500F University Centre, University of Manitoba, Winnipeg MB R3T 2N2.

A further erosion of library service to the faculty and practising engineers is the loss of the position of Reference Librarian (recently opened due to sickness). The Donald W. Craik Engineering Library is the fourth-busiest library in the system, after the Dafoe, Law, and Medical Libraries

for reference questions per librarian, and the third-busiest for the number of users per year after Dafoe and Science. The Library is also the third-most used library by external users after Dafoe and Law – meaning practising engineers use this Library often. The cancellation of this position indicates a severe problem to be faced by the remaining staff (especially the only remaining librarian) as well as users at all levels: students, faculty, staff, and practising engineers and their librarians who have relied on the Engineering Library for information and document delivery. This situation is currently being discussed with Library Administration, but it is a predicament you should be aware of. The service to external users is further harmed by the fact that many engineering companies are now closing their own libraries and donating their collections to this Library and access to them may be hampered by a merge.

For full information and background about this issue, you may contact members of the Engineering Library Committee:

G. Morris 474-9809;
R. Sri Ranjan 474-9344;
A. Shah 474-9674;
M. Raghuvier 474-8468;
S. Balakrishnan 474-8482;
N. Godavari 474-9445; or
Dean D. Shields 474-9806. □

NEWS RELEASE

Canadian Welding Bureau Accredited as ISO 9000 Registrar

The Canadian Welding Bureau, an independent, not-for-profit organization, is pleased to announce that it has been accredited by the Standards Council of Canada as a quality systems registration organization. The Bureau's Quality Registration Division, QUASAR, is responsible for the delivery of the ISO 9000 certification and registration services.

The Bureau is already accredited by the Standards Council of Canada, the national accreditation body, as a Certification Organization for the administration of: CSA Standards W47.1 "Certification of Companies for Fusion Welding of Steel Structures"; CSA Standard W47.2 "Certification of Companies for Fusion Welding of Aluminum"; CSA Standard W186 "Welding of Reinforcing Bars in Reinforced Concrete Construction"; and CSA Standard W178.1 "Certification of Welding Inspection Organizations". Its Mississauga Laboratory is accredited as a Testing Laboratory. □

Research & Development

Nuclear Research: The Regulator's Perspective – Dr. Agnes Bishop

By: M.J. Brown, P. Eng.

Dr. Agnes Bishop, President of the Atomic Energy Control Board (AECB), spoke to members of the engineering and medical professions at a joint meeting on March 10, 1995. The meeting was co-sponsored by the APEM's Research and Development Committee and the Manitoba Branch of the Canadian Nuclear Society (CNS).

The AECB, with a staff of over 400, is the regulator of all nuclear matters in Canada, and is responsible for such things as the licensing of uranium mines, nuclear reactors (power and research), and hospital radiotherapy and diagnostic departments. While in Manitoba, Dr. Bishop discussed Canada's nuclear research, particularly reactor-safety research, and how it is utilized by the AECB.

Dr. Bishop began by giving a brief history of the AECB. Established under the Atomic Energy Control Act of 1946, the AECB is the oldest atomic energy regulator in the world. The board is set up to control and supervise the development, application and use of atomic energy in Canada. In 1954, Atomic Energy of Canada Limited (AECL) was established as a Crown Corporation, and subsequently became responsible for the majority of nuclear research in Canada.

The AECB, with a more defined mandate, still maintains a research program of its own. This Research Support Program (RSP), with an annual budget of \$3.3 million, assists the AECB in setting standards, regulating industry and licensing. Three of the main objectives of the RSP are to:

1. Acquire knowledge and expertise to assist the AECB in making sound, timely and credible decisions concerning the regulation of Canada's nuclear industry. This work is performed mainly through contracts, to address

issues identified by AECB staff.

2. Stimulate licensees to perform research on safety, security and environment issues. Dr. Bishop noted that at present the operative word is "stimulate", but the present climate of budget-cutting may one day require the AECB to "demand" research on the above-mentioned issues.

As an example of how small-scale AECB research impacts larger programs conducted by the industry, a three-fuel channel flow visualisation rig was built by the AECB to study flow phenomena in multiple-linked channels (a single CANDU reactor has between 380 and 480 horizontal fuel channels). The AECB research stimulated a significant change to current reactor-modelling being undertaken by AECL here in Manitoba.

3. Develop external sources of expertise on which the AECB can draw. Dr. Bishop noted that the AECB cannot provide all the necessary expertise and research itself, due, in part, to the enormous financial costs.

The AECB also endorses projects and submissions to the federal Treasury Board, and thus stimulates research without providing direct financial support. The AECB's own research and support group has only 15 staff, guided in part by independent advisory committees on nuclear safety and radiological protection.

The nuclear industry's own research programs dwarf the RSP. The largest program is run by the CANDU Owner's Group (COG), an organization of the Canadian CANDU-owning utilities and AECL. COG has a current annual budget of \$120 million, of which \$37 million is devoted to reactor safety and licensing research. In response to the AECB, COG has increased the focus of their

Safety and Licensing research program on safety issues, despite the fact that COG is under heavy budget constraints.

In conclusion, Dr. Bishop demonstrated the value of AECB research with a recent real-life example. Research performed in the 1970's, under the direction of the AECB, had shown that the original low-pressure emergency cooling systems of the CANDU reactor may not be adequate to handle certain loss-of-coolant scenarios, and thus high-pressure systems were installed on all existing reactors. In December of last year, Unit 2, at Ontario Hydro's Pickering Nuclear Generating Station, lost coolant and uneventfully shut down by utilizing the developed-by-research high-pressure system.

Dr. Bishop stated that nuclear research will continue to have an important role in maintaining a satisfactory level of safety in Canada's reactors, achieving AECB's goals of protecting the public, workers and the environment. □

Canadian Council of Professional Engineers Mobility Clarification

In the March, 1995 edition of ACEC's Communique, an article was published describing the CCPE-sponsored agreement on mobility for Professional Engineers. This article has been widely misinterpreted, both by professional engineers and their clients, as removing the need for registration in each province in which the engineer practises. The current agreement does not remove this requirement; rather, it calls for easing the administrative process for an engineer seeking to transfer membership or apply for multiple memberships or licences.

YOU MUST BE REGISTERED OR LICENSED IN EACH PROVINCE OR TERRITORY IN WHICH YOU PRACTISE ENGINEERING.

The CCPE Mobility Agreement simply helps the transfer and registration procedures for Professional Engineers registered for at least five years in Canada. Under this agreement, an engineer registered in one province or territory, with at least five years of continuous registration in Canada and no disciplinary action taken or pending, and meeting the appropriate language requirements, will be registered by a second jurisdiction upon proof that the original registration is in good standing. □

Have You Paid Your 1995 Dues?

Your 1995 annual dues were payable to this Association by January 1, 1995.

As of March 1, 1995, the \$50.00 late payment penalty was assessed.

If we have not received payment for your dues, complete with late-payment penalty fee, by June 30, 1995, your name will be removed from the register and you will cease to be a member of this Association.

If you are de-registered and wish to become reinstated to membership, you will be required to:

- pay the current deregistration fee (\$300);
- pay the current annual membership dues;
- pay the current admission fee;
- write and pass the Association's Professional Practice Examination;
- provide the names of referees who will verify at least four years of your recent engineering work experience; and
- provide Council with a satisfactory explanation as to why your membership was allowed to lapse.

Canadian Perspective on Mini-Hydro and Energy in the Ukraine

Continued from page 1

utilities could benefit from their methods of outdoor oil-spill containment systems."

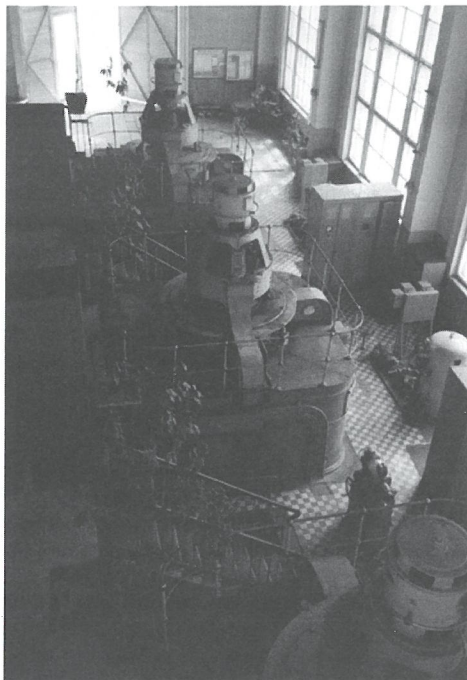
Walter is writing a paper on "Canadian Engineering Opportunities in the Ukraine" which will be presented at the 1995 Canadian Society for Civil Engineering Conference in Ottawa. "My goal is to inform Canadian engineers of the tremendous overseas opportunities for engineering consultants in Ukraine."

"Ukraine is a beautiful country and has a very talented and highly educated work-force. Combined with Western capital and management principles, the benefits could be mutually advantageous." Ukrainian electrical utilities such as LvivEnergoproekt are anxious for Western investment and joint ventures.

Walter introduced the Lviv State administration to the state-of-the-art information highway: INTERNET. "To move ahead and be effective, organizations need better communication and access to information" says Walter. "INTERNET allows the Lviv State Administration to exchange information with people all over the world and gives them access to Canadian, U.S. and international research networks, along with a worldwide electronic mail system."

Walter Muzycska obtained his Master of Science Degree from the University of Manitoba and

is an active member of the Canadian Society for Civil Engineering. Walter also acts as a project advisor on Manitoba Hydro Research & Development projects at the University of Manitoba. □



Terebla-Riska Hydro-electric Generating Station showing the layout of the generator floor. Employees take advantage of the abundant heat and light in the plant to grow vegetables for consumption.

Engineering Endowment Fund Advisory Committee

Continued from page 7

The Engineering Endowment Fund Advisory Committee will meet in November, 1995 to select and recommend to the Dean those proposals which should be funded.

Categories of Activities and Projects That May Be Supported By The Fund:

- Research and Scholarship
- Teaching
- Student Activities
- Equipment and Facilities
- Academic and Support Staff
- Library
- Outreach

Examples of activities under each category are given in the detailed proposal information. □

ROSTER UPDATE/CHANGE OF ADDRESS NOTIFICATION

Full Name _____

New Address _____

City _____ Province _____

Postal Code _____ Country _____

Employer _____

Position/Title _____

Bus. Tel. _____ Date Effective _____

Mail to: A.P.E.M., 530-330 St. Mary Ave. Winnipeg, Manitoba R3C 3Z5 or fax to 942-3718.

Coming Event

Human Factors Association of Canada

ERGONOMICS AT WORK II – EXAMINING THE FUTURE

June 20-21, 1995

Ramada Marlborough Hotel, Winnipeg

Contact: Betsy Burt

Phone: (204) 986-6493

Fax: (204) 986-3318

Call For Papers

INTERNATIONAL CONFERENCE ON DEEP GEOLOGICAL DISPOSAL OF RADIOACTIVE WASTE.

September 16-19, 1996

Winnipeg, Manitoba.

Sponsored by the Waste Management and Environmental Affairs Division of the Canadian Nuclear Society.

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Historic Military Expedition Overshadows Project

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Dawson had to build his road in addition to managing the expedition, without the aid of modern means of communication. He had other problems too: notably, the personnel provided to him. Colonel (later Field Marshall) Wolseley paid tribute to Dawson's Work in his biography, published in 1903. Wolseley included this note in his biography: "I often pitied him, for his work was constant and the assistants sent to him by the Minister responsible for the department in the Canadian Cabinet were only too often drunkards or incapable; they mostly belonged, in fact, to the class well-known in America as "loafers" who, when a liquor bar is handy, spend most of their time there... in some cases friends of politicians in office."

The expedition is documented in "Report on the Red River Expedition of 1870" prepared by Dawson for H.L. Langevin, Minister of Public Works, and printed by order of the House of Commons in 1871. The 57-page booklet is accompanied by a coloured plan of the wagon road from Prince Arthur's Landing to Shebandowan Lake. Dawson's personal comments on the expedition are published as a supplement to the expedition report. The report is full of miscellaneous interesting information. For example, the average travelling speed along the Dawson Road was 25 miles per day in good weather. □