THE MANITOBA
Professional Engineer
April, 1995

"Evening of Recognition"

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

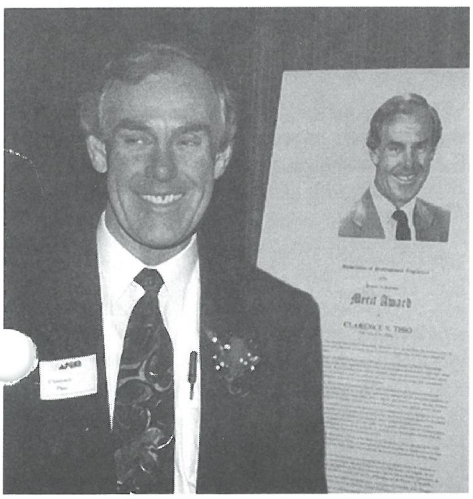
On March 7, 1995, APEM held an "Evening of Recognition" at the Holiday Inn Crowne Plaza, to welcome new members to the Association and to present the 1994 Merit and Certificate of Engineering Achievement Awards. Also on the agenda was the presentation of the 1989 Canadian Engineering Memorial Foundation Engineering Students Project Award.

The ceremonies opened at 8:00 p.m. with President Don Osman welcoming the group and presenting the 27 newly-registered members in attendance with their framed certificates. APEM registered 212 new members between March, 1994 and February, 1995, and we look forward to the contributions these new members will make to the engineering profession.

Carl Anderson was then called upon to announce the terms of reference and the names of the winners of the 1994 Merit Awards, which recognize outstanding achievement and direct advancement of the engineering profession by an individual member, and the Certificate of Engineering Achievement Awards, which recognize engineering excellence in and major contributions to the concept, design and implementation of engineering work by a member or group of members.

Merit Awards

The first 1994 Merit Award was presented to Clarence V. Thio, who graduated from the University of Manitoba with a Bachelor of Science degree in Electrical Engineering in 1961 and a Master of Science degree in 1964. Employed since then with Manitoba Hydro, Clarence has been engaged in the planning and development of the corporation's major high voltage power transmission system, particularly on the Nelson River. He was instrumental in the recommendations to adopt thyristor technology for the second stage transmission addition, the paralleling capability of the two direct current lines, and the raising of the design and operating voltage level to 500 kV. He has acted as consultant on power transmission projects around the world, has contributed to many mathematical and theoretical concepts for direct current systems, has authored and co-authored many technical papers, and is active within his community through his playing, coaching and organizing of amateur sports. His contribution to the engineering profession, the community and the Province of Manitoba has been outstanding.



Clarence Thio, pleased to be recognized.



David Stanbury and the New Flyer team accepting their award.

The second 1994 Merit Award was presented to Judy Weiszmann for her pioneering achievement in the field of engineering for women and immigrants. Born in Hungary, she graduated from the Technical University of Budapest with a Structural Engineering degree in 1954. She and her husband, who is also an engineer, immigrated to Canada in 1957 and currently work together at Weiszmann and Associates. During her 40 years as a structural engineer, she has completed over 450 projects for industrial, commercial, municipal and residential buildings, and has inspected and reported on over 900 residential buildings. She has provided expert engineering opinions to the building industry, the legal profession and the Courts.



Don Osman with Paul Barritt-Flatt and David Cormie accepting on behalf of the HERMES team.

Judy has had to overcome many obstacles and much skepticism over her career. Growing up in Hungary during the Communist seizure of power made obtaining admittance to the university very difficult, and completing her masters degree was made impossible by the Soviet invasion. Registration with APEM was also made difficult, since

Continued on page 9

THE MANITOBA
Professional Engineer

April, 1995

Published by the Association of Professional Engineers of the Province of Manitoba
530-330 St. Mary Avenue
Winnipeg, Manitoba R3C 3Z5
(204) 942-6481 Fax (204) 942-3718

APEM COUNCIL

D.G. Osman, P. Eng., President
C.L. Stewart, P.Eng., Vice-President
M.G. Britton, P.Eng.
D.G. Chapman, P.Eng., Past-President
E. Eddy, Ph.D., B.P.T., M.C.P.A., M.C.S.P.
S.K. Fedeniuk, P. Eng.
A.N. Kempan, P. Eng.
R.J. Partridge, P. Eng.
A.H. Permut, P. Eng.
J.M. Symonds, P. Eng.
B. Thomson, R.N.
S.L. Ursel, P.Eng.
P. Washchyshyn, P.Eng.

APEM STAFF

D.A. Ennis, P. Eng., Executive Director and Registrar
S.M. Matile, P. Eng., Director of Admissions
J.C. McKinley, Administrative Officer
D. Bilodeau, Admissions Co-ordinator
E. Ryan, Accounting & Membership
M. Little, Administrative Secretary
L. Dupas, Receptionist/Secretary

PUBLICATION COMMITTEE

J.W. Bogan, P. Eng., Chair;
A.E. Ball, P. Eng.; B.A.K. Danielson, P. Eng.;
B.A. Dobran, P. Eng.; V.L. Dutton, P. Eng.;
L.Y. Ganetsky, P. Eng.; C.P. Gray, P. Eng.;
A. Kempan, P. Eng.; J. Lucas, P. Eng.;
W.G. McKay, P. Eng. (Ret.);
H.S. Zbigniewicz, P. Eng.

CORRESPONDENTS

J. Close, P. Eng., Portage
D. D'Amour, P. Eng., Thompson
R. Menon, P. Eng., Brandon

Opinions expressed are not necessarily those held by the APEM or the Council of the APEM



Science in the Summer

Do you know someone who would benefit from a fun-filled summer at the Whiteshell Campus of the Deep River Science Academy? The Academy, a non-profit private school, provides scientifically-inclined high-school students with an opportunity to experience an enriched, hands-on science program in a scientific setting in Pinawa. Students work with professional scientists on actual scientific and engineering research projects. Many of these projects, in the environmental sciences and energy production areas, are conducted at Whiteshell Laboratories, a large national R&D laboratory operated by Atomic Energy of Canada Limited.

Additional projects are carried out in collaboration with other research partners, such as the Ironwood Interpretive Trail Project, the Manitoba Model Forest and Manitoba Hydro. Upon successful completion of the six-week program, including the completion of a written and oral scientific report presented to a group of professional scientists, students receive two credits towards their high-school diploma. But it's not all work and no play. Students live in residence with 21 other kids from across Canada, (supervised by our resident supervisor) and enjoy a jam-packed recreational program which includes tennis, rowing, water-skiing, site-seeing and the odd movie and barbeque night. If you know someone who would enjoy a summer like this, call Mrs. Louise Young, Principal, at 204-753-8302, or Dr. Roger Dutton, Chair of the Board, at 204-753-2311 for more information. □

WE HAVE LOST CONTACT. MAY WE HAVE AN ADDRESS?



P.A.T. Ayiku
D.C. DeLeeuw
M. Green
B.A. Gustafson
N.Y. Haddad
M. Husain
B.R. Jackson
A.K. Kading
C. Mistry
J. Pawelkiewicz
A. Pele
A.D. Round
R.L. Soviak
S.L. Wilson
A.C. Yim

NEW MEMBERS REGISTERED JANUARY & FEBRUARY, 1995

D.E. Anderson (SK)
R.K. Arora (ON)
D.I. Auch
T.S. Biberdorf
L. Bulka (SK)
K.J. Cusack
P.M. Dixon
B.E. Faltous (AB)
J.G. Fisher (ON)
R.A. Froese
T. Hansen
J.D. Hintsa (NS)
C.S.W. Humeny
R.R. Jones
S.L. Kleinsteuber
E.H. Lazar (AB)
B.J. McKay (NF)
D.S. Marion
T.M. Miles
G.R. Milley (NB)
W. Mueller
D.P. Nielsen
G.W. North
G.K. Patton
G.L. Payne
G.A. Pozzobon (ON)
W.M. Reich
M.S. Starodub
C.W. Swanson
R.S. Swartz
E.R. Toutant
T.V. Tran
R.T. Yanos (AB)

In Memoriam

The Association has received with deep regret notification of the deaths of the following members:

D.G. McCrae
W. Sorby

LICENCES ISSUED JANUARY & FEBRUARY, 1995

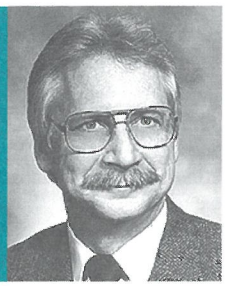
W.F. Barraclough (PA)
B.J. Bell (ON)
C.C.E. Chan (AB)
D.P. Cope (PA)
N.R. Dickey (AB)
J.C. Draper (PQ)
L.G. Farrant (BC)
S.H. Gebler (IL)
R.J. Gillis (AB)
D.K. Hall (ON)
T.W. Hedberg (MN)
N.A. Legatos (NY)
T.J. Nahachewsky (SK)
D.R. Parker (CO)
A.K. Parvatam (ON)
K.J. Pontiff (PA)
B.D. Ryder (AB)
J.B. Shah (SK)
P.G. Smith (AB)
P.A. Surace (PA)
J.A. Vlooswyk (AB)

ENGINEERS-IN-TRAINING ENROLLED JANUARY & FEBRUARY, 1995

J.G. Anderson
S.C. Arabsky
S.A.J. Beatty
J.H. Borger
W.D. Bridges
G.D. Buchanan
M.S. Buckberger
R.J. Cantin
J.S. Carrie
J.D.C. Chudzik
S.B. Cook
J.A. Cooke
C.A. Connor
T.A. Corbet
D. Cule
V. Edwards
B.R. Everton
K.S. Gelmich
B.W. Giesbrecht
J.M. Giles
P.V. Godavari
B.P. Gojkovic
B.C. Gryba
P.D. Hagar
B.A. Haugh
B.E.B. Heinrichs
R.L. Himbeault
D.J. Jaremowich
D.H. King
K.A. Kopczewski
A.S. Kotula
G.P. Kos
G.A. Lagadi
V.R. Lam
C.K. Lodon
D.O. Lyhkun
P.D. Maksimovich
S.B. Meleschuk
B.L. Moore
G.K. Mustapha
G.C. Oramasionwu
T.R.J. Ouellette
K.W. Pilek
A.C.D. Poole
J.L. Rocke
S.W. Roper
A.C. Rosales
K.B. Sawatzky
D.G. Scott
B.C. Smith
K.G. Snider
R. Srinivasan
B.P. Station
A.R. Subramaniam
D.A.S. Switzer
G.L. Tait
F. Torchia
G.D. Verniest
C.D. Waldmo
R.J. Weatherburn
B. Weeks
B.J. Wiebe
C.E. Wright
D.J. Wazney

President's Message

D.G. Osman, P.Eng.



This message is to alert you to a development that could, in the future, have a far reaching impact on the ways in which your Association carries out its mandate to "...govern and regulate the practice of engineering in the Province of Manitoba ..." as provided for in *The Engineering Profession Act*. That development is the release in December 1994 of Report No. 84 of The Manitoba Law Reform Commission entitled *Regulating Professions and Occupations*.

In 1990 the Minister of Justice and Attorney General asked the Commission "...to consider the issue of professional and occupational associations and the role and responsibility of the provincial government regarding the governing of such professions and occupations." Among the specific matters that the Commission was asked to consider and report on were:

- the extent to which the provincial government should delegate governing authority to the professional and occupational associations, including the criteria by which self-governing status should be conferred on professions and occupations;
- the necessity of a structure within government to deal with issues pertaining to the governing of professional and occupational associations and the nature of that structure;
- the advisability of enacting general legislation regarding the governing of all occupational and professional associations and the proposed provisions of any legislation recommended;
- the advisability of permitting incorporation of professionals.

The Commission issued a discussion paper in late 1993 entitled *The Future of Occupational Regulation in Manitoba*. APEM provided comment on the discussion paper in February of 1994.

The Commission has undertaken a project of very significant size and complexity. The Report is 160 pages in length and provides 90 recommendations which the Commission suggests "...represent a thoroughgoing reform of the current approach to occupational regulation and would result in a rational, effective and responsive system based on principles which are designed to protect and benefit the public."

Briefly, the report recommends that:

- The traditional occupation-based approach to delineating scopes of practice should be replaced by task-based model of occupational regulation wherein tasks and services are regulated, rather than the practitioners or the occupations.
- A single, independent entity, operating at arms length from government be created. It would be responsible for the regulation and oversight of all licensing and certification regimes.
- A scheduled review by that independent entity of all existing licensing and certification regimes be completed within ten years of the establishment of that entity.
- A number of changes be made to the entry and practice standards, enforcement of practice standards, administrative requirements and the enforcement of the exclusive practice and title provisions of licensing and certification regimes.
- Occupational regimes should develop and implement a program to ensure that practitioners remain capable of meeting entry standards after their entry into a regime.
- There be a requirement for the immediate adoption by the licensing regimes of a number of "transparency" measures.
- There be a requirement for the immediate implementation by the licensing regime of an Annual Report to the government and the public incorporating prescribed reporting items.
- The question of incorporation and non-practitioner involvement in the corporation be considered for each service separately by the independent entity during its review of the existing licensing regimes.

The council is reviewing the Report and, while it is generally supportive, has some concerns with the some of the recommendations. Of particular concern is the tendency for the Commission to focus on the apparent cost rather than on value, or the ultimate cost, to the unaware third party public of the services provided by the practitioners under a regulated regime. It is the intention that, once clarification has been obtained on some points, the position of the Association will be provided to the Provincial Government.

Members who wish to familiarize themselves with the Report may obtain a copy from the Publications Branch, Office of the Queen's Printer, 200 Vaughan Street Winnipeg, Manitoba R3C 1T5. There is a charge of $7.95. Members who wish to make their views on recommendations known to the Association are asked to provide them to me in writing at the Association office. Given that this matter is fundamental to the governance and self-regulation of your profession and the way in which you practice engineering, I encourage you to provide us with your input. □

CCPE National Scholarships 1995 Competition Officially Opens

The Canadian Council of Professional Engineers is pleased to announce the opening of the 1995 National Scholarship Program competition. This year, six cash prizes totalling $45,000 will be awarded to promote excellence in the Canadian engineering profession through advanced studies and research programs.

To be eligible, candidates must be registered as full members with one of the provincial or territorial professional engineering associations, and have been accepted for post-graduate studies by a recognized university.

The following scholarships are available:

- The North American Life Scholarship Program offers three scholarships of $10,000 each to province financial assistance to engineers returning to university for further study or research in an engineering related field.
- The Meloche Monnex Scholarship Program offers two scholarships of $5,000 each to provide financial assistance to engineers returning to university for further study or research in a field other than engineering.
- The Encon Endowment of $5,000 will be awarded to an individual wishing to pursue studies in the area of engineering failure investigation and/or materials testing.

Deadline for all applications is May 1st, 1995. Application forms are available from the APEM office. □

What If I Don't Pay My Dues On Time?

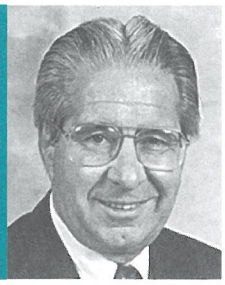
All members who have not paid their 1995 Annual Fees are reminded that, if all outstanding fees and penalty charges are not received in the Association office on or before June 30, 1995, their names will be removed from the register and they shall cease to be members.

No exceptions are allowed under the Engineering Profession Act or the Association By-Laws.

Persons who are deregistered may not practise engineering in Manitoba or use the title "Engineer".

Those who are deregistered for non-payment of fees may apply for reinstatement. Each applicant will be required to: pay the current annual membership dues, prorated as set by Council; pay the current admission fee; write and pass the Association's Professional Practice Examination; provide the names of referees who will verify the accumulation of at least four years of recent engineering work experience; and provide the Council with a satisfactory explanation as to why the membership was allowed to lapse.

CCPE President's Message



Dr. Garland E. Laliberte, P.Eng.

Engineering – More Than Just A Profession That Serves?

Engineers are perhaps better equipped than most others to make decisions that involve the welfare of the general public, especially where there are technical issues involved. But why do engineers, in general, tend to avoid public sector decision-making roles?

To illustrate, it is a generally well established fact that engineers run for political and civic office in disproportionately low numbers compared to some other callings. When an engineer runs for political office, it is news, particularly within the profession. If a lawyer or an economist does the same thing, it is considered natural and the candidate's profession does not attract any special attention. Why?

When engineers do succeed in their bid for political office, they usually make a significant contribution. C.D. Howe, one of the great builders of our nation, is an excellent example. Gary Filmon, currently Premier of Manitoba, is another. There have been many others – Harvie Andre, Tom Siddon and Bill Weingard – are three whose names come to mind. But the fact remains that our numbers are still lower than might be expected, given that there are more than 156,000 of us in Canada.

I believe that, in some measure, this phenomenon derives from the preoccupation of the undergraduate curricula which prepare us for our profession with "things technical". Humanities and social sciences are a relatively recent addition (in the past twenty years) to our undergraduate curricula. And even with the accreditation requirement of one half year (one eighth of the total requirement for a four-year curriculum), we include technical communication skills and engineering economics within that requirement, leaving precious little time for content that deals with some of the central issues, methodologies and thought processes of the humanities and social sciences. Furthermore, most of our students regard humanities and social sciences as peripheral to the technical content – the "real" engineering. And so the humanities and social sciences are tolerated but not really assimilated into their thinking. And so we have become a profession of "techies".

Is this attributable entirely to our curricula? I don't think so. We reinforce this kind of thinking when, in our iron ring ceremonies across the land each year, we stress our commitment to service and, by implication, we de-emphasize aspects of human endeavour other than service.

To be sure, we are providers of service. We can be justly proud of the important contribution of our profession to the building of the infrastructure of this great country, with its many climactic and geographic challenges. But can we be more? Have we played a central enough role in the past in deciding which of our country's important projects should proceed and which should be put on the back burner? To what extent have we participated in setting the agenda for our country and to what extent have we left it to others?

Are the signs positive for the future? I think so, but we still have a distance to go. Many of our schools of engineering are currently re-thinking their curricula to reflect the changing expectations of the marketplace. This presents an ideal opportunity to project engineers to our students as important partners in broader societal issues. It may be unwise to preempt the current review of our accreditation criteria but, if the review identifies the need for educational processes more in line with the new realities of engineering practice, as I expect it will, the changes already underway in our schools of engineering will be reinforced.

Another positive sign is the greater interaction that is occurring among professionals of all stripes in multi-disciplinary projects. A good example of a category of projects that have brought engineers into closer working relationships with other professionals is the whole area of practice where the environment is concerned. Engineers are taking an increasingly proactive role in developing sustainable solutions to societal needs. This is good because they have a great deal to offer and it would be unnatural for engineers to leave the leadership role to others.

I cannot say that there is any strong evidence that engineers are running more frequently for political or civic office than in earlier years or that they are more active than before in participating as non-candidates in the political process. It is interesting to note, however, that the National Society of Professional Engineers in the United States has an extremely active Legislative and Governmental Affairs Committee and that it has established a Political Action Committee Task Force with the objective of greater political involvement by engineers.

Does the Canadian Council of Professional Engineers have a similar role to play, perhaps through our Canadian Engineering Public Awareness Board? What are your thoughts? □

Three More Historical Plaques Dedicated

On Homecoming weekend in September, three historical plaques were dedicated to individuals after whom university buildings and spaces are named. The three honour Duff Roblin, Peter D. Curry and J.P.C. (Jack) McMath. The High Voltage Laboratory was renamed in honour of Professor McMath as the lab was built based on his designs of the facilities and test equipment, with the generous support of industry and alumni. The facility opened in 1957 when McMath was head of the Department of Electrical Engineering. Dean Fetherstonhaugh, for whom the lab was originally named, was honoured with the naming of one of the wings of the engineering building in 1991. □



Jack McMath Plaque Dedication. Pictured left to right: Dr. A Mauro, Prof. R. Johnson, G. McMath, his wife Barbara, Prof. McMath and the three sons of George and Barbara.

APEM Luncheon Meeting, November 17, 1994

Nuclear Waste Disposal in Canada – Dr. Ken Dormuth

by A.E. Ball, P.Eng.

In Canada, electrical power is generated primarily by coal-fired thermal, hydroelectric and nuclear power stations. Each has its own unique environmental problem. Coal-fired plants contribute to global warming and air pollution, hydroelectric sites are notorious for flooding productive lands and wildlife habitats. Nuclear stations produce long lasting radioactive wastes. But all of these environmental implications are simply a part of the costs that society pays for abundant and reliable electrical power for industrial, commercial and residential applications.

Today, substantial changes are taking place for each of these power sources: in coal-fired plants new combustion and flue gas scrubbing technologies are improving effluent streams (albeit global warming remains the same), environmental review processes are mitigating the damage imposed by hydro-electric projects and the concept of safely disposing of nuclear wastes is being studies in great detail.

It was on his favorite subject of long term disposal of nuclear waste that Dr. Kenneth Dormuth, Director of Disposal Technology at AECL Research spoke on the afternoon of November 17, 1994. Ken has spent the better part of his life researching the materials and methods of safely storing nuclear fuels.

Ken reminded us that at the current rate of CANDU nuclear power generation – 15% of Canada's and 60% of Ontario's total power generation capacity – there will be somewhere between 4.5 and 20 million used CANDU fuel bundles in Canada by the year 2060. These bundles are about 10 cm in diameter and 50 cm long, and weigh 24 kg. A fuel bundle will be fully utilized in the CANDU reactor after it has produced about one million kWh of electricity. It will then be highly radioactive and still ejecting a large amount of heat. For the next six years the bundle will be stored in a large pool of water to shield its radiation and remove residual heat. After that, the activity and heat will have decreased enough to allow the fuel to be transferred, if desired, to dry concrete canister storage.

The current storage practices have demonstrated excellent safety records, but unfortunately, require ongoing administrative controls to ensure the integrity of the storage system. Through a number of reviews initiated by the federal and provincial governments and the Atomic Energy Control Board of Canada (AECB), it has been determined that a more permanent method of storage is required. A 1978 agreement between the governments of Canada and Ontario established the Canadian Nuclear Fuel Waste Management Program, which ultimately gave AECL Research the mandate to research and develop a viable concept of disposal that did not require constant attention.

For the past 15 years AECL has reviewed various concepts of permanent disposal, specifically in the geologically stable hard rocks of the Canadian Shield. The idea is simple; excavate large rooms in the granite pluton about 0.5 to 1 km below the surface of the earth and store the nuclear fuel. The execution, however, is more difficult. A number of fuel bundles would be inserted into a corrosion resistant titanium or copper container. The container would then be placed into a large room and surrounded with a combination of specially engineered buffer and backfill materials (consisting of select clays, crushed rock, and sand). Sealing bulkheads would be placed at the entrance to each room and all the underground passageways would be backfilled. At the end of its useful life the site would be restored to its natural state.

A single disposal vault of this type could receive between five and 10 million fuel bundles over its operating life of 40 years. Between the development and siting activities, which are expected to take 25 years and the decommissioning monitoring time, the overall life of the facility would approach 90 years. The cost of this disposal vault is believed to cost between 8.5 and 13.5 billion dollars. Now, before you choke on this figure, consider that this amounts to only 2 to 3% of the cost of your current electric bill.

In his presentation, Dr. Dormuth very quickly answered the commonly asked questions about radioactive decay and calculated risk. The characteristics of CANDU fuel are well known: the fuel bundle in 10,000 years will be no more harmful than the naturally occurring uranium ore bodies found in Canada. And, most reassuring, when AECL determines the worst case scenario, they really mean worst case. For example, their risk assessment of the release of radioactive material considered that the container corrodes very quickly, the contaminants dissolve and enter the ground water, the ground water moves unimpeded through open fractures in the rock, and the ground water moves into the biosphere from which humans take all of their drinking water. Even under these remarkably coincident events the exposure to the human is one million times less than the AECB criteria (or 100 million below the natural background radiation level experienced by most Canadians). With the occurrence of destructive events like earthquake or meteor strike the risk to humans would still be a thousand times better than the established criteria.

Imagine for a moment if we designed our bridges, buildings and transportation systems with this level of risk.

Ken concluded his talk with a brief discussion of the recently released Environmental Impact Statement (EIS) and the next steps in the review process. Following a series of public open houses across the country, an Environmental Assessment Panel will determine if the EIS is suitable for use in public hearings to be held later this year or in 1996. The involvement and participation of the public is a key factor in the success of the disposal concept. Watch your newspaper for announcement of the hearings and be a participant. □

Marathon Relay '95

By: M.D. Vanderpont, P.Eng.

The Manitoba Marathon will be held on Father's Day, Sunday June 18th, 1995. Once again, your Sports Committee will be assembling teams of APEM members to participate in the Corporate Relay. Its a great motivator to get in shape after our long winter hibernation. This is the story:

- teams consist of 5 runners. You can enter as teams, groups or individuals. The Sports Committee will put together the teams.
- the length of each leg varies between 4.5 to 5.7 miles.
- cost is approximately $28 per runner. Proceeds go to the Manitoba Association for Community Living, which assists Manitobans with disabilities.
- exclusive APEM track tops are also available.
- spaghetti-fest included.

We have been running this event for several years now and everyone who tries it is eager to run again. If you are at all interested, please call Murray Vanderpont at 453-4903 (office) for more information. I look forward to hearing from you. □



The West End Water Pollution Control Centre

By: D. Taniguchi P.Eng.

In October 1986, the City of Winnipeg began the planning for their new wastewater treatment plant that would serve 100,000 people in the west end of the City. Reid Crowther was the consulting engineers for the preliminary planning, functional design and contract administration of this facility.

The plant design uses a conventional activated sludge process with circular primary and secondary clarifiers and coarse bubble diffused aeration. All tankage is covered for odour control and weather protection. The clarifiers are covered with fibreglass reinforced plastic domes with a 50 mm layer of styrofoam insulation.

The preliminary planning included the review of the existing extended aeration plant and lagoons, flow records, river modelling data, population and planning data, and previous reports and conceptual studies in order to establish design criteria for the new facility. In addition, an extensive odour monitoring program was carried out.

The functional design included study of waste activated sludge thickening alternatives. The City of Winnipeg practice of co-settling in the primary clarifiers was compared to separate thickening using centrifuges, gravity belts, presses and dissolved air flotation. Coarse bubble and fine bubble aeration systems were evaluated taking into consideration oxygen transfer efficiency and power requirements, maintenance costs and initial capital costs. Coarse bubble diffusers were selected, due mainly to their projected lower maintenance costs.

Odour control measures reviewed included ozone, wet scrubbers, activated carbon and a dispersion stack for off gas treatment, and oxygen, chlorine, permanganate and hydrogen peroxide injection into the raw waste stream for in-plant odour control. Hydrogen peroxide was recommended for in-plant odour control. A mobile bed scrubber was installed to treat the vent gases from the waste sludge storage system.

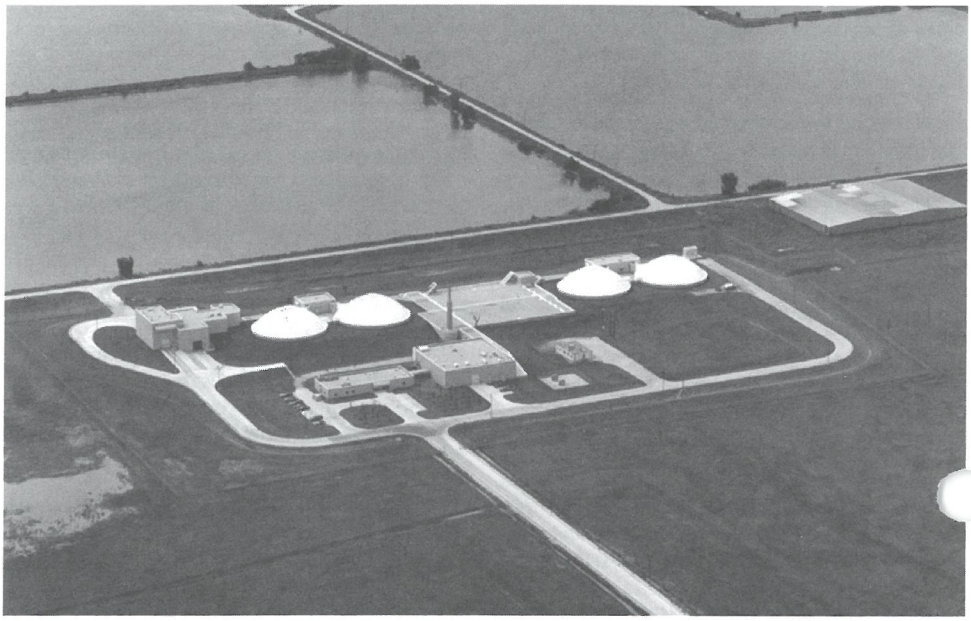
The facility incorporates a state-of-the-art distributed control system with central data acquisition. The system consists of one process control centre located in each of three main process areas.



They are linked together on a redundant local area network to a central control centre located in the plant main control room. Monitoring and control of a remote raw sewage pumping station is achieved through a modem link. The instrumentation includes various elements such as magnetic flow meters, ultrasonic level detectors, suspended solids meters, hazardous gas analyzers, and dissolved oxygen meters.

Construction commenced in the summer of 1991 and commissioning was completed at the end of 1993. The total project cost of the facility was over $40 million.

The new treatment plant replaces the former lagoon system and extended aeration mechanical plant. Decommissioning of the lagoon facilities is now being planned. Alternatives for the removal and land application of the biosolids from the lagoon cells and the demolition of the existing structures are being reviewed. □



Global Communication Promoted

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

"Hable Frances? Hable Ingles?" was the title of the keynote address, delivered by Claudette MacKay-Lassonde, P. Eng., to over a hundred Manitoba engineers, engineering students and high-school students, at Manitoba's second annual Capitalizing on Today's Challenges Conference.

The conference, organized by APEM's Women in Engineering Advisory Committee and the University of Manitoba's Faculty of Engineering, is designed to bring together practising engineers, engineering students and high school students interested in learning more about engineering.

The theme of this year's conference was COMMUNICATION; and Dr. MacKay-Lassonde's presentation, which addressed the issue of communication in a global economy, was truly inspiring.

Dr. MacKay-Lassonde, who holds a Bachelor's degree in chemical engineering, a Master's degree in nuclear engineering, and a Master's degree in business administration (MBA), and who recently established her own investment firm, described the challenges facing the business community today. She stressed the importance of globalization to the survival of a business. She described management skills, fundraising skills, the ability to attract and retain good employees, and the ability to recognize and seize opportunities as the major challenges facing the business community today. She warned against too-rapid expansion; she pointed out that small global companies have the advantages of "nimbleness" and adaptability; she criticized the attitude of the major banks toward small business; and she emphasized the need for flexibility and adaptability, rather than stubbornness.

Following her keynote address, Dr. MacKay-Lassonde spent considerable time fielding questions from the audience, for many members of which she had already become the ideal role model. Her advice to the young women present? Believe in, and stop underselling, yourself; choose your partner in life very carefully; whatever you do, make sure you can laugh; and "TALK BIG".

I am quite sure that everyone who attended the conference will long remember Claudette MacKay-Lassonde and her wonderful words of wisdom. □

Theory and Applications of The Global Positioning System

R.J. Bruce, P.Eng.

On Thursday, January 12 1995, Mr. Jim Watling of Pollock & Wright Land Surveyors gave a lecture on The Theory and Applications of the Global Positioning System (GPS) to a breakfast meeting sponsored by the PD committee of the APEM. There was a crowd of more than 80 people present, many of whom were non-engineers from the Winnipeg Surveying and Mapping community.

Jim is a Professional Engineer who implemented the first precise uses of GPS in Manitoba when he was chief of the Field Surveys Section of the Manitoba Surveys and Mapping Branch. While he worked for the Province, Jim supervised many GPS surveys, establishing vertical and horizontal control for the Province's 1:10,000 topographic mapping program, and control for cadastral surveys. Jim then went to work for Pollock & Wright, establishing the first GPS surveying capability in Manitoba's private sector. Jim's firm has received a federal government certification for eligibility for contracts requiring high positional accuracies.

The presentation started with a general description of the Global Positioning System. GPS began in the mid 1970s as a system for the U.S. military who made the "mistake" of allowing civilian use. Since then civilian use has spread rapidly to all activities requiring positional information.

The GPS system consists of satellites in known orbits transmitting signals on two frequencies synchronized by atomic clocks, and of ground control stations that track the satellites and control them. There are 25 GPS satellites in orbit, which are enough to support aircraft navigation throughout the Earth. As an example of the coverage, there were 9 satellites accessible from Winnipeg at the time of this talk. The two GPS frequencies, called the L1 and L2 frequencies, contain two coding methods, the C/A and P codes. A good GPS receiver receives both frequencies and uses both codes. There is data encrypted in the P code which allows a receiver equipped with a decryption system to acquire precise data about the satellite orbit and clock. The military will occasionally change this encryption and prevent civilian access to the P code data during some military operations.

Jim then talked about the errors affecting GPS positioning: orbital errors deliberately coded into the broadcast ephemeris; atomic clock errors in both the satellite and receiver; atmospheric errors introduced by the signal moving through the troposphere and ionosphere; and multipath errors when signals reflect from buildings. Atmospheric errors can be reduced by comparing the signals on the two frequencies, and many other errors can be eliminated by receiving the same signals at more than one receiver during a positioning project.

Some of the advantages of using GPS that were presented were: no need for intervisibility between survey points (which allows wider spacing of points and reduces the requirements for bush clearing); it can be operated under all weather conditions; it supports both daytime and nighttime operations; and it supports highly accurate geodetic surveying operations when advanced methods and equipment are used.

The following modes of operation with GPS were presented: **Standalone** – when the observer remains at position with a single receiver receiving the satellite signals, this method yields positional accuracies of 50 to 100m; **Static or fast static** – when the observer receives data at one or more reference positions and one or more unknown positions for some time. This method requires post processing of the data to determine the positions, it requires longer observational times, however it is the most accurate methodology since it can give positional accuracies of 5mm + 1ppm x baseline-length (better than 10cm) if the right procedures are used; **Kinematic** – when an observer is moving using a single receiver. If the P code is not being used the data must be post-processed to derive the positions, however the observation times are short. Problems occur with this mode when one or more of the four required satellite signals is lost. This method yields accuracies of 10mm + 1ppm x baseline-length; **Real Time Kinematic** – when a base station receiver is used in conjunction with a moving receiver with the base station transmitting corrections to the moving receiver. This method provides real time positions and can be used to stake out positions for engineering projects, however the range is limited to the distance that corrections can be received from the base stations. The accuracy is 15mm + 1ppm x baseline-length.

Dual frequency receivers have the advantage of shorter observational times (an 80km line can be measured in 10 minutes) than single frequency receivers, using two frequencies also allows atmospheric errors to be determined and eliminated and phase ambiguity errors can be eliminated with these receivers. Most positioning projects require the use of dual frequency receivers because of these advantages.

A knowledge of GPS and surveying theory and practice, map projections, survey network

Continued on page 8

Meet Your New Councillor –

Peter Washchyshyn, P.Eng.

By: J.W. Bogan, P.Eng.

Peter Washchyshyn is one of APEM's newly elected Council members. Peter graduated from the University of Saskatchewan in 1968 and moved to Winnipeg that same year as an Engineering Officer with the Canadian Armed Forces. Peter moved to Lac St. Denis, Quebec in 1970, where he served as Base Engineer until 1971. At that time he returned to Winnipeg to join Damas and Smith Limited, Consulting Engineers. Peter moved to Ottawa with Damas and Smith in 1972 and again returned to Winnipeg in 1974. Peter is now the President of DS-Lea Consultants Limited (changed from Damas and Smith in 1984).

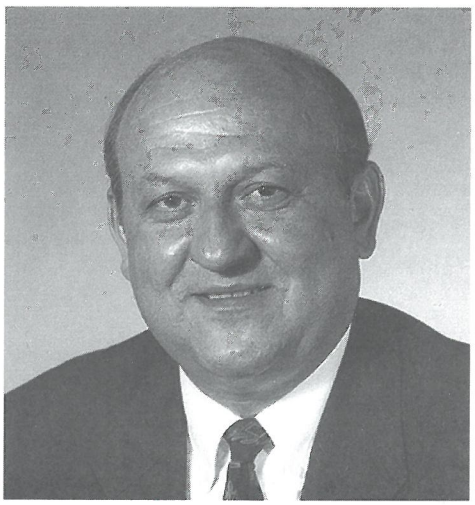
Peter is actively involved in both the engineering profession and the community. Besides his current commitment to Council, Peter is an active member of the Association of Consulting Engineers of Manitoba. He was part of that group at the time of their charter and acted as their Chairman in 1980. Peter also served on the Board of the Association of Consulting Engineers of Canada from 1988 until 1992 and was Vice-Chair of the Federal Government Relations Group in 1992.

During his time with Council, Peter hopes to address the issues of improving the engineer's public image and remuneration commensurate with responsibilities.

Peter is currently registered in several other provinces and is a member of the Institute of Transportation Engineers.

Peter works tirelessly within the Ukrainian community and St. Joseph's Church, where he has served as Treasurer and President. He is also a member of the Ukrainian Cultural and Education Centre board.

Peter married his wife Joan in 1970 and they have four daughters: Katherine, 22; Mary-Anne, 19; Kristina, 16; and Johanna, 7. After handling the numerous business interests and affairs in the daily operation of DS-Lea Consultants, and when there is time left from his community work, Peter likes to travel with his wife and family. □



Councillor Peter Washchyshyn

Council Reports

Tuesday, January 10, 1995

By: J. Lucas, P.Eng.

AT WHICH COUNCILLORS ELECT FIRST WOMAN VICE-PRESIDENT

The meeting was called to order at 12:30 with 11 councillors present and normal housekeeping duties were completed in a timely fashion.

In a truly unique move, the election of Vice-President resulted in the appointment of Cathy Stewart to this position. It will be a story to tell my grandchildren that I was there when the APEM moved our first woman towards the Presidency.

It should be noted that the voting process involved several ballots combined with an inverse weighted accounting system. The examination and explanation of the voting sequence was much longer than the actual voting/counting process.

A Council sub-committee will meet to discuss the Law Reform Commission report on Professions. It was generally agreed that there are a number of problem areas in the report that needs further review.

One short session was held in camera which gave this reporter a chance to catch up on office gossip (article to follow).

Councillors discussed Doug Chapman's comment that information on understandings was not being communicated between Council and committees. Some effort should be made toward developing an information sheet format to be used for this transfer.

A three person task force has been formed to review the proposed Environmental Management Framework Agreement and early response is expected.

Council discussed the ongoing process of moving Professional Development to a mandatory requirement with required reporting. At present, there is no provision in the Act or By-Laws to make this a mandatory requirement. The Legislation Committee will prepare mandatory revisions for the Act to include Professional Development reporting. The Professional Development Committee will move forward with drafting necessary procedures and requirements.

The Thompson Chapter is preparing for an upcoming promotion of engineering in the area. Work includes library displays; an engineering video which will run on the local public access channel; and preparations for the upcoming Science Fair.

The committee on the Electronic Seal has gone back to square one on the evaluation of the acceptance of electronic seals.

At 3 p.m., the meeting was joined by Mr. John Frye, of the City of Winnipeg, who attended to discuss the Safety Committee's report on Building Envelope Failures.

The sub-committee which produced the report was made up of engineers, architects, and representatives of the City of Winnipeg and construction fields. The report was issued after 15 meetings and included 16 recommendations. It should be noted that this sub-committee was struck after several building envelope failures occurred in the City of Winnipeg. Mr. Frye's presentation was quite extensive and well received by Council. Council will circulate copies of the report to a number of committees for comments.

The Enforcement Committee is preparing action plans for their on-going work. It was reported that the work load may be higher than expected.

Council adjourned at 4:00 p.m. □

February 14, 1995

By. B. A. Dobran, P.Eng.

AT WHICH THE COUNCIL CONSIDERS A REVISED ACT

On Valentine's Day, all the Councillors, but four, met in the Board Room of the APEM offices. President Don Osman called the meeting to order at 12:30 p.m. sharp. In one of the first items of business, Council approved the Financial Statement dated December, 1994. Next, Council received the Registration Board Report – Applications approved on January 25, 1995. It was noted that the high number of EITs (42) enrolled was attributable to the December 30, 1994, deadline for application under the two year experience requirement.

Council then considered the minutes of the Executive Committee meeting of February 2, 1995, and ratified the actions contained therein. When considering the Terms of Reference of the Executive Committee (which had not been changed for ten years) minor amendments were made , including the change from the President being the "Chairman" to the "Chair". Once satisfied with those terms of reference, Council authorized the Executive Committee to finalize the Association's submissions on the Public Review of Safety Legislation and a comment to the Canadian Council of Ministers of the Environment on a proposed Environmental Management Framework Agreement.

Other matters dealt with included:

- a follow up on a recent Long Range Planning Session;
- a status report on the review of the Report of the Manitoba Law Reform Commission;
- two matters of comment to the CCPE;
- a change to the criteria for the Honourary Life Membership (subject to By-law change) eliminating the need for the recipient to be retired; and
- establishing an Early Achievement Award.

Another less routine matter was the receipt of a report from the Legislation Committee, setting out the culmination of three years work on a proposed revised Act. After an initial review, it was agreed that the Councillors would study the proposal with the intent of adopting a document at the March meeting. The intent being to circulate it to the APEM Committees, other interested parties and the APEM membership for comment.

Among the changes between the current Act and the proposed one is the provision for the registration of Geoscientists as members of the Association with the designation "P. Geo."

The meeting wrapped up at 4:45 p.m. in sufficient time for the male councillors to hit the florists shops. □

Theory and Applications of The Global Positioning System

Continued from page 7

adjustments and analysis, geodesy and computer usage skills are needed to conduct GPS positioning projects. The costs of using GPS range from the capital costs of the receivers, to maintenance costs of the hardware and software, to operational costs of doing field surveys.

Some of the applications for GPS are: military uses for positioning friendly and hostile forces, it was used to target Iraqi positions in the Gulf war; geodetic surveying uses it to establish survey networks; topographic mapping uses it to establish ground control and also to determine the camera positions as the aerial photography is captured; site surveys can use it for the capture of spot heights and layout of points; legal surveys can use it for retracement of surveys and staking out positions; the navigations of vehicles, sea vessels and aircraft; and it can be used in conjunction with electronic charts and maps.

Jim then described a project that his firm completed at the Ear Falls hydro dam where they used GPS to establish a control network and then used it aboard a boat to capture soundings and positions to be used in developing an underwater terrain model of the area.

Jim's talk was informative and entertaining. It gave an excellent overview of the Global Positioning System for people who are not knowledgeable about it, and it provided some new information for people who were not aware of the latest developments in this technology. □

"Evening of Recognition"

Continued from page 9

the Communists renamed her university for political reasons. After some years of correspondence with and refusals by APEM to confirm what was merely a name change, Judy ended up having to take APEM's exams in order to obtain registration. In addition, Judy's experience, background and judgement were scrutinized to a higher degree than her male colleagues, as she was one of the first women practicing engineering in the province.

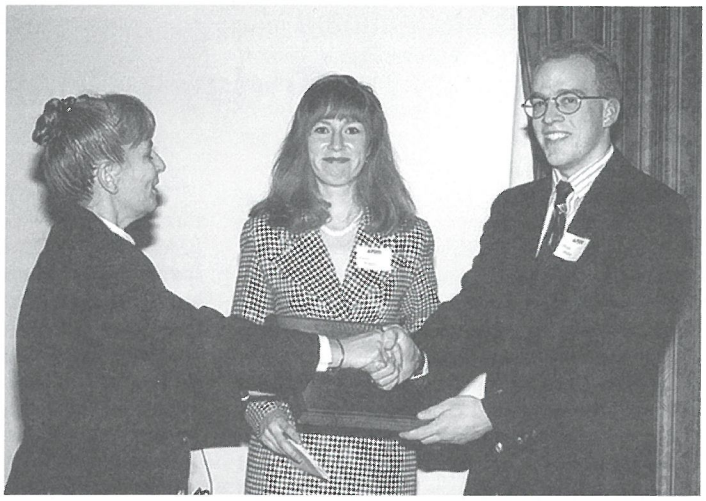
Now, Judy regularly attends the Association's Annual General Meetings, and has been a member of APEM's Safety in Engineering Practice Committee since its inception in 1986. She is also very supportive of the APEM Women in Engineering Advisory Committee.

Engineering Achievement Awards

The two Certificate of Engineering Achievement Awards were then presented one to Manitoba Hydro, represented by Paul Barritt-Flatt and Dave Cormie, and the other to New Flyer Industries Ltd., represented by David Stanbury.

Manitoba Hydro received their award for the development of the Hydro Electric Reservoir Management Evaluation System (HERMES). HERMES is a computerized engineering decision support system used for reservoir and energy management. The system is made up of several thousands of files of information about reservoir sizes, power-house and spillway discharge characteristics, number and size of generating units, maintenance schedules, inter-connection ratings, export and import contracts, exchange and interest rate forecasts, environmental and regulatory limits, as well as specific operating criteria related to the electrical and hydraulic operation of the system. A computer program retrieves all of the necessary data contained in these files and creates a single mathematical formulation using Linear Programming to provide an optimal schedule. HERMES is in the forefront of engineering decision support systems for management of water resource systems, and allows Manitoba Hydro to maximize the benefits and minimize the costs of operating the power system while ensuring that a reliable supply of electrical energy is available to Manitoba consumers.

New Flyer Industries received its Certificate of Engineering Achievement award for the design and development of the Low-Floor Transit Bus. The first of its kind in North America, the product design provides a continuous floor at 14 inches above ground, from entrance door to exit door, and incorporates a simple wheelchair ramp and tie down locations, allowing full accessibility and the utmost of convenience to handicapped and elderly persons.



Laura Binkley and Derick Bishop receiving the Engineering Students Project Award from Dee Parkinson of the 1989 Canadian Engineering Memorial Foundation.

The coach was designed from the ground up, including drive-train, suspension, structure and auxiliary equipment, and has undergone extensive testing. The projected fatigue life of the coach structure easily exceeded the design criteria of 500,000 miles, and it has successfully completed three 12,000 mile cycles of the U.S. Urban Mass Transit Association's durability test cycle (most coaches rarely complete one cycle). The coach also complies with both the U.S. and Canada's safety standards, including braking performance, roof crush and side impact tests.

New Flyer is the only North American bus manufacturer to date with a production Low-Floor coach, and has delivered over 500 hundred of them, with an additional 1000 on order. This engineering achievement has resulted in the most user-friendly transit coach available today.

1989 Canadian Engineering Memorial Foundation

Following the presentation of APEM's award, Dee Parkinson, Board Member of the 1989 Canadian Engineering Memorial Foundation, was called on to present its 1994 Engineering Students Project Award to the University of Manitoba's ACCESS Program. On hand to accept the award were Laura Binkley, Senior Coordinator of the ACCESS Program, and Derek Bishop, Senior Stick, Engineering Students Society of the University of Manitoba. Implemented by a group of engineering and science students in 1990, the program has reached close to 80 000 Manitoba students from grades 3 through 12 in communities from Lynne Lake to Sprague. While providing positive role models, the program endeavors to bring out the fun in science and engineering to students, teachers and community groups such as Brownies and Guides, parent-teacher associations and women's groups. The group's ability to suit the program to specific target audiences and their extensive outreach are the reasons for documented and continued success of such a young program.

Don Osman closed the ceremonies shortly before 9:00 p.m., thanking all of the presenters and speakers, and inviting the new Association members to linger and listen to the experiences of some of the "older" members present. With over 120 people in attendance, there were plenty of opportunities. □

Some of the members registered with APEM in 1994-95.



Panel Discussion Summary

Capitalizing on Today's Challenges

By: C.E. Geddert, P.Eng.

Panelists Dr. Janice Dodd, Mr. Terry Lewis, and Dennice Leahey were asked by moderator Carol Roberts, P.Eng. to present arguments on both sides of the issue "Should There Be Special Programs for Women". The panel were not restricted to any one category of special programs and were reminded that they were all chosen because they had an opinion on the subject and that they should feel free to express it.

The first to speak was Dr. Dodd, an Associate professor in the faculties of Medicine, Pharmacy, and Women's Studies at the University of Manitoba. Dr. Dodd related her own observation that although many women had started on the same academic path that she had chosen, when she completed her studies and began to teach, she was the only female in her peer group. Dr. Dodd continued by explaining that the Women in Science course she currently teaches at the University of Manitoba was born out of her own search for female role models in science history. She described the Women in Science course as a way to improve the way in which female students viewed themselves, as well as providing a balance to the overall curriculum at U of M. In that way it serves the female portion of the student body along with the student body as a whole and is therefore a program worthy of support. The other side of the issue, as presented by Dr. Dodd, is that these types of programs may lead society to believe that we have done enough to really cause change. Society has encouraged young women to enter non-traditional course of study but has not changed its institutions enough to be "female friendly" and as a result many women do not complete their studies of continue to pursue their careers. Society should not be satisfied with more entrants but continue to press for more graduates.

Next on the panel was Reform Party federal candidate Terry Lewis. Mr. Lewis represented the Reform Party policy on government funding for special interest groups. That policy states that government should not fund special interest groups, but provide funding on the basis of need alone. Mr. Lewis went on to make the point that in his opinion there is not sufficient evidence of need to provide funding for Canadian women. To support his point, Mr. Lewis quoted several statistics which both showed the affluence of Canadian women and the poverty in other segments of Canadian society. Mr. Lewis also characterized the majority of Canadians as being against special programs which benefit only certain segments of the population. Mr. Lewis concluded by saying that these types of programs should be privately funded if they are required but that any government involvement would be a subversion of democracy.

The final speaker was Royal Bank of Canada Senior Vice-President and General Manager – Manitoba, Dennice Leahey. Mrs. Leahy related her own experience with gender segregated education. Mrs. Leahey attended this type of school at the high school and university levels. In Mrs. Leahey's experience there was an atmosphere of freedom to risk and take responsibility which may only be found in a gender segregated environment where some of the social pressures are removed. Mrs. Leahey also felt that it was this lack of social pressure which promoted self esteem and confidence among all the students. Mrs. Leahey felt strongly that this type of experience is beneficial to the majority of (if not all) women and should remain available to as many as possible. Mrs. Leahey also pointed out that there are management opportunities available for women, as the "cookie cutter" approach for filling management positions is not as prevalent as it once was.

The discussion concluded with a series of questions from the conference attendees. Some of the issues raised were as follows. What are the alternatives to special programs? What are the experiences of a lone female in a non-traditional

Continued on page 11

Attention Golfers!



Date: Thursday, June 15, 1995
Place: Falcon Lake Golf Course
Mark Your Calendar!

Canadian Engineer Receives International Recognition

By: Faculty of Agriculture and Food Services

Dr. Digvir Jayas, a professor in the Department of Agricultural Engineering at the University of Manitoba, has been awarded the Ford New Holland Young Researcher Award by the American Society of Agricultural Engineers. This is the first time in its 23-year history that this honor has been awarded to a Canadian Engineer.

Jayas was chosen as the recipient of this award for his research accomplishments associated with grain storage and handling. For the past 10 years, he has been working to ensure that high quality grain does not spoil once it is in storage – a challenge facing all grain farmers. Until now, there has been no fast and easy way to measure the amount of spoilage occurring in the stored grain bulk. Although there are physical tests available which can detect such changes in quality, they are both slow and expensive.

Through the development of mathematical models, Jayas can now predict the spoilage before it occurs. These models, developed from field observations, predict the movement of moisture and heat – the two most significant factors causing stored grain to spoil. Predicting their movement allows extension personnel to make practical recommendations about whether or not it is profitable to dry the grain. These models have also been used by engineers to design more efficient grain drying equipment and grain storage systems.

Dr. Jayas is also working with Prince Rupert Grain Ltd. to develop a system to automatically identify and monitor grains and oilseeds as they pass through the handling system. This technology, referred to as machine vision, uses a camera and a computer to identify weed seeds and other foreign material in the sample. Ultimately, it will lead to the automation of many aspects of grain and oilseed handling, cleaning and classifying.

During his career, Dr. Jayas has written over 150 publications and given presentations related to grain storage. He is also actively involved with the agricultural engineering profession – presently serving on 16 local, national and international committees.

This award adds to a list of previously earned honors, including several awards in recognition of his teaching ability. □



Dr. Digvir Jayas

News From Other Associations

By: L.Y. Ganetsky, P.Eng.

Alberta

Court Orders Firm to Cease Using Engineering in Title

APEGGA has obtained a Court of Queen's Bench injunction against Opus Magnum Knowledge Engineering Inc. of Calgary for using the word "engineering" in its corporate title.

APEGGA took the position that by using "engineering" in its title, the company implied that it provided engineering services and was licensed to do so. APEGGA's Enforcement Review Committee investigated and suspected Opus Magnum Knowledge Engineering Inc. was in violation of the Engineering, Geological and Geophysical Professions Act. Subsequent action ensued by the Association, requesting the firm to cease holding itself out as a provider of engineering services. When this action went unheeded, an injunction was obtained. Opus Magnum Knowledge Engineering Inc. did not attend to oppose APEGGA's application.



After reviewing affidavit evidence, the Honorable Mr. Justice W.E. Wilson, Court of Queen's Bench of Alberta, ordered the company to refrain from using the word "engineering" in its corporate name. The company was also to refrain from representing or holding out, expressly or by implication, that it is entitled to engage in the practice of engineering or is a permit holder pursuant to the provisions of the Engineering, Geological and Geophysical Professions Act.

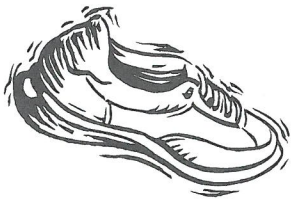
In recent months, the Enforcement Review Committee has dealt with an increasing number of cases in which companies or individuals represent themselves to the public as professional engineers. The action in the Opus Magnum Knowledge Engineering Inc. case has been taken on behalf of the Association as part of its regulatory mandate as the administrator of the Engineering, Geological and Geophysical Professions Act to ensure that only companies and persons who are properly qualified offer engineering services within the province of Alberta. As the engineering and geoscience regulatory body for Alberta, APEGGA can take action to prevent individuals and firms who illegally misrepresent themselves as professional engineers or geoscientists or illegally provide these services to the public.

North West Territories

Hazardous Sneakers

Those flashing lights on the heels of your running shoes do so because of 0.5 grams of mercury in a motion switch. A number of states in the U.S. have now legislated these shoes to be hazardous waste requiring disposal at a hazardous waste site.

It has been estimated that the company that manufactured these shoes has added an additional 3.5 tonnes of mercury to the environment. The company is reported to have changed the design of their shoe light and now uses a ball bearing instead of mercury.



Mercury is a significant environmental contaminant that has no beneficial biological effect. As our study and understanding of mercury in ecosystems and on humans increases, it seems that so does the incidence of mercury in the environment. For example, many of our lakes have fish with elevated levels of mercury. Some lakes now have health advisories on fish consumption. Others are being considered for health advisories.

The source of this mercury? Certainly in some locations the source has been old, abandoned mines with improperly contained tailings; but some contaminated lakes do not have an obvious anthropogenic source. These lakes seem to be effected with a combination of both natural mercury leached from the local geology and mercury deposited as a result of the long range transport of air pollutants. The principal sources of these wayward air pollutants are the burning of coal and the incineration of municipal waste.

The only way to decrease the amount of mercury, and other detrimental contaminants such as lead, from entering the environment is to decrease their use. Designers should be careful to specify processes and products that do not contain these and other contaminants.

Ontario

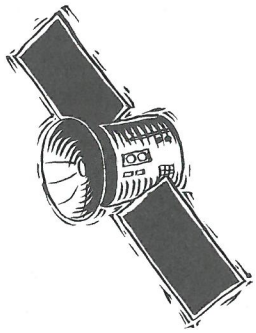
Telesat Engineers Recover Anik E2

Telesat Canada recently got its Anik E2 communications satellite back on the information highway achieving an engineering first. The $300-million satellite was out of service for six months this year, because the controls that keep it pointing toward receiving stations on earth failed during a solar wind storm. To correct the problem, Telesat space systems engineers and technicians developed the world's first ground-based attitude control system for satellites.

The Ground Loop Attitude Control Systems (GLACS) are located at ground stations in Edmonton and Allan Park, near Barrie. The truck-sized Anik E2 is parked in geostationary orbit over 35,000 kilometres above the equator. The GLACS keeps it pointing accurately toward the earth, by firing the satellite's thrusters and controlling its magnetic torquers continuously. To do the job, the system's software is fed measurements of the satellite's pitch, roll and yaw, or tilting out of alignment with the equator.

Marc Dubois, P.Eng., director of satellite ground systems, said, "Telesat has installed three GLACS at each site: two are backups available for Anik satellites in case of failures. If the operating system for the Anik E2 failed, there would be an automatic transfer to a redundant system. A third system is also on standby, in case there is a momentum wheel control failure on the Anik E1." Telesat determined that designing and manufacturing the GLACS was feasible in a joint study with Martin Marietta Astro Space, which manufactures the Anik satellites' momentum wheel control systems. Telesat also studied the fuel requirements for ground based satellite control, finding that extra fuel consumption will shorten the Anik E2's life by about a year. It's now scheduled for retirement in 2003.

Dubois says the recovery project's technical challenges included "designing the software to control the satellite, which required the use of simulations to evaluate its performance. There was also a scheduling challenge to build the ground stations in time for the satellite to resume full service on August 1, which was the date announced to Telesat customers."



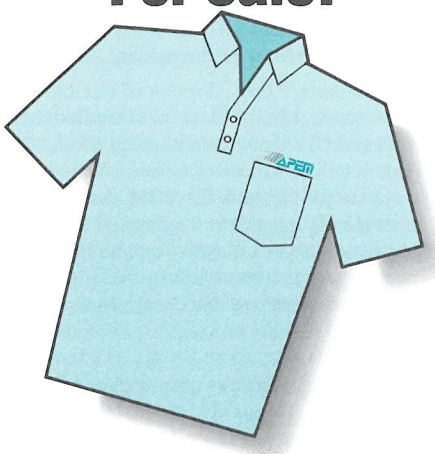
The GLACS may create new opportunities for Telesat's consulting business. Dubois says, "Several satellite manufacturers have experienced similar failures, and have been talking to us about the GLACS. Some may want to hire us to study the feasibility of their building and using similar systems." □

Capitalizing on Today's Challenges

Continued from page 10

role as more women join her in that field? What are the causes of discrimination? What about backlash reactions to special programs? Should men be gender sensitized? Should programs for women be available at the professional level and not just at the academic level? During the course of answering these questions it was mentioned that when asked to choose, more young women will choose having a family over having a career. The final point made in the discussion was that there was no information from that source regarding the choice of young men because young men were not asked to choose. □

For Sale!



APEM Logo Golf Shirts and Sweatshirts

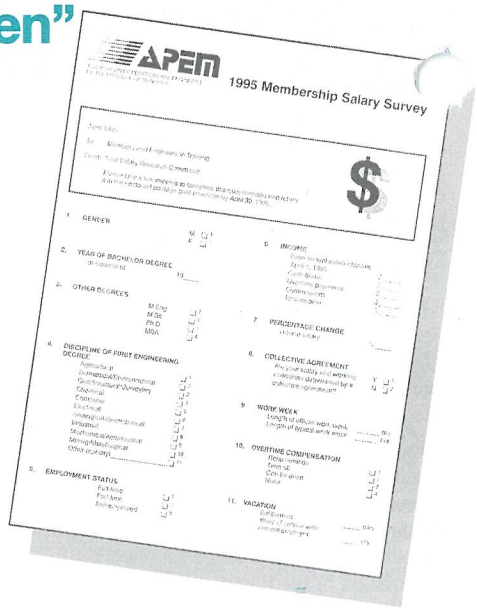
Several colours and sizes available

Golf Shirts $20.00 Sweatshirts $18.00 (incl. all taxes)

Contact Bruce Biglow, at UMA Engineering – 284-0580, or Donna Bilodeau at APEM – 942-6481 (or another Sports Committee Member) to place your order.

Salary Survey "Top Ten"

By: E.G. Parker, P.Eng., Chair, Salary Committee



Freezes, days off, downsizing, rightsizing, and deficit reduction; how are all these strategies impacting salaries today? Once again, APEM is conducting our salary survey to gauge compensation for Professional Engineers. What graduating class has the highest salaries, what industries and job functions are paying more, and what were the salary increases in Manitoba in 1994; these are just some of the questions answered in our Salary Survey Report. Please take a few minutes to complete your questionnaire enclosed in this mailing.

This year's top ten reasons for completing your salary questionnaire are:

10. Answers will be used in next Dilbert strip.
9. Show your boss you are underpaid.
8. Look for typos our word processor couldn't find.
7. Questionnaire too small for starting bonfire.
6. Fill the APEM recycling bin.
5. Because you lost last year's questionnaire.
4. Counting rating points is the only time you can still use your slide rule.
3. Need more data to fill the Information Highway.
2. You can check Premier in principal job function.

And the number one reason to complete your salary questionnaire.

1. It takes less time than a council meeting. □

Engineering Students and Professionals Come Together at the Annual Engineering Student Dinner

Future Engineers Dine Out

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

The 1995 Annual Student dinner was held on February 1st with close to 200 persons in attendance. It is an occasion of long tradition at which fourth year and some third year engineering students spend an evening with practising Professional Engineers who are their hosts. Various technical societies assume the responsibility for this event. This year, the Winnipeg section of the IEEE was the sponsoring group. Assisting were members of the U of M Engineering Student Society along with a representative from the Association of Professional Engineers of Manitoba.

Beginning the program, Chair Andrew Drobot, P.Eng., welcomed the students and the professional engineers as well as recognizing those who had assisted with the organization.

Dr. Donald Shields, Dean of the Faculty of Engineering at the University of Manitoba, welcomed the students present at the dinner. He noted that there is a competition for the position of Head of the Civil and Geological Engineering Department, which is up for renewal. He raised the question as to whether it should be a person of non-engineering background as against the traditional professional engineer.

Don Osman, P.Eng., President of APEM, indicated that there is and there will continue to be an increasing demand for the Professional Engineer in the work place. He encouraged those who would be graduating this year to register in the new EIT four-year program in order to be in a better position to apply for registration later on.

As has been the custom at past dinners, Hannya Klimenko, Program Convener of the Professional Engineers' Wives Association, announced its Scholarships of $400.00 each to four engineering students. This year's winners were: for the E.P. Fetherstonhaugh Scholarship – Karen Sze, 2nd year Civil; for the D.A. McDonald Scholarship – Tomasz Swierczynski, 3rd year Electrical; also to Shuquian Yan, 4th year Electrical, and to Andrew Hymers, 3rd year Mechanical. Andrew was the only student recipient in attendance at the dinner.

The guest speaker was Dr. H.C. Card, P.Eng., Professor of Electrical and Computer Engineering, University of Manitoba, with the topic "Engineering – A Look into the Future". Using a series of transparencies as background, Dr. Card delved into the future computer world in its many aspects.

To the writer, whose computer experience is somewhat limited to a narrow field of word processing, the presentation was interesting but very difficult to comprehend in its many aspects. Dr. Card touched on the aspects of the computer in communications, such as fibre-optics and cordless telephones. He also indicated that the computer will change the corporate structure, suggesting that small corporate organizations working together on an ad hoc basis for a project will be commonplace. The computer as a "box" will disappear and in appearance will become more and more hidden. Its presence will be everywhere and there will be software surrogates and assistants. Micro-chips will continue to diminish in size and may be implanted in the brain as an aid to improvement of the human memory. The ultimate objective will be to have the computer more adaptable to the person rather than the person endeavouring to adapt to the computer. After a question period, the event adjourned.

It is always enjoyable to meet the young engineers, to learn of their background and experiences and to share some of your own experiences with them. It is hoped that this event will continue, since it is an excellent form of communication between the young undergraduate-to-be and the practising engineer. □

Coming Event

75TH ANNUAL
CANADIAN DAM SAFETY ASSOCIATION CONFERENCE

Banff, Alberta

Date: October 2-5, 1995

Contact: H.S. Williams, Williams Projects Ltd.
128 – 12th Avenue S.E.
Calgary, Alberta T2G 4E3 Canada

Phone: (403) 265-1472
Fax: (403) 269-4244