



Editorial

Fine Words and Parsnips

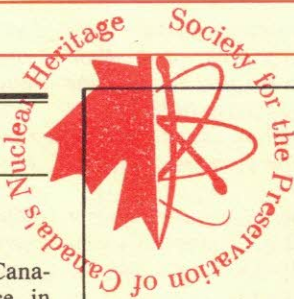
One thing to emerge from the recent Canadian Nuclear Association conference in Montreal is the fact that everyone around seemed to think that electricity export to the US from purpose-built nuclear generating stations is like motherhood, a Good Thing.

In his lunchtime address (as read by AECL Chairman Robert Despres), Federal Energy Minister Jean Chretien was particularly encouraging, suggesting that "firm guarantees" might be available for generating plants to be built specifically for power export. Exactly what these guarantees might be, however, was not specified.

But some things were specified. Utility representatives from the US, after making the not unanticipated motherhood statements, delivered a clear message: the days when the US would buy any amount of electricity under any conditions and at almost any price are past. Future power sales will require tough-minded and realistic bargaining. Also stumbling blocks such as interprovincial squabbles and export permit uncertainties will require resolution.

From the Canadian side of the border specific problem areas were also identified — particularly those relating to plant scheduling — and once again the finger was pointed at regulatory delays and uncertainties. Little substantive comfort was available from a National Energy Board representative. While the principle of electricity exports was endorsed (when in the "national interest"), the speaker did not offer any real hope that the detailed, specific and time-consuming public examination of export contracts could be streamlined.

Fine words butter no parsnips, as the saying has it, and at the Montreal conference we heard any number of fine words. But fine words are at least a starting point for the nuclear industry, utilities and federal government agencies. Long-term exports of nuclear-generated electricity to the US could be of great benefit to all parties, but those export contracts will have to be worked for — hard. It's a worthwhile objective and, if the sentiments expressed in Montreal can be translated into action, it's an eminently achievable one.



John Hewitt Elected CNS President

John S. Hewitt was elected President of the Canadian Nuclear Society at its annual meeting in Montreal this June.

He becomes the third CNS President and is formerly CNS Vice-President, and Communications Chairman.

Dr. Hewitt is currently Professor of Applied Nuclear Studies with the Department of Chemical Engineering and Applied Chemistry and an Associate Dean with the Faculty of Applied Science and Engineering at the University of Toronto.

His research interests are physics, nuclear reactor physics, and nuclear instrumentation and he has published extensively in these areas. From 1978-

79 he was a visiting scientist at Chalk River Nuclear Laboratories.

Dr. Hewitt was born in Kincardine, Ontario and received his B.Sc (Engineering Physics) from Queen's University, and his M.Sc (nuclear Reactor Physics and Engineering) and Ph.D (Physics) from the University of Birmingham where he studied as an Athlone Fellow. He has broad teaching experience in undergraduate and graduate courses, as well as thesis research supervision.

Dr. Hewitt has numerous professional affiliations and is extensively involved in professional and community service.

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Bulletin Editorial Misleading?

Your editorial in the March-April *CNS Bulletin* pertaining to management of nuclear waste will contribute very little to an improved understanding of this issue.

You note that "There are two possibilities: either nuclear wastes do present an unprecedented long-term hazard to humans and the environment and require extraordinary measures, or they do not, when considered in the context of more familiar toxic materials." In giving only these two extremes, you have missed the core of the issue, that although not an "unprecedented long-term hazard", nuclear waste, particularly nuclear fuel waste, does represent a potential long-term hazard that must be carefully addressed. The fact that chemical wastes have for the most part not been managed adequately does not in any way negate our responsibility to put in place safe management practices for nuclear waste - and very importantly, it does not lessen our responsibility to show the public that we have in fact done this.

You also mention the cost of AECL's programs on waste management research. While it is certainly true that this research is expensive, as is all scientific research today, the costs are not unreasonable when considered in relation to the value of the product that has led to the waste. For example, the Canadian Nuclear Fuel Waste Management program was funded in 1981 at an average of 29 million dollars per year for ten years; the value of the nuclear electricity generated in Canada over the eleven years from 1972 to 1982 is approximately \$2.3 billion, a value that will increase markedly in the future as more reactors come into service in Ontario as well as in other provinces. This research expenditure is surely not exorbitant given the value of the product, and the fact that the program will result in the development of safe methods for the permanent disposal of Canada's nuclear fuel waste, past, present and future. I would also point out that the methodology and equipment being developed in nuclear waste research programs will undoubtedly have application to the disposal of a variety of other, non-nuclear wastes. We are therefore addressing not only the management of nuclear waste, but will assist in addressing the "chemical cornucopia of toxins introduced to the environment by modern industrialized society..." mentioned in your editorial.

T.E. Rummery
Director,
Waste Management Division
Whiteshell Nuclear Research
Establishment

The Nova Scotia Uranium Inquiry — Stage One

As Manager, Environmental Affairs with Kidd Creek Mines, Roy John led the Kidd Creek presentation to the first stage of the Nova Scotia Uranium Inquiry, Judge Robert McCleave, Commissioner. John is now with CANMET and here recounts his impressions of the inquiry.

By the middle of the 1970's the concept that Nova Scotia had a "European" geology was being eagerly tested by a number of companies. This theory evolved from Tuzo Wilson's ideas of continental drift that had Nova Scotia, France, Portugal and Spain joined together in ages past. Although they are now separated by a vast ocean their geological structures should be similar. Tin, tungsten, molybdenum, and uranium had all been found in Europe and these were the elements sought in Nova Scotia.

Two companies in particular seemed to be making good progress. Shell Minerals, a subsidiary of Shell Resources Canada, eventually found a major tin deposit in the south-western part of Nova Scotia. They had also made a number of exciting finds of uranium-bearing rocks near the north rim of the large granite batholith of southern Nova Scotia. Aquitaine Company of Canada Ltd., a subsidiary of the French Elf-Aquitaine had also made great progress. It too had made a number of interesting discoveries, most significant of which was a deposit of uranium mineralization at the northern end of the batholith.

For some years Nova Scotia has had a well-organized activist lobby. Their primary concerns were herbicide and insecticide spraying and opposition to the Point Lepreau reactor. Most of the leading organizers were well-educated young Americans who occupied professional positions. They had emigrated to Nova Scotia attracted by its peaceful rural atmosphere. Many of them appear to be strong supporters of the Jeffersonian ethic of a decentralized agrarian society.

In late 1980 and early 1981, the geologists involved in the uranium discoveries suddenly found themselves in the midst of a fierce public debate. Sometimes they were horrified at the way facts were distorted and even discarded. At other times they were at a loss to answer questions that were beyond their field of expertise. Those involved recognized that there was a need to reply to these criticisms, and both Shell and Aquitaine began working on public information programs. There was also an attempt to form a combined industry group but this did not materialize.

As a result of the public agitation the provincial government under Premier John Buchanan announced a moratorium on uranium mining and milling. As the exploration programs were still in the early stages this was not of great concern to the industry groups. Even the most likely prospect, the Millet Brook discovery of Aquitaine, was several years of exploration, environmental study, planning and construction work away. The government appointed a select committee to investigate the issue with David Nantes, both an engineer and a politician, as chairman. Before this committee could achieve anything, the Premier called a general election and thereby dissolved all standing committees. Shortly before the election itself the Minister of Mines and Energy, Ron Barkhouse, announced a moratorium on exploration. This surprising development was a major blow to the exploration program.

Slowly the exploration groups disappeared from the scene. Exploration dwindled almost to a halt. In 1981 provincial exploration budget was around 14 million dollars. This dropped to less than 3 million dollars for 1982. But the most significant change to the uranium issue was the result of new policies at Shell's head office. A worsening economic condition had convinced Shell's senior management that they should withdraw from minerals exploration. They completely disbanded the Shell minerals group and eventually sold their one major discovery, the tin deposit, to Rio Algom. This left Aquitaine as the sole industry proponent.

Aquitaine's minerals group was like Shell's, a small section of a large oil company. The Millet Brook uranium discovery was its first major mineral find; an exciting success for this small group. While the political changes were taking place in Nova Scotia the Canada Development Corporation concluded a deal with Elf-Aquitaine which allowed it to acquire Aquitaine Company of Canada Ltd. Subsequently, CDC transferred the Aquitaine minerals group into Texasgulf of Canada and renamed this company Kidd Creek Mines Ltd. This changed the whole concept of the original Aquitaine group. From being on the verge of producing Aquitaine's first mineral program the group became part of a huge mining corporation with ore reserves that dwarfed the Nova Scotia deposit. However, the newly appointed president of Kidd Creek Mines, Dr. George Mannard, reviewed the project, gave it full support, and make Kidd a full participant in the inquiry.

Premier Buchanan announced the formation of the Nova Scotia Uranium Inquiry with Judge Robert McCleave as its Commissioner. Judge McCleave announced the Inquiry would take place in three stages. The first stage would allow all interested parties to make presentations of their opinions on uranium mining in Nova Scotia. These opinions did not have to be supported at this stage. The second stage was to be a more typical courtroom style inquiry and was labelled the "confrontation" stage by Judge McCleave. The final stage was to be a summation by the interested groups.

The first stage sessions were conducted in a very informal atmosphere. The presentations followed the same pattern as those made at other inquiries with many legitimate concerns being raised that would have to be resolved before any development could take place. The issue of primary concern was tailings management. It appeared that the terrain was suitable and materials were available for acceptable management practices but much more detailed engineering work would be required to confirm this. Other questions such as watershed protection and social impact would also have to be addressed.

There were some wildly distorted presentations. It was amazing to hear the vivid, detailed descriptions of Elliot Lake and its people, given by individuals who had never visited the town; descriptions that bore no resemblance to the truth whatsoever. All of the old myths; black grass; leafless, stunted trees, the "special" childrens wing at the St. Joseph's hospital; were all resurrected to astonish the audience and capture the media's attention.

There were, of course, many well-organized presentations by the activist groups, designed to influence the ultimate political decision. One medical group, for example, submitted a very cleverly rewritten version of the Woollard-Young report from British Columbia. On some occasions these presentations turned into political statements. However, the Judge normally curtailed these and insisted the presentation concern only the central issue. Presentations in favour were made by representatives of industry. The newly formed Chamber of Mineral Resources of Nova Scotia based its presentation on a report that had been prepared for its members. (This report is available from the Chamber for a cost of \$5.00. It gives concise outline of the uranium fuel cycle from exploration through mining, milling, fuel production, power production, waste disposal. It also briefly comments on some of the environmental and health issues.) The CNA, strongly supported by AECL, gave a presentation concentrated on the health issues and waste disposal. New Brunswick Power's presentation helped put the nuclear industry in the Maritime region into perspective. Kidd Creek Mines presentation urged that the moratorium on exploration be lifted as soon as possible.

The federal and provincial regulatory groups

were among the last to make presentations. These were carefully worded, well-researched, scientifically accurate presentations. It was clear that the Nova Scotia Ministries of Health, Environment and Mines had put in a major effort to become fully familiar with all of the issues. As these presentations did not support the distortions made in earlier presentations they were immediately labelled as "Pro"!

In general, the Inquiry was held in a friendly, low-key atmosphere. At the early hearings, attendance often ran to 100-200 people. This quickly dropped to about 25, and even at the Kidd Creek Mines presentation in early June there were only 40 in attendance. (Including about a dozen media people and about a dozen Kidd Creek employees.) By the time the government groups made their presentation attendance was down to half a dozen or so.

On a few occasions there were some unfortunate incidents. Although most people behaved in a responsible fashion there were one or two who insisted on trying to disrupt the proceedings. There was also a bizarre incident, which although not disruptive, clearly upset the Judge. A woman at the end of her presentation pulled out a pistol, placed it quickly to her head, and pulled the trigger! It was not loaded. Her dramatic gesture was to show that uranium mining is like committing suicide.

The first stage finished in October of 1982. The Judge said that he would be summarizing the issues and then defining those issues which were to be taken to the second stage. A while before the finish of stage one Kidd Creek's president died, and in November Kidd Creek announced its withdrawal from the inquiry on economic grounds. This removed the only industry proponent with a committed stake in the issue. The Chamber of Mineral Resources immediately formed a uranium committee to represent the industry's viewpoint. This committee is faced with a different task as it has little funding and has joined the inquiry half way through.

Judge McCleave also has a problem with the activist groups. He would like them to amalgamate into one body but they seem unwilling to do so. After the first two sessions of stage one the activist presentations became extremely repetitive. Although this is good for media coverage and adds suitable statistics to the activist cause it is a wasteful procedure for technical discussion.

Recently there have been a number of events which have given the Nova Scotia Inquiry a unique tone. As mentioned earlier, the prominent opponents to uranium mining are also active in anti-spray issues. Late in 1982 their activities had annoyed the Minister of Lands and Forests to such a degree that in a hard-nosed public attack he labeled them "subversives". One of these groups, from Cape Breton is involved in legal battles with a pulp and paper company.

An award of court costs to the pulp and paper company coincided with strongly worded criticism of some activist groups by the Deputy Minister of the Environment. It was during this period when the activist groups were feeling more and more persecuted that Judge McCleave held a special session of the Inquiry. Those people whose behavior had been objectionable in the eyes of the Judge were brought before him and presented with various alternatives. In one particular case he ordered a newspaper reporter not to print certain derogatory statements about the inquiry. This immediately became an issue of freedom of speech, an issue close to the heart of all those in the media. Only a few days before, one of the leading activists had found out that she was being sued for statements she had made in the press. In the fall of 1982 she had attended a presentation by a prominent academician supporting nuclear energy. She had written a scathing review and had it printed in the Halifax newspaper.

Amidst cries of harassment by the activists and the issue of freedom of speech from the journalists the Liberal opposition leader and the sole NDP member of the Nova Scotia legislature called for McCleave's resignation. After much political haranguing the Attorney General agreed to investigate these complaints. This he did and a short time later he announced there was no reason to interfere with the Nova Scotia public inquiry. At this writing (April 1983) the issues for the second stage have not been defined and no date has been set for resumption of this Inquiry. There are no longer any major industry proponents, there are no active projects and Canada's economic condition is not likely to encourage further exploration for new projects for some years to come. The activists have a major court battle against the pulp and paper industry and a private suit to face. The Provincial government had budget deficits, unemployment and the offshore oil prospects as its major issues. The Judge then, has a very difficult task ahead to conduct an Inquiry with the key figures and the conditions in a constant state of change.

Roy John

NB Power Chairman's Address

Following is a message from NBEPC Chairman Leland McGaw on the occasion of the official opening of the Point Lepreau Nuclear Generating Station, June 25.

Point Lepreau is Atlantic Canada's first nuclear powered generating station, a mega-project destined to play a major role in meeting New Brunswick's energy requirements well into the future, while producing export revenue through sales of surplus power to neighboring utilities in the New

England States during the first six to nine years of operation.

Point Lepreau's impact on the provincial economy has been on-going since construction started in 1975. From early planning to completion of construction, more than 14,300 man-years of employment went into the project and millions of dollars were injected into the economy of the region. Of a total of 139 contracts at Point Lepreau, 108 went to local contractors. Nearly 50 per cent of the material and labour cost were spent in New Brunswick. Trades and labour alone cost \$225 million, 85 per cent of which originated in New Brunswick.

Point Lepreau was the first nuclear plant with a full quality assurance program on construction. Skills gained by contractors and tradesmen at Point Lepreau place them among the one per cent in the country with knowledge of nuclear quality assurance. As more and more industrial construction moves toward stringent standards, this experience is invaluable.

The high technology introduced at Point Lepreau has provided new opportunities for many New Brunswickers. Millions of dollars have been spent on providing advanced training for construction trades and plant operators and institutions throughout the province have been encouraged to offer specific courses coinciding with the high standards required to construct and operate such a facility.

Certain nuclear speciality skills developed to solve problems at Point Lepreau are now being marketed abroad providing new opportunities and challenge to several local engineering groups.

During the eight years it took to build and commission Point Lepreau, it became the focus of public attention and controversy.

Despite escalating costs caused by a variety of factors including increased material requirements, design changes, labour unrest, component replacement and rampant inflation, Point Lepreau compares favourably with other nuclear construction in the world and represents both a Canadian and a New Brunswick success story. Although started third, it became the first of four CANDU 600s under construction in Canada and abroad to achieve criticality and is one of 13 CANDU reactors operating in Canada. Atomic Energy of Canada Ltd. designed and procured the primary reactor-related material and Canatom, a private Canadian nuclear consulting firm, designed the reactor building and related structures and systems. NB Power served as construction manager and drew upon United Engineers and Constructors and others for management and commissioning assistance. NB Power's own engineering group designed and procured the balance of the plant.

Point Lepreau represents a series of accomplishments for NB Power. It's the first CANDU 600 to be licensed for operation; the first to be built under the new federal environmental assessment and review regulations; the first to be constructed under

the recently written nuclear quality assurance program; the first Canadian nuclear unit to be cooled by sea water and the first to come under contract for power export to the United States.

New Brunswick made the decision to build Point Lepreau in response to the dramatic price increase and growing insecurity of supply of oil fuel after 1973. The demonstrated success of the world class nuclear units in Ontario were also determining factors. The availability of interconnections with various Canadian and US utilities made a 630,000 kilowatt unit technically and financially possible for the NB Power system.

These interconnections are proving one of our most valuable assets providing security and flexibility for our utility. They allow for the import and export of electricity on a large scale and as a result, NB Power customers pay less for electricity than would otherwise be possible.

Point Lepreau did not happen by chance. It was a logical step in a series of well-planned events that saw NB Power develop from a piece of legislation in 1930 to a first class power generation and distribution system that now serves virtually the entire province providing homes and industry with a secure source of reliable and reasonably priced power.

Point Lepreau is much more than just another generating station, it is in a very real sense a tribute to a small utility and a dedicated group of skilled people with foresight and imagination and the will to succeed.

Leland McGaw

FYI

Point Lepreau Opens (Staff)

June 25 marked the official opening of the Point Lepreau nuclear power station in New Brunswick. At the opening of the \$1.3 billion, 600MW unit Jean Chretien, federal Energy Minister, emphasized that new reactor sales are vital to preserve the nuclear industry, but he was optimistic about a Point Lepreau 2, the Romanian deal and another South Korean sale. New Brunswick is projected to realize a net gain of \$118 million over the next eight years in the sale of 230MW of Lepreau power to the US, from export contracts now in place.

Pickering 5 Declared In Service (Ontario Hydro)

Unit 5, the first of four 500MW Ontario Hydro nuclear reactors to be commissioned at Pickering B Nuclear Generating Station, was declared commercially in service on May 10th.

The unit produced first electricity last December and since then has undergone major testing to establish reliable performance.

Fuel loading of the next reactor slated for commissioning, Unit 6, will take place in September with reactor start-up scheduled for October.

Fault Tree Guide for Review

(AECB)

The Atomic Energy Control Board advises that a proposed regulatory guide entitled "The Use of Fault Trees in Licensing Submissions," Consultative Document C-70, is issued for public comment as of May 31.

The document is available for scrutiny at the AECB's office in Ottawa, and may be ordered from the Office of Public Information at the address below.

Comments received before September 1, 1983, will be considered in the revision process for this document, prior to its being used on a trial basis or formally applied in the nuclear regulatory process.

**Office of Public Information
Atomic Energy Control Board
P.O. Box 1046
Ottawa, Ontario
K1P 5S9**

Metallophilic Compounds Discovered

(Staff)

Two McGill University scientists, Drs. Irving DeVoe and Bruce Holbein, have discovered particulate, molecular composition with the potential to decontaminate nuclear power station water systems and extract metals from seawater. The compounds have extremely high affinities for specific metals, exceeding those of ion-exchange resins and were discovered while pursuing microbiology studies. The substances can be recycled and are not susceptible to radiation damage. Uranium, thorium, cobalt, strontium and cesium are a few of the metals for which the compounds have been created with specific affinities. Ontario Hydro and AECL have shown interest in the new substances.

Nuclear Management Team Formed

(Staff)

Nuclear Project Managers Canada Inc. has recently been formed under the Canada Business Corporations Act, with head office in Montreal. The new group is a consortium of AECL, Canatom, Monenco, Lavalin, SNC and Canadian Foundation Co. and combines engineering, construction and project management expertise under one umbrella.

Overseas CANDU 600s Opened

(Staff)

The last two months saw the official opening of Canada's two CANDU 600 over-

seas export reactors. April 22nd marked the official inauguration of the Wolsung nuclear power station in South Korea. Officials present included Korean President Chun Doo Hwan, and representing the Canadian Government, Hon. Jean Chretien, Minister of Energy, Mines and Resources. May 3rd saw the opening of the Embalse nuclear station in the Province of Cordoba, Argentina. Representing the Canadian Government was Mines Minister Judy Erola and others present included Argentine President Reynaldo Bignone. Speeches at both inaugurations emphasized the degree of nuclear co-operation between the two countries allowing these considerable achievements.

Nuclear Employment Figures Released (CNA)

Economic impact figures of the nuclear industry in Canada have recently been updated by the CNA. The annual economic activity generated by this industry is in excess of \$4 billion dollars with direct employment reaching almost 40,000 high skilled jobs, as shown in the accompanying table. Since the statistical data are inevitably more than a year old they do not reflect the economic downturn of the past year. Despite this, the industry remains remarkably resilient: although major areas of slow-down have been in uranium exploration, consulting engineering and CANDU manufacturing, in all the other areas employment and economic activity have been remarkably stable. Significant future opportunities lie in the area of supply and service to operating nuclear stations, especially in decontamination, equipment retrofit and the deployment of remote handling technology.

	Man years in	
	1980	1981
Uranium		
Exploration	500	400
Mining & milling	6,068	6,740
Refining	892	630
Fuel fabrication	649	649
	8,109	8,419
AECL	7,512	8,021
Utilities		
Ontario Hydro	12,578	14,578
Hydro Quebec	1,460	1,820
NBEPCC	2,165	1,239
	16,203	17,637
Manufacturing	5,400	4,700
Consultants	1,000	800
Other R&D	200	200
Total	38,424	39,777

Employment in Canada's Nuclear Industry

AECL Service Department Established (AECL)

A new department, the CANDU Operating Station Services Department (COSS) has

been established within AECL CANDU Operations in Mississauga, Ontario. This new business unit will act as a "one-stop shopping centre" for the supply of Canadian-based services to the newly-commissioned CANDU 600 units. The COSS Marketing Director will maintain contact with clients (plant owners) via Site Representatives and may form agreements with other non-AECL sources of services in Canada to serve clients.

NRX Gets 5-Day Week (AECL)

The world's oldest functioning nuclear research reactor is the NRX at Atomic Energy of Canada Ltd. Chalk River laboratories. It's been running for 36 years, has been invaluable in physics research, and has now been cut back to a five-day week.

Canada Creates Safeguards System (R. Silver, Nucleonics Week)

Canada has provided the IAEA with a safeguards system to prevent the diversion of irradiated fuel. Designed and built into the 600MW CANDU reactors at Wolsung, (South Korea), Embalse, (Argentina) and two Canadian stations, the system depends on six types of devices, some of which could be readily applied to LWRs.

The safeguards devices represent a \$15 million development program, funded two-thirds by Atomic Energy Control Board and one-third by AECL since 1977. AECL will spend some \$3.5 million this year to adapt the system to 540MW and 825MW Ontario Hydro CANDU's at Pickering and Bruce. The actual safeguards detection equipment costs about \$600,000 and its installation some \$350,000 per unit.

The equipment helps meet IAEA concerns that CANDU's on-line fueling system is more difficult to monitor. Basic detection systems — 8-mm surveillance camera, closed-circuit TV, spent fuel bundle counters, detection of fuel bundles, and sealing stacks of spent fuel in swimming pool storage — were initially tested in AECL's 220MW Douglas Point station. Data from the system is electronically stored at a remote location accessible to IAEA inspection. The system also uses Cerenkov radiation detection and seals which can be ultrasonically inspected.

Canada to Lead US in Uranium (Staff)

Speaking to the CNA annual conference in June, CNA President Dr. Norman Aspin predicted that Canada should lead the US in uranium production this year. He noted that Canadian production of uranium has shown a steady growth and in 1982 produced over 8,000 tonnes U, while recently uranium production in the United States has shown a dramatic decline. From a high point of over 16,000 tonnes in 1980, production dropped to 10,000 tonnes in 1982

and this year is expected to drop to approximately 7,000 tonnes. This has resulted from the closing of many high cost mines following a period of declining uranium prices.

In line with this prediction, the AECB has announced three new licenses:

- Denison Mines Ltd., new uranium mining facility operating licence, Stanrock Mine, Elliot Lake, Ont.; two-year term to June 30, 1985.
- Rio Algom Ltd., new uranium mining facility operating licence, Stanleigh Mine, Elliot Lake, Ont.; one-year term to June 30, 1984.
- Key Lake Mining Corporation, new uranium mining facility operating licence, Key Lake, Sask.; 25-month term to July 31, 1985.

The CNA Award Recipients for 1983 (CNA)

The Canadian Nuclear Association awarded the Ian McRae Award to Frank Foulkes and the W.B. Lewis Medal to Albert Pearson at its annual conference in Montreal in June.

Dr. Pearson was a major contributor to Canadian leadership in the design and development of automatic nuclear reactor control and safety systems, with AECL. His career paralleled rapid developments in solid-state devices and digital data processing and he played a major role in ensuring that these developments were promptly applied to improve reactor control, safety, and data acquisition systems.

In his career as an engineer and a manager, Frank Foulkes accumulated more than 30 years experience in design, management and construction of fossil and nuclear generating stations.

He has participated with Canatom in most of the CANDU projects around the world: Kanupp, Glace Bay Heavy Water Plant, Gently 1 and 2, Cordoba, Point Lepreau, Wolsung 1 and Cernavoda. Earlier, with AECL Power Projects, Toronto, he was responsible for the development of the Douglas Point Control Centre, including the first digital computer used for control in a Canadian power plant.

Two from Plenum (Staff)

Plenum Press of New York has published two texts of particular relevance to understanding Canada's nuclear program and research effort. "Nuclear Fission Reactors" (1982) by I.R. Cameron, Professor of Physics at the University of New Brunswick, covers basic nuclear physics, elements of reactor theory, materials problems, heat generation and removal, safety, and in a survey of reactor types, includes a substantial section on CANDU. The text is intended for advanced undergraduates or graduate students and is suitable for pro-

professionals as well.

"Nuclear Energy Synergetics" (1982) is authored by A.A. Harms of the Department of Physics at McMaster University and M. Heindler of the University of Graz, Austria. This work discusses nuclear synergetism with respect to fission, fusion, spallation and transmutation and analyses emerging systems such as fusion-fission-electronuclear breeder hybrids. The authors employ an easy-to-use "zero-dimensional lumped-parameter formulation" to represent these advanced nuclear processes. The text is intended for professionals or senior university students. For information or ordering contact **Plenum Publishing, Corp., 233 Spring St., New York, NY 10013.**

Compact Boron Analyzer Developed (Energy Analects)

Scientists and engineers at Atomic Energy of Canada Limited's Chalk River laboratories have developed a boron analyzer for use with CANDU reactors operating overseas. The analyzer is unlike most similar models because it is easily transportable.

During the first year of operation, CANDU reactors have excess reactivity — too many free neutrons. For this period a neutron absorber, such as boron in the form of boric acid, is added to the moderator.

By measuring the amount of boron-10 in the moderator, the newly-developed analyzer can check reactor performance during commissioning. The concentration of the boron is an indication of how well the reactor fuel is performing. The actual method, whereby the analyzer measures the boron, is to convert (by a neutron activation technique) boron-10 to lithium-17 plus an alpha particle. The number of alpha particles is then measured.

The analyzer system was designed for non-specialists, who are led through the procedure by messages displayed on the unit's computer terminal. Two analyzers have been built to date. The first has been in operation at Wolsung-1 in Korea since last November and the second will be shipped to Cordoba later this year.

Ontario Hydrogen Institute Funded (Canadian Energy News)

Ontario Energy Minister Robert Welch has signed an agreement to provide \$10 million over the next five years to the new Institute for Hydrogen Systems at the University of Toronto. The agreement, which enables the institute to officially open for business, was also signed by Dr. James Ham, President of the University of Toronto, and by Dr. David Scott, Executive Director of the institute. The ceremony took place three years to the month from when the Ministry of Energy set up a Hydrogen Energy Task Force to study the future role of hydrogen in Ontario. Members of the hydrogen task force reported that Ontario is in an excellent

position to play a leadership role in researching and developing hydrogen technology.

The task force believes that Ontario-based CANDU nuclear technology could pave the way for producing hydrogen at increasingly competitive prices. A nuclear reactor, dedicated to producing electricity for an electrolysis plant, would increase the efficiency and volume of hydrogen production.

This reactor-electrolyser could be situated at an existing nuclear station in Ontario for distribution by truck and pipeline to manufacturers, refineries or retail outlets. The unit could also be built on site at an oil sands deposit to upgrade the energy content of the petroleum products. In this way, hydrogen could help ease our transition out of the age of fossil fuels.

Researchers at the Institute for Hydrogen Systems will analyze the most promising hydrogen technologies, then develop demonstration projects for commercial use of hydrogen in Ontario. The institute will also study the environmental and safety

aspects of producing, distributing, storing and using hydrogen and will promote public awareness of this new fuel.

New Radioactivity Detected (AECL)

A previously unobserved form of radioactivity has been detected in nuclei of both aluminum and phosphorus by an American — Chinese — Finnish team at the Lawrence Berkeley Laboratory of the University of California.

The radioactivity, whose existence had been predicted, is called beta-delayed two-proton decay. It is characterized by the simultaneous ejection of two protons and a positron. This brings to three the types of radioactivity in which a proton is emitted. The first — beta-delayed single-proton emission — was first identified nearly 20 years ago at McGill University.

In all there are now eleven distinctly different types of radioactivity involving particle emission.

The CNS and the Shaping of Things to Come

A Message from the New President

Called to serve as the Canadian Nuclear Society's third president, I pause to contemplate the society's future along with the professional futures of all of us who are its members. It was always clear that the society and the professional futures are inextricably linked. I sense that we now stand at the threshold of the era when the fate of our members, and that of the many who are eligible non-members, rides as never before on the fate of the society and particularly its ability to fulfill its original objectives. Until now, the opposite was true: the fate of the society was dependent upon what was indeed the good fortunes of its members, its officers and the nuclear industries which offer us professional opportunities and livelihood. That was fortunate all around, for the good times meant an excess of personal energy and industrial support for the embryonic society's activities, such as organizing and participating in conferences, while the new society was deserving and needful of an infusion of freely available effort to become launched.

To best support my few brief comments on why and how I think the CNS will prove particularly vital in the times ahead, I must first profile the society's principal resource, namely, all of us who are its members. For most of us, the general nuclear scene in Canada was well established before we emerged from our varied kinds of preparatory preoccupations, often (but not in all cases) that of wresting a science or engineering degree from a notable institution of higher learning. The Manhattan Project,

and Canada's role in it, seemed in the distant past and the course for Canada's civilian nuclear industry was charted, and much of it already travelled; the early successes of the NRX and the NRU reactors had spawned our extensive industry in isotopes for medical and industrial applications, and those same successes had proved much of our own CANDU technology, based on natural uranium and heavy-water reactor systems, for the economic development of electrical generating capacity. We were attracted to careers in the nuclear areas for a combination of reasons: (i) having completed some of the most rigorous and demanding university programs we identified easily with the scientific and technical challenges of the nuclear field; (ii) as if the academic preparation was not a sufficiently great challenge to our intellectual integrity, to take up professional responsibilities in a field in which the serious consequences of errors of fact, calculation, and judgement were known from earlier days (before the times of dedicated nuclear critics), would certainly test our mettle; and (iii) we perceived a world of continuing need for advanced medical technology and increased capacity for the release and/or capture of useful energy; to play a role in advancing the most apparently viable energy technology in meeting the energy needs of our industrial expansion at home, not to mention a role in international development, appealed to our altruistic sense.

The prospects were almost too good to be true! We could look forward to devoting

our working lives to the application of our hard-won understanding of nature and engineering to the advancement of an exciting established field. Our aim was to relieve the stress of human existence by facilitating medical services and useable energy - the most fundamental physical human needs in the modern age.

My purpose in profiling our society's members in terms of their primary motivations and ideals is simply to remind ourselves, and others observing us from a distance, just what kind of people we are and "what makes us tick". I would argue that the personal qualities born out of the circumstances depicted are those which have maintained the excellence of Canada's nuclear endeavours to the present and augur well for the future. The very same qualities are those which will prove essential to the continuing vitality of the society and enable it to fulfill its unique role in the not-so-good times ahead.

But what is this special role for the future CNS? First, let me remind you that the CNS Council under the vigorous leadership of my predecessor, Phil Ross-Ross, put together a master plan called "the CNS of Tomorrow". Many of the program activities (conferences, seminars, branch meetings, etc.) we have witnessed already - and will see in the years to come - are a partial fulfillment of this master plan. We have much more to do in advancing the aims of the plan, particularly in such areas as scholarly publishing, liaison with other learned societies and nuclear continuing education programs for the public. These are already receiving attention and no doubt will come about in time. But I believe that the great challenge for the CNS is to make a lasting and positive impact on the community within which it executes its program, whether on the local, national or global scale.

I envisage that this ultimate challenge, which is somewhat difficult to define and quantify, might be met in the manner of the scenario to follow. First, I must confess that my earlier discussion of the profile of CNS members betrayed an element of career expectations unfulfilled; indeed, we did not imagine when we entered the field that society in general in 1983 might be less than enthusiastic about nuclear energy and the practice of shipping medical isotopes, even though millions of individual members of that society gladly accept the benefits of these enterprises; nor did we anticipate that society would balk at the cost of nuclear energy even though it cannot in most practical circumstances be replaced at less cost by other energy technologies. Furthermore, we were innocent in our failure to realize that as later over-stressed by our critics, there was a potential linkage between peaceful nuclear applications and nuclear weapons proliferation, or that chronic or accidental leakage of radioactive materials from even a well designed civilian nuclear

(continued on page 8)



Out-going President of Canadian Nuclear Society, Phil Ross-Ross (right) receives silver tray in recognition of his contribution to development of the society from Peter Stevens-Guille, CNS Vice-President.

Phil Ross-Ross — A Tribute

The silver tray sparkled in the Queen Elizabeth Hotel lights as Peter Stevens-Guille read out the inscription:

**Presented by the
Canadian Nuclear Society**

to

**P. A. Ross-Ross
President 1981-1983
in recognition of his leadership
Montreal, 1983**

Phil Ross-Ross had just stepped down after a busy two years of President of the CNS.

In the first year of the CNS, George Howey, as the first President, had ably launched the good ship CNS. However it fell to Phil Ross-Ross to keep it afloat, head it in the right direction and set the sails (yes Virginia, nuclear powered ships do have sails!)

Early on as President, Phil wrote a far reaching, thoughtful paper entitled "The CNS of Tomorrow." It outlined a mature organization for the CNS to meet in the future. It discussed frankly the strengths and weaknesses the CNS had and faced. It became the Council's reference map.

"The CNS of Tomorrow" has served the Council well over the past two years. Although much has happened the map remains unaltered and still points the way to a mature society in the near future.

However Phil is more than a writer. He has patience to handle the many irritations the President faces, he has diplomacy to cut through the tape and reach to decision makers in Canada and elsewhere. Above all he has drive, energy and enthusiasm to stimulate the Council and bring about achievements.

During his two years as President, the CNS has gone a long way to establishing itself as a technical society. The CNS has held international conferences, national meetings and symposia. Above all these events have been profitable and the society rests on firm financial feet.

Phil engineered a coup on the international scene. He has brought about a meeting under his chairmanship of the newly formed International Nuclear Societies Group in Vancouver at the 4th Pacific Basin Nuclear Conference this September. It is a credit to the CNS that he is able to bring together the major nuclear societies in the world in Canada for their first formative meetings.

As past president Phil remains on the Council. We all look forward to his advice, critical appraisal and counsel during the years ahead.

**Peter Stevens-Guille
Vice-President**

facility (the only kind we have in Canada) could seriously compromise the integrity of our environment. Even though our innocence has still to be proven unjustified, it is a fact of life that our works are questioned by many of the public which to date has been unwilling or unable to apply the scrutiny we think it would take to assuage its collective doubt on the acceptability of nuclear technology.

Despite our disappointment at the current socio-economic climate's ambivalence towards the fruits of our labours, we find solace if we can agree with the many expert observers who predict that in due course a healthy demand for nuclear energy will return. The argument for such optimism includes the anticipated return of economic growth, the continuing impracticality of renewable sources making a significant overall impact on energy supply, the ultimate shortage of non-renewable energy with the exception of coal and nuclear, the environmental and transportation limitations of coal, and the urgent need to redress the inequitable world distribution of energy resources in the interests of global political stability. To complete the argument, the additional required ingredients will be the social enlightenment and the political will necessary for society to recognize the merits of the nuclear option as portrayed in the experts' prognostications. Specifically, it is here in the shaping of a positive social climate to ensure high quality decisions on energy issues, taking full account of such factors as are currently held by our experts as reasons for optimism, that the Canadian

Nuclear Society, perhaps in a concerted effort with its sister organizations, can make a determining contribution.

The shaping of social climate will not derive from an instant public relations activity whenever the need arises; but rather it will come through the CNS winning the public's confidence as it wins public profile. The many conferences, seminars and branch activities, as well as fulfilling an immediate technical need in the specific areas involved, are helping us to win confidence in ourselves as a group of individuals which is collectively knowledgeable on all aspects of nuclear energy and the issues. The existing programs along with the emerging new efforts in publication, continuing education and international participation, all contribute towards our ultimate effectiveness as a force in the evolution of society at large.

John Hewitt

Post script

With regard to the above list of reasons on why we as individuals were attracted to the nuclear field, I hope that we will continue to consider them as valid reasons to enter the field or to remain in the field. There are still thousands of non-members who, given the opportunity, could identify easily with the depicted background of our members and with CNS objectives. Please talk to them about our hope that the CNS can help fulfill those original expectations! The CNS is already greater than the sum of its membership, but critical mass is still some way off!

posia such as Simulation Symposia which were formerly organized by other groups, the first originated by CNS was the Commissioning Symposium under Brian Harling (Toronto, May 1983) of the Mining, Manufacturing and Operations Division. It also was highly successful technically and financially. The next division seminar is sponsored by Design and Materials on ASME III in October in Toronto.

The Technical Divisions continue to be responsible for the technical sessions of the CNS program at the Annual CNA/CNS International Conference, i.e. Toronto in 1982 (Dan Meneley), Montreal this year (Jan Charuk), and they are already started on arrangements for Saskatoon in 1984 (Irwin Itzkovitch). Other activities being organized by the divisions are radiation protection — spring 1984, and Simulation Symposium - March 1984.

The Program Committee under Tom Drolet is responsible for the coordination of all CNS conferences i.e. those originated by the Technical Divisions and those where CNS is invited by other societies to be a co-sponsor or participant in some way. CNS assisted with the conference on Decontamination of Nuclear Facilities in Niagara Falls, September 1982, Materials in Nuclear Energy, Hidden Valley, Ont., September 1982, Thermal-hydraulics for CANDU Reactors — Hamilton, December 1982. CNS will be contributing to many similar activities in 1983 and 1984. As a service to members the Program Committee is issuing twice a year a Calendar of Events listing Canadian and foreign conferences that could be of interest to members.

Close liaison is continuing with the CNA, particularly with their Technology Committee, who formerly were responsible for many of the activities now covered by the CNS. With an established long range program, the CNS is in a position to work with other societies. As a start, the CNS will be sending an observer to the Technical Operations Board of the Engineering Institute of Canada in order to help improve coordination and cooperation with existing Canadian technical societies; CNS is now approaching many other societies to be co-sponsors of our events.

On the international scene, an Agreement of Cooperation between the American Nuclear Society and the Canadian Nuclear Society is currently in the process of being signed. With good liaison between CNS and ANS, we expect to better plan conferences, avoid conflicts, and encourage joint sponsorship. One of the benefits to members is the reciprocal arrangement for members of either society to pay member rates for conference registration. CNS is gaining identity also through the International Nuclear Societies Group. Again the prime purpose of this group is to open lines of communication. Of particular interest is to learn at an early stage what the prime groups responsible for most of the major nuclear conferences i.e. the ANS,

Canadian Nuclear Society Annual Report 1982-83

The Canadian Nuclear Society is now in its third year, and is quickly evolving as a learned society. Visibility is important in its efforts to earn a reputation as a learned technical society, and such efforts require the contributions of more and more members to develop programs and get the ball rolling. This past year has seen the maturity of the technical divisions, whose various committee members were responsible for the highly successful entry of the CNS into the field of international conferences and symposia.

As a measure of committee effectiveness and member involvement, the Technical Divisions under Joe Howieson (and with Irwin Itzkovitch assisting) each held at least 6 committee meetings during the year. The first entirely CNS international conference was organized by the Environment, Health and Public Affairs Division under Tom Drolet. The Radioactive Waste Management Conference was held in Winnipeg in September 1982 in conjunction with the Annual

Information Meeting of the Canadian Nuclear Fuel Waste Management Program. Over one-third of the participants were from outside Canada, and the conference was an outstanding technical and financial success. So much so that at the conference the CNS announced that the next CNS Radioactive Waste Management Conference would be held in 1985.

The next CNS international conference (under Ric Bonalumi of the Nuclear Science and Engineering Division) is Numerical Methods in Nuclear Engineering to be held in September 1983 in Montreal. In September 1984, the Mining, Manufacturing and Operations Division will be responsible for the International Conference or Applications of Robotics and Remote Handling in the Nuclear Industry. The Design and Materials Division is proceeding with arrangements for an International Conference on Containment Design in June 1984 in Toronto.

Although CNS has been involved in sym-

CNS Council 1983-84



Photo - R. Bertrand

Left to right: T. Colenbrander (Secretary Treasurer), N. Yousef, E. Card, J-G Charuk, P. Stevens-Guille (Vice-President), J. Hewitt (President), P. Ross-Ross (Past President), G. Lynch, I. Itzkovitch, J. Weller. Not present: R. Bolton, G. Bereznaï.

ENS, IAEA, NEA, etc. are planning. An attempt is being made to reduce the number of conferences by joint sponsorship and avoid unnecessary conflicts through communications before conference dates are finalized. Through the INSG, a special task force was formed to look at the potential for an International Commission on Nuclear Safety. Dan Meneley is the CNS representative and this group will be reporting to the INSG who hold their next meeting in Vancouver in September in conjunction with the 4th Pacific Basin Nuclear Conference. The CNS will be host for the INSG meeting with Phil Ross-Ross as Chairman.

No decision has been reached yet on a Canadian Technical Journal. The two committees most involved in deciding on the concept and financing of a journal are the Technical Divisions and Communications (under John Hewitt). There is considerable member interest, and an adequate supply of manuscripts appears likely. Financial concerns during this period of a depressed economy are being examined carefully; much depends on how much support can be secured from libraries and other institutional subscriptions. This program is progressing cautiously.

The *Bulletin* is the responsibility of the Communications Committee (George Bereznaï) and the Editor and workers responsible for the *Bulletin* have turned it into a first class publication. The newsletter is now typeset, printed and mailed on a regular basis. The Communications Committee held 2 formal meetings during the year and a few informal sessions and have been looking at items such as a CNS standards manual (and continuing education

short courses as a possible first entry into the field of public education).

Branch activities were formerly a part of the Membership Committee, but are now separate and under Ernie Card, who has just taken over this committee with the objective of focusing branch views and requirements into the policies, guidelines etc. related to all branch activities. Branch programs are developing well. The Ottawa Branch has continued with its regular program of evening meetings. The Toronto Branch came into its own this year with a good mixture of technical tours and meetings. The Montreal Branch has focused most of its efforts towards the annual CNS Conference and the Numerical Methods conference. The Chalk River Branch held its inaugural meeting in November 1982 and continues to serve as a valuable resource group to the technical programs. The Winnipeg Branch continues with a modest program and also contributes as a technical resource group.

No new branches were formed, but contacts have been made in New Brunswick, British Columbia and Bruce with intentions to actively work towards branch formation next autumn. The CNS intends to cover the whole uranium cycle from mining through to waste disposal. The two more concentrated areas for uranium mining are Elliot Lake and Saskatchewan. In April Joe Howieson arranged the program for the evening meeting of the local CIMM chapter in Elliot Lake. We believe there should be some forms of cooperative program between CNS and CIMM; there may be sufficient interest to proceed with formation of a CNS branch. At the end of May, the CNS members in Saskatoon arranged

a meeting of over 30 to discuss the CNS (with Phil Ross-Ross) and to consider formation of a Saskatchewan Branch. With the annual meeting in Saskatoon in June of 1984, formation of a Saskatchewan Branch would be very timely.

The Membership Committee under Tony Colenbrander develops and promotes efforts to generally increase membership. Posters, and a membership booth which can be dismantled and transported have been added to the list of aids for membership campaigns. Membership is now over 650. Most new members have joined as a result of campaigns at CNS conferences.

Finance and Administration is under the Secretary-Treasurer Peter Stevens-Guille. The CNS is in a very good financial position. The Radioactive Waste Management Conference, Commissioning Seminar and Annual Conference in Toronto resulted in about \$25,000 surplus. Attendance at all was above the budget plan. These funds are separate from operating funds and serve as a reserve for unforeseen circumstances, and for seed money for new ventures, conferences, journals, etc. It is our intent to maintain a reserve which is about equal to one year's operating budget. As of the end of the fiscal year (end January) the CNS had about \$39,000. The current membership fee of \$30 just covers annual operating costs, but as the society develops we will be paying more for our share of headquarters services, and fees will rise accordingly. Again this year, the CNS has enjoyed the benefits of CNA support and a well organized and effective headquarters staff under Jim Weller.

The CNS is evolving and maturing. The contributions of many members and particularly the over one hundred who directly served on Council, the branch executives, conference committees, the technical divisions and the standing committees are greatly appreciated. These contributions have been extremely effective in developing programs, and earning recognition for the society and the Canadian nuclear program.

Phil Ross-Ross

(Annual Reports of the CNS Communications Committee, Membership Committee, Program Committee and Technical Divisions are available on request to CNS members from the CNS office.)

CNS Annual Conference Report — Addresses and Plenary

W.K. Davis, consultant and former Deputy Secretary of the US Department of Energy gave the keynote address on the future of the US nuclear program, at the CNS Annual Conference in June. He indicated that the US still leads the world with 79 reactors producing more electricity than France, Japan and West Germany combined and that by 1990, investment in the US nuclear

industry will be about \$150-200 billion. On the current slowdown, Davis observed that until the first oil shock of 1973, the US has a 25-year history of 7% annual electricity growth, which when halved resulted in cancellations of about half the nuclear plants on order. Stretchouts have also resulted in high costs and long construction lead times, an abnormal state of affairs, but nuclear power plants continue to compete favourably with coal plants in most parts of the US. He observed that utility performance is improving and that electricity growth should resume as the GNP rises, but that licensing uncertainty remains. A good sign is the recently passed waste management legislation which defines responsibilities, a timetable and funding. Davis also foresaw a shift to smaller nuclear units and joint ownership when reordering resumes.

In the CNS Luncheon address, G. Dietz, President of Isomedix Inc. spoke on the potential contribution of food irradiation to feeding the world, indicating that a sizeable portion of the world's food is lost to pests and spoilage which could be prevented using gamma sterilization. He emphasized that gamma treatment of food is simply a process, analogous to cooking or freezing, for preservation of food and is not an additive to food. He outlined how non-acceptance of food irradiation arose and held back the industry, and expressed hope that WHO approval of food irradiation, expected shortly, will help open up North American and other markets to the industry. He observed that AECL Radiochemical Co. supplies a large portion of the world's supply of cobalt-60, which is used in the industry.

The afternoon plenary session dealt with the subject "Nuclear Techniques in the Treatment of Society's Wastes." M. Cleland of High Voltage Engineering Inc. spoke on his company's work, with MIT, on a new method of sterilization of sewage sludge and water with an electron accelerator beam. He indicated that accelerators are required due to insufficient supplies of isotopic sources, however the techniques, can be complementary. He described how an electron accelerator beam would scan and sterilize a thin "waterfall" of sewage sludge. The city of Miami is presently installing this technology at a sewage treatment plant, while Albuquerque is installing an isotopic irradiator (cesium-137) for gamma treatment of dried sewage sludge, based on technology developed by Sandia National Laboratories.

A. Singh of Whiteshell Nuclear Research Establishment described a technique for the radiolysis of chemical wastes. Radiolysis is well understood, in which radiation degrades complex molecules to harmless constituents, such as water, and can destroy pesticides, PCBs, etc. Depending on the economics, accelerators or isotopes could be used, and a demonstration plant could be designed by next year. T. Ouwerkerk of AECL Radiochemical Co., who also chaired the session, dealt with radiation steriliza-

tion of bio-effluents from laboratories. He indicated that pencils of cobalt-60 could irradiate pools of such wastes, even killing virus particles, at a lower cost and with higher efficiency than the present method of "cooking it." The animal diseases laboratories of Canada could benefit from such a process.

The final speaker, J. McKeown, of Chalk River Nuclear Laboratories, also dealt with accelerator technology in waste treatment, dealing specifically with the new CW linac which has a high 50% efficiency in the electrical to radiation conversion and works reliably on a 24 hour basis. He indicated that the beam power of accelerators is such that they are truly the irradiation source of the future and that a sewage treatment plant based on an accelerator is feasible for a city the size of Ottawa.

David McArthur

CNA Conference Report — Despite Gloomy Outlook, There Are Bright Spots

An understandable preoccupation with current problems should not lead to Canada's nuclear industry overlooking some of the solid achievements of the past year, CNA President Norman Aspin told the CNA 23rd Annual International Conference in Montreal. Dr. Aspin reminded his audience that despite the shambolic state of the world economy, nuclear energy continued to grow — in the OECD countries 1982 saw 294 nuclear reactors in service with another 215 under construction. This situation, Dr. Aspin pointed out, was reflected in Canada with 11 large commercial reactors in operation and another 11 under construction. Similarly the worldwide dearth of new reactor orders was mirrored in Canada, where no new nuclear reactors on the order books after the Ontario Hydro Darlington Nuclear Generating Station, scheduled to be in service by 1992.

But uranium producers and fuel fabricators faced a somewhat brighter future, Dr. Aspin noted. By 1990, under the present nuclear growth rate, uranium demands would exceed current production capacity, hence the uranium industry could look forward to a period of expansion. In 1983, Dr. Aspin said, Canadian uranium production would overtake that of the US, with Canadian production predicted at 8500 tonnes, compared with 7150 tonnes in the US.

Reactor operations and heavy-water production were two other bright spots, with heavy-water plants working well and production costs continuing to decline, while Ontario Hydro's achievement with its CANDU units was an "outstanding testament" to the Canadian-designed reactor system. Summing up, Dr. Aspin emphasized that the immediate future of the CNA would be strongly dependent upon the strength

of the support it could receive from its uranium industry and electrical utility members.

Power Exports

The theme of this year's conference — "Electric Power — a viable export commodity" was the subject of a lunch address by federal Energy Minister, Jean Chretien. Unfortunately Mr. Chretien was unable to appear in person, but his speech, as read by AECL Chairman Robert Despres, endorsed in forceful, if general terms, the principle of long-term firm electric power exports to the United States. "We are prepared to re-affirm our policy for long-term exports and to look at the possibility of providing even further assurances should these be necessary" Mr. Chretien wrote, "Indeed, it should not be difficult to provide firm guarantees for plants that would not otherwise be built at a given time, as such projects would be clearly surplus to Canadian needs."

The principle of Canadian power exports to the US was also endorsed by representatives from two US utilities — GW Nichols, President of the New England Electric System and RA Hiney, Senior Vice-President Planning and Marketing of the New York Power Authority. Both speakers identified the opportunities that existed for Canadian power sales, but were at pains to emphasize the fact that there did exist concerns about this south of the border. Overdependence on off-shore supplies, interprovincial disputes, Canadian energy export permits, Quebec's potential for electrical instability and loss of jobs and related economic benefits in the US were all potential stumbling blocks. Future export deals, it appeared, must be predicated on firm contracts and realistic pricing. These views were echoed by Alex Tomlinson, President of Washington's National Planning Association (the US analogue of the C.D. Howe Institute). Mr. Tomlinson was encouraging about the possibility of selling power to the US from Canadian energy mega-projects, but cautioned that US utilities would no longer be very much attracted by the "pay and go" form of export contract whereby the US customer pays the somewhat higher early costs of an installation on, for example, a ten-year contract, after which Canadian consumers reap the economic benefits. There must be a more equitable distribution of costs and benefits between supplier and customer, Mr. Tomlinson argued. Implicit in Mr. Tomlinson's presentation was the point that the US was looking for long-term (circa 20 years) contracts from dedicated generating facilities — an arrangement that might not be without a few political complications in Canada.

A refreshingly realistic (and specific) look at the Canadian supplier's side of the power export question was provided by Arthur O'Connor, New Brunswick Power's General Manager. He defined a dramatic improve-

ment in plant construction schedules, more streamlined and flexible regulatory processes and some form of national "umbrella financing" to help smaller utilities as the prerequisites for future major contracts for the export of firm power to the US. Mr. O'Connor expressed concern that both regulatory authorities involved — the National Energy Board and the Atomic Energy Control Board — develop sufficiently flexible procedures to expedite the processing of licence applications for both nuclear plant construction and operation and electricity export. The National Energy Board, he said, was rightly or wrongly perceived as lacking sensitivity and quick reactions to the commercial environment, not providing adequately clear guidelines and causing inappropriate delays through extensive public hearings covering every detail of every export contract. A streamlining of the process would result, he suggested, by using the public examination process to look at a general export application and approve it in principle, while the details of specific contracts could be examined by skilled NEB staff removed from the forensic hurly-burly of public hearings.

With reference to the AECB, Mr. O'Connor called for a licensing guide which would provide a fixed and early cut-off date for revisions, and early design by AECL and approval by the AECB of reactor safety systems. Early establishment and maintenance of a consistent quality assurance programme, and a process of appeal of AECB decisions would not only act to shorten construction times, but decrease uncertainty, Mr. O'Connor argued. "We need clear and timely action at every stage by the Control Board" Mr. O'Connor said, "we just have to shorten schedules. If Canada is to develop its electricity export market, Canadians must be reliable and economic suppliers".

A subsequent presentation by the Vice-Chairman of the NEB, Ralph Brooks, could not be construed as providing much in the way of substantive comfort for Mr. O'Connor. Admitting that some of the NEB's licensing criteria could be described as somewhat "nebulous" — those provisions referring to the "national interest" for example — Mr. Brooks pointed out that Canada's 20-year old National Power Policy had as a general aim the encouragement of power exports to and interconnections with the US. Also, he pointed out, the government was willing to provide support for a second reactor at Point Lepreau for power export, providing the project could be demonstrated to be in the public interest. Such demonstration would involve, he noted, social cost-benefit analyses, local impact studies and risk analyses. One could also infer that these studies and analyses would by no means be exempt from public examination at public hearings. On the question of licensing approval in principle, Mr. Brooks seemed to discount the possibility. The NEB, he said, could only make

decisions in the framework of a specific application and required for its deliberations copies of signed export contracts in order to confirm pricing arrangements and terms. Neither could the Board issue what Mr. Brooks referred to as "fishing licenses" for export markets yet to be found.

David Mosey

CNS Commissioning Symposium Conference Report

On May 3 at the Constellation Hotel, Toronto a highly successful event took place — the Canadian Nuclear Society conducted the CNS Commissioning Symposium, co-sponsored by the CNA. This event was the first time nuclear power plant commissioning experts on the Canadian scene were brought together to discuss the various approaches to commissioning, the success enjoyed, the problems encountered and the future directions. The symposium attracted international attention that included participation from Japan and the United States. This unique opportunity allowed comparison of the approach to commissioning of CANDU reactors with others in the CANDU family and provided a broader perspective on the approaches used outside the Canadian scene.

The first talk was devoted to examination of the various organizational approaches to commissioning. Ken Talbot, the Commissioning Manager at Pickering NGS gave a review and comparison of the techniques and requirements for the first four units at Pickering A versus the current four unit extension at Pickering B being commissioned. The first units were commissioned a decade ago and there has been a few changes since then, particularly the formal requirement for a Quality Assurance Program. It was interesting to note that while the volume of documentation produced has increased dramatically and the complexity and diversity of equipment has increased significantly, the commissioning appears to be just as successful as it was ten years earlier. A contrast to the CANDU experience was presented by M. Akebi, the Deputy Senior Director for the Fugen-HWR Project in Japan and L.J. Albert, the Civil Engineer, Advisory Operations Division of Stone and Webster Engineering from Boston, Massachusetts.

The panel moderated by Dave Anderson of Canatom Ltd. received a good cross section of questions from the attendees. In particular the audience was very interested in the commissioning review meeting approach used at Pickering. The heavy water needs and schedule for the nuclear expansion program underway in Japan were also of keen interest to the audience.

The second session in the morning consisted of three papers which focused on the commissioning of the Point Lepreau station in New Brunswick. Papers by S. Yerramilli of AECL, W. Schneider of Babcock and Wilcox Canada and S. Alikhan of NBEP

discussed the use of design and manufacturing expertise to support the utility commissioning team. The panel experts provided an excellent analysis of a highly successful commissioning effort by a new utility entering the nuclear scene with its first unit.

The afternoon session, chaired by Richard Alami of Hydro-Quebec was devoted to technical and related aspects of commissioning. A paper by R.V. Murphy of the Research and Productivity Council of New Brunswick discussed the latest ultrasonic techniques being used in the commissioning of systems and equipment. W. Brimley of AECL presented a paper which discussed the benefits of correlating field data and computer simulations of primary heat transport system thermalhydraulic conditions. D. Whelan of Ontario Hydro addressed the problems and unique aspects associated with the commissioning of a major refit at an existing station. J. Wiecekowski of Pickering described their quality assurance program and R. Colquhoun discussed the symptoms-oriented operating procedures being developed by Canatom Ltd.

The afternoon session was then concluded with a paper by B.M. Ewing of the AECB that dealt with commissioning requirements as seen from an AECB perspective.

Each of the presentations was followed by questions from the audience. The dialogue was good and the information exchange was clearly of benefit to all. The feedback from the event has strongly indicated that similar events should be held on at least an annual basis to provide the forum for the various participants in the nuclear program to exchange technical ideas and experiences.

No proceedings were published, however a list of available papers and ordering information is available from the CNS office.

Brian Harling
Symposium Chairman

Conferences & Meetings

International Conference on Numerical Methods in Nuclear Engineering

Co-sponsored by Canadian Nuclear Society and American Nuclear Society, to be held **September 6 to 9, 1983** in Montreal, Quebec. For information contact **R.A. Bonalumi, Conference Chairman, Nuclear Studies and Safety Dept., H16-H17, Ontario Hydro, 700 University Ave., Toronto, Ontario, M5G 1X6.**

4th Pacific Basin Nuclear Conference

Co-sponsored by CNS, CNA et al., to be held **September 11 to 15, 1983** in Vancouver. For information contact CNS.

The CNS Bulletin is the membership newsletter of the Canadian Nuclear Society; 111 Elizabeth St., 11th Floor; Toronto, Ontario; Canada; M5G 1P7. (Telephone (416) 977-6152; Telex 06-23741)

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CNS provides Canadians interested in nuclear energy with a forum for technical discussion. For membership information, contact the CNS office, a member of the Council, or local branch executive. Membership fee is \$30.00 annually, (\$5.00 to students).

La SNC procure aux Canadiens intéressés à l'énergie nucléaire un forum où ils peuvent participer à des discussions de nature technique. Pour tous renseignements concernant les inscriptions, contacter le bureau de la SNC, les membres du Conseil ou les responsables locaux. La cotisation annuelle est de \$30.00 (\$5.00 pour les étudiants).

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Manitoba Ernie Card (204) 956-0980

CNS 1984 Annual Conference Chairman /

Président de la conférence annuelle de la SNC

Irwin Itzkovitch (613) 238-5222

Overview of ASME III and its Relationship to Canadian Requirements

Sponsored by the CNS Design and Materials Division, to be held **October 4 to 5, 1983** in Toronto, Ontario. For information contact **J.T. Martin, Mechanical Design Dept. H14, Ontario Hydro, 700 University Ave., Toronto, Ontario, M5G 1X6.**

CSNI Specialist Meeting on Water Reactor Containment Safety

Sponsored by OECD NEA, to be held **October 17 to 21, 1983** in Toronto, Ontario. For information contact **V. Snell, CANDU Operations, AECL, Sheridan Park Research Community, Mississauga, Ontario, L5K 1B2.**

Workshop on Analytical Chemistry Related to Canada's Nuclear Industry

Co-sponsored by Canadian Nuclear Society, Canadian Nuclear Association, AECL et al, to be held **October 24 to 26, 1983** on Hecla Island, Manitoba. For information contact **P. Campbell, Whiteshell Nuclear Research Establishment, Pinawa, Manitoba, R0E 1L0.**

24th Annual International Conference of the CNA and 5th Annual Conference of the Canadian Nuclear Society

To be held **June 3 to 6, 1984** in Saskatoon, Saskatchewan. For information contact CNS.

International Conference on Thermal Nuclear Reactor Safety

Hosted by European Nuclear Society, co-sponsored by CNS, ANS et al., to be held **September 10 to 13, 1984** in Karlsruhe, West Germany. For information contact **Bill Penn or Dan Meneley, Ontario Hydro, 700 University Ave., Toronto, Ontario, M5G 1X6.**

International Conference on Occupational Radiation Safety in Mining — Call for Papers

Sponsored jointly by CNA, EMR Canada and AECB, to be held **October 14 to 18, 1984** in Toronto, Ontario. Areas of special interest are:

- Dosimetry and biomedical data
- Radiation hazards in uranium and non-uranium mines and mills
- Engineering techniques in radiation control
- Regulatory standards and control
- Epidemiology and risk assessment
- Worker protection and training
- Instrumentation and measurement techniques
- Assessment studies, methodology and evaluation of health impacts

Abstracts of papers are due **January 1, 1984** and presentation is by poster or paper. For submissions and for further information on presentations contact:

**R.D. Gillespie, Program Chairman
Radiation in Mining Conference
c/o MacLaren Engineers Inc.
33 Yonge Street
Toronto, Ontario, Canada
M5E 1E7**

The Unfashionable Side

ASLEEP Update

The following are updates on activities of ASLEEP (The Association of Solar Laboratories for Ephemeral Energy Production) to inform the CNS Bulletin readership on recent accomplishments.

- Apparently inspired by Bob Guccione's "disposable fusion reactor," the ASLEEP Appropriate Technology Committee has originated the new "disposable CANDU reactor" concept. A prototype reactor resembles a large aspirin tablet suspended in a fishbowl of D₂O, and testing shows promising neutron economy. An ASLEEP spokesman said the reactor, which could supplement the home heat supply of domestic solar panels, "could be used for a few months and then be discarded." The design has been submitted to Atomic Energy of Canada Ltd. which has not yet commented on it.
- The head of ASLEEP, Dr. Solomon Breder, reports that Gecko Solar Laboratories Inc. has achieved another breakthrough: the world's first amorphous-photovoltaic solar-powered flashlight. This product substitutes for the unrealized "solar beach spray" which in test trials, users were found to mistake for suntan lotion, and which the price of \$500.00 (US) per 16 oz. "large economy size" aerosol can was thought to be a drawback.

- ASLEEP's Ontario chapter is lobbying the provincial government to push through legislation requiring Ontario Hydro to purchase from homeowners any excess hot water generated by domestic solar collectors. Hydro would be required to maintain a fleet of 1000 "heat trucks" to collect this energy (they must travel quickly) and return it to the steam generators of nuclear and fossil-fuelled generating stations. The new legislation, if passed, is expected to increase sales of solar equipment.

Chuck Wood

Ernest Worthing is reported to be drying out in AECL's hospitality suite.