CANADIAN NUCLEAR SOCIETY

Bulletin

DE LA SOCIÉTÉ NUCLÉAIRE CANADIENNE

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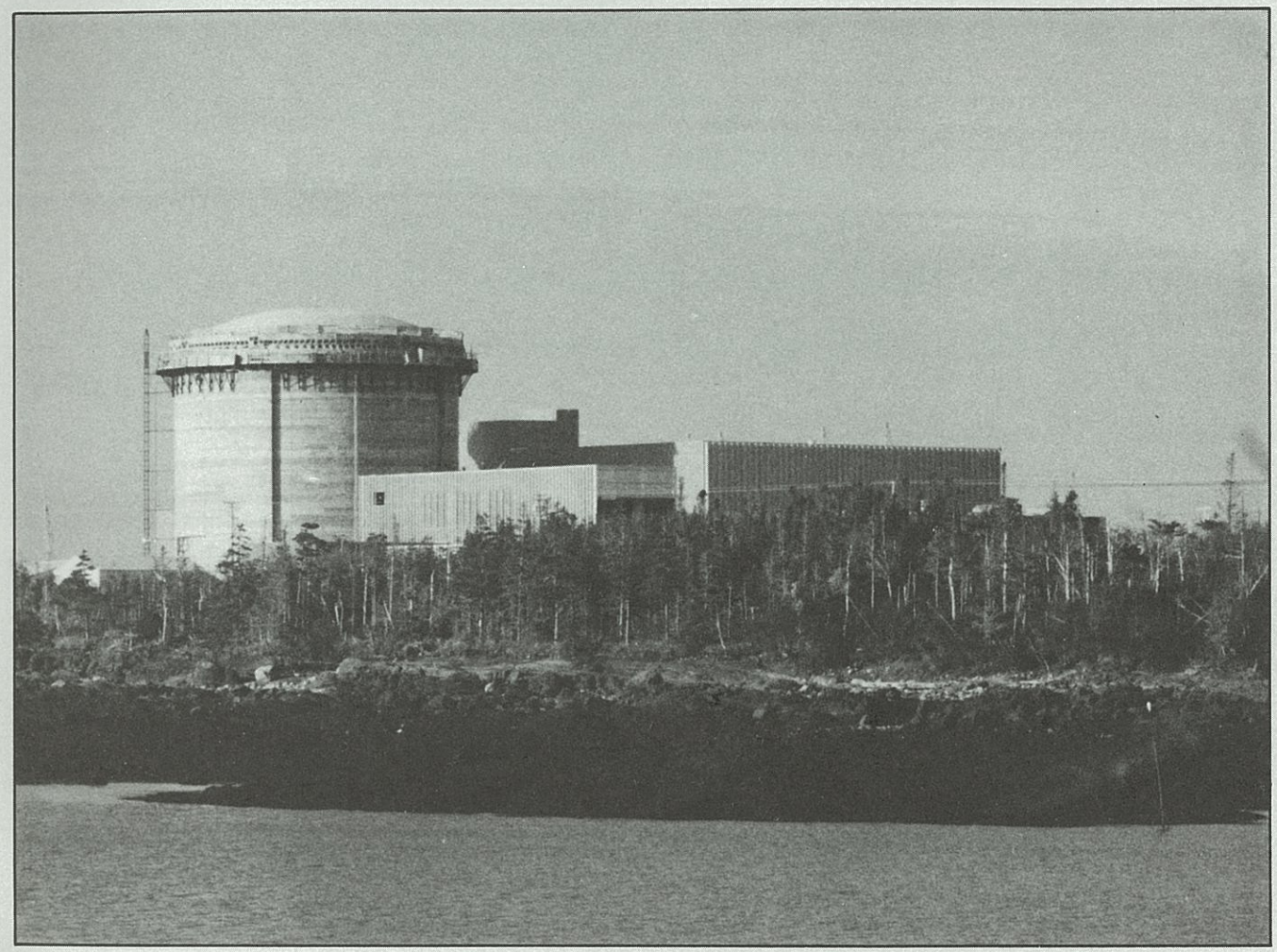

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In this issue

There is no overall theme to this issue – rather the articles span a number of topics: CNA's winter meeting and five-year plan; AECL Research's CQI program; CAIRS; international nuclear safety; retrospective looks at the beginning of our nuclear program at the Montreal Laboratory and at the early years of the CNS; and, of course, news of the society. Hopefully there is something of interest to all readers.

Acknowledgements

As always a number of people have contributed to or assisted in the production of this issue. With apologies to those missed we wish to thank: Mike Whitfield, Metro Dimitrio, Michel Hebert, and Elise Menard of AECL; Fergal Nolan of CAIRS; Bob Andrews, Jerry Cuttler and Shayne Smith of the CNS; and Keith Weaver of Ontario Hydro.

Cover photo

On the cover is a photograph of Point Lepreau NGS in recognition of its tenth anniversary and its top standing in lifetime capacity factor for all CANDU units.

(Photo courtesy of AECL)

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Le Bulletin SNC est l'organe d'information de la Société Nucléaire Canadienne.

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 $55.00 annually, $30.00 to retirees, $20.00 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, veuillez bien entrer en contact avec le bureau de la SNC, les membres du Conseil ou les responsables locaux. La cotisation annuelle est de 55.00 $, 30.00 $ pour les retraités, et 20.00 $ pour les étudiants.

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Guest Editorial

Where Are We Going?

Comments on the Ontario Hydro Demand/Supply Plan Hearings

Ed. Note: *This commentary is by an active member of the CNS who has been following closely the hearings on Ontario Hydro's Demand/Supply Plan. The author has asked that his name be withheld.*

Ontario Hydro Demand/Supply Plan (DSP), the 25-year plan which was submitted in December 1989, has been undergoing a comprehensive review by the Environmental Assessment Board (EAB). That plan set out the following priorities for meeting future electricity demand in Ontario to the year 2014:

- increased energy efficiency
- maximum utilization of existing generation and transmission facilities
- developing hydraulic generation
- purchases from non-utility generation
- nuclear or fossil generating stations to meet remaining requirements.

The 1989 plan called for about 16,000 MW of new generating capacity by the year 2014, including 8,800 of nuclear. Following the election of the NDP government a moratorium was imposed on any Ontario Hydro pre-engineering for additional nuclear generating stations.

The DSP has been under EAB review for the past year and the cost of that review is now expected to exceed $100 million. The 48 intervenors were granted $23 million nine months ago to probe the implications of the plan. Evidence has been presented from Ontario Hydro's first seven witness panels and the EAB is preparing to hear evidence from Panel 8 on fossil options and alternative energy options. This will be followed by Panel 9 on the nuclear option and one panel following that on the overall and planning issues.

By mid December 1991, Hydro's Panel 9 had prepared answers to more than half of some 2,300 questions from intervenors. The binders containing these answers span approximately 2 metres of shelf space!

Ontario Hydro has now issued a "Demand/Supply Plan Update – 1992", dated January 15, 1992, "to reflect the economic realities of 1992, the success of our top priorities over the past two years, and the need to minimize electricity costs for our customers". With the effects of the current recession factored in, the updated electricity demand forecasts now indicate no need for a large generating station until the 2009-2014 period. The biggest reason for the change is the much higher expectation of savings through electricity conservation (demand management). The new plan calls for an investment of $6 billion for "demand management" over the next 10 years, which is argued to:

- provide electricity at lower cost than major new stations
- reduce the number of new stations needed
- create over 50,000 person-years of employment

The updated plan also calls for increased purchases from non-utility generation; predicts less hydraulic power due to suspension of plans for stations in northern Ontario; and, assumes extension of the life of existing fossil stations. This sudden change in direction has raised concerns in many industries, businesses and labour unions about the potential effects on jobs, supply of electricity, price, pollution, increased imports of fossil fuels, quality of life, etc. Organizations that were expecting to play a supporting role in defence of the 1989 plan have been taken aback by Hydro's new stance and are assessing their role in the EAB hearings.

Hydro's presentation will end in a few months and then it will be the intervenors' turn to execute submissions, present expert witnesses, conduct cross-examinations, etc. Despite confusion over which DSP is being reviewed the EAB is still targeting to finish by December 1992.

The hearings seem to be more of a battle between high-priced lawyers than an exchange of knowledge and ideas.

Many people remember when Ontario was an exporter of electricity and "a place to stand and grow". Will such a time ever return or are we on a relentless road to decadence?

A Year of Anniversaries

Major events in the Canadian nuclear program appear to have happened in five year cycles. The result is that 1992 marks a number of anniversaries.

- 50th of the creation of the Montreal Laboratory, 1942
- 45th of the start-up of NRX, 1947
- 40th of the creation of AECL, 1952
- 40th of the NRX accident, 1952
- 35th of the start-up of NRU, 1957
- 30th of the start-up of NPD, 1962
- 10th of the start-up of Point Lepreau, 1982

In recognition of these anniversaries we plan to run a series of retrospective articles, beginning in this issue with some personal recollections of the project that came to be known as the Montreal Laboratory by George Laurence who was the senior Canadian in the multi-national team.

On the world scene there are further notable nuclear anniversaries:

- 125th of the birth of Madame Curie
- 60th of the discovery of the neutron, 1932
- 50th of the start-up of the first reactor, in Chicago, 1942.

We will leave it to some clairvoyant to interpret the meaning or significance of this periodicity.

Editorials

Perceptions

With the current position of the Ontario government, reflected through Ontario Hydro, towards nuclear energy, the future of the domestic nuclear power program is bleak. Fortunately there have been advances abroad, with Wolsong 2, work at Cernavoda, and several good prospects for further projects.

Nevertheless, it is unlikely that the Canadian nuclear power program can exist on export markets alone. The scale and nature of nuclear power projects make it almost impossible to achieve, through exports alone, the steady flow of business needed to maintain the industry. It is essential, therefore, to address the domestic situation.

The attitude of those forming the current Ontario government derives from a perception (some would say, misperception) of nuclear power in which the risks outweigh the benefits. That perception is understandable. They look at the continuing Darlington fiasco, they remember Chernobyl (and shudder at the thought if that happened at Pickering) and they listen skeptically to the antithetical stand of nuclear advocates who claim that the waste problem is solved while asking for hundreds of millions of dollars to continue research into waste management.

The hope of the CNA's TV advertising program is to make people "feel" more comfortable with things nuclear. Given the influence of TV it might partially succeed but, just as with North American cars, if the product does not live up to the impression the ads will not be enough.

There is a fundamental problem of credibility. It may be a small point, but the reaction to concerns raised by respected members of the nuclear community about using actors in the TV ads to portray prominent nuclear people (whose names were prominently displayed) at the recent CNS winter meeting, was not encouraging. The TV ads also emphasize the medical benefits of nuclear technology while, ironically, the companies in that business, Nordion and Therastronics, are not members of CNA and, in fact, try to distance themselves from the label "nuclear".

Sadly many senior members of the nuclear industry still portray the insular, arrogant yet xenophobic, attitude they did a decade and a half ago when the first attempts were made to address the then emerging nuclear issues.

Until those in the nuclear community recognize their own perceptions (or misconceptions) it is unlikely they will be able to change the perceptions of others. Perhaps members of the CNS can take a lead.

Letter to the Editor

Kiev May Have Been Lucky

Dear Sir:

The article on Kiev and Chernobyl by Mr. Segel ("Chernobyl – A Kiev Resident's View", Vol. 12, No. 3) was very interesting. However, it is terrifying to contemplate what might have resulted had the Chernobyl accident occurred under different meteorological conditions.

As you will recall, in the critical 5-day period after the accident at 0130 h, 26 April 1986, winds, from the surface to 5,000 metres, were generally SE to E, a direction which took the heaviest doses of atmospheric fallout away from Kiev and across the relatively unpopulated western half of Byelorussia. Although the fallout plume approached the cities of Minsk and Grodno these were 4 to 6 times further away than Kiev and not as large.

If, in that critical period following the accident (the first 36 hours) winds had been from the NW to the N, taking the plume over Kiev, I estimate that the dose received over the weekend of April 26, 27 would have been 50 to 100 times what it was. The distance and the timing (poised to descend on Kiev in the morning inversion breakup period) would combine to suggest that this city of several million would have received a very serious radiation dose. Continuation of this fallout for 3 to 5 days would have exposed hundreds of thousands to unsafe doses before there were any effective public safety measures in place.

One might add this postscript to Victor's account – as serious as the situation was the people of Kiev probably never realized how fortunate they were in that the weather pattern saved them from a much more serious result.

Looking at historical weather records, the chances of a NW to N wind appear similar to one from the E to SE. I invite readers to imagine the social consequences of this scenario.

Roger Smith
Future Weather Incorporated

The Montreal Laboratory

G.C. Laurence

Ed. Note: *Fifty years ago this year, in the depths of World War II, an action was taken that became the beginning of Canada's nuclear program – the decision to locate a joint British-Canadian atomic energy research project in Canada. By the fall of 1942 a team of scientists arrived from the U.K. and joined with Canadians from the National Research Council to set up what is now referred to as The Montreal Laboratory.*

The official story of those early days of our nuclear program is recorded in "authorized" texts such as "Nucleus – the history of Atomic Energy of Canada Limited" by John Bothwell and the earlier "Canada's Nuclear Story" by Wilfred Eggleston.

To give a different, more personal, account of those fascinating early years that set the course for Canada's remarkably successful nuclear program, we are presenting excerpts from a talk given by Dr. G.C. Laurence to the Canadian Association of Physicists back in 1966.

In the 1930's George Laurence was a scientist at NRC specializing in radiation. He had studied at the famous Cavendish Laboratory under Lord Rutherford. His work at NRC on the dosimetry of radium and X-rays placed Canada among the leading nations in the development of standards and radiation safety regulations.

Following the reports of the discovery of fission in 1939 Laurence realized that a nuclear fission chain reaction might occur if carbon was used to slow down the neutrons from lumps of uranium in a large array. He managed to borrow a tonne of uranium oxide and obtained a large quantity of petroleum coke. Working initially alone (and mostly on his own time because NRC was totally engaged in "more important" war work) and subsequently with Dr. B.W. Sargent, he constructed a sub-critical assembly. They reluctantly came to the conclusion that the coke and uranium oxide contained too many impurities to achieve a critical mass.

Nevertheless, that work served as the major Canadian entry into discussions with American and British scientists and opened the way for the decision on the Montreal Laboratory.

Laurence was assigned as the senior Canadian in the group. His comments are from that perspective. Characteristically, he does not mention his own work.

Dr. Laurence went on to be one of the senior people at Chalk River, and, subsequently, president of the Atomic Energy Control Board. He died in 1987.

Having worked with him over many years we are confident that he would not have objected to this reprinting of some of his memoirs. In particular we are sure that he would have liked to have his closing words on the importance of research repeated over and over.

For those who would like more on the Montreal Laboratory, Laurence wrote a more detailed, and more formal, account in a paper "Early Years of Nuclear Energy Research in Canada," which was published by AECL in 1980.

Many of you remember the Montreal Lab – the wartime atomic energy project in Montreal. Some of you will have read about it in one or more of the official histories of the early days of atomic energy development that have been written from different national points of view. At the risk of adding confusion, I thought it might be of interest to recall unofficial impressions of it.

Early in 1942 the British decided that their research effort on atomic energy would be more effective if it were moved to the United States where the supply of equipment and materials was easier and where they could collaborate closely in the American programme. The Americans rejected this proposal. They felt it was too great a security risk because the senior members of the group that would be sent from Britain were refugees from countries in Europe that were under Nazi domination.

The British then suggested that their team be moved to Canada where they would be closer to the American effort. The Americans could scarcely refuse to accept this arrangement.

"The objective was speculative."

The objective was speculative. It was doubtful if it could be completed before the end of the war. It would divert scientists, equipment and facilities from other wartime effort and would commit Canada to the expenditure of many millions of dollars. There would be difficulties in the procurement of materials, particularly the many tons of heavy water.

Dr. C.J. Mackenzie [acting president of NRC at the time] said later that the deciding consideration was the thought that when peace was restored atomic energy was bound to have consequences of social and economic significance far beyond the possibilities of imagination and prediction, and that the proposed United Kingdom-Canadian research effort would provide an opportunity for the training of Canadian scientists in this field that should not be missed. So the decision was made.

It was decided that administration of the laboratory would be under the National Research Council. It would be in Montreal, and H.H. von Halban, who was the leader of the group in Britain, would be the scientific director of the laboratory.

By the end of the year 1942 the first of the British team had arrived from England. It consisted of two Frenchmen,

two Germans, one Czechoslovakian, one Austrian, an engineer from Imperial Chemical Industries, and one other Englishman. As temporary quarters, we occupied an old residence, later torn down, at 3470 Simpson Street in Montreal, and as we recruited more staff it became very crowded. The master bedroom served as the director's office while the adjoining bathroom was occupied by his secretary as her office.

Three months later we moved into larger space in the new building of the University of Montreal. Dr. Keys, acting on behalf of the Wartime Bureau of Technical Personnel, helped us in finding Canadian scientists and engineers. More scientists and engineers came from the United Kingdom and the staff grew fairly quickly to over 300.

The project was started in an atmosphere of enthusiasm and expectation of great scientific adventure. Technicians were soon busy making boron chambers to detect neutrons and scaling circuits to count them. Twenty tons of graphite bars were obtained [for measurements of] the penetration of neutrons through that material. A two million volt X-ray machine was purchased and its rays, by bombarding beryllium, provided a source of neutrons for experiments in the graphite.

About one hundred kilograms of heavy water arrived from England. It was a major part of the world supply at that time which von Halban and Kowarski were able to get out of France before it was overrun by the Germans. This was a precious treasure. Great care was taken to avoid loss of even minute quantities by evaporation. Drips were carefully wiped up with hospital cotton which was then sealed in vapour-tight containers so that the heavy water could be recovered.

The theoretical physicists were busy developing mathematical methods for the calculation of the behaviour of neutrons in an atomic reactor. The chemical properties of uranium, neptunium and plutonium were being investigated and efforts were made to develop a corrosion resistant alloy of uranium. The biological effects and the hazards of radiation were being studied.

"Someone had spilled 'mayonnaise' and stepped in it."

Various kinds of reactors were discussed and considered. One proposal was that the uranium should be in the form of a slurry in heavy water. I remember footprints down a corridor – yellow footprints. Someone had spilled some "mayonnaise" and stepped in it. "Mayonnaise" was the laboratory jargon for a slurry of uranyl nitrate in water. That was before there were any Atomic Energy Control Board regulations about radioactivity contamination. Nowadays there would be men in white coats mopping up the yellow spots and others checking with radiation meters to see that they did a good job.

Soon we became impatient as we waited for the close collaboration with the Americans to become established. The Americans were still worried about security and the very mixed national background of our team. They made counter proposals for a limited cooperation for the exchange of information restricted to certain aspects of the work only. In particular they excluded information on the chemical extraction of plutonium on the grounds that the supply of this information to Montreal would not in any way contribute to the war effort at that time.

The British felt that the attitude of the Americans was unfair and somewhat insulting. This British reaction was not understood in the United States. To Canadians it seemed particularly frustrating and tragic that there should be such poor understanding between the British and the Americans.

Meanwhile the Montreal Laboratory was cut off from information about the atomic energy work in the United States. This is in contrast to the easier correspondence that had existed before. In 1941 I had visited Columbia University where I talked to Fermi, Compton and Pegram, who described their subcritical experiments with graphite blocks and uranium, and to Urey who discussed the production of heavy water and the separation of U-235. In Washington I talked to Dr. Briggs, the chairman of the committee that was then coordinating the atomic energy research in the United States. In 1941 and 1942 we obtained secret reports of the American work without difficulty.

Von Halban was not accustomed to Canadian business methods. The administrative staff in Ottawa was equally unaccustomed to the Austrian style. They spoke of the Montreal Laboratory as a madhouse – not an ordinary madhouse, but one that was run by the inmates.

"They spoke of a madhouse – that was run by the inmates."

In the beginning it was intended that the scientific programme of the laboratory should be planned by a committee known under the code name of the Technical Committee on Radiological Protection. The committee soon ceased to meet and I, as the only Canadian on it, was left more and more in the dark about what was being planned. This was just another aspect of the difficult relations between the scientific direction of the laboratory and the National Research Council.

Churchill discussed the very unsatisfactory state of British-American collaboration in atomic energy with Roosevelt at the Quebec Conference. On 19 August, 1943, they agreed on behalf of their governments that arrangements would be made "to ensure the full and effective collaboration between the two countries in bringing the project to fruition."

Notwithstanding this, months passed without progress towards effective collaboration. The morale of the Montreal Laboratory sank very low.

By the end of 1943 the usefulness – at least for Canada – of continuing to operate the laboratory was questioned. There appeared to be too little point in it unless effective collaboration could be established.

Those who played leading parts in the negotiations at this time were General Groves, Professor Chadwick and Dr.

Mackenzie. Groves and Chadwick were men of very different backgrounds and temperament. Yet, evidently a mutual respect and confidence had grown between them. This factor, as well as the good sense of the three men, made it possible at length to bring about cooperation and thus to save the Montreal Laboratory.

John Cockcroft was persuaded to become Director of the laboratory and it was agreed that the alien members of the staff should leave. It was also agreed to proceed at once with a heavy water moderated reactor plant in Canada. The atmosphere changed quickly. The Americans then wholeheartedly supported the project. Scientific information, essential supplies and help in many ways came from the United States and visits were arranged for senior Montreal scientists to the American projects.

Secrecy was an important feature of the whole activity with great precautions for the care of documents and detailed instructions to the staff regarding what they might discuss with their colleagues in other divisions of the laboratory, and what they might write on blackboards that were opposite windows.

"In spite of difficulties the scientists maintained a very high standard."

On one occasion we received a visit from the United States by a Mr. Baker. Senior members of the staff and their wives were entertained at Cockcroft's home. All evening we chatted with Mr. Baker, solemnly addressing him by that name, but knowing all the time that he was Niels Bohr.

In spite of the administrative difficulties, the lack of clearly defined objectives, and the sense of disappointment and frustration during the period of about a year, the scientists in the Montreal Laboratory maintained a very high standard in their research. Never before in Canada had so large a group of scientists of different disciplines been brought together for a single purpose.

Their work in the Montreal Laboratory was mostly applied research but the background of most of them was fundamental research. Canada's atomic energy had its origin in fundamental science, and, through wise direction at Chalk River, fundamental science has continued to inspire and stimulate it.

Never before has the Government of Canada supported so strongly a specific programme of research and development. The consequential growth of our nuclear industry is one of the factors that have brought about a growing realization that strong support of research is essential in a country that aspires to compete as a manufacturing nation in the commerce of the world.

The Montreal Laboratory and the research and development that has since grown from it have brought Canada recognition as one of the pioneer nations in atomic energy, have given greater authority to Canadian opinion in international relations, and have opened greater opportunities for us in industry and commerce. Thus the Montreal Laboratory is deserving of mention in the history of science in Canada.

Programme d'échange d'étudiants et de jeunes professionnels

Déscription du programme

Sous l'égide conjointe de la Société nucléaire canadienne et de la Société française d'énergie nucléaire, le programme d'échange d'étudiants et de jeunes professionels vise à rendre possible des stages de recherche pour les membres de chacune des Sociétés dans le pays de l'autre Société. Ces stages permettront aux participants d'acquérir non seulement des connaissances et des techniques du pays-hôte, mais aussi d'échanger des points de vue et du savoir-faire en science et en génie nucléaires, tout en créant des liens personnels entre les participants. Ce programme d'échange est possible grâce à une entente convenue et signée en Septembre 1989 entre la Société française d'énergie nucléaire et la Société nucléaire canadienne.

Procédure

À la réception d'une demande de stage d'un candidat, la Société nucléaire du candidat passera le dossier à l'autre Société nucléaire qui établira les contacts nécessaires avec les établissements appropriés ou avec les compagnies où un stage est possible dans le domaine d'intérêt.

Une fois que l'on aura choisi l'établissement et une équipe de recherche pour le stage, les deux Sociétés fourniront de l'aide pour satisfaire aux besoins administratifs, comme par exemple, des conseils sur la marche à suivre pour obtenir les visas et les permis de travail nécessaires. Toutes les questions sur les aspects de confidentialité et de secret industriel restent la responsabilité de l'institution-hôte et des candidats. Ni la SFEN, ni la SNC, ne pourront être tenues responsables des conséquences dans le cas où les candidats ne peuvent satisfaire aux exigences de sécurité.

Une fois les arrangements définitifs sont complétés, les Sociétés nucléaires paieront les frais de voyages raisonnables des candidats entre leur domicile et le lieu de leur stage.

Durée

Les stages dureront normalement de trois mois à une année. Des durées plus courtes ne sont pas encouragées, mais des termes plus longs sont possibles. Les démarches visant à faire accréditer le travail de recherche pour les besoins d'une Maîtrise ou d'un Doctorat sont la seule responsabilité des candidats et de leur université. La propriété des résultats et des découvertes effectuées lors des stages devra faire l'objet d'une entente écrite entre les candidats et l'institution-hôte. La SFEN et la SNC ne seront tenues responsables d'aucun manquement à ces ententes.

Demande

Les étudiants de niveau universitaire et les scientifiques et ingénieurs au début de leur carrière peuvent poser leur candidature pour un stage en soumettant, par écrit, les renseignements décrits ci-bas et en fournissant les noms de leurs superviseurs immédiats et les noms du directeur du département (dans le cas des étudiants) ou du directeur de la Division ou section (dans le cas des jeunes professionnels). Dans les deux cas, un rélevé des notes universitaires est requis avec la demande de stage.

Sélection des candidats

Les demandes seront examinées sur une base de mérite par un Comité ad-hoc de trois membres nommés par le Conseil de la SNC (pour les Canadiens). (La SFEN doit avoir déjà sa procédure de sélection pour les candidats français.) Comme les occasions et les ressources financières vont limiter le nombre de stages, le nombre de candidats choisis sera forcément faible les premières années du programme. Toutes les décisions du Comité seront sans appel, mais un candidat à qui l'on aura dû refuser un stage pourra faire une nouvelle demande l'année suivante.

Renseignements requis pour la demande de stage

- Noms et adresses au complet (domicile et au travail)
- Numéros de téléphone (et fax)
- Lieu de naissance, citoyenneté
- Diplômes
- Expérience de travail (technique)
- Domaine de recherche préféré pour le stage
- Centres de recherche préférés pour le stage
- Notes académiques
- Référence #1
- Référence #2

Dates importantes

- Date limite pour soumettre les demandes de stage: **31 janvier 1992**.
- Annonce des stages: **15 mai 1992**.

Adresses pour envoyer les applications

Société nucléaire canadienne
(Programme d'échange SNC-SFEN)
Kathy Murphy
144, rue Front ouest
Suite 725
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Télécopieur: 416-979-8356

Société française d'énergie nucléaire
48, rue de la Procession
75724 Paris Cédex 15
France

Téléphone: (1) 45.67.07.70
Télécopieur: (1) 40.65.92.29
Télex: SEE 200 565 F

CAIRS Opens New Laboratory

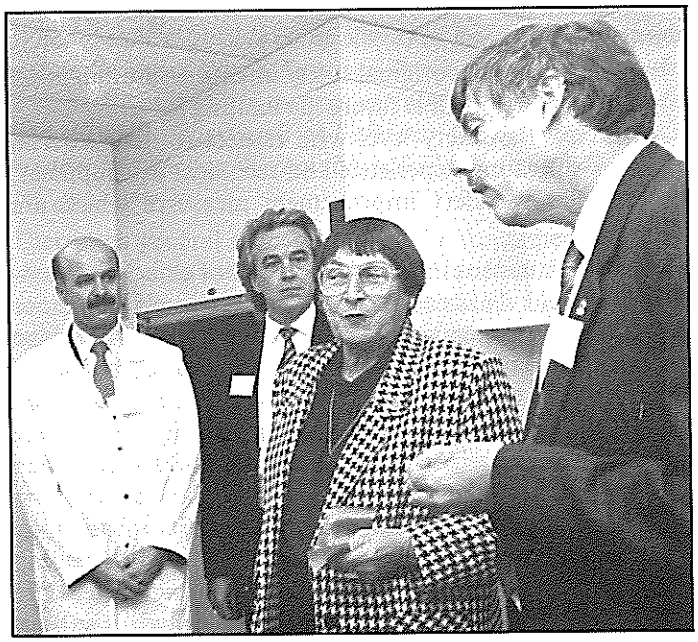
On November 6, 1991, the new national laboratories of the Canadian Institute for Radiation Safety (CAIRS) were opened in Saskatoon by the Honourable Sylvia Fedoruk, Lieutenant Governor of Saskatchewan. The new laboratory will replace a smaller facility in Elliot Lake.

CAIRS was founded in 1981 in Elliot Lake to respond to growing concerns about the health and safety of uranium miners. It operated a laboratory there to provide monitoring services to the uranium mines in the area until the establishment of the new laboratory in Saskatoon. CAIRS will continue to operate an office in Elliot Lake, primarily for its Early Lung Cancer Detection Program.

In 1985 CAIRS opened its headquarters and public information centre in downtown Toronto.

CAIRS is constituted as an independent, not-for-profit institute, whose objective, according to Fergal Nolan, CAIRS' president, is "to attend to the practical needs of Canadians actually or potentially exposed to radiation, wherever it occurs." Its motto is "good science in plain language."

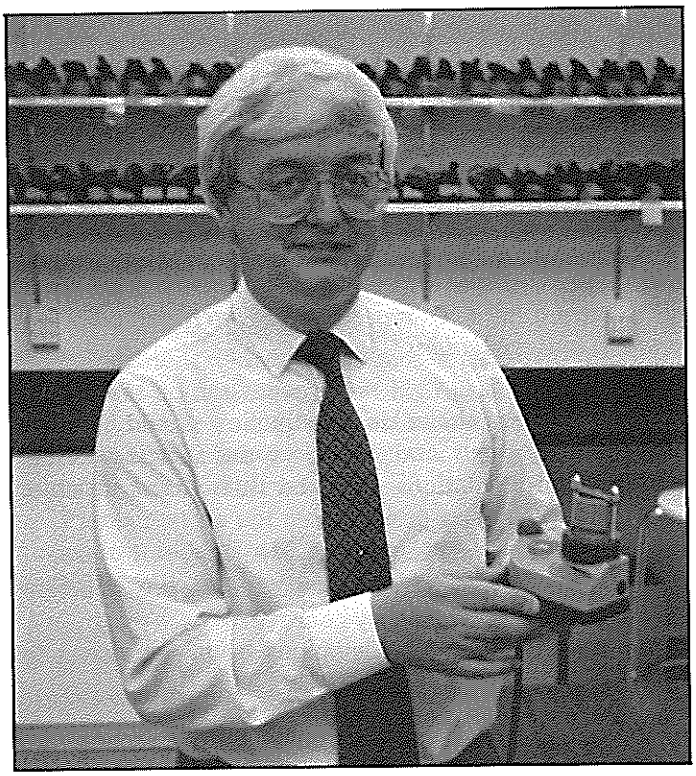
A major focus of CAIRS activities has been Canada's uranium miners. After its formation in 1981 CAIRS took over the work of the Elliot Lake Centre that had been set up in 1978 and reorganized it into an early detection and treatment program for lung cancer. This program is supported by Rio Algom and Denison mines and has the cooperation of the United Steel Workers union. The medical aspect of this program is directed by Dr. F.G. Pearson, professor of surgery, and Dr. D.W. Thompson, professor of pathology, at the University of Toronto. Almost 3,500 miners have participated in the program which involves providing sputum samples for cyctological analysis.



Shown inspecting CAIRS' new laboratory in Saskatoon after the official opening 6 November 1991 are: (L to R) Dr. Reza Moridi (CAIRS); Jack Darville (CAIRS Chairman); Sylvia Fedoruk (Lieutenant Governor, Saskatchewan); and Dr. Ernest Becker (CAIRS).

Subsequently CAIRS developed a radon monitor based on one created by the Commissariat d'Energie Atomique (CEA) of France. The CAIRS monitor is now approved by the Atomic Energy Control Board and is being evaluated by the US Environment Protection Agency. CAIRS has the monitor manufactured in Saskatchewan. Nolan has stated that the CEA is sufficiently impressed with the CAIRS modifications that they are considering buying the Canadian model.

In recent years CAIRS has become involved in other tasks where radiation or radioactive contamination were concerns. It was engaged by the Port Hope Liaison Group in 1989 and 1990 to assist that group in its work of informing and involving citizens on proposals for dealing with the contamination in that community.



CAIRS president Fergal Nolan holds one of the many radon monitors they have placed in schools, homes and other buildings.

In 1990 and 1991 CAIRS worked with the Metropolitan Toronto School Board to monitor all schools for radon. Several were found to have elevated levels. For such purposes CAIRS has developed a simple, reliable radon detector for use in schools, homes and other buildings. Dozens of these monitors were placed in Toronto and area schools, with the detection films being counted by CAIRS.

Nolan says that CAIRS' objective approach puzzles many people who ask if he is a "nuke" or an "anti-nuke." His reply is that CAIRS does not take sides – it is non-partisan, cooperative and independent. People seem to like that, he says, and attributes CAIRS' growth to its objectivity and its "plain language."

Conference Report

Nuclear Power Safety

Reports from the International Conference on the Safety of Nuclear Power – Strategy for the Future

Ed. Note: *The last issue of the CNS* Bulletin *contained a brief report on the "International Conference on the Safety of Nuclear Power – Strategies for the Future", which was held in Vienna in September 1991. To give some insight into the specific conclusions at that conference (which will undoubtedly have a significant effect on the future of international safety standards), following are the rapporteurs' reports from the five issue sessions at the conference.*

Issue 1

Fundamental principles for the safe use of nuclear power

The session discussed the four main topics introduced in a lively and constructive manner. No secondary topics were introduced.

Topic No. 1

Safety objectives and standards: What should they cover and is there a need for more binding international safety standards and regulations?

Findings:

It was pointed out that a clear distinction should be made between safety goals and objectives and binding formal standards and regulations. Indeed a three tiered structure can be discerned:

- long term safety goals or aims;
- medium term objectives as a basis for specific action plans to reach long term safety goals;
- formal standards and regulations being the means to achieve goals and objectives.

There was widespread agreement that existing, internationally agreed safety and radiation protection measures, tools, methods and standards have reached such a state of maturity that if the quality of implementation is high, a very high level of safety will be achieved. Nevertheless some further development is warranted. Also, it is the achievement of this safety level at each plant that should be the final objective.

"There was agreement to move towards an international safety regime."

There was not a consensus that this could be achieved by the development of more binding international standards. However, there was agreement on the benefits of more exchange of regulatory experience, methods of verification of safety and use of peer reviews.

It was strongly stressed that no measures taken in the international arena should take away or be seen to take away any responsibility for maintaining and developing safety from manufacturers, operating organizations and national regulatory bodies.

There was, however, an overall agreement to move forward in a very cautious way towards an international safety regime, based on some general safety principles, methods of verification, exchange of experience and peer review. This regime should build on existing IAEA documents and activities as well as activities of other international organizations such as the OECD/NEA and WANO.

There was a widespread, strong feeling that binding, detailed international standards would be impossible to verify and enforce and could be counter-productive to safety by hindering flexibility and development.

Topic No. 2

Approaches to systematic safety reassessments throughout the operational lifetime of nuclear installations: Should periodic safety reviews be used to supplement or replace continuous assessment programmes? Should some combined assessment and review approach be used and if so, what form should it take?

Findings:

It was agreed that systematic safety reassessments have three objectives:

- to confirm that the original safety intentions are still met;
- to identify any possible future life limiting features;
- to review the safety level with respect to new criteria, based on operating experience and technical development, and to identify safety improvement measures which are justified.

There was consensus that the safety level of a nuclear installation should be reassessed in a systematic manner throughout the operating life of the installation, and also that the basis of such an approach should be the use of continuously ongoing safety assessment programmes. Analysis of operating experience and plant specific, living PSAs were emphasized as important tools for use in such reassessments.

Also, there was agreement on the benefits of periodic, plant specific reassessments with longer intervals, standing back and taking a more long term overview. Periodic reassessment may also help in transferring knowledge about the plant safety case to new generations of operators and plant management. The appropriate balance between continuous and periodic safety reassessment programmes has to be decided on a national basis.

There was also agreement that better exchange of findings and conclusions from analysis of operating experience and PSAs should be encouraged. Compilation of data on systems and component reliability should preferably be a matter for groups of owners/operators, whereas international organizations such as the IAEA and OECD/NEA have an important role to play in exchanging findings and conclusions from systematic analyses of operating experience, in particular human and organizational performance, and to promote such systematic analyses.

Topic No. 3

Emergency planning as a part of the total defence in depth concept: How may requirements for emergency planning be affected by implementation of improved severe accident management and release mitigation capabilities in both existing and future reactor designs?

Findings:

There was a strong consensus expressed on the need for emergency planning as a last line in the defence in depth strategy. Preparedness for supplying prompt information to the public and some type of confirmatory off-site radiation measurements are basic components. There may be some scope for relaxation of detailed and extensive planning in the future as plants become safer, especially taking into consideration the effects of improvements in severe accident management and release mitigation measures.

Nuclear emergency planning should be harmonized, as far as possible, with planning for other types of emergencies, e.g. at chemical plants. There was consensus on the need for more international exchange of information and discussion on basic criteria for emergency planning, e.g. the choice of reference accident scenarios for various reactor designs and sites.

Topic No. 4

What are the desirable components of information dissemination, information exchange and communication activities with political decision makers and the public? For example, how should issues such as "are our (or our neighbour's) nuclear installations acceptably safe?" be addressed?

Findings:

There was general agreement that the fundamental principles for the safe use of nuclear power are not the exclusive concern of the regulators, owners, operators and vendors of nuclear installations. The basic principles, as well as the safety level achieved through their implementation at each particular plant, must also be communicated to, and understood by, political decision makers, investors and the general public as a basis for their acceptance of a nuclear power programme and their consideration of energy policy options. Such communication and understanding are essential not only in the national context, but also with respect to reactors in neighbouring countries, because of possible transboundary effects of accidents.

There was also general agreement that communication on nuclear risk and safety matters should never be a one way process; rather the creation of multiple networks for communication with various groups was recommended. It was also pointed out that public acceptance has to be based mainly on trust in the professionals controlling a complex technology, rather than on an attempt to make the general public understand the technology. This trust has to be earned by utilities and regulators on the basis of demonstrated performance and attitudes in safety matters and demonstrated transparency and openness to peer reviews.

It was also recognized that if utilities wish to obtain public acceptance of nuclear power, their information has to be based rather on demonstration of benefits and operational safety performance than on simply an understanding of low risks.

Particular attention should be paid to explaining that the introduction of new reactors built to higher safety standards does not necessarily make older reactors unsafe.

In view of the findings reported above, there was no consensus that more binding international standards would improve public acceptance – it is the local performance that counts.

Issue 2
Ensuring the safety of operating plants

The Background Paper prepared by the expert working group and the comments received from Member States made clear that most nuclear power plants operating today meet current quality and safety standards, and that they can achieve and maintain a high quality of operational safety. The discussions addressed the case of the small fraction of plants that do not achieve that high level of safety and so constitute a main safety issue. How can they be identified and how can the safety performance of all of them be raised to the standards of the best?

Plants that do not meet current safety design and construction standards will be discussed in Session III. Some conclusions should be common to both sessions.

Topic No. 1

What should be the approaches by utilities and regulatory organizations in order to promote excellence in safety performance of all nuclear power plants?

Findings:

It was generally agreed that all 15 areas identified in the Background Paper were important to this aim. They constitute a coherent set of criteria, standards and practices, in accordance with the contents of IAEA documents, such as the INSAG-3 and INSAG-4 reports.

On the utility side, they include:

- the need for acceptance of full responsibility for the safety of the plant with the appropriate commitment and involvement of the senior staff;
- the need for education, training and motivation of personnel, including a competent technical capacity;
- the use of experience analysis and feedback at the appropriate level of responsibility;
- plant maintenance, replacement parts and configuration control developed to an adequate level;

– independent in-house safety evaluations and adequacy of quality assurance programmes.

It was emphasized during the discussions that the continuous verification of the plant operational safety level, by incident analysis, use of performance indicators and of specific probabilistic safety evaluations based on operational experience, internal audits and peer reviews, would act as an early warning system for possible safety degradation involving an increased risk of accident.

"Discussion underlined the importance of a strong, competent, regulatory body."

The discussions underlined the importance of the role of a strong competent regulatory body, with enough power to make it independent from undue pressures. It is essential that there should be no confusion of responsibilities between the operating organization and the regulatory body, and that open and trustful relations should be established between the two sides.

The effectiveness of the regulatory system should be assessed with reference to the operational experience record and by use of international peer reviews.

Topic No. 2

What more can be done to strengthen national commitment to safe operation of nuclear power plants?

Findings:

The conference generally agreed that the improvements were needed among the Member States that include:

– a regulatory regime with adequate expertise and independence and a clear understanding of its responsibilities and authority;

– provision of information to the public so that a transparent safe operation is shown, and so that when this is not the case corrective actions are taken;

– the regulatory authorities and utilities doing all they can to stimulate, develop, and enhance a safety culture in each utility and nuclear plant;

– international exchanges of successful national regulatory practices and proven programmes directed towards the goal of improving the safety of operating plants to the level of the best.

Topic No. 3

What positive actions can be taken on the international level to enhance safety in nuclear power plants?

Findings:

The first priority is that all national organizations, operating or regulatory, should have free access to all relevant information originating from foreign countries. There should be complete openness in all countries. Programmes in the IAEA and OECD/NEA aimed at such exchange and dissemination of information should be supported.

On the other hand, it was stressed that international organizations should make sure that their actions cannot be interpreted as relieving the national organizations of any part of their own responsibilities (one of the governmental responsibilities is to provide the national regulatory body with appropriate financial resources to sustain its activities at a proper level). Actions of international organizations must be reviewed, assessing the quality of the national performance, and assisting Member States in achieving the highest possible safety level. This applies to the present IAEA programmes as well as to future new programmes (see Topic No. 4).

It was agreed that the IAEA should launch a programme of information to the public about the operational experience of nuclear power plants, based on the data collected in the IRS and INES programmes, keeping in mind the need for adequate speed of delivery and full transparency of such information.

During the discussions it was suggested that the IAEA could provide, as a service to Member States, the assistance of an international inquiry team in the case of an accident with large impact on public opinion, in order to support the credibility of the national authorities. This was generally considered as being neither feasible nor desirable.

Topic No. 4

What should be the roles of the various international organizations in addressing the safety of the world's nuclear power plants?

Findings:

WANO has recently been created and is starting to develop its activities. It is necessary that they move forward into specific activities such as the technical support of weak organizations, development of good practices for the overall operation and independent peer reviews of operating organizations. Although some of these activities could overlap in the future with ongoing programmes of the IAEA, for the time being this problem does not exist. The long term goal would be for WANO to dedicate its efforts to operators.

The IAEA could then dedicate its activities mainly to the government organizations. It is essential that the countries review their activities in light of the international consensus that exists in relation to the topics addressed in the Background Paper.

At the same time ongoing programmes for safety review at the international level should be pursued and all countries should participate in these programmes on a regular basis.

The IAEA Board of Governors should consider the appointment of a standing committee that would regularly review the results of national and international activities so that the necessary remedial actions would be undertaken.

Issue 3

Treatment of plants built to earlier standards

Topic No. 1

How should reactors built to earlier safety standards be shown to be adequately safe?

Findings:

It was agreed that the safety of plants built to earlier standards needs to be justified against current safety thinking. The framework for safety reviews proposed in the Back-

ground Paper was well accepted.

The reviews should be plant specific and use current safety assessment methodology. The nine factors defined in the Background Paper, that is the safety concept of the original design, the plant's safety history, its operational experience and physical state, the management and training of the operating staff, the safety analysis, plant records and trends, and the qualification of its equipment, required for the safety assessment should be treated in a balanced way.

"All older plants will need to be reviewed."

For poorly designed and operated plants, an immediate upgrading of operational safety based on proven safety practices has first priority and should be realized with the support of other operators representing good practices. All older plants will need to be reviewed, but first priority should be given to the most suspect plants. A plant specific PSA should be carried out to identify further improvements only after immediate and necessary improvements have been completed.

While the amount of work required for reviews was questioned, those who have already done integral safety reviews were strongly in favour of this approach, stating that the effort is worthwhile and pays off.

Effective regulatory control is considered as an indispensable prerequisite for an adequate review process and necessary consequential actions.

For some countries with limited capacities and expertise additional international support is necessary to strengthen both the operational safety practice and the regulatory system.

Existing documents such as NUSS Codes and the Basic Safety Principles need review, but should be applied by all. Appropriate means such as peer reviews should assure that the common international principles and requirements are applied in an adequate way.

The IAEA should give additional guidance on safety reviews and on the process required to judge acceptability. Special consideration should be given to generic issues typical for older designs, for example relating to physical separation, seismic design and containment function. Experience from Member States and from the ongoing special programme for the VVER 440/V230 should be evaluated systematically and used for the development of planned documents within the NUSS programme and for related activities in international organizations.

Topic No. 2
Should an international consensus be sought to define a minimum level of safety to be met by reactors built to earlier standards?

Findings:
There was a consensus that a minimum level of safety should be defined and established internationally which all plants must meet. The definition of a minimum level of safety should include consideration of the ideas presented in the Background Paper, NUSS standards and INSAG documents, as these sources already represent international experience.

"A minimum level of safety should be decided and established internationally."

Judgement of the level of safety achieved should include the nine factors identified in the Background Paper.

An international workshop was proposed on current practices and experiences for the judgement base and on the main parameters to be taken into account when deciding on the acceptability of further operation.

Topic No. 3
What should be the role of the various international organizations (IAEA, OECD/NEA, WANO) in the implementation of recommendations on these topics?

Findings:
The conference considered that there was a need for assistance to Member States from these international organizations not only in the review process but also in the verification of the resultant decisions on the operating regime of each specific plant. Verification that the specific plant safety level was at least equal to the proposed minimum level was an activity preferably undertaken by an international organization in order to gain public acceptability not only in the host country of the plant but also in its neighbouring countries. The verification process could be built around specific plant missions or assessment of suitable reports from the plant operator.

The conference considered that the roles of each of these international organizations, and also the CEC, WHO and the World Bank, in this issue (treatment of older plants) should be more clearly defined to allow a more efficient use of the limited resources and finance available for the proposed reviews and the implementation of the findings. Coordination of their relevant activities was necessary to gain maximum advantage from their work.

Workshops should also be convened to develop an assistance strategy which considers the role of training courses, safety missions, etc.

Direct assistance to operators to improve procedures, training, maintenance practices and implementation of corrective measures and to assist operators to develop an adequate safety case and hence to promote self-regulation by operators should be provided by WANO.

The IAEA should expand its present activities, particularly its OSART and ASSET missions for older plants.

The IAEA should also provide technical assistance to those Member States who require safety assessment of their older plants but who do not have adequate expertise, particularly in the regulatory aspects.

The conference supported the proposal from the USSR for an IAEA programme to review the safety level of RBMK nuclear power plants.

A proposal was made for the IAEA to provide perman-

ent missions in those Member States requiring assistance.

Topic No. 4

What weight should be given to socioeconomic factors when making decisions on reactors built to earlier standards?

Findings:

Socioeconomic factors should not be used to justify operation of a plant below an acceptable level of safety. Socioeconomic factors should influence the level of effort and the degree of international assistance required to bring the plant up to an agreeable level of safety so that the plant need not be shut down, and so that significant adverse socioeconomic effects can be avoided.

In some cases, the level of effort required within a country and from international assistance may prove to be too high. In such cases, the plant should be shut down, and other means of supplying electrical power should be used, for example supplies from other countries. A judgement on the viability of achieving the minimum level of safety should be made at an early stage.

Issue 4
Next generation plants

The session debated the four main issues presented in the Background Paper and the following findings to each topic can be identified:

Topic No. 1

Next generation nuclear power plant designs will have incorporated design improvements for accident prevention. Although different designs take different approaches to accident prevention, are their overall objective and approach acceptable?

Findings:

Example of design approaches taken for accident prevention include improved component and system reliability, improved man-machine interface through design simplicity and human factors design improvements, increased design margins to safety limits, increased system redundancy and diversity including using passive systems, where appropriate, and improved accident management procedures. Also emphasized are design improvements that will enhance maintainability and protection against outside threats. These improvements in the framework of an increased quality assurance enhance both safety and plant availability, and are thus highly desired by nuclear plant owners and operators as well as the general public. These preventive measures contribute to a stronger basis for increased reliance on the nuclear option for future energy needs.

Topic No. 2

Next generation nuclear power plant designs incorporate features for the mitigation of potential severe accidents. Is there a need for harmonization or consensus on different aspects such as design approaches, accident scenarios and analytical methods?

Findings:

The next generation of nuclear power plant designs will improve accident mitigation systems. They will consider severe accident scenarios explicitly and systematically in design. The containment system will then play a key role for the next generation of reactors. This approach is considered acceptable. There is a need for and a benefit expected from an international consensus on design approaches (e.g. containment design parameters, accident scenario selection and methods of analysis), and on how to treat severe accidents in the regulatory process. The limitation of off-site consequences should enhance public acceptance.

Topic No. 3

What should be the role of emergency planning for future reactor designs? Do design improvements and recent severe accident research results provide an adequate technical basis for simplifying or eliminating emergency planning for future designs?

Findings:

Advanced reactor designs will explicitly incorporate design features that would permit the technical demonstration of adequate public protection with significantly reduced emergency planning requirements, e.g. relief from the requirement for rapid evacuation. Potential future owners of these designs have encouraged incorporation of such design features, and although no consensus has been established to totally eliminate emergency planning, many desire to eliminate the more onerous aspects of current procedures, particularly rapid action requirements. Such modifications to emergency planning should be considered.

Topic No. 4

What should be the role of the IAEA with respect to future reactor designs? Specifically, should the IAEA develop a set of desired safety characteristics for the next generation of nuclear power plants?

Findings:

There are many areas where increased international co-operation has been beneficial and could be expanded further. Many multinational efforts are already underway outside the IAEA to help define user needs, harmonize regulatory approaches, consolidate designer efforts, etc. The IAEA has started an effort to develop a set of desired characteristics covering all of the principal features for the next generation of nuclear power plants, irrespective of type.

Issue 5
Final disposal of radioactive waste

The session discussed the three main topics presented. No new main topics were raised.

Topic No. 1

How should the developed strategy for the final disposal of radioactive waste be implemented?

Findings:

There was general agreement that ongoing R&D programmes for final disposal of radioactive waste should be pursued. It was, however, pointed out that in many countries there is no need to take speedy actions and that suffi-

cient time is available to study outstanding issues. On the other hand, it was stressed that there is a need to demonstrate progress in disposal technology and safety, inter alia in consideration of the wider public perception of the nuclear energy option.

Issues that could be studied, in order to achieve a common understanding both on a national and on an international basis, include the following:

- retrievability of waste after sealing the disposal facility;
- actinide partitioning and transmutation;
- the role of extended storage;
- the possibility of regional or international repositories.

There are, however, differences of opinion as to the emphasis that should be put on these issues, relating to the progress and decisions regarding national programmes on geological disposal.

"The regulatory body should have a firm technical basis, justifying its decisions."

There was general agreement on the importance of public understanding and acceptance of final disposal strategies and their implementation. This should be achieved by increasing communications, with the objectives of increasing confidence and credibility. Research into the issues mentioned above could be seen in this context as well. Finally, public participation in the review of and decision making on the various steps in national programmes would add to the public confidence.

Topic No. 2

What role should the regulatory body have in relation to the implementation organization with regard to the programme for disposal of HLW?

Findings:

Nations should have clearly defined legal frameworks, including a definition of the responsibility of the regulatory body and the implementing organization. The regulatory body should establish safety objectives that are understandable to the general public. On that basis standards and criteria should be developed, for example via an iterative process between the implementing organization and the regulatory body. Because of the long time process involved in developing repositories and their licensing, such an iterative process should start at an early stage. However, the regulatory body should maintain its independence throughout this process. It is the role of the regulatory body to determine if the repository is acceptable and if it meets the safety objectives. The regulatory body should have a firm technical basis, justifying its licensing decisions. It is the role of the implementing organization to select the site and demonstrate its suitability and that the proposed repository meets the safety objectives.

Topic No. 3

International co-operation, how can it help? What should be the role of the IAEA?

Findings:

To achieve responsible and safe management of radioactive waste, the possibility of an internationally legally binding arrangement was discussed. This could also be seen in the context of the proposed nuclear safety convention. The basis for such an arrangement could be the safety fundamentals of the IAEA's RADWASS programme.

The importance of the ongoing IAEA programmes in the area of radioactive waste management was recognized and supported. To complete this programme with regard to the disposal of spent fuel, safeguards approaches should be studied, with due regard to safety requirements.

International

IRPA Congress

The Eighth World Congress of the International Radiation Protection Association (IRPA) will be held in Montreal from May 17 to 22, 1992. IRPA is an association of 31 national radiation protection societies, including the Canadian Radiation Protection Association, which is co-hosting the congress.

The Congress is expected to be the largest ever organized by IRPA. All aspects of ionizing and non-ionizing radiation protection will be explored, with some 2000 specialists in the field and more than 200 product and service suppliers, from around the world, participating in a scientific and technical exhibition. Training sessions on specific aspects will also be offered to participants.

Major scientific topics on the agenda include:

- Radiation risks in perspective
- Perceptions of risks from radiation
- Biological effects from radiation
- Protection concepts, policies and standards
- Optimization of radiation protection
- Exposures in the practice of medicine
- Exposure to natural radiation
- Occupational exposure
- Medical surveillance of workers
- Exposure to the public from radioactive materials in the environment
- Instrumentation and measurement techniques
- Radiation accidents
- Environmental surveillance monitoring
- Decontamination and decommissioning of large facilities
- Transport of radioactive materials
- Radioactive waste disposal
- Protection of the environment
- Education and training in radiation protection

Many of the workshops and training sessions will take place during the Congress at Montreal's Palais des Congrès. However, pre- and post-Congress workshops will also be held in other Canadian cities. Non-ionizing radiation will be the topic in Vancouver from May 10 to 15, 1992, and uranium mining will be discussed in Saskatoon from May 25 to 29, 1992.

Additional information on the Eighth World Congress of the International Radiation Protection Association may be obtained from: IRPA 8, 2155 Guy Street, Suite 820, Montreal, Quebec, Canada H3H 2R9. Tel: (514) 932-9552 Fax: (514) 932-9419

Ontario Hydro's DSP Update

Ed. Note: *The following material is taken directly from Ontario Hydro publications related to its "Demand/Supply Plan Update - 1992" which was issued in mid-January.*

The first article is an overview from a one-page release, the second is the Executive Summary of the DSP Update - 1992 report, and the third is a chronology of this saga which was included as an appendix to the Update report.

Overview

Ontario Hydro's Demand/Supply Plan (DSP), the 25 year plan which was submitted in December 1989, is currently being reviewed by the Environmental Assessment Board (EAB).

Since 1989 there have been several changes which have led Ontario Hydro to update the original Demand/Supply Plan. This information sheet gives a quick overview of what has changed and how Ontario Hydro is adapting to that change.

Coping with change

A main consideration in planning remains flexibility to cope with an uncertain future. While the planning priorities and framework have not changed, the planning environment and some planning assumptions, and elements of the Plan have changed. Furthermore, there has been public input and government direction on planning since 1989, affecting components of the plan.

Changes include:

1. a short term forecast of slower economic growth in the Province's demand for electricity;
2. increased expectations for demand management and increased contributions from non-utility generators;
3. a greater confidence in Hydro's ability to extend the life of existing fossil stations;
4. suspension of planning for about 1,500 MW of hydraulic potential in the Moose River Basin to reflect the need for co-planning with aboriginal people.

As a result of the above, the urgency for major supply approvals has diminished.

Changed Circumstances, Same Strategy

The 1989 Plan and the Update are both based on the same planning approach:

- the strategy was developed through defining options, public consultation and government review
- objectives are customer expectations for safety, environmental protection, reliability and low cost
- strategy focus;
  - maintaining and upgrading the existing system
  - top priority to demand management
  - encouragement of non-utility generation
  - development of economic hydraulic generation
  - keeping open options for major supply (nuclear, fossil, purchases) to meet future requirements.

The Public Review Process

Ontario Hydro supports the continuation of the Demand/Supply Plan hearing in front of the Environmental Assessment Board. Apparovals are being requested for the requirement for up to 1,800 MW of hydraulic generation, and for the transmission necessary to incorporate the 1,000 MW purchase from Manitoba. Because they will not be required until later in the 25-year period, Hydro is no longer asking approval for the need for fossil and nuclear stations.

The DSP hearing before the EAB started with the submission of the DSP to the Minister of the Environment in December of 1989. The intervenor funding process commenced in June of 1990 and continued to December of 1990. The evidence phase of the hearing started in April of 1991 and by the end of 1991 Ontario Hydro had presented six of its planned 11 panels of witnesses.

Hydro's 25 Year Plan

	The 1989 Plan		1992 Update	
Option	**Additional Capacity by 2014**	**Retirements by 2014**	**Additional Capacity by 2014**	**Retirements by 2014**
Demand Management	5,570 MW		9,860 MW	
NUG	2,120 MW		4,200 MW	
Manitoba Purchase	1,000 MW		1,000 MW	
Hydraulic	2,849 MW		(up to) 1,800 MW	
Fossil	5,376 MW	6,654 MW	6,000 MW of major	2,366 MW
Nuclear	8,810 MW	2,060 MW	supply required by 2014	2,060 MW

Executive Summary

1. Over the course of five years, Ontario Hydro developed an integrated Demand/Supply Planning Strategy containing a set of principles, guidelines and priorities to be used to develop Ontario Hydro's Demand/Supply Plans to meet the future electricity needs of its customers. The Demand/Supply Planning Strategy evolved through stages of defining options, consulting with the public, and undergoing government review. The 1989 Demand/Supply Plan was based upon that strategy, and is currently being reviewed by the Environmental Assessment Board (EAB).
2. It was recognized at the time that the Demand/Supply Plan was issued that planning is itself an on-going process. Since 1989 there have been a number of significant changes affecting the planning environment. These changes include a revised load forecast, higher expectations for demand management and non-utility generation, the suspension of planning for much of the hydraulic potential in the Moose River basin and a government moratorium on nuclear pre-engineering. In light of this, Ontario Hydro advised the EAB that it was assessing the effect of the changed circumstances and intended to update its Plan.
3. This document updates and supplements the 1989 Demand/Supply Plan, and focuses on those changes in the planning environment which have occurred since 1989 and which have a significant effect in shaping the Updated Demand/Supply Plan.
4. The following summarizes the Updated Demand/Supply Plan:
   a) The current load forecast (median) affects the planning environment in two ways. The substantial lowering of the Primary Load Forecast defers the need date for major new supply facilities and therefore was a major consideration in updating the Demand/Supply Plan. The broader uncertainty bandwidth associated with the load forecast has resulted in a requirement for a greater degree of flexibility than existed in the original Demand/Supply Plan.
   b) As reflected in the primary load forecast, the expectations for demand management were increased by about 4300 MW by the year 2014, reflecting expected Ontario Government initiatives to mandate higher energy efficiency standards, and to allow Ontario Hydro to offer incentives for customers to switch from electricity to natural gas. The current Demand Management Plan expects to achieve 9860 MW of load reductions by the year 2014. The exposure of the load forecast to uncertainties associated with mandated demand management is judged to be about 2600 MW in 2014, or about 30% of the gap between the median and upper Primary Load Forecasts in that year. This demand management uncertainty reinforces the need for flexibility in the Updated Demand/Supply Plan.
   c) Substantially higher quantities of non-utility generation can be achieved due to the rapid growth of the non-utility generation industry in Ontario and a higher than originally forecast number of feasible and economic projects. It is now expected that, if required, non-utility generation could be relied on for 4200 MW of generation by the year 2014.
   d) Planning for a portion (about 1500 MW) of the hydraulic potential in the Moose River basin has been suspended to reflect the need for co-planning with aboriginal peoples. This change, and other updates to the hydraulic information base, result in a decrease from over 2800 MW to a range of 1400-1800 Mw in the amount of hydraulic capacity expected to be developed by the year 2014.
   e) The existing contract to purchase 1000 MW of power from Manitoba is not affected.
   f) Planning no longer assumes that all fossil stations will be retired at the end of 40 years. Life extensions are believed likely to prove feasible and preferable to committing new supply, provided that the high standards of environmental protection are maintained. Programs would be committed for extending life and improving performance, including retrofitting additional environmental control equipment. This change results from growing confidence regarding technical and economic viability of fossil life extension.
   g) The need dates under the upper growth forecast are deferred from the Demand/Supply Plan, to about the year 2001. In addition, the changes in the Primary Load Forecast and other changes have delayed significantly the need date for new supply facilities under median conditions, to about 2009-2011. As a result, there is less urgency to obtain approvals to meet both median and upper requirements. Moreover, the approach of planning to the upper by obtaining early approvals for major supply facilities carries with it an increased risk that the significant work (and costs) associated with definition phase of major projects would be wasted.
   h) With the spread between the median and upper forecasts becoming larger, and with the corresponding difference in need dates, the Updated Demand/Supply Plan addresses planning uncertainty by focusing on planning around the median forecast. In particular, flexibility to meet supply requirements associated with the upper growth forecast would be provided by shorter lead time options. These include natural gas fired generation (e.g. CTUs), return to service of mothballed stations, non-utility generation and demand management. In the event of upper load growth, these shorter lead time options would be used to bridge to longer lead time major supply options.
   i) The achievement of the currently expected levels of demand management, non-utility generation and hydraulic development create the potential for a surplus of up to 5000 MW that peaks around the year

2000. If the surplus were to materialize, there would be adverse rate impacts for customers as a result of paying for the costs of non-utility generation and demand management that are not required. Typical steps that might be taken to manage such a surplus are illustrated in this document. The Updated Demand / Supply Plan adopts these as an *illustrative approach only* to managing the surplus. For many of the steps outlined, no decision is required immediately, so there is adequate time to deal with those measures in the normal planning process, and on the basis of information which is current at that time, including actual load growth experience. Because the approach is illustrative only, and will be updated with changed circumstances and actual load growth experienced, no change is being made to the request for hydraulic approvals, even though the illustrative approach contemplates changes with respect to certain specific projects. This is consistent with accommodating the higher risk associated with the approach of planning more closely to the median outlook.

j) The long lead times for major base load fossil and nuclear options reduce flexibility, which somewhat offsets the advantage of potentially lower long term energy costs from these facilities. For nuclear options in particular, facilities having shorter lead times, reduced investment risk and increased planning flexibility would better respond to changing circumstances. Other nuclear options beyond the 4 × 881 MW Darlington-type station preferred in the Demand / Supply Plan, including single unit stations, would be considered when making future base load choices.

k) With the deferral of the need to the 2009-2011 period, approvals are no longer requested for fossil and nuclear major supply options. Accordingly, the Updated Demand / Supply Plan does not specify preferred major supply options. Approvals continue to be requested for the requirement and rationale for a range of 1400-1800 MW of hydraulic generation and associated radial transmission, as well as transmission to incorporate electricity purchased from Manitoba.

Demand / Supply Plan Chronology

Demand / Supply Options Study (DSOS) 1984-1986

- Ontario Hydro Consultation Program
  - Provincial Organizations (Sep. 1985 - Mar. 1986)
  - Regional Community Leaders (Nov. 1985 - June 1986)
  - Municipal Utility Meetings (Feb. - June 1986)
- Select Committee on Energy (July 1985 - July 1986)

Draft Demand / Supply Planning Strategy (DSPS) 1987-1988

- Ontario Hydro Employee Presentations (Jan. - June 1988)
- Select Committee on Energy (Feb. 1988 - Jan. 1989)
- Electricity Planning Technical Advisory Panel (Mar. - July 1988)
- Review by Government Ministries (Mar. - July 1988)
- Ontario Hydro Presentation to Municipal Utilities (May - June 1988)
- Other Related Activities:
  - Ontario Nuclear Safety Review (Dec. 1986 - Mar. 1988)
  - Ontario Nuclear Cost Inquiry (Mar. 1988 - Jan. 1989)
  - Thermal Cost Review (Feb. - Oct. 1989)

Demand / Supply Planning Strategy (DSPS) March 1989

- Reviewed and Approved by the Hydro Board (March 1989)

Demand / Supply Plan (DSP) December 1989

- Reviewed and Approved by the Hydro Board (Dec. 1989)
- Demand / Supply Plan Public Feedback Program (Jan. 1990 - June 1991)
- Environmental Assessment Board Hearing (Apr. 1990 - ongoing)
- Update Reviewed and Approved by the Hydro Board (Dec. 1991 - Jan. 1992)

Nominations needed

CNS Innovative Achievement Award 1992

Nominations are sought for the 1992 Innovative Achievement Award. This award was established by the Canadian Nuclear Society in 1991 to honour persons who have been responsible for a significant innovation that has been successfully implemented in the Canadian nuclear program. The innovation may be in any phase of a project and in any technological field embraced by the CNS.

Nomination letters should describe the innovation or innovations for which the nominee was responsible and provide a brief biography of the nominee. Nominations must be supported by at least three of the nominee's peers.

Last year was the first year the award was granted. The 1991 winners were William A. Morison and Wing F. Tao.

Nominations should be sent by April 24, 1992 to:

Chair, Honours and Awards Committee
Canadian Nuclear Society
144 Front Street West, Suite 725
Toronto, Ontario
M5J 2C7

AECL Research Adopts CQI

Over the past several months members of AECL Research have been immersed in CQI.

What is that, you ask.

CQI stands for Continuous Quality Improvement, which is described as a program and process to achieve a high level of quality in everything the company does.

Last fall AECL Research management adopted a statement of "Quality Vision" which expresses the objective of the program:

> "AECL Research will be a recognized international leader in nuclear research and development, meeting or exceeding customer expectations through continuous improvements in everything we do, and making outstanding contributions in the areas of energy, health and the environment." –

Back in 1987 AECL Research looked into a "total quality management" program. Following the appointment of Terry Rummery as president he modified the approach, established a "Quality Authority" of senior management, and appointed Larry O'Brien as Director of Continuous Quality Improvement.

An employee survey on attitudes towards "quality" was undertaken, managers were interviewed, and discussions were held with representatives of various "client" organizations, such as government departments, utilities, and universities.

With that input an overall CQI Implementation Plan was developed in early 1991 and later that year seven pilot teams from various parts of the company were formed. The teams received training on "quality foundations" and then were used to test the proposed implementation plan.

During the first half of 1991, while the pilot teams continued working, each organizational unit developed plans to implement CQI in their part of the company. The goals for the CQI program in 1991 included:

- development, testing and finalization of training and methodology;
- establishment of an awareness and understanding of CQI throughout the company;
- incorporation of improved customer performance information into the planning process;
- initiation of needed changes to management, human resources and accountability systems;
- initial use of CQI as a tool to improve performance.

Three CQI Guide documents have been prepared in cooperation with the US firm of Ernst and Young which was engaged as a consultant for the program:

- Quality Through Involvement and Leadership;
- Process Improvement
- Problem Solving

In the first there is the following statement of the relationship of CQI to QA (quality assurance):

"CQI is AECL Research's process for assuring that each and every product and service provided to every internal or external customer meets or exceeds that customer's requirements and expectations. The CQI approach to quality incorporates such principles as defining and documenting work processes, defining and documenting customer's requirements and expectations, and verifying the quality of the products or services received by the customer through monitoring and evaluating the degree of customer satisfaction.

The QA requirements of a working unit are defined by a variety of sources. These include national or international codes and standards, contractual agreements and internal needs. AECL Research's QA function is responsible for understanding all the QA needs of [the] working unit, for providing direction, guidance and assistance and for ensuring compliance with stakeholder, customer or regulatory requirements on a company-wide basis."

A major motivation for the CQI program was stated by Rummery as the need to meet "clear and uncompromising imperatives":

- maintain AECL Research's position as a world class research organization;
- demonstrate to all stakeholders that AECL Research is a progressive, indispensable, R and D company;
- the need to secure additional commercial revenues.

The focus of the CQI program is expressed as "meeting or exceeding customer expectations", with "customer" being anyone or any organization who is the recipient of the product (goods or services). The customer could be the next person or group in the process within the company, or outside organizations such as government, regulators, or communities, as well as those purchasing the product.

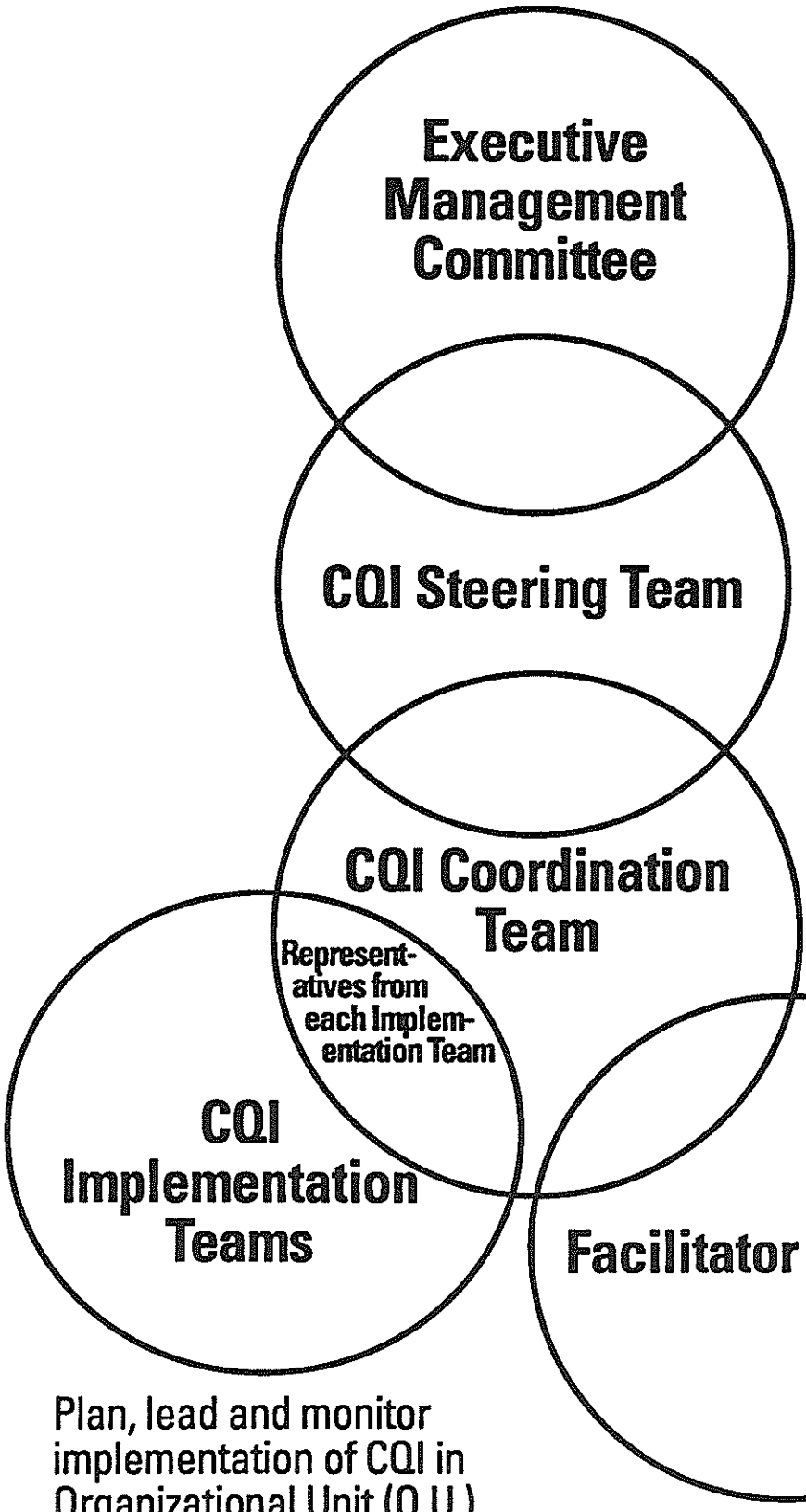
The CQI program requires continual effort to improve performance at every level in the organization. This has been recognized as requiring a change in the culture of the company. As Dan deVerteuil, vice-president of engineering, said recently; "CQI requires a certain frankness, a certain intellectual honesty, which says that what I care about is not important – it's what my customer wants that is driving me."

O'Brien is a member of a study tour sponsored by the Conference Board of Canada related to quality. After visiting leading companies in Europe and the USA O'Brien commented, "the more you get into CQI the more you realize CQI is simply an amalgam of good management practices". Although all the companies visited shared a common objective, he said, each company has adopted methods and processes that are most appropriate to its environment and problems.

Through its CQI program, AECL is doing just that.

The following two pages are from documents prepared by AECL Research to explain and to train staff in the CQI program, provided through the courtesy of the company's CQI office.

AECL Research CQI Program
Implementation Management Scheme



Responsible for establishing strategy, organization structure and allocation of resources

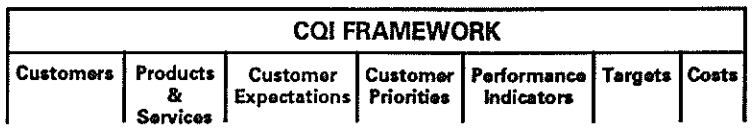
- Monitoring over all implementation
- evaluate effectiveness
- making CQI policy decisions
- keep EMC informed

- Sharing information
- identify issues
- coordinate activities
- forward recommendations to steering team

- Sharing information
- identify training issues
- identify facilitator training needs

Plan, lead and monitor implementation of CQI in Organizational Unit (O.U.)

AECL Research CQI Framework



Starting The CQI Framework

① **Identify Customers/ Products & Services**

② **Decide on Customer Sample**

- Select customer sample
- List Customer expectations (our views)

Customer Contact

③ **Identify Important Customer Issues**

- Profile the sample
- Develop interview guide
- Conduct interviews
- Summarize answers

④ **Identify Customer Improvement Priorities**

- Develop survey
- Conduct survey
- Analyse data & establish priorities

Process Improvement

⑤ **Establish Performance Targets. Innovate and Solve Problems.**

- Identify performance indicators, and set preliminary targets
- Investigate new ways of doing things
- Problem solving for process improvement
- Revise targets and confirm with customers

⑥ **Track Performance**

- Monitor complaints/problems and measure performance gaps
- Track overall satisfaction and maintain dialogue with customer

CNA Winter Meeting

"Getting the Globe" was the theme of the winter meeting of the Canadian Nuclear Association held in Ottawa, February 10 and 11. Although the title puzzled some participants they were treated to a full day of interesting perspectives of the world scene.

The first afternoon was devoted to a presentation and discussion of the CNA's new five-year strategic plan and associated advertising program. (The CNA Strategic Plan is described in a separate article.)

In the discussion on the Strategic Plan, CNA Chairman David Anderson said full implementation would require a budget of $4.2 million (about a 30% increase). When asked what would happen if the member organizations did not respond to this increase he commented that the plan had been approved by the Board of Directors whose members represent organizations providing 80% of the CNA funding.

The major objective is to improve public acceptability. The "information" program, which includes advertising, will be enhanced and a new "community outreach" program will be launched.

Darrell Bricker of Angus Reid Associates described the results of their public surveys and analyses. They grouped people in five "mind-sets" according to their "psychographic" profile: confirmed advocates (20); pragmatic supporters (15); cautious traditionalists (25); receptive conformists (20); activist opponents (20). (The numbers in brackets are the approximate percentage of the public surveyed in each group.)

The third and fourth groups are currently negative towards nuclear but are persuadable, Bricker said, and would be the focus of the TV advertising campaign. The first two groups primarily needed information to support their positions, which can best be done through print material.

The message of the TV advertising campaign will be warm and reassuring, said Marc Perrault of the Groupe Everest. He stated that the CNA ads would be a "breakthrough" because they would be "the most honest ads around". (The TV ad campaign started the week of the conference and will continue until mid-May.)

After samples of the TV ads were shown, former CNS president Eva Rosinger asked why they had used actors to portray scientists whose names were on the screen. This could destroy credibility, she said. The answer was that Quebec actors' union rules were very strict and the real person could not be used. For consistency they chose to follow the same practice for the English language ads.

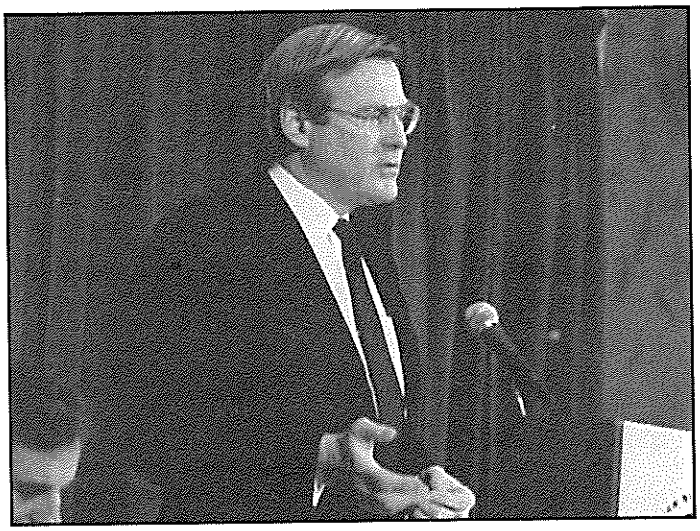
The evening of February 10 a reception was held in the centre block of the Parliament Buildings where Jake Epp, the Minister of Energy, Mines and Resources, cut a cake to commemorate the 40th anniversary of the founding of Atomic Energy of Canada Limited.

Tuesday morning saw three senior federal officials, from External Affairs and Industry, Science and Technology Canada comment on various international and national matters affecting the Canadian nuclear industry.

Tony Eyton, of ISTC, described the work of the Prosperity Task Force which is consulting with people and groups across the country in a search for ideas to enhance our prosperity. Although there is no sectorial group specifically for nuclear Eyton urged those attending to submit their ideas, either as organizations or individuals. The Task Force will be submitting an action plan to the government this fall.

Then, in an innovation for the CNA, participants were divided into working groups for discussions on several themes.

At lunch, trade minister Michael Wilson referred to the prosperity initiative and went on to mention several businesses spun off from AECL. In the context of AECL's work in Romania he spoke of the "renaissance of eastern Europe" in which Canada was playing a significant part. On the domestic scene he quoted his colleague, Jake Epp, that the nuclear option would be maintained, and commended the CNA for its campaign "to correct misconceptions".



Trade Minister Michael Wilson is shown speaking at lunch during the CNA winter meeting, 11 February 1992.

The afternoon was devoted to UNCED, the United Nations Conference on the Environment and Development, to be held in Rio de Janeiro in June. Robert Slater, of Environment Canada, noted that the underlying theme would be "sustainable development", a phrase coined in the 1987 UN Report "Our Common Future" (often referred to as the Brundtland report after the chairman of the commission). The five-week conference will focus on a 900 page report referenced as "Agenda 21", containing hundreds of proposals.

This will be a huge meeting; John Bell of External commented, with 175 countries represented, including 100 heads of state, plus dozens of NGO's (non-governmental organizations). The more than 500 programs proposed in Agenda 21 would cost more than $150 billion, he said, an amount which

could not be raised or absorbed. Most likely, he suggested, there would be a split between OECD countries and developing nations.

AECL's Bill Hancox looked at UNCED from the energy perspective. He noted a prior meeting on an International Convention on Climate Change. If this convention is ready and is signed at UNCED it would imply a legal undertaking by all the signatory nations.

He noted that in the Agenda 21 document the term "environmentally sound energy systems" is used interchangeably with "renewable energy sources". Commenting that Agenda 21 appeared to have been written by environmental NGO's he criticized the energy community for failing to get involved. He mentioned that Saudi Arabia h ad proposed adding the word "safe" to "environmentally sound energy systems" in an apparent move to preclude nuclear.

The real work of UNCED will be done in a five-week pre-conference session at the UN in New York, Hancox said, which the Canadian energy community hoped to attend.

If nothing else, John Bell commented, the process has forced many disparate groups to talk to each other, especially in the energy field, which has resulted in a number of partnerships.

The CNA winter meeting closed on this note and a call from CNA president John Reid to attend the annual conference in Saint John in June.

CNA Adopts Five-Year Plan

The Canadian Nuclear Association is moving into a new "community outreach" program.

This is the major thrust of the "CNA Strategic Plan, 1992-1996", which was approved recently by the CNA Board of Directors and presented publicly at the CNA Winter Meeting in Ottawa on February 10.

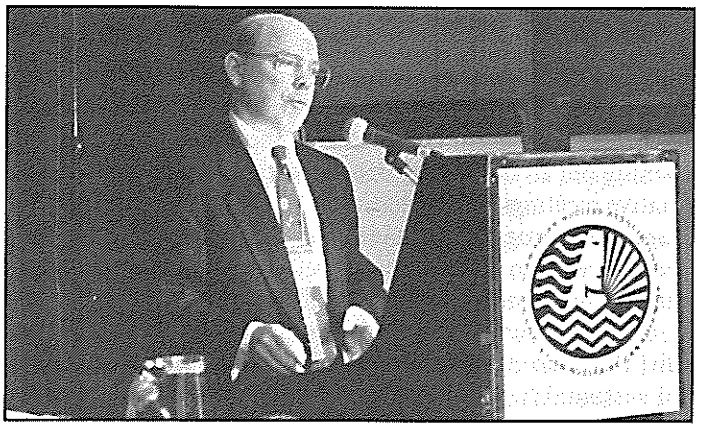
Although most of the existing CNA activities are to continue, there will be changes in the organization and operation. A growth of staff and funding will be required to fulfill the expanded mandate.

One change that will affect many CNS members is the planned restructuring of the CNA committee system. The CNA Council, which was made up of the chairpersons of the various committees, will be abolished. Instead, each of the new committees will report through a sponsoring member of the CNA Board of Directors (as was the case some years ago before the Council was created to coordinate the activities of the various committees).

Under the new program there will be six committees:

- Community Outreach
- Education and Human Resources
- Fusion
- Economic Development
- Government Relations
- Safety and Environment

The last three are essentially continuations of committees of similar names that have existed for many years. The Education and Fusion committees are relatively new – the former having been restructured recently and the latter just formed last year.



Bill Hancox of AECL presents views on UNCED at the CNA winter meeting in Ottawa, 11 February 1992.

The new Community Outreach Committee will, obviously, be the flagship of the committee system, to support and guide the new CNA community outreach program.

There is an additional committee – the Information Committee – which is distinct from the rest in that it is an operational committee, reporting to the Chairman, and responsible for the CNA information program, including the $3 million advertising budget.

The CNA Strategic Plan is presented in a 34 page document. Following is the Executive Summary of that report.

CNA Strategic Plan, 1992 - 1993
Executive Summary

Throughout 1990 and 1991, the CNA examined the potential for hosting a major international conference and exhibition in Canada in 1993. The goal was the provision of a vehicle for seeking consensus on the role nuclear energy should play in meeting global energy needs into the next century. It became clear there is significant support for placing additional resources into advancing the future prospects of the industry. Support was received, in principle, from the CNA board on the idea of including additional advocacy, educational and consensus-building programs into CNA activities.

With the concurrence of the Board, the CNA Executive Committee directed CNA staff to prepare a five-year strategic plan incorporating these proposed new outreach initiatives. This plan is the result of that effort.

The plan reviews the mandate and mission of the CNA and how these new initiatives relate to CNA's objectives. It identifies the needs of customers and members in the context of regional/international market forces and opportunities. Flowing from this analysis, the result areas, key to success, are defined. The objectives in each key result area, the activities for their achievement and the planned outcomes are identified. Estimates of the financial and staff resources necessary to perform the various activities are provided. Individual activities are organized into programs. The or-

ganizational structure to carry out the plan is defined.

The plan calls for continuation of revised information, education and advocacy programs together with the initiation of a new community outreach program. The community outreach program complements the other programs by reaching out to individual constituencies in a series of consultative meetings to find common ground on nuclear power issues. The program provides a much needed forum for constituencies to state their views. It will also provide them with an opportunity to satisfy their concerns.

The Community Outreach Program is built around the belief that finding a way to meet future energy needs safely and sustainably is one of the most urgent political, economic, and environmental challenges facing the world community today. All sources – the fossil fuels, nuclear and renewables – must be used wisely to provide prosperity, improved living standards, and a clean environment. The objective of the Community Outreach Program is the building of consensus on nuclear issues with representatives of the constituencies. Implicit in this consultative process is the understanding that the nuclear industry must be not only willing to listen to the concerns of others, but must also be willing to make whatever changes are necessary to address them.

Implementation of the strategic plan requires that member companies will be willing to freely provide the voluntary efforts of their personnel as services-in-kind to staff the required support committees. Finally, it requires that member companies be willing to increase the funding required to the level necessary to secure the future prosperity of their industry.

New Logo for CNA

The new identity of the Canadian Nuclear Association depicts man harnessing the forces of nature – including nuclear energy – while living in harmony with our natural environment.

The central figure prominently proclaims nuclear energy for the benefit of humanity. Nuclear energy is not harmful to mankind. Rather it is an energy form crucial to preservation of a healthy way of life. The oval form suggests the earth. Air, fire and water, the other elements of our environment are also depicted. The sun imagery is a reminder that the source of all life on earth is also the most basic source of radiation.

The forces of nature are depicted such that they can be conceptualized more broadly as energy. The sun is a literal depiction of nuclear energy. This energy is contained and controlled around the individual by the precision of the oval. The shape is also a subtle reference to a reactor.

The colours are yellow for energy and blue for water.

CNA Bulletin Board

The Canadian Nuclear Association has established an electronic bulletin board to provide up-to-the-minute information on the nuclear scene. The number is 416-977-4892.

Appel aux communications

Symposium de simulation SNC 1992

Sous la commandite de la Division des Sciences et du Génie Nucléaires de la Société Nucléaire Canadienne et du Royal Military College of Canada, le 17ème Symposium Annuel de la SNC sur la Simulation de la Dynamique des Réacteurs et du Contrôle des Centrales aura lieu les **17 et 18 août 1992** au Royal Military College of Canada, Kingston, Ontario, Canada.

Le Symposium couvre tous les aspects de la modélisation nucléaire et de la simulation, et inclut d'habitude des sessions sur la simulation des systèmes, la thermohydraulique, la physique des réacteurs, l'analyse en matière de sûreté et sur d'autres aspects pertinents de la Recherche et du Développement. Le fait de présenter une communication à ce Symposium n'empêche pas la présentation de cette communication ailleurs et l'on encourage les communications sur des problèmes en voie de résolution et/ou sur des méthodes en cours de développement.

La date limite pour recevoir vos résumés de 300 mots ou moins est le **29 février 1992.** Veuillez bien les envoyer à :

Dr Hugues W. Bonin
Département de Chimie et de Génie Chimique
Royal Military College of Canada
Kingston, Ontario, Canada
K7K 5L0

Pour de plus amples informations, veuillez bien téléphoner au Dr Hugues W. Bonin aux numéros de téléphone suivants : (613) 541-6613 ou (613) 541-6271 ; Télécopie (613) 542-9489.

New Educational Program

It's time to get involved.

The CNS has recently embarked on an educational program to address nuclear-related engineering and science issues at Toronto area secondary and elementary schools. Plans are currently being developed to establish a speakers group from within the CNS membership, capable of presenting a range of topics to interested students.

The first meeting of the newly formed CNS Education and Public Affairs Committee was held at the CNS/CNA Office on January 30, 1992. The committee, chaired by Shayne Smith, and consisting of Stephen Rogers (Secretary), Troy Lassau, Jerry Cuttler, and Mike Sydney met to discuss the logistics of developing a speaker program focused on local area schools. Since many of the committee members have experience in public speaking, they will form the core of a CNS speakers group which would include volunteers from the membership. Current plans are to develop speaker kits, from presently available material, on topics chosen in concert with school board representatives. Speaker training was also discussed.

It was recognized that young students represent a sophisticated audience, in that any discussion of nuclear-related technologies or issues must be accompanied by an appropriate environmental or safety rationale. As well, the use of nuclear energy must be justified with respect to the other energy options available. Presentation topics will most likely include: Nuclear Energy and the Environment, Energy Choices, Waste Management, Uses of Nuclear Energy, Careers in the Nuclear Industry, etc.

Previous surveys of the CNS membership have indicated both a desire for the CNS to get more involved in speaking out on nuclear issues and a willingness to make a personal commitment to participate in public information programs. An opportunity now exists for you to assist the committee in developing speaker packages (possibly from overheads which you have developed or collected) and/or in volunteering your time to discuss nuclear-related topics with our next generation of engineers, politicians, and media reporters. Contact a member of the CNS Education and Public Affairs Committee to get involved!

(Interested members can contact committee members through the CNS/CNA Office or call Shayne Smith at (416) 673-3788.)

Shayne Smith, P. Eng.

CNS Education and Public Affairs Committee

Terms of Reference (Proposed)

- To facilitate the exchange of information pertaining to nuclear-related issues amongst CNS members and the general public and to develop and administer educational programs in this regard
- To encourage CNS members to become involved in speaking out on nuclear issues and to participate in public education programs
- To improve the means by which the CNS communicates with the public
- To represent the CNS on the CNS/CNA Education and Human Resources Committee
- To administer the CNS/CNA Education Fund

The Deep River Science Academy

Ed. Note: *One of the CNS programs is the support of energy-related education projects undertaken by CNS Branches. The recently restructured CNS Education and Public Affairs Committee (see other article) administers the CNA/CNS Education Fund which makes available to branches up to $1,000 per year for approved projects.*

The following article by Alistair Miller describes the leading example of such a project – The Deep River Science Academy – in which the Chalk River Branch is a major participant.

To people like those working at AECL Research, the need for science and technology to provide solutions to the problems facing the people of this planet is obvious. Yet scientific careers have lost much of the cachet that attracted students up to 20 years ago. So in 1986, when the Canadian government announced sharp cutbacks to Federal funding for nuclear R&D, many Chalk River Laboratories employees were struck by apparent public disinterest. There seemed to be a need for enhanced public understanding. From debate on how to do this, the Deep River Science Academy was born.

The immediate focus for the Academy's creation was the difficulty that even scientifically inclined students face in choosing a career. The choice of what to do in university is often bewildering. Too many students make wrong choices and either drop out immediately or switch courses, often leading to unproductive delays in entry to the workforce. Chalk River Laboratories and the Petawawa National Forestry Institute seemed ideal to provide a broad overview of scientific and engineering careers. As the idea developed in discussion with Ontario's Ministry of Education, the concept of giving high school students real involvement in ongoing research projects emerged.

Participating in genuine science is the essence of the DRSA experience. Working in pairs, the 42 students spend six weeks on a carefully selected project. They are under the immediate supervision of a tutor (a science undergraduate

hired as a summer student by the DRSA with Ontario Environmental Youth Corps funding) who has already spent about 10 weeks developing the project. Overall direction comes from a researcher on the staff of CRL or PNFI. About half the students will spend all week in the lab; the remainder spend three days and also complete a related, regular Ontario high school credit. Evening and Saturday morning lectures and tutorials complete the formal program.

The cost ($3600 in 1992) is substantial but just under 40% of fees are met by means-related bursaries allocated by the Academy but funded by industrial, NSERC, service clubs, and private individuals. DRSA directors believe that money has almost never prevented an applicant from attending the Academy though many families make impressive sacrifices to send their children. This broad range of bursary support also demonstrates the importance that a broad constituency in Canada places on scientific careers.

The DRSA works: student applications are growing rapidly and considerably exceeded capacity in 1991; a survey of alumni from the first four years showed that most students felt that it had helped them in their career choices and had influenced them toward research careers. Student enthusiasm during and after the Academy term is invariably immense and alumni have proved great ambassadors, multiplying many-fold the audience reached as well as sharing their experience of real science in their regular classrooms. There is great enthusiasm for development of associate campuses elsewhere in Canada to cope with the flow of applicants. A Victoria campus in 1992 now seems almost certain; campuses in Alberta and at Whiteshell should follow in 1993; and other major centres across Canada should follow in fairly quick succession.

The DRSA brings out the best in everyone involved: researchers revel in the opportunity to encourage the next generation; 21 demanding opportunities for summer employment are created for exceptionally motivated tutors; and students take with them unparalleled insights into science and career possibilities. By contributing to the DRSA bursary fund, the CNS helps to bring the experience within the reach of any Canadian youngster with special abilities in science.

Membership Time

The CNS year runs from February 1 to January 31 – so if you have not yet renewed your membership you are already overdue.

As members know, the CNS is a society of individuals involved in the development or application of nuclear science and technology. One of the prime objectives is to provide opportunities for the exchange of information and ideas. Although it is associated with the CNA the CNS operates independently, financially as well as in programs. In 1991 PAID UP membership grew by about 30% to 683. At last count the list is over 750.

Membership forms are included in this issue for those of you who may have misplaced the ones mailed to you, or for use in recruiting a colleague. This year all members will receive a handsome CNS pen (in addition to all of the regular benefits). Those signing up a new member will also receive a CNS scarf or tie. (Write your name as sponsor on the application form.)

For information contact Sylvie Caron at the CNS office (416-977-7620) or CNS Membership Chairman Jerry Cuttler at 416-839-1151, extension 6885.

Simulation Symposium

Paul Thompson, of Point Lepreau, reports that the 1991 CNS Nuclear Simulation Symposium, held in Saint John, N.B., 26, 27 August 1991, was a great success with 96 delegates and 50 papers presented. As well as the technical and social success the symposium was also quite profitable.

The 1992 Simulation Symposium will be held at RMC, Kingston, Ontario, 17, 18 August 1992.

LIBERTY PEASE

One of Canada's nuclear pioneers and a leading figure in CANDU safety design and analyses, Liberty Pease, died suddenly in Saskatchewan in January.

Liberty retired from AECL CANDU in 1984 after a career spanning 34 years. He joined the Chalk River project (then under NRC) in 1951, immediately after obtaining a M.Sc. from the University of Saskatchewan. At Chalk River he initially worked on physics experiments on ZEEP. Later he was part of the nuclear power group that developed the CANDU concept.

After a year attachment to Harwell in the U.K. in 1957 he moved to Toronto as one of the original team of AECL Power Projects (a predecessor of AECL CANDU). For most of the next 26 years he was head of physics and safety.

Associates remember him for coining the phrase "core disassembly" to describe the results of a loss-of-coolant accident combined with failure to shut-down, an analysis required by the Reactor Safety Advisory Committee of the Atomic Energy Control Board. For his brilliant presentation on Gentilly-1 to one of the many meetings of that committee, his colleagues awarded him the "order of the golden tongue".

Outside of work Lib was active in school affairs and served on his local school board.

While many disagreed with Lib from time to time no one doubted his ability or sincerity. He will be missed by all who had the privilege of knowing him.

Fred Boyd

Branch News

Chalk River

On January 15 Ken Talbot, manager of Bruce 'A' NGS, spoke to a good crowd on "The Restoration of Bruce 'A' Performance", outlining the many challenges inherent in modifying and maintaining the systems and organization to regain a high performance at Ontario Hydro's Bruce 'A' station.

On February 13 the CNS branch joined with the Deep River Science Association to sponsor a talk by Dr. Norm Gentner of AECL's Radiation Biology Branch, on the aftermath of Chernobyl. Gentner was a member of the UN team that reviewed the effects of the Chernobyl accident on the surrounding population.

Ottawa

The recently revived Ottawa Branch held its first meeting January 30, with Ken Johnston, of Health and Welfare Canada, speaking on "Birth Defects Around the Pickering NGS". Johnston had led the study sponsored by the Atomic Energy Control Board in response to media accusations in 1988. (See article in last issue.)

Planned meetings include Peter Allen of AECL CANDU speaking on CANDU 3 and Roger Humphries, Director General Nuclear Safety, DND, on international safety initiatives.

Saskatchewan

The first meeting of the season was a luncheon at which Frank Finlay spoke on the topic, "God is a Nuc". In January Don Lawson of AECL CANDU gave an update on CANDU 3.

The branch has applied to FEARO for funding to participate in the review of the Rabbit Lake uranium mine development to be held later this year.

Toronto

Continuing its monthly series, in late November Allen Brown of Ontario Hydro provided the first open technical talk on the problems at Unit 2 of the Darlington NGS. The first meeting of 1992 had Dr. John Simpson providing an update on research on neutrinos.

1993 Conference

The CNS Council has agreed to drop the regular CNS annual conference in 1993 and join the Canadian Nuclear Association in sponsoring a special international conference in Toronto in October 1993.

Over the past year or so the CNA has been promoting a large event, called "INC '93", which would have been a combined international congress and exhibition, with considerable opportunities for "dialoguing" with non-nuclear groups. However, international support for such an event proved lower than anticipated.

George Pon (former AECL vice-president) will continue to be engaged by the CNA as executive director of the modified 1993 CNA / CNS conference.

Chalk River Branch Presents Brief on Energy Policy

Ed. Note: *Taking advantage of a visit of Ontario's then Minister of Energy, William Ferguson, last fall, the Chalk River Branch of the CNS presented a brief on Ontario's energy policy. The brief was prepared and given by Bob Andrews, vice-chairman of the Chalk River Branch. Following is the Executive Summary of the brief, which was titled "Ontario's Energy Policy – Comments and Concerns".*

One of the most vital issues that will face the world is the transition from an energy system dominated by fossil fuels to one composed of environmentally-benign, sustainable technologies. In Ontario, the present government has placed emphasis on energy policies to address long term issues including sustainability and environmental protection. We feel that such policies must be based on a broad analysis that transcends purely "supply side" or "demand side" thinking.

Sustainable energy options are quite well defined by pres ent scientific knowledge. In large part, they comprise solar-based renewables, nuclear fission with appropriate advanced fuel cycles, and possibly controlled nuclear fusion some time in the future. Of these nuclear fission is the only one known at present that can be deployed as required to form the core of a sustainable system. The present energy debate tends to overlook this fact.

We are particularly concerned about present policies that advocate increased use of natural gas for three basic reasons:

- natural gas is projected to become increasingly expensive and uncertain in supply early in the next century;
- these policies lead away from sustainability and result in increased greenhouse gas emissions;
- they represent short-term gain with long-term pain.

Our other concerns are related to the widespread belief that the construction of new electricity generating stations should be delayed as long as possible. This puts the reliability of the electrical system at risk. Further, excessive delay will undermine the ability of the nuclear sector to respond to future needs. Again this is a policy with some perceived short-term gain but having much potential long-term pain. A strong electrical system will be of tremendous benefit in a very competitive world – particularly in the light of our free trade agreements with the USA and perhaps with Mexico.

Our recommendations to the government of Ontario are:

1) that the government study carefully the role of natural gas and its influence on future electric supply and demand, with particular attention to realistic expectations past 2010;
2) that the government re-examine its policy of delaying the construction of new electricity generating capacity, in the light of possible system disruptions, lost competitive opportunities, and its impact on the nuclear option;
3) that the government reconsider its decision on funding of advanced CANDU, a stepping stone to a major sustainable technology.

The future of our electrical system is in our hands: Wise decisions will promote success; Poor ones will guarantee failure.

Seminar – Science for Educators

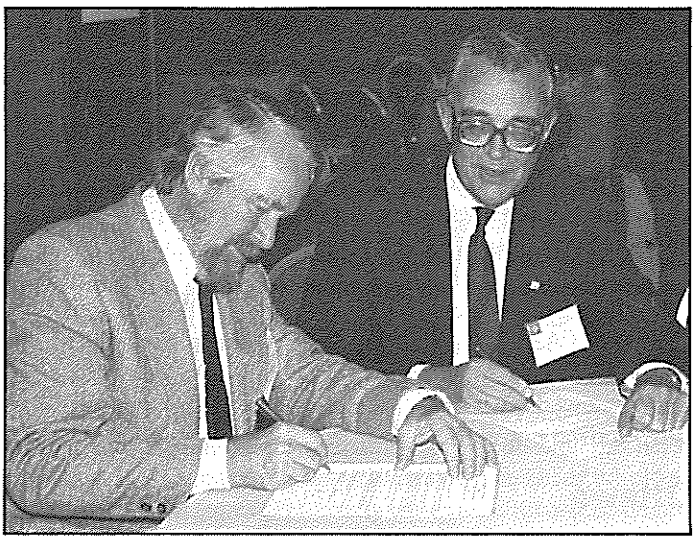
The 17th annual Science for Educators Seminar will be held at Chalk River, April 9 to 11.

This seminar is presented by the Chalk River Laboratory of AECL Research, in cooperation with the Science Teachers Association of Ontario, the CNA, New Brunswick Electric Power Corporation and the Canadian Nuclear Society.

Over the years this program has provided sound information to scores of science teachers from across the country. CNS members should ensure that teachers in their local schools are aware of this opportunity.

Further information can be obtained from:

Science for Educators Seminar Office
AECL Research
Chalk River Laboratories
Chalk River, Ontario
K0J 1J0
Tel. 613-584-3311



CNS' Gil Phillips signs a cooperation agreement between the Canadian Nuclear Society and the European Nuclear Society while ENS president Jean van Dievoet looks on. The signing took place during the winter meeting of the American Nuclear Society in San Francisco, 12 November 1991.

1992 CNS Conference Technical Program

The program committee for the CNS Annual Conference, to be held in Saint John, N.B., 7-10 June 1992, have just completed the selection of over 100 papers for presentation and have planned the following schedule:

Mon., June 8, p.m.	Reactor Physics
	Thermalhydraulics 1
	Safety Analysis 1
	Reactor Design 1
Tue., June 9, a.m.	Thermalhydraulics 2
	Safety Analysis 2
	Fuel and Fuel Channels
	Reactor Design 2
	Operator Training & Licensing 1
Tue., June 9, p.m.	Small Reactors
	Fusion Science & Technology 1
	Darlington N 12 Assessment 1
	Reactor Performance
Wed., June 10, p.m.	Safety Analysis 3
	Fusion Science & Technology 2
	Darlington N 12 Assessment 2
	Operator Training & Licensing 2

Call for Papers

1992 CNS Simulation Symposium

Sponsored by the Nuclear Science and Engineering Division of the Canadian Nuclear Society and hosted by the Royal Military College of Canada, the 17th Annual CNS Symposium on Simulation of Reactor Dynamics and Plant Control will be held on **August 17 and 18, 1992** at the Royal Military College of Canada, Kingston, Ontario, Canada.

The scope of the Symposium covers all aspects of nuclear modelling and simulation, and usually includes sessions on systems simulation, thermalhydraulics, reactor physics, and related aspects of R&D and safety analysis. Presenting a paper at this Symposium does not preclude presentation elsewhere and papers are encouraged on unresolved problems and/or methods under development.

The deadline for receipt of your abstracts of 300 words or less is **February 29th, 1992.** This should be sent to:

Dr. Hugues W. Bonin
Dept. of Chemistry and Chemical Engineering
Royal Military College of Canada
Kingston, Ontario, Canada
K7K 5L0

For further information, call Dr. Hugues W. Bonin at (613) 541-6613 or (613) 541-6271, or FAX (613) 542-9489.

The Formative Years of the CNS 1976-1984

G.R. Howey, P.A. Ross-Ross, and J.S. Hewitt

Ed. Note: *Even though the CNS is a relatively young society it is becoming evident that many members are not aware of its beginnings. On the premise that those who ignore history are likely to repeat it we are reprinting excerpts from an article that was run in the first issue of the ill-fated "Nuclear Journal of Canada" in 1987.*

Phil Ross-Ross, one of the original authors, who is still active with the CNS as chair of the past-presidents' committee, has offered to write a sequel to bring the story up to date. We look forward to that article later this year.

Introduction

The Canadian Nuclear Society/Société Nucléaire Canadienne was born as the 'Technical Society of the Canadian Nuclear Association,' on 11 June 1979, at the Annual Business Meeting of the Canadian Nuclear Association. The Canadian Nuclear Society (CNS) was to be a learned society, with membership open to individuals. The CNS was to be distinct from the Canadian Nuclear Association (CNA) whose membership is composed primarily of industries and institutions, and thereby serves as an industrial forum.

Two basic factors held the door open for the creation of a learned nuclear society in Canada. The first was CANDU. The second was the early existence of the CNA. Had it not been for CANDU and the CNA, the CNS might already have become another chapter of the American Nuclear Society (ANS). The presence of the CNA (established in 1960), whose focal point was CANDU and which had played the dual role of industrial forum and technical society, countered any strong interest of the ANS to expand into Canada. But the CNA recognized its limitations in trying to serve both institutional interests and the interests of the individual seeking enrichment of his chosen pursuits, hence there was a small group within the CNA and elsewhere that promoted the formation of a learned nuclear society in Canada.

The present story deals with the formation and the early years (to 1984) of the Canadian Nuclear Society.

The Learned Society and the CNS in Perspective

The 'learned society' as an organization serving, through orderly deliberation, the intellectual pursuits of its members, and from thence the welfare of society at large, has survived many centuries. In each instance, the creation of a society depended on the motivation of the practitioners of the subject pursued, and its survival depended largely on whether society at large and the prevailing institutions were hostile or supportive concerning the perceived aims of the organization.

The many thousands of scientific/technical societies, including the CNS, have had the dual obligations of the advancement of their scientific or technical subject, on the one hand, and service to a larger society, to which they also owe their existence, on the other.

As we shall see, the CNS evolved with a great deal of support at its foundation from existing bodies, particularly the CNA and the founders' employers. Receipt of this support did not compromise the freedom of the CNS to attain the state of autonomy appropriate to the good health of a learned society. Moreover, its ability to function in the interests of the broader community has been demonstrated.

The Gathering Support for a Canadian Nuclear Society

The earliest active support for a Canadian learned society devoted to the nuclear sciences and their practical applications came from individuals who would eventually become its members. The question of why there was no Canadian nuclear society was frequently asked.

Such discussion, in the late 1950s, led to the formation, in 1960, of the CNA. Although this organization was established as a corporate-based association of Canadian nuclear industries, with a primary objective of advancing nuclear energy based on the CANDU development, a number of features of its organization and its activities over the years betrayed the breadth of aspiration of its founders. One such activity was organizing the series of technical sessions held, on a fairly regular basis, at the annual CNA conferences.

The first such technical ("Third Day") program was included in the 1973 conference in Toronto. Over the years since its founding in 1960, the CNA had also sponsored and organized numerous conferences and seminars on special topics, as well as the annual student conferences.

At the time of the joint ANS/CNA conference in 1976, the possibility of promoting full-scale Canadian sections of the ANS was raised, particularly by the ANS, but Camille Dagenais, CNA President at that time, identified the importance of exploring the possibility of a Canadian-based nuclear society, rather than supporting development of a Canadian arm of a foreign-based organization.

R. Langlois, Dean of the Ecole Polytechnique, was appointed Chairman of the CNA Scientific/Technical Task Force, which made recommendations to the CNA Board of Directors on the creation of a new technical society.

The Langlois Task Force

At its first meeting in January 1978, the Task Force undertook the preparation of a Prospectus on a 'Professional Association of Individuals Working Within the Canadian Industry' that outlined the needs, objectives, and constraints

for such an organization. The Prospectus stressed the need for improved communications at the scientific and technical level through publication, peer-review, public exchange of information, and debate. The Prospectus also included a recommendation for 'the society [to] be allowed to evolve naturally,' without predetermined or rigidly imposed notions of 'structure, objectives, roles, organization, etc.' The Task Force would 'provide guidance and leadership to the process.'

In keeping with its recommendations, the Prospectus included some modest proposals, such as (1) that an 'Individual Members Section' be formed under a standing committee of CNA; (2) that the Section be responsible for the Third Day Program at the CNA annual conferences; (3) that there be no plans, initially, for the publication of journals; and (4) that the Standing Committee of the Individual Members Section form the executive of the new organization.

Although it described an organization that, in profile, fell far short of what the Society actually became a few years later, the Prospectus in many ways set the tone for the evolution of the Society.

At the Langlois Task Force meeting of 17 August 1978, many members expressed the view that, while there was an important role to be played by the new society in the area of 'authoritative' public relations with respect to nuclear technology, greater emphasis should be placed initially on developing learned society traits. With the benefit of hindsight, this discussion must be considered ironic, because at the 26 February 1979 meeting of the Task Force, in which representatives of the CNA Public Affairs Committee were included, the case was made, that if the new society were to have local chapters or branches, individual members could play an important role in addressing local public nuclear issues.

The Langlois Task Force undertook to request, through its chairman, that the CNA Board of Directors establish a professional society (later referred to as a Technical Society) within the CNA. It was also agreed to ask the Board of Directors to nominate a small task force to develop the structure of the proposed society with a view to presenting the details to the CNA membership at the upcoming 1979 CNA Annual Meeting in Toronto. The CNA Board of Directors accepted these recommendations at its 13 March 1979 meeting, and promptly prepared to announce the existence of the 'Technical Society of the Canadian Nuclear Association' at the annual conference.

The membership information contained a statement of objectives and organization for the Society reflecting the recommendations of the Task Force.

The Langlois Task Force and the CNA Board of Directors had performed their respective tasks, and, as of 11 June 1979, the Canadian Nuclear Society existed in all fundamental respects but that of its name.

The *Pro Tem* Council, 1979-80

Creation

The Organizing Committee met on 27 August 1979. The official name of the new Society was now to become: The Canadian Nuclear Society – The Technical Society of the Canadian Nuclear Association. The following were nominated and accepted as executive of the Organizing Committee, and therefore as officers of the *Pro Tem* Council of the new Society:

G. Howey, President
J. Hewitt, Vice President
D. Meneley, Secretary-Treasurer

The newly appointed executive met immediately in what was later referred to as the first meeting of the CNS Council. By the second meeting of the CNS Council on 11 September 1979, the membership consisted of: G. Howey, President; J. Hewitt, Vice President; D. Meneley, Secretary-Treasurer; W. Paskievici, Program Chairman; R. Harrison, Member-at-Large; and J. Weller, General Manager. P. Ross-Ross, who had participated in many of the earlier preparations, was added a short time later as Membership Chairman.

Accomplishments

The President and Vice President revised the earlier draft version of the Constitution and By-Laws to reflect the new circumstances. After approval by Council, the document was presented to the CNA Board on 25 October 1979.

In the early Council meetings, careful discussion took place in establishing necessities such as the logo and letterhead. Membership was the key item, and membership brochures, application forms, and a membership drive were needed. A branch structure was essential as a means of soliciting membership. Membership eligibility received careful attention. (The CNS is not a 'professional' society in the restricted sense; membership is not tied to educational qualifications. Rather, membership is open to individuals who are contributing, in a positive way, to the advancement of nuclear science and technology.) Those who joined before the end of 1980 are identified as 'Charter Members' of the Society.

Policies, procedures, and guidelines were needed, and Phil Ross-Ross, with his wealth of experience from the EIC and CSME, took a lead role in preparing policy statements.

Lines of communication with the CNA Board of Directors were not always adequate. There was some concern by the Board as to just what Council was doing. To assure communications the CNS President was invited to attend, *ex officio*, subsequent CNA Board of Directors meetings. Also, the newly appointed CNA President, Norm Aspin, attended Council in February 1980, and was constantly supportive of CNS affairs.

The 'Third Day', the day of specialized technical papers at the CNA Annual Conference, and one of the considerations in the formation of the Technical Society, had been placed in the hands of the *Pro Tem* Council. Council found itself heavily involved as 'the conference committee' for the first annual conference at a time when it really had expected to concentrate on organizing the Society. Fortunately, Wladimir Paskievici, who had been heavily involved in the 1977 CNA Annual Conference, did a noble job as the CNS's first conference chairman.

Another major task of the *Pro Tem* Council was to produce a newsletter for disseminating information to mem-

bers. John Hewitt was the key figure in creating the 'CNS-Bulletin-SNC.' The first 'Bulletin' was issued in May 1980. The cover page was printed on CNS letterhead; the contents were mostly oriented to the First Annual Conference of the CNS, to membership, election procedures, and general news on progress of the Society.

The CNS First Annual Conference was finally held in conjunction with the 20th Annual International Conference of the CNA in the Queen Elizabeth Hotel in Montreal on 18 June 1980.

The first Annual General Meeting of the CNS was held after the conference luncheon. George Howey, Interim President of the new society, could be justifiably proud of the achievements of the *Pro Tem* Council. The conference was a success, and the year had been very productive. Basic policies and procedures were in place, membership stood at 370, the first 'CNS-Bulletin-SNC' had been issued, and work was progressing to create branches to serve members locally and to establish divisions to meet the scientific and technical interests of the members. The nominating committee presented a slate of officers selected to ensure reasonable continuity and also a reasonable geographic and technical representation. With no further nominations from the floor, the first Council, elected by acclamation, took office.

The Council consisted of George Howey, President; John Hewitt, Vice President; Bob James, Secretary-Treasurer; Ernie Card, Tony Colenbrander, Tom Gellatly, Joe Howieson, Wladimir Paskievici, Phil Ross-Ross and Tom Schur, Members-at-large; and Jim Weller, General Manager.

The First Elected Council, 1980-81

The first meeting of the new, duly elected Council (also the 11th meeting of the CNS Council), was held on 18 July 1980. One of the first items of business was the approval of the 'Guidelines' for CNS Committees' prepared by Phil Ross-Ross. Five standing committees were formed: Communications, Program, Technical Divisions, Membership, and Finance and Administration.

Branch Steering Committees were formed in five locales: Ottawa (Joe Howieson), Manitoba (Ernie Card), Montreal (Michel Therrien), Chalk River (Ian Hastings), and Toronto (Arthur Guthrie). The Ottawa Branch, although not yet formally constituted, was first off the mark, holding a meeting on 4 February 1981, with Ron Hodge, as guest speaker, addressing a group of thirty on the 'Canadian Coast Guard's Nuclear Ice-Breaker Project.' The Manitoba Branch was the first constituted (approved by Council on 30 January 1981) and held its first meeting in Winnipeg on 23 February, with guest speaker John Boulton giving a talk on 'Nuclear Fuel Waste Management in Canada.'

As more members were enlisted into committees and activities, there was a need for a who's who (and where); the first issue of the booklet 'Membership List' was published in mid-1980.

The heart of a learned society is, of course, its scientific and technical structure. Joe Howieson was the key man. He presented a 'Policy Statement on the Formation of Technical Divisions' to Council in November 1980. The various areas of interest were grouped into four divisions:

Nuclear Science
Design and Materials
Mining, Manufacturing and Operations
Environment, Health and Public Affairs

Committees for each division were set up, and took lead roles in the development of the division.

Radioactive waste management was a topic that received much attention at this time, and this was a likely topic for the first major international conference of the new Society. In late May 1981, when Tom Drolet announced plans to hold the conference in Winnipeg in 1982 in a convention centre still under construction, a few Councillors were apprehensive. The case was well presented, however, and Council gave the organizing committee the go-ahead.

The CNS Second Annual Conference, held in Ottawa on 10 June 1981 in conjunction with the 21st Annual International Conference of the CNA, was organized under the able chairmanship of Frank McDonnell. He was well supported by members in the Ottawa Branch. They relieved Council of direct responsibility for the conference, and did much to develop the CNS's capability to run a first class conference. The luncheon guest was Milt Levenson, who later, as ANS President, played a key role in formalizing CNS/ANS co-operation.

In April of 1981, David Mosey relieved John Hewitt as editor of the *Bulletin*. Subsequently, Hugues Bonin became Associate Editor and Dave McArthur became Production Editor.

By the end of the second year with George Howey as President, the CNS had the framework for the Society fairly well established. Branches and divisions had been formed, guidelines were in place, headquarters had been set up to handle a society of individuals, and the *Bulletin* was providing a means of communication between the society and its members. Membership was over 500, and over 50 were now serving on the various committees of the Society. The Society was now ready to start serving its members and the Canadian interest, both at home and abroad, in nuclear science and technology.

The Adolescence, 1981-1984

At the Second Annual General Meeting of the Society, the Council elected for 81/82 was Phil Ross-Ross, President; John Hewitt, Vice President; Peter Stevens-Guille, Secretary-Treasurer; Ernie Card, Tony Colenbrander, Tom Drolet, Antoine Duchesne, Walter Harrison, Joe Howieson and Wladimir Paskievici, Members-at-large; George Howey, Past President; and Jim Weller, General Manager.

One should look at this period over the longer term. A great deal of stability had been achieved; there was a gradual turnover in Council membership, and the formation of branches and divisions had provided a source of dedicated members from which future councillors and presidents would emerge.

Although Ross-Ross and the Council were not generally in favour of a president serving two successive terms, the

events of the time made his continuation highly desirable, and he agreed to stand for a second term.

A Long-Term Plan

When Ross-Ross became President in June 1981, he prepared a document with the aid of Council entitled, 'The CNS of Tomorrow.' The document covered goals, organization, services to members, strengths and weaknesses of learned societies in Canada, strengths and weaknesses of CNS/CNA relations, and many other topics. The key points of 'The CNS of Tomorrow' were as follows:

1. It is very difficult for any small Canadian learned society to work in the shadow of a corresponding giant to the south. That the ANS is a very well-organized society with well-developed conference and publication programs, heightens this concern.
2. The CNS needs visibility.
3. A conference program is good for visibility, and conferences should always be designed to earn revenue for the Society.
4. The CNS will have a journal one day, but not now. Journals can be a burden on a society in terms of resources and finances.
5. Someday the CNS may be an independent society. Meanwhile, the CNS should be run on an independent basis and should move towards paying for services received from the CNA.

Building strong membership in a technical society is a universal and difficult challenge. For CNS, superimposed on this challenge was an identity problem. The fact that the CNS was the Technical Society of the CNA still left some doubt and confusion. Identity was essential. To overcome these limitations the CNS would have to become well recognized within Canada, if only to facilitate building its program and membership, and also to become recognized internationally. Three main avenues were open: (1) through a technical program of conferences and seminars; (2) through first rate publications; (3) through active involvement in international affairs. As will be seen, progress was made on all counts over the next few years.

International CNS Developments

Establishing the CNS internationally was essential. The world was experiencing a proliferation of nuclear conferences, and the ANS and ENS (European Nuclear Society) were well entrenched. Lead times of three to five years on conferences are not unusual. The CNS would, in some sense, have to pry its way in if it were to run an international conference program without severe scheduling conflicts.

In late 1981, riding on the coat-tails of the CNA and a well-established national nuclear program, the CNS began to move into the international scene.

The ANS and ENS, the latter composed of a consortium of many European national societies, dominated the international scene, and the ANS had in addition very strong international committees. In the late 70s, after a number of attempts, efforts were focused on the creation of an 'International Union of Nuclear Societies.'

By 1981 the IUNS was developing into a cumbersome organization and the promoters needed a means of easing into a less formal organization. In November of 1981 a formation meeting in San Francisco abandoned the IUNS and led to the formation of the International Nuclear Societies Group (INSG). The INSG became a very loosely structured informal organization, composed of 12 delegates representing four areas: three from Europe (ENS), three from Asia (Japan, China, Korea), three from Latin America (Argentina, Brazil, Mexico) and three from North America (two from the ANS and one from the CNS).

Ross-Ross chaired the third meeting of that organization in Vancouver, in September 1983, in conjunction with the fourth Pacific Basin Nuclear Conference. This was the first to be held outside the ANS/ENS jurisdiction. Canada and the CNS were in a unique position; although the CNS was a young emerging society, it was backed by a fully established national nuclear program. The CNS was in a good position to speak on behalf of the old established, as well as the new emerging societies, and the Canadian voice was heard. Ross-Ross later drafted the charter for the INSG.

In early 1983, the ANS, supported by the ENS, placed before the INSG a proposal to form an International Institute on Nuclear Safety. Many of the objectives overlapped with the IAEA's established role. The end result was an advisory group to the Director General of the IAEA called the International Nuclear Safety Advisory Group (INSAG). Dan Meneley continues as the Canadian representative on INSAG.

Ross-Ross had the opportunity to talk about ANS/CNS co-ordination and co-operation, and he drafted the 'Agreement of Co-operation Between the Canadian Nuclear Society and the American Nuclear Society.' The agreement was approved by both societies in June 1983 and formally signed in Vancouver in September 1983.

As a result of INSG participation and the CNS/ANS Agreement, the CNS was now better positioned to co-ordinate its conference program with the international scene.

China, a country emerging from many years of isolation, was seeking to improve its participation in the world of technology transfer. Through the INSG, the Chinese Nuclear Society approached the CNS, in 1983, concerning an agreement of co-operation. Such an agreement between the two was ceremoniously signed in Toronto in November 1984.

On his retirement as CNS President in 1983, Phil Ross-Ross became the first incumbent appointed to the position of CNS International Delegate. The position later became an *ex officio* position on the CNS Council.

Conferences

The CNS did not delay getting its conference program underway. The International Conference on Radioactive Waste Management was held in September 1982 in Winnipeg, in conjunction with the Annual Information Meeting of the Canadian Nuclear Fuel Waste Management Program. About 240 attended the three-day conference for which 90 papers were selected. Of these, over one third were from abroad. The conference earned a surplus of over $20,000 – just what the Society needed. The Waste Management Con-

ference set a standard for all future conferences.

Internal CNS Development

To help maintain a sense of common purpose among active members the concept of the Officers' Seminar was introduced. The first such seminar for the CNS was held on 23 September 1982. All members of Council, Branch, Division, and other committees are invited to meet once a year to get up-to-date on the affairs of the Society. The Officers' Seminar has become a tradition.

By the end of the CNS's adolescence, the Technical Divisions had reached a degree of maturity, and from July 1984, each Technical Division has been represented on the Council by its chairperson. Also during this period, the position of Branch Activity Chairman was established on the Council.

CNS Publications

The CNS-Bulletin-SNC became a typeset newsletter in the fall of 1983. Also, a typeset technical supplement to the Bulletin was introduced at the suggestion of Joe Howieson in 1983-84.

Also during 1983-84, the CNS undertook to develop an international market for its conference proceedings, both of the many conferences that had already taken place, and of future conferences organized by the Society. The favourable response to this offering of CNS publications was a good omen for the introduction of a CNS-published journal.

Early in the adolescent period, a segment of Council wrestled with the question of establishing the *Nuclear Journal of Canada*. In the autumn of 1983, the Council sought professional advice and commissioned Alan Wyatt to study the matter and report. Wyatt's proposal for a 'Canadian Nuclear Journal,' dated 18 February, was received by Council on 7 March 1984. Wyatt was authorized to recommend the next step. [***Ed. Note:*** *The* Nuclear Journal of Canada *was launched in 1987 but was terminated a year and a half later because of the disappointing revenues.*]

Concluding Remarks

The evolution of the CNS has been traced from its early conception, through its formation, birth, and adolescence, to the stage of affirming many of the attributes of a mature scientific and technical society. That the CNS achieved such a sound and visible stature, in so few years after the first co-ordinated steps were taken, is remarkable.

It will be evident from the foregoing account that the CNS was not simply 'willed' into existence. Rather, the founders took account of the prevailing circumstances, so that the CNS was indeed, in the words of the Langlois Task Force, 'allowed to evolve naturally.' Thus, the emerging Society was able to draw on the best of its environment to lay a strong foundation, to grow quickly, and to stand tall, strong, and self-directing among the nuclear societies serving the common good through the advancement of nuclear science and technology.

Appendix

Chronology of Events Spanning the Formation and Early Years of the Canadian Nuclear Society

1960	Inauguration of the Canadian Nuclear Association (CNA)
1973-06	Technical Papers Program at the CNA Annual Conference
1976-06	Canadian Nuclear Association / American Nuclear Society Joint Conference in Toronto
1976-11-12	Letter from G. Howey to R. Langlois calling for the formation of a Canadian nuclear society
1977-06	First of a series of 'Third Day' Technical Programs organized by Standing Committees of the CNA for the CNA Annual Conferences in 1977, 1978, and 1979
1977-07	Technical Society Steering Committee recommends ongoing Task Force
1978-01	Langlois Task Force, first meeting
1978-06	Open discussion on a technical society at the Third Day Luncheon of the CNA Annual Conference
1979-02-26	Langlois Task Force makes recommendations to the CNA Board on the nature and establishment of the new Society, at its final meeting
1979-06-11	The Technical Society of the CNA formally established at CNA Annual Conference
1979-07-31	Meeting of the Technical Society Organizing Committee. The full name of the society as the Canadian Nuclear Society – The Technical Society of the Canadian Nuclear Association and the officers of the *Pro Tem* Council are confirmed
1979-07-31	First meeting of the CNS Council (*Pro Tem*)
1979-10-25	The CNS Council presents the draft CNS Constitution and By-laws to the CNA Board
1980-05	CNS-Bulletin-SNC first issued
1980-06-18	First Annual CNS Conference, held in conjunction with the twentieth CNA Annual Conference in Montreal
1980-11-25	First technical publication of the CNS available as the full proceedings of the First CNS Annual Conference
1980-1981	CNS branches established for Manitoba, Ottawa, Chalk River, Toronto, and Quebec
1980	CNS Membership List first published
1981	Planning document 'The CNS of Tomorrow' tabled
1982-09	CNS holds its first major international conference, on Radioactive Waste Management, in Winnipeg
1983-09	CNS hosts meeting of the International Nuclear Societies Group (INSG) at the Pacific Basin Nuclear Conference in Vancouver and is heavily involved with the ANS and the ENS in INSG formation and development
1983-09	CNS/ANS Agreement of Co-operation formally signed at Vancouver
1983	CNS participates, through the INSG, in the formation of the International Nuclear Safety Advisory Group (INSAG)
1984-10-29	CNS contributes a major formal submission to the Interfaith Program for Public Awareness of Nuclear Issues (IPPANI)
1984-11	CNS and the Chinese (PRC) Nuclear Society formally sign an Agreement of Co-operation in Toronto
1984	CNS commissions a study and receives a formal proposal for the *Nuclear Journal of Canada*

Book Review

Splitting the Atom

Stephen Amidon, Bloomsbury, London, 1991.

Reviewed by Keith Weaver

I don't know quite what I expected when I picked up this book.

Would it be yet another valiant effort on someone's part to "prove" definitively that nuclear power is an evil force? Would I find myself embroiled in page after hopeless page of moralistic slop? The reviewers' comments on the back cover are glowing, but this isn't always a good thing.

"Splitting The Atom" turned out to be a good read, which is already quite a bit for a reviewer to say about a novel. As a first novel, it is particularly ambitious, if somewhat conformist in spots. For example, there is the by now obligatory dash of sex, served up with the required degree of explicit description. (Not all novels, even first novels, bend to this perceived dictum. Another recent first novel, "Red Fox", by Anthony Hyde, has no sex in it at all, and yet somehow manages not to bore the pants off its readers, so to speak.) For the present audience, the real interest in "Splitting the Atom" lies elsewhere.

The story centres on a man and his twin sons. Walter, the father, is a successful engineer at an electrical utility, inferred to be somewhere near Washington, D.C. Walter's life turns out to have been a struggle to overcome the legacy of his father, in whose footsteps he definitely did not want to tread. The twin sons, Eddie and Matthew, are very different. Eddie, the brilliant high flyer, is always after new thrills, trying to come closer to the edge. An intuitive type, he always seems to "know" things, especially things about people. Matthew, who has just finished university, is struggling with or against something. He appears to have no plans, no objectives, and expends rather a lot of effort arguing with, or becoming enraged at, his father.

On the twins' twenty-second birthday, Eddie is killed in a glider crash. Walter, who was supposed to be piloting the craft, survived the accident, but is left with injuries that give him pain for the rest of his life.

Walter is working on a nuclear plant called Olympic, the fate of which is that it will not be given an operating license, will never go into service, and will be demolished without having produced so much as a watt-second of energy. Walter is promoted to the job of selling the first core, an outcome which also is not to be. All these near misses are part of an elaborate plan to save the utility corporation, which finds itself in a dreadful financial fix. Recognizing that years of effort on his part have been cynically thwarted at every turn by his management, Walter sends a frank letter to the NRC, thereby complicating the utility's financial schemes and simplifying his own employment picture. After a bit of half-hearted searching for alternative employment, he "retires" and takes himself off to Greece, home of his wife's family, where he intends to repair a broken down house he owns there, a gift from his in-laws years earlier.

Now we can look at all the intriguing bits that the author has woven into the plot.

The book itself is laden with symbolism. In fact, there is probably far too much symbolism. The cover on the paperback edition depicts Prometheus chained up and about to be attacked by the vulture which was detailed to devour, eternally, Prometheus' liver, an organ which would also be eternally renewed. There can be few people in the nuclear industry who are not familiar with the Prometheus myth. For his temerity in stealing fire from the gods and taking it to the human race, Prometheus was condemned to this continuous and unending evisceration. Guess what fate awaits nuclear engineers? Of course, there is nothing so crude in the book as a point blank statement such as that, but the heavy Prometheus imagery is continued throughout the story: the fact that the plant is called "Olympic", the later connection with Greece, the physical pain and mental torture that Walter and all those around him have to endure.

There is a much more striking image pervading the book, and it is so prevalent as to be unavoidable. Everything in the story seems to contain the seeds of its own destruction. In trying to avoid his own father's mistakes, Walter ends up ruining his life, and he questions whether, in fact, he killed his son, Eddie. Eddie is himself a twilight zone character, driven by some demonic force that ticks away inexorably deep within him. Matthew drifts about rudderless, unable to take any control of his life. He finally falls into the company of two talented but warped hippie-types, pursuing what they perceive to be great art and artistic expression to the edges of anarchy and beyond. The fate of Walter's utility employer is also sealed, a foregone conclusion by virtue of the company's own corruption. Walter's death is due to inoperable bone fragments from the glider crash which have lain dormant within him but then one day one of them suddenly pierces his heart. And, presumably providing the driving image for it all, there is the nuclear plant itself, the exemplar of a technology that draws its lifeblood from (and leaves behind a legacy of) unstable atoms whose internal destruct-mechanisms might go off at any time.

Now, the question is "Just what the hell is one to make of all this?"

The author is evidently not intimately familiar with either the nuclear industry or with power stations. Minor clangers such as "coolant towers" seem to indicate that. In describing parts of the nuclear station while it is being dismantled, the author keeps his descriptions very general, with no clear reference to any identifiable piece of equipment. All this is neither here nor there, but it does make interpretation a bit more problematic. It seems that there are two possibilities.

One. The author is reflecting his own thoughts or those of people around him, on the human race's Promethean plight. Mere human beings are not equipped to deal with the nuclear forces they have unleashed. The general tendency of humans to screw things up no matter how hard they try not

to has been deftly spliced onto a nuclear theme. Result: a good yarn and nothing much more. Prometheus has ventured too far and he will pay, as is humankind's lot. Is life really like this? Should we all just roll to our rifles now, blow out our brains and go...(where?)...like soldiers? No need. If Interpretation One is correct, then all we have is a good read after which we might feel a bit depressed, a bit reflective, perhaps a bit more despondent than usual. But it's only fiction.

Two. I like the second possibility (of the two that I see). Just call me a pessimistic optimist. This interpretation says that the author has laid out a story that looks like Interpretation One, but that's not what it means. In keeping with the commonly encountered fatalistic view of that tragedy called life, the author encourages us to recognize that people do have unfortunate, tragic or doomed lives. Such a view or outlook almost welcomes the observation that nuclear energy is scary to a lot of people. Having an object on which to project one's perceptions of an omnipresent villainy makes the world a much more tidy place, intellectually. And in the myth, Prometheus actually was caught and punished by the gods for invading their domain and taking what wasn't his to take. The real point, though, is that he *did take it*. He *did* give fire to humankind. People *have* used fire to great advantage and the race has never looked back since. Prometheus' punishment may not be the most important aspect of the myth; perhaps the point is the great power of fire, and its ability to deliver unspoken but enormous and outweighing benefits to people. Why else would the gods be so jealous of having lost monopoly control of it?

Did the author actually intend this hidden and rather ironic social commentary? It's a nice thought, but is almost certainly too much to wish. The mere possibility does raise a lot of interesting points though.

The most important of these, I think, is the question of why people dwell so much, and sometimes exclusively, on the dark side of things. This happens even when there is light to hand that could be used to dispel darkness. What are the deep and mythic connections relating our perceptions of darkness, ignorance, and evil? Whatever they are, they are as real in our materialistic and faithless world today as in any past spirit-haunted civilization. The reviews of *Splitting the Atom* were glowing, and with good reason. Despite its faults, it is a work that many people would be proud to claim, and, most important of all, it is a good read. However, none of the reviews I was able to locate questioned the implicit assumption behind all the symbols: that the modern world's Promethean fire is too hot to handle and will lead to no good. For them, it appears that the book reflects the general human landscape of fears and concerns in a particularly well-crafted way. For that reason, justifiably, they feel that it is a fine work.

Wouldn't it be nice, though, if the book were actually a huge and superb piece of irony. Against all reasonable evidence that it isn't, I hope it is. What a coup that would be! What a delight! To extract the mickey from all those earnest reviewers and readers!

Nominations Sought for CNA Awards

Calls have gone out for nominations for the following awards presented annually by the Canadian Nuclear Association:

- W.B. Lewis Medal
- Ian MacRae Award
- Outstanding Contributor Awards

The W.B. Lewis Medal is to recognize a Canadian scientist or engineer who has demonstrated a level of technical competence and achievement in the field of nuclear science and engineering as exemplified by Dr. W.B. Lewis.

The Ian McRae Award is to honour an individual for outstanding contribution (other than scientific) to nuclear energy in Canada.

The Outstanding Contributor Awards are to recognize Canadian based individuals, organizations or parts of organizations that have made significant contributions in the field of nuclear, either technical or non-technical.

Nominations should be sent to:
The Secretary, 1992 Awards Committee
Canadian Nuclear Association
144 Front Street West, Suite 725
Toronto, Ontario
M5J 2L7

For further information contact the CNA office at 416-977-6152.

CNS Annual Conference

The 13th Annual Conference of the Canadian Nuclear Society will be held in Saint John, New Brunswick, from the 7th to the 10th of June 1992.

As usual this year's conference will be held in conjunction with that of the Canadian Nuclear Association.

The CNS Conference is co-chaired by Keith Scott of Atlantic Nuclear and V.S. Krishnan of AECL CANDU. Over 100 technical papers, many from abroad, have been accepted for presentation in 16 sessions.

Details and registration forms will be mailed to all members in a few weeks. If they are not received contact the CNS office.

Saint John, New Brunswick

7 to 10 June 1992

Plan to Attend

Notice Re Numbering

Please note this is issue No. 1 of Vol. 13; Vol. 11 and 12 each have 3 numbers.

Calendar

1992

March 27-28 **CNA/CNS Student Conference**
McMaster University, Hamilton, Ontario
contact: Dr. J.S. Chang
Dept. of Engineering
McMaster University
Hamilton, Ontario L8S 4L7
Tel.: 416-525-9140 Ext. 4924
Fax: 416-577-9099

May 17-22 **8th World Congress of the International Radiation Protection Association**
Montreal, Quebec
contact: Jean-Pierre Gauvin
2155 rue Guy, Bureau 820
Montreal, Quebec H3H 2L9
Tel.: 514-932-9552

May 25-29 **Meeting on Radiation Safety in Uranium Mining**
Saskatoon, Saskatchewan
contact: Dr. L.D. Brown
Uranium Saskatchewan
P.O. Box 507
Saskatoon, Sask. S7K 3L7
Tel.: 306-242-8222

June 7-10 **CNA/CNS Annual Conference**
Saint John, New Brunswick
contact: Dr. V.S. Krishnan
AECL-CANDU
Tel.: 416-823-9040
or Dr. K. Scott
Atlantic Nuclear Services
Tel.: 506-458-9552
or CNA/CNS office

June 7-12 **ANS Annual Meeting**
Boston, Massachusetts
contact: Dr. W.I. Midvidy
Ontario Hydro
Tel.: 416-592-5543

August 17-18 **17th CNS Nuclear Simulation Symposium**
Kingston, Ontario
contact: Dr. H.W. Bonin
Royal Military College
Tel.: 613-541-6613
Fax: 613-547-3053

September 20-25 **15th Congress of World Energy Council**
Madrid, Spain
contact: Dr. E.P. Cockshutt
CANWEC
Tel.: 613-993-4624

September 21-23 **Design and Review of Software-Controlled Safety-Related Systems**
Waterloo, Ontario
contact: Ms D. Del Belluz
Institute for Risk Research
University of Waterloo
Tel.: 519-885-1211

September 21-24 **5th International Topical Meeting on Nuclear Reactor Thermalhydraulics**
Salt Lake City, Utah
contact: Dr. W.I. Midvidy
Ontario Hydro
Tel.: 416-592-5543

October 4-8 **3rd International Conference on CANDU Fuel**
Chalk River, Ontario
contact: Dr. P.J. Fehrenbach
AECL/CRNL
Tel.: 613-584-3311

October 25-29 **International Conference on Design and Safety of Advanced Nuclear Power Plants**
Tokyo, Japan
contact: Prof. Y. Oka
Nuclear Engineering Research Laboratory
7-3-1 Hongo, Bunkyo-ku
Tokyo, Japan

November 15-20 **ANS Winter Meeting and concurrent meeting on Fifty Years of Controlled Nuclear Chain Reaction, Past, Present, Future**
Chicago, Illinois
contact: Dr. W.I. Midvidy
Ontario Hydro
Tel.: 416-592-5543

November 17-18 **Conference on the Management of Irradiated Nuclear Fuel**
Manchester, UK
contact: Alison Elgar
Institute of Mechanical Engineers
1 Birdcage Walk
London SW1H9JJ, UK

November ? **CANDU Reactor Safety Course**
Toronto, Ontario
contact: Dr. V.S. Krishnan
AECL-CANDU
Tel.: 416-823-9040

Société Nucléaire Canadienne

Renseignements sur l'abonnement
Formulaire de renouvellement

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ADRESSE (DOMICILE) _____

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- ☐ QUÉBEC
- ☐ SASKATCHEWAN
- ☐ TORONTO
- ☐ LAC ONTARIO CENTRAL (Pickering, Darlington, Port Hope, Peterborough)
- ☐ ÉTATS-UNIS ET INTERNATIONAL

DIVISION TECHNIQUE À LAQUELLE OU AUXQUELLES VOUS DÉSIREZ APPARTENIR

- ☐ SCIENCE NUCLÉAIRE ET GÉNIE CIVIL
- ☐ CONCEPTION ET MATÉRIAUX
- ☐ EXPLOITATION MINIÈRE, FABRICATION ET EXPLOITATION DES CENTRALES
- ☐ GESTION DES DÉCHETS RADIOACTIFS ET ENVIRONNEMENTALES

TYPE D'ADHÉSION ET COTISATION POUR 1992†

☐ RÉGULIER	55.00 $ ††
☐ FONDATEUR	55.00 ††
☐ ÉTUDIANT(E)	20.00
☐ RETRAITÉ(E)	30.00
☐ INSTITUTIONNELLE	55.00

† Les membres qui enverront leur application après le 1er septembre 1991, seront automatiquement transférés à l'année 1992. Les frais de la TPS sont inclus dans les frais d'inscription.
†† Seulement les membres réguliers et fondateurs ont le droit au vote.

ESCOMPTE DE 15.00 $ POUR LES NOUVEAUX MEMBRES QUI PARTICIPERONT AUX ACTIVITÉS DE LA SNC.

Vous avez droit à un rabais de 15.00 $ sur le montant de votre première cotisation.
Veuillez simplement déduire 15.00 $ sur le montant.

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Veuillez faire parvenir votre paiement, incluant le numéro de facture, le plus tôt possible. Les paiements par carte de crédit peuvent être envoyés par télécopieur au (416) 979-8356. Un reçu officiel sera expédié dans les plus brefs délais.

Veuillez compléter et retourner à
Société Nucléaire Canadienne, 144, rue Front ouest, Ste 725, Toronto, Ontario M5J 2L7
Téléphone (416) 977-7620

Canadian Nuclear Society

Membership Application Renewal Form

SURNAME _____ GIVEN NAMES _____ ☐MR. ☐MS ☐DR.

HOME ADDRESS _____

CITY _____ PROVINCE _____ POSTAL CODE _____

PHONE (HOME) _____ PHONE (BUSINESS) _____ FAX _____

COMPANY/INSTITUTE/SCHOOL _____ STUDENT ☐

BUSINESS ADDRESS _____

BUSINESS TITLE (IF APPLICABLE) _____ RETIRED ☐

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- ☐ BRUCE
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CNS DIVISION TO WHICH YOU WOULD LIKE TO BELONG

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MEMBERSHIP TYPE AND FEE SCHEDULE FOR 1992†

☐ REGULAR	$55.00††
☐ CHARTER	55.00††
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☐ RETIRED	30.00
☐ INSTITUTIONAL	55.00

† New members joining after 1991 September 1st will be members for 1992. Fee includes GST.
†† Only regular and charter members have voting rights.

$15.00 DISCOUNT FOR NON-MEMBERS ATTENDING CNS EVENTS

You are entitled to a $15.00 introductory discount on your first-year fees.
Simply deduct $15.00 from your fees amount.

METHOD OF PAYMENT

☐ CHEQUE ☐ VISA ☐ MASTERCARD ☐ AMEX

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Please send payment with this invoice now. Credit card payment may be faxed to (416) 979-8356. An official receipt will be sent in return.

Please complete and return to
The Canadian Nuclear Society, 144 Front St. W., Ste. 725, Toronto, Ontario M5J 2L7
Telephone 416-977-7620

AECL Adopts Code of Conduct

Recently the Board of Directors of Atomic Energy of Canada Limited approved a statement of the principles that underlie the corporation's policies, procedures and practices. This has been issued as AECL's Code of Conduct and distributed in pamphlet form.

The Code includes concise statements under the headings of: Integrity; Laws and Regulations; Commitment to Customers and Suppliers; Public Accountability; Environment, Health, Safety and Security; Teamwork and Communication; Community Relations; Management Responsibilities.

Copies are available from the office of:

Francoise Guenette
Vice-President, Corporate Relations
AECL
344 Slater Street
Ottawa, Ontario
K1A 0S4

LAST MINUTE NOTICE

CNS Nuclear Science and Engineering Division

presents

2-day Course

on

REGIONAL OVERPOWER TRIPS

10, 11 March 1992

to be held at
AECL CANDU, Mississauga, Ontario

Fee: $133.75 (including GST)

For registration: Sylvie Caron, CNS office, 416-977-7620
For information: Joe Almon, Ontario Hydro, 416-592-9688

Deadline
for Next Issue,
Vol. 13, No. 2, Spring 1992
is Friday 24 April 1992
(for publication late May)

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1991-1992

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