



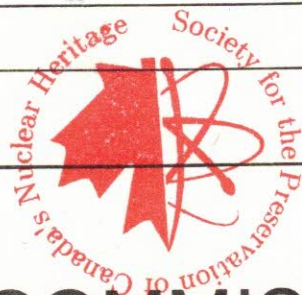
Canadian Nuclear Society  
Société Nucléaire Canadienne

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CNS  
**BULLETIN**  
SNC

Vol. 3, No. 1

February/Février 1982



# DECOMMISSIONING

## BRANCH PROGRAMMES '82

### CHEMICAL ENGINEERING CONGRESS REPORT

The CNS Bulletin is the membership newsletter of the Canadian Nuclear Society.

*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 \$20.00 annually.

*La SNC procure aux Canadiens intéressés à l'énergie nucléaire un forum où ils peuvent participer à des discussions de nature technique. Pour tous renseignements concernant les inscriptions, contacter le bureau de la SNC, les membres du Conseil ou les responsables locaux. La cotisation annuelle est de \$20.00.*

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# CNS BULLETIN SNC

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EDITORIAL

Next Week We Really Must Get Organized

Macbeth has a few cogent remarks about vaulting ambition o'er leaping itself and falling flat on its face. Greek tragedy too, is replete with examples of hubris being inexorably followed by nemesis. All of which applies to editors. Setting out with ambitious plans we have seen, over the months, one disaster followed by another. Gremlins working overtime reduced our typesetting and layout efforts to a shambles. A redesigned front cover disappeared into some cosmic plughole from which it has yet to be retrieved. And pressure of other work reduced the Bulletin editor to a gibbering maniac.

At last we have something now, with a certain promise of something better in the near future. We hope for establishment of a production/editorial team which will not only produce an expanded Bulletin, a better looking Bulletin, but also, and most importantly, a more frequent and timely Bulletin.

Apologies are meekly proffered to all CNS members who've had to wait so long for so little.

And next week we really will get organized.

## PERSPECTIVE

### Decommissioning Nuclear Reactors

In 1980, Ontario Hydro completed a study on the decommissioning of nuclear facilities that have reached the end of their useful life. The study was undertaken to answer three questions.

How is decommissioning carried out?

What costs are involved?

How are these costs financed?

At the 1981 CNS/CNA conference, Ontario Hydro presented a paper explaining the decommissioning method and its associated costs. Following this, at the OEB hearings, Hydro's Financial Information Systems Division explained the financing of decommissioning in greater detail.

This study was followed up with a comprehensive report entitled "Nuclear Decommissioning Cost Study", issued in April 1981.

The decommissioning process may be accomplished by the implementation of three possible options, which may be adopted in whole or in part or some combination as it applies to a specific reactor.

After completing the study, two conclusions were drawn:

1. Decommissioning can be completed in an acceptably safe manner. There are several reasons for coming to this conclusion. They include:
  - (a) The dismantlement and removal of all equipment (with the exception of the reactor) can be done following existing Ontario Hydro maintenance and operating procedures and practices. In addition, this work will be completed under conditions which are less severe than those already existing in a station during operation or shutdown.
  - (b) The reactor, endshields and dump tank can be removed, using a plasma arc cutting method under water. This method is well established in the United States.
  - (c) The building structures and reinforced concrete will be removed, again using Ontario Hydro established procedures and practices.

2. Decommissioning, which may take place, some 60 years or more from now, will in any case, probably be carried out in a manner different from that suggested in the present study. This may appear to negate the value of the study as it is practically impossible to say with any confidence how certain activities will be carried out 60 years from now. Obviously technology will change. However, it can be established that it is possible to do decommissioning work with present day technology.

Another area of uncertainty is the degree of dismantlement. Maybe a new station has to be built on the same location and certain structures may be reused.

In order to meet these needs when they arise, Ontario Hydro has prepared an overall decommissioning schedule for the Pickering NGS-A station which spans more than 28 years.

Each activity has been evaluated and the estimated collective occupational radiation dose for the entire station is 18.24 Sievert (1824 rem).

A summary of the decommissioning cost reveals that the four reactor unit station at Pickering NGS-A will be  $\$162 \times 10^6$  (in 1980 dollars). This is calculated supposing the work is done at this time under present working conditions and agreements.

Extrapolated from this, it is calculated that the Bruce NGS-A station decommissioning cost will be  $\$190 \times 10^6$  (1980 dollars), again calculated as if work were done today. The costs are significant enough that a certain percentage of the financing should be included in the hydro rate charged to present customers.

Bob Sissingh

## CONFERENCE REPORT

### The Second World Congress of Chemical Engineering

In October Montreal hosted one of the most important world conferences in chemical engineering. About 4000 participants from 60 countries convened in the largest French-speaking city besides Paris, to exchange on about 18 themes including energy development, petrochemistry, control, environmental chemical engineering, biochemical and biomedical engineering, and, more interesting to us, nuclear engineering. More than a thousand scientific papers were presented.

The nuclear engineering theme involved such subjects as heavy water production, nuclear fuel cycle, uranium mining and refining, environmental impact and nuclear steam for process and resource industries. The many nuclear engineering papers were grouped in three sessions, and the principal co-ordinator was Dr. H.K. Rae, of A.E.C.L.

The first session was scheduled on the morning of October 5th, and was entitled "Nuclear Energy for the Process and Resource Industry", and the papers presented were: "Nuclear Process Heat Supply by an Interconnected Piping System", by R.E. Harth, H. Harms and M. Walbeck, (West Germany); "Using Nuclear Energy for Oil Sands", by A.R. Bancroft, (Canada); "The Generation of Process Steam for the Recovery and Transformation of Fossil Energy Resources Using Nuclear Energy", by K. Kuenstle, H.-J. Thelen, K. Reiter and A. Leziro, (West Germany); "Optimization of Thermal Energy Supply from Combined-Purpose CANDU Nuclear Reactors", by J.T. Rogers, (Canada); "Nuclear Process Steam for Industry", by W.A. Seddon, (Canada); and "Process Heat System from Ontario Hydro", by F.A. Mulligan, (Canada).

The second session was held in the afternoon of October 5th, under the title "Process Development for the Nuclear Fuel Cycle". Four papers were presented: "An Evaluation of the Canadian Research Program for Nuclear Fuel Waste Management", by L.W. Shemilt and G. Scheng, (Canada); "The Treatment of Radioactive Aqueous Wastes by Reverse Osmosis", by T.D. Hodgson (United Kingdom); "Contactors for a Nuclear Fuel Reprocessing Plant, Development of the Horizontal Pulsed Column", by A.F. Cermak, (U.S.A.); and "Radiation Stability of Organic Extractants used in Nuclear Waste Treatment", by B. Antaya and M.W. Davis Jr., (U.S.A.).

The title of the third session was "Heavy Water Production and Tritium Separation". Six papers were presented in the morning of October 6th: "Canadian Heavy Water Production - 1970 to 1980", by M.R. Galley, K.M. Raven and R.T. Bailey, (Canada); "Heavy Water Production in India", by P.G. Deshpande, K.S. Bimhat and R.K. Bhargava, (India); "Heavy Water Production Benefits of a Supporting R. & D. Program", by A.R. Bancroft, M.R. Galley,

K.M. Raven and R.T. Bailey, (Canada); "Kinetics of Trifluoromethane-T  
Dissociation in Tritium Separation by CO<sub>2</sub> Lasers", by K. Takeuchi,  
Y. Makide, I. Inoue, S. Arai and R. Nakane, (Japan); "Separation  
of Deuterium by H<sub>2</sub>/H<sub>2</sub>O Reaction with Hydrophobic Platinum-Catalyst",  
by A. Kitamoto, Y. Takashima and M. Shimizu, (Japan); and "Present  
Status of Hydrogen Isotope Separation in Japan", by R. Nakane,  
(Japan).

The Congress organizers arranged tours in industrial centers,  
among which were the Chalk River Nuclear Laboratories and the  
Pickering Generating Station. The Congress was very successful,  
and it is interesting to see that nuclear engineering occupies an  
important niche in the many activities of chemical engineering.

Hugues Bonin

## CNS BRANCH PROGRAMMES

### Ottawa Branch

Healthily established, the Ottawa Branch has organized a substantial programme with topics ranging from fusion to nuclear safeguards.

Future meetings are:

31 March -- speaker: J.G. Russell      topic: overseas projects

28 April -- speaker: J.H. Jennekens      topic: safeguards

26 May -- speaker: A.R. Bancroft      topic: tritium

Previous meetings have included an account of Ontario Hydro's large scale fuel channel replacement programme for the Pickering "A" Nuclear Generating Station by Brian Murdoch in October. At this meeting the Branch was also pleased to have President Phil Ross-Ross to provide a few encouraging words from the national perspective.

F.C. Boyd

### Chapitre Québec

Alors que l'Association Nucléaire Canadienne regroupe des entreprises pour défendre les intérêts de l'industrie nucléaire, la Société Nucléaire Canadienne (SNC) s'adresse à la communauté sur un plan individuel dans le but premier de favoriser l'échange et la diffusion d'information relative à la science et à la technologie nucléaire.

Afin justement de rencontrer cet objectif premier, le Conseil national encourage la formation des chapitres régionaux, offrant ainsi une tribune aux membres régionaux pour se rencontrer, multiplier les échanges et faire entendre leur voix au niveau national.

Localement, un groupe de membres s'est réuni le printemps dernier et il a été jugé opportun de former un Chapitre Québec de la Société Nucléaire Canadienne. L'été dernier, le Conseil national autorisa sa création.

Les objectifs du Chapitre Québec sont les suivants:

- a) Faciliter l'échange d'information entre les membres régionaux et inter-régionaux.
- b) Informer les personnes d'autres milieux intéressées par les questions techniques, scientifiques, économiques et sociales de la fission et de la fusion nucléaires et les inviter à nous faire connaître leurs points de vue.



- c) Entretien des liaisons étroites avec les centres de recherche, les milieux universitaires et autres organismes oeuvrant dans le domaine nucléaire.
- d) Faire connaître la voix de la communauté technique et scientifique du Québec en matière nucléaire au Conseil National et vice versa.

Du point de vue organisationnel, la composition de l'exécutif provisoire vous est présentée ci-après.

Exécutif provisoire

Président: Jan-G. Charuk, NUCLÉOTEC-LAVALIN INC.  
Vice-Président: Richard Bolton, IREQ  
Relations publiques et correspondant: Mireille Alexandre,  
Ordre des Ingénieurs du Québec-Régionale de la Mauricie

Agent de liaison avec le conseil national: Antoine Duchesne, HYDRO-QUÉBEC

Officiers de recrutement: Jean-Paul Dietrich, Gentilly-2  
Donat Martinoli, CANATOM  
Fernand Paré, EACL

Trésorier: Richard Hu, HYDRO-QUÉBEC

Secrétaire: Raymond Thivierge, EACL

Programme d'activités pour 1982:

Février 1982 Le Transfert Technologique du CANDU  
(Conférencier à être annoncé plus tard)  
Endroit: Ecole Polytechnique,  
Université de Montréal

Mars "982 L'évolution de la filière CANDU  
(M. William G. Morison, directeur de la Conception et du Développement technique à l'Ontario Hydro)  
Endroit: à déterminer

Avril 1982 Les Médias d'Information  
(conférenciers à être annoncés plus tard)  
Endroit: Université du Québec à Montréal

12-13-14 Mai 1982 Colloque - L'Energie Nucléaire au Québec  
(Programme à être distribué plus tard)  
Endroit: Université du Québec à Trois-Rivières

## Toronto Branch

An emphasis on the nuclear industry's future -- particularly with respect to nuclear technology exports -- is a principal theme informing the Toronto Branch 1982 programme. Plans are in hand for a meeting at which Dr. S.R. Hatcher of AECL will discuss the Mexico proposal and other overseas opportunities for CANDU. Also, recognizing the important part public understanding inevitably plays in the development of nuclear energy in Canada, the Branch hopes to invite a prominent representative of the news media to discuss the public perceptions of the nuclear industry and ways in which members of the industry can help to bring those perceptions closer to the reality.

Art Guthrie

FYI

## CANDU Units Still Lead World

Based on figures from Nucleonics Week, Ontario Hydro's CANDU power reactors (led by Bruce Unit 1 at 96.6 percent) took the top 6 places in performance in 1981 compared with 130 large commercial reactors around the world. Two Pickering units took 8th and 14th place. In lifetime reliability too, CANDU's lead the pack with 7 of Ontario Hydro's 8 reactors taking 1st, 3rd, 4th, 5th, 6th, 7th and 10th places. On a lifetime basis, Bruce Unit 3 is the world's best performer with a lifetime rating of 84.3 percent.

Staff

## No Nukes

It took \$744 million and eight years to build, but Austria's first nuclear power plant has yet to produce a kilowatt of electricity. Since its completion in 1978, the Zwentendorf nuclear installation has been idle because of public fears about nuclear power and the resulting political conflict.

Associated Press

## Rumours of death greatly exaggerated...

Many US papers (and some Canadian ones) recently carried an Associated Press story which painted a dark picture of nuclear operations in the US. "One third of the nation's nuclear plants are shut, many of them victims of problems that include a hydrogen explosion and various equipment failures leading to radiation and water leaks" the story began. However, Donald Winston, Media Relations Manager for the Atomic Industrial Forum, put the matter in somewhat better perspective in a letter to AP which made 3 main points:

FYI

"Of the 24 plants that were shut, approximately half were down for scheduled refuelling. Most of those are in the south, where annual refuelling is traditionally timed for the off-peak winter months"

"Of the remaining plants, most were shut down for a period of less than a week. Nuclear power plants for the first nine months of 1981 showed a 61.3 percent capacity factor and a 12.6 percent forced outage rate."

"Thus, the reliability of nuclear plants statistically is close to that of coal-fired plants, which showed a slightly inferior 58.2 percent capacity factor and a 13.9 percent forced outage rate during 1980."

Staff

#### Major International Award to W.B. Lewis

Wilfred Bennett Lewis, who directed the Canadian Nuclear Energy Research Program from 1946 to 1973 has become the first Canadian to receive the prestigious Enrico Fermi Award from the United States Department of Energy.

International in character, the Award was established in 1956 to honour theoretical physicist, Enrico Fermi, one of the chief architects of the nuclear age. It is given on the approval of the U.S. President for "exceptional and altogether outstanding scientific and technical achievement in the development, use or control of atomic energy, in scientific management or in nuclear engineering." Dr. Lewis will receive the Award which includes a gold medal, \$25,000 and a Presidential citation, from the U.S. Secretary of Energy on February 24.

The Citation on the Award reads:

"For his dedicated support of heavy water-moderated reactors for research and power generation: for his inspiring leadership of Canadian nuclear energy development: and for his contribution to the use and control of Atomic Energy through the International Atomic Energy Agency."

Dr. W.B. Lewis was responsible for the scientific direction of the highly successful CANDU nuclear energy program until his retirement in 1973.

WNRE Weekly Bulletin

Bruce Unit 2 Down - Possible Tube Change

Unit 2 at Ontario Hydro's Bruce Nuclear Generating Station was shut down February 9 after heavy-water was detected in the annulus gas system. Acoustic examination has identified a small crack (about 0.5 in.) at the pressure tube/end fitting rolled joint.

Staff

CONFERENCES AND MEETINGS

Decontamination of Nuclear Facilities

Sponsored by the CNS, the CNA and the ANS the conference will be held at Niagara Falls, Ontario, September 19-22, 1982. Further information from Eric LeSurf, London Nuclear Services Inc., 2 Buffalo Avenue, Niagara Falls, N.Y. 14303.

International Conference on Radioactive Waste Management

Sponsored by the CNS, the conference will be held at the Winnipeg Convention Centre, September 12-15, 1982. Areas covered will include:

- characterization, conditioning and storage of nuclear wastes
- environmental, health and safety aspects
- licensing, regulations and standards
- hydrogeological and geochemical studies
- development of models and codes for safety analyses and assessment studies
- public affairs and the influence of the media

For further information, contact Dr. T.S. Drolet, c/o Ontario Hydro, 700 University Avenue, Toronto, M5G 1X6, telephone (416) 592-5539.