Nuclear Journal of Canada

Journal Nucléaire du Canada

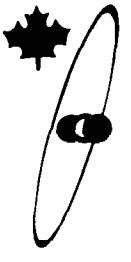
Volume 1 No. 2 June 1987 juin

Table of Contents / Table de matières

Canadian Nuclear Society
Societé Nucléaire Canadienne

Nuclear Journal of Canada
Journal Nucléaire du Canada

Volume 1 No 2 June 1987 juin



Published by University of Toronto Press
for The Canadian Nuclear Society
111 Elizabeth Street, Toronto, Ontario, Canada, M5G 1P7

Annual Subscription Rates:
Institutional in Canada $90.00 Canadian
outside of Canada $90.00 U.S. (includes postage and handling)
Single issue in Canada $25.00 Canadian
outside of Canada $25.00 U.S. (includes postage and handling)
Replacement Issue in Canada $20.00 Canadian
outside of Canada $20.00 U.S. (includes postage and handling)
Note: Supplements to the journal will be published periodically
and will be priced separately
Designed and Printed University of Toronto Press
ISSN 0833-1758

Second Class Mail Registration Pending

Editorial

Alan Wyatt
Editor

In this, our second issue, the *Nuclear Journal of Canada* includes its first paper on the Chernobyl accident. Although the accident took place over a year ago, on 26 April 1986, we make no apology for scientific papers taking a considerable length of time to appear in print. The process of ascertaining the facts, checking them, analysing them for pertinent lessons, submitting a scientific paper for peer review, and journal production will take from 12 to 18 months and maybe more. This may not satisfy the desires of the mass media, but seeking the truth is more important, in the long run, than an eye-catching but wildly inaccurate headline.

The paper by Professor Rogers in this issue is a useful overview of many of the major implications of the Chernobyl accident. In our next issue there will be a more detailed technical evaluation by V.G. Snell and J.Q. Howieson. It is expected that these papers will generate an interesting discussion.

The Chernobyl accident also raises many interesting questions that are not strictly in the scientific areas. Since nuclear power is a global energy source, any problems with it have global implications. If there were major shortcomings in the RBMK design and operating procedures, why did the professional critics of nuclear power not draw proportionate attention to them – proportionate to the attention that they gave to their perception of the shortcomings of designs in the Western World?

The Three Mile Island Unit #2 accident in 1979 had negligible health implications, but a side-effect was a delay of six years in starting up the adjacent undamaged and uncontaminated Unit #1. At Chernobyl, Units #1 and 2 were decontaminated and restarted some six months after the accident to Unit #4. The adjacent Unit #3, which shared the control room with the destroyed reactor, is scheduled to go back into service about now, and a new fifth unit will be in service by year end. To what extent are these differences between TMI and Chernobyl due to differences in political systems, to the Soviet need for electric power, and to the actual level of hazard involved in working on the Chernobyl site?

About 30 lives were lost in the actual Chernobyl accident, mainly among firefighters. Best estimates are that, over the course of the next 70 years in a population of about 70 million, the number of additional cancer deaths resulting from the release of radioactivity is in the range of 2,000 to 5,000 people. In that same period, in that same population, many more people will die from tobacco and alcohol-related diseases, and more than one thousand times as many will die from 'natural' cancers. The Soviets have already announced a major program of health monitoring of the population of European Russia in order more accurately to assess the effects of the accident. From the evidence of similar programs carried out over the past 40 years on the survivors of the Hiroshima-Nagasaki bombs, the resulting early diagnosis of other medical problems will probably save more lives than will be lost from the effects of the radioactivity released. This should surely raise some pertinent questions of the value, or lack of value, that is placed on preventive medicine in countries that spend billions on weapons.

Steady day-by-day carnage on our highways does not seem to provoke much soul-searching for remedies. Even major single disasters that kill hundreds in a few minutes, such as aircraft crashes or ferry sinkings, rarely rate headlines for more than a few days. Even a nuclear accident that injures nobody often attracts more attention. Although many in the nuclear industry feel somewhat paranoid about this, my own opinion is that it is a reflection of the exceedingly high standards of safety set and practiced throughout the nuclear industry. When any accident occurs we try harder to learn more from it – and that is as it should be.

Since our first issue went to press we have been saddened to learn of the deaths of Dr W.B. Lewis, on January 10, at the age of 78, and of J.L. Gray, on March 2, at the age of 74. Both died in Deep River, close to the Chalk River Nuclear Laboratories that were the centrepiece of their professional lives. Their

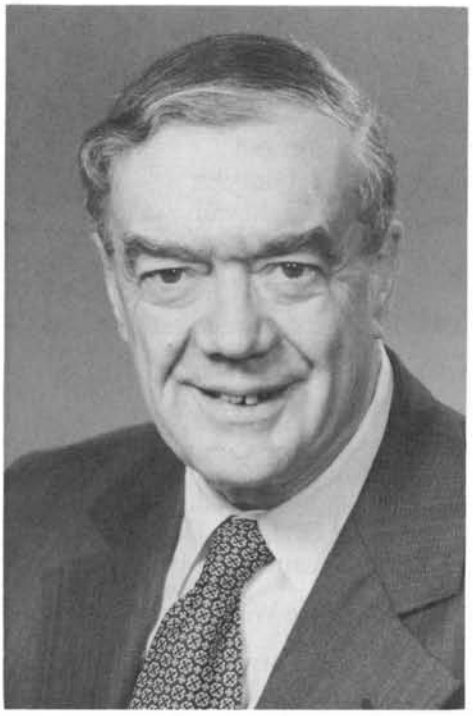
departure marks the end of an era. Neither of them was involved with the Canadian work on the Manhattan Project at the end of the Second World War. Both were architects of 'atoms for peace,' nationally and internationally.

Both men were members of the Canadian Nuclear Society. Much will be written about them when the histories of Canada's involvement in the nuclear age are written. The highlights of their lives are given on the following pages; however, I would like to add my personal tribute to these two great Canadians.

My first contacts with Dr Lewis occurred in 1958. I was a recent immigrant from the UK, working, in the very early days of the Douglas Point Project, on trying to develop a new steam cycle suitable for the commercial CANDU reactors. I was surprised, and somewhat alarmed, to start receiving lengthy memos from a remote figure at Chalk River, whom I had never met, raising detailed questions about steam cycle thermodynamics and the design of a steam turbine plant. I was yet another recipient of the probes by Dr Lewis into every aspect of the plant design. He wanted the best and he was determined that you were going to produce it. Shortly afterwards he cornered me in my cubby-hole of an office in order to carry on his questioning at first hand. His keen interest certainly spurred me on to do my best, and for the next 15 years, up until his retirement, even though for much of that time I was pursuing a career outside the nuclear industry, he corresponded with me, forever seeking refinements and improvements in cycle efficiency. His grasp of the fundamentals of science and technology was awe-inspiring. He was a true scientific genius, in the full sense of the word.

Although I first met Lorne Gray in the discussions on the selection of the turbine generator for Douglas Point, it was not until the mid-sixties that I was to see him in action at close quarters. At that time I was working directly for AECL on the Gentilly-1 Project and had been the principal force behind recommending the selection of a high-speed (3,600 rpm) turbine generator instead of the almost universal low-speed (1,800 rpm) machines. In the usual fiercely competitive bid negotiations for these large contracts, this had become a political issue and had been raised with ministers and deputy ministers in Ottawa. I was asked to attend a meeting with Lorne Gray to settle this. In the morning Lorne took me through every step and every possible question on the entire contract. In the afternoon a meeting was held with the DM or ADM from every department in Ottawa evenly remotely connected with the contract – a horde of mandarins! Apart from my being asked to confirm some very minor technical points, Lorne answered every single question concisely and accurately, and the contract award was approved as recommended. I was impressed that a topic that had involved my full attention for several months, and had a host of nuances and implications, could be handled in such masterly fashion.

I would hope that these two anecdotes illustrate how fortunate AECL and Canada were to have such outstanding scientific and administrative leadership. The conjunction of the unique talents of these two men, over the quarter-century 1948–1973, was a major factor in establishing the CANDU system as a unique Canadian achievement on the world scene. The first paper in this issue was prepared for the sessions sponsored by the Canadian Nuclear Society at the recent Engineering Centennial Conference in Montreal. In it Lorne Gray details some of the key decisions in the development of the CANDU program.



Wilfred Bennett Lewis

1908 June 24	Born Castle Carrock, Cumberland, England
Education	Clare House School Haileybury College Cambridge University
1930–39	Cavendish Laboratory, Cambridge Worked on alpha radioactivity with Lord Rutherford Worked on nuclear disintegration by particles accelerated by high voltage and on the construction and operation of the Cambridge cyclotron
1939–46	On loan to the British Air Ministry. At end of the war was Chief Superintendent of the Telecommunications Research Establishment
1945	Fellow of the Royal Society (London)
1946	Appointed Director, Division of Atomic Energy Research, NRC at Chalk River
1952	On formation of Atomic Energy of Canada became Vice-President, Research and Development Fellow of the Royal Society of Canada
1955–64	Director of the American Nuclear Society (President 1961–62)
1963	Appointed Senior Vice-President (Science) of AECL
1966	First recipient Outstanding Achievement Award of the Public Service of Canada
1967	U.S. Atoms for Peace Award
1968	Companion of the Order of Canada
1971	Honorary Fellow of Gonville and Caius College, Cambridge University
1972	Royal Medal of the Royal Society of London
1973	Retired from AECL. Appointed Distinguished Professor of Science, Queen's University
1981	U.S. Department of Energy Enrico Fermi Award

In the international sphere Dr Lewis was a member of the Scientific Advisory Committee to the Director General of the International Atomic Energy Agency and Canadian delegate to the Scientific Advisory Committee to the Secretary General of the United Nations. He was also active in the organization of the various UN Geneva Conferences on the peaceful uses of nuclear energy.

James Lorne Gray

1913 March 2	Born Brandon, Manitoba
Education	Winnipeg Public School Saskatoon High School University of Saskatchewan B. Eng. 1935 M. Sc. (Mech. Eng.) 1938
1938	Canadian General Electric Test Course
1939	University of Saskatchewan – Lecturer in Engineering
1939–45	RCAF (retired as Wing Commander)
1945–6	Associate Director-General, Research and Development Division, Department of Reconstruction and Supply, Ottawa
1946–8	Montreal Armature Works Limited, Montreal
1948	Scientific Assistant to the President, National Research Council
1949	Chief of Administration, National Research Council – Chalk River Project
1952	General Manager – Atomic Energy of Canada Limited
1954	Vice-President, Administration and Operations, AECL
1958–74	President, AECL
1961	D. Sc. University of British Columbia LL. D. University of Saskatchewan
1962–73	Member, Board of Governors, Carleton University (Chairman 1970–73)
1969	Appointed a Companion of the Order of Canada
1973	Awarded The Professional Engineers Gold Medal by the Association of Professional Engineers of Ontario