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NUCLEAR ENERGY - PERCEPTIONS AND PERSPECTIVES

by

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INTRODUCTION

In this period of unprecedented public interest in the perils and potentials of nuclear energy, and the industry's struggle to ward off irrational criticism with reasoned argument, I am reminded of Lewis Carroll's famous line:

"The time has come, the Walrus said, to talk of many things."

Indeed, there is a great deal to talk about, and today, under the theme of "Perceptions and Perspectives", I would like to cover a number of topical points ranging from the equivalent of the whimsical "cabbages" to the functional "sealing wax".

AN HISTORICAL FOOTNOTE

In 1895 two scientific events occurred which proved to have a profound effect on subsequent developments:

1) the discovery of a "new kind of rays" by Roentgen, which led, among other things, to the development of diagnostic radiology and therapy with X-rays; and

2) the development of psychoanalytical psychiatry through the work of Sigmund Freud, beginning with his essays on hysteria.

Even the most perceptive contemporaries of Roentgen and Freud could not be expected to have anticipated the relevance of these developments to events which have occurred in recent months. This is perhaps no better illustrated than by what may prove to be one of the most potentially serious consequences of the March 28 accident at the Three Mile Island nuclear power station, namely, the apparent loss of credibility suffered by the news media.
Without discounting the seriousness of the accident, and recognizing that the news media had extreme difficulty in acquiring accurate information on which to report in the early stages of the event, nevertheless, much of the coverage which ensued went well beyond the bounds of objectivity and credibility.

The only glimmer of reason which appeared, despite pages filled day after day with nuclear horror stories based on misinformation and misunderstanding, were the various editorials in major Canadian newspapers which took the responsible attitude of "let's try to put this into perspective". Unfortunately, editorials rarely serve to correct the impressions fostered by front-page headlines.

In the final analysis, the so-called disaster at Three Mile Island may turn out to be essentially financial, and not the public health and safety calamity portrayed in the news and in public affairs programming. With the media's credibility in doubt due to the original sensationalist reporting, it will be further damaged if obvious measures are not taken to give equal play to the reassuring facts which are emerging during the follow-up investigations, to wit: the less than catastrophic radiation releases experienced; the fact that on the whole, the safety systems did prevent a worse event, and so on.

In short, having alarmed millions of people with a commitment to front-page and prime-time stories at any cost, there is a responsibility to give equal play to what did not happen, and why. Without this, we have a "cry wolf" situation, and when the news media must be counted on for

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information in a real emergency, people may come to harm through either panicked over-reaction, or inaction resulting from cynical disbelief in what the news media is telling them.

Consider this allegorical scenario: Allegations of gross journalistic error have been made; numerous examples of failure of communications equipment have been cited; and calls for a moratorium on all new media initiatives have been repeated. In some sectors there have been demands for the suspension of all existing journalistic licences. Sound familiar? Here is more:

Some anti-media groups have proposed a return to the soft, simplistic means of communication enjoyed by our forefathers. Industry efforts to counter this "damn the media" campaign have met with only limited success. Leading media spokesmen have been denigrated and accused of covering up the horrendous inaccuracies revealed by conscientious insiders.

The tablet disposal and abandoned quarry problems cited by industry sources as major drawbacks to the stone tablet option are scoffed at by the anti-media groups. Similarly, the biomass, or more correctly the pony express option, which the media has described as environmentally polluting and highly susceptible to disruption by the forces of nature, is lauded by anti-media groups because of its labour-intensive and protection-of-endangered-species advantages.

Smoke-signalling, which offers direct employment benefits in the forestry industry and the possibility of expansion of small, "cottage-type" industries across the country for the weaving of blankets, is proving
to be an equally contentious option. Media representatives have claimed that the unreliability of the option due to its dependence on good weather, together with an anticipated increase in mortality rates arising out of prolonged exposure to the elements, and the synergistic effects of chronic inhalation of wood smoke, (which contains appreciable concentrations of tar and certain radioactive elements including potassium-40), simply pose unacceptable risks to the signallers.

The final outcome of this debate is a matter for conjecture. One possibility touted by anti-media groups lies in the age-old saying "no news is good news". However, this is unlikely to enjoy very much popular support. A more rational approach might well be to adopt the 200-year old recommendation of Voltaire:

"When we hear news we should always wait for the sacrament of confirmation."

The title of this section is "An Historical Footnote", and for good reason lest someone misinterpret its meaning. However, should that happen, I shall claim author's licence, and rely on the oft-repeated words of the unknown writer who said that:

"History is something that never happened, written by a man who wasn't there."
THE PUBLIC PERCEPTION OF RISK

Certainly the media has been criticized for its coverage of the nuclear field and other areas of human endeavour, but the media has no monopoly on criticism. The world-wide reaction to the accident at Three Mile Island forcefully revealed the extent of public concern about the risks of nuclear power. Notwithstanding the clear evidence that the concern is non-uniform and that opportunistic persons have attempted to utilize its existence to advance their own causes, the fact remains that a public perception of unnecessary or unacceptable risk prevails in many quarters.

A far-reaching analysis of the historical developments which led to this perception of unnecessary or unacceptable risk would undoubtedly contribute to an informed understanding of the subject. Indeed, many initiatives in this respect have already been undertaken, and further initiatives are expected.

During recent years, a number of valuable studies have been made in connection with governmental and other inquiries concerning a variety of specific and generic nuclear development proposals. These inquiries include:

1) The Ranger Inquiry chaired by Mr. Justice Russell Fox;

2) The Royal Commission on Environmental Pollution chaired by Sir Brian Flowers;

3) The Windscale Inquiry chaired by Mr. Justice Parker;

4) The Royal Commission on the Health and Safety of Workers in mines chaired by Professor James Ham;

5) The Cluff Lake Inquiry chaired by Mr. Justice E. D. Bayda;
6) The Ford Foundation Study on Nuclear Power conducted by
the Mitre Corporation; and

7) The Royal Commission on Electric Power Planning chaired
by Dr. Arthur Porter.

These inquiries, the last mentioned still being underway, have
collectively identified the spectrum of concerns for public and occupational
health and safety as well as environmental risks associated with the nuclear
industry, and the results of the inquiries have been well publicized.
However, for reasons which are not well defined and even less well under-
stood, the recurring conclusion that effective and practicable measures
exist to either avoid or to limit the extent of these risks is either
overlooked or forgotten.

While recognizing the current existence of a public perception of
unnecessary or unacceptable risk and for the need for appropriate action
by industry, government and international authorities to allay the public's
concern, it is equally essential that one further point be recognized.
From the outset of nuclear power programs in most countries, very
appreciable efforts have been made to inform the public about the measures
being taken to protect their interest. As a result, the public is accustomed
to seeing in print or to hearing on radio and television some of the jargon
of the nuclear field. Terms such as nuclear safety philosophy, design
basis accident, defence-in-depth, redundancy, fail-safe, risk assessment and
genetic and somatic effects are used by industry, regulatory and media
representatives with almost complete abandon.
In the absence of exposure to similar jargon for other industries in which public and occupational health and safety risks are posed, the public was largely unaware of such risks until recently, and tended therefore to consider the nuclear industry as uniquely hazardous. With the growing awareness that there is no such thing as a risk-free industrial activity (or for that matter human activity) the public has also tended to conclude that nuclear risks are incremental to an established way of life rather than to consider the desirability of substituting one risk for another on the basis of a risk versus benefit assessment. However, in a report on a recent U. S. electric utility conference, it was considered by some participants that the relative risk argument held little promise for influencing people in considering energy options. In other words, the man with an old and hazardous coal-burning furnace in his basement is more likely to think in terms of costs, fuel availability and convenience when considering a substitute than he is in reducing the risk to himself or his neighbourhood.

Thus, there is little reason to believe that a massive public information program offers much hope of an early resolution of the risk perception reality. What would appear to be required is a reasonable extension of current information programs combined with demonstrated evidence of the effectiveness of industrial, governmental and international measures in protecting and in serving the public interest in its broadest sense. One aspect of this demonstration is a strengthening of the independence and competence of national nuclear regulatory agencies, to which I will refer shortly.
In the 1800's, there occurred a rash of steam boiler disasters, at one point on an average of one every four days. At Hartford, Connecticut in March, 1854, nine persons were killed and 50 injured in a boiler accident, and on April 27, 1865, the Mississippi River Steamer Sultana suffered a boiler explosion which killed 1,547 people.

On March 28, 1979, a nuclear reactor accident occurred at the Three Mile Island electric power plant in Pennsylvania. U. S. health experts estimate that the consequences of this accident may result in at most 10 deaths above the expected norm in a few decades time.

Nineteenth century technologists learned how to minimize the dangers from steam boilers, and society grew to accept these devices for the benefits they brought. With twentieth century technologists learning from the TMI accident to make nuclear power plants safer, can we expect that society will accept this energy option in the same way as their forefathers adjusted to steam power?

The question can only be answered positively if society evinces a recognition of the benefits of nuclear energy, if it comes to terms with this "mysterious" thing called radiation, and if it believes in its technologists and regulatory systems.

As Adlai Stevenson said in 1952:

"There is no evil in the atom; only in men's souls."
THE INFORMATION RELEASE DILEMMA

In informing the public about nuclear energy and its risks, both meaningfully and in context, the AECB and the nuclear industry are often faced with a dilemma.

Dictionary definitions of the word "dilemma" are "an argument presenting a person with two or more alternatives, but equally conclusive against him, whichever he chooses"; and "a situation involving choice between equally unsatisfactory alternatives". In his widely read novel, "Catch-22", Joseph Heller endeavoured to illustrate the plight of an individual caught up in a system of apparent imponderables by relating a series of predicaments with which the main character and his friends were unceasingly faced.

Although seemingly without resolution, the difficulties encountered by the main character can be seen on reflection to be capable of solution if the unrealism of the extremes is discounted. Herein lies the answer to the question of the availability to the public of information about the safety of nuclear power - a question which is often referred to as "the information release dilemma".

Avoidance of illogical extremes is a principle which every successful person observes regardless of his field of endeavour. To refuse to disclose any information on a matter or public interest, or to reveal all of the details of every human activity, are extremes which a minimum of consideration will cause any astute person to recognize as being contrary to one or more aspects of that very public interest. In the case of the AECB, the provisions of Section 26 of the Atomic Energy
Control Regulations, which reads in part, "No information that has been obtained by the Board by virtue of these Regulations with respect to any business shall be disclosed without the consent of the person carrying on such business....." has been cited as proof of the Board's advocacy of secrecy in the nuclear field. Even more significantly, one special interest group alleged last year that the Board and other organizations had deliberately deceived the Ontario Royal Commission on Electric Power Planning. The unequivocal reply by Dr. Arthur Porter, the Chairman of the Commission, to the President of the Board:

"It is particularly regrettable in the light of the unstinting help which you and your colleagues have provided to this Commission....."

failed to diminish the impact of the allegation as evidenced by the continuing attention which certain elements of the media paid to subsequent, equally erroneous, allegations. We have operated ever since under a cloud for the simple reason identified by Dr. Thomas Fuller almost 250 years ago:

"Even doubtful accusations leave a stain behind them."

In these circumstances, concerned members of the public might well wonder whether or not their interests are being served by the Atomic Energy Control Board in its licensing and compliance programs.

What then does Section 26 of the Atomic Energy Control Regulations mean in practice? Essentially, it is a reflection of methodology and
not a commitment to secrecy for secrecy's sake. For 30-odd years, the principle embodied in Section 26 has allowed a relatively small regulatory body to conduct its affairs in the public interest through unrestricted access to proprietary documentation and information which might require a small army of inspectors to ferret out if its provisions were waived. There are cogent arguments for the amendment of Section 26, not the least of which is the AECB staff's own view that it hampers its dealings with the news media and the public, but I suggest that simply doing away with it would not be to the public's advantage at this time. What we have to do is interpret information release restrictions in an enlightened fashion, reflecting current societal interests, until such time as the rules of the game are overhauled completely. To change this one rule alone would handicap the referee while seriously jeopardizing the interests of the fans.

It is interesting to note that over the past three or four years, certain segments of the nuclear industry have taken actions which anticipate the climate of open access to information that will result from changed procedures. Examples of this are the availability of Safety Reports and Quarterly Reports in the offices of Ontario Hydro. The Board encourages these initiatives, for they make a significant contribution to the ease of transition to the new regulatory regime which we foresee.

With respect to information freely available from the AECB, the basic safety criteria and principles developed over the past two decades are summarized in dozens of technical papers written by senior members of the Board's staff. Over the years, many hundreds of these papers have
been sent to interested members of the public. A program is currently underway to consolidate these criteria and principles into a set of "licensing documents" which will be issued for public comment prior to final revision and adoption. In parallel with this effort, the Board will continue to develop and issue explanatory documents which describe how, when, where and why we carry out our activities. A recent example is AECB Report-1139 by Mr. M. Joyce entitled "The Licensing Process for Nuclear Power Reactors" which has replaced documents dating from 1965 and 1973 on the same subject.

Since 1977, the AECB has also been making publicly available the reports of major contracts conducted under the Board's mission-oriented research program. It is intended that in future, under the restructured AECB advisory committee system announced recently, formal reports to the Board from advisory committees will also be published, if it is considered in the public interest to do so. Lest that last phrase be misconstrued as too restrictive, I should explain that, for example, advisory committee reports on security matters might be withheld, while those concerning radiological protection would be made available.

Apart from the reports and publications of the AECB, there is so much information freely available on all aspects of nuclear energy, including radiation and its effects, that no person could plough through it in a lifetime, starting from scratch. There are probably very few people who would even want to try. We may well be in the situation described by James Thurber:

"So much has already been written about everything that you can't find out anything about it."

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However, certain interest groups have claimed that it is not what is available that is important, but what is not accessible. The past methods of operation of the nuclear industry and its regulatory body, and the titillating "revelations" of leaked documents, have led to the perception that dire secrets inimical to the health and safety of the population are being withheld for sinister purposes.

The only way to alter this perception is to open the books, and to allow the public to play a role in the decision-making process. To this end, the Board is on record as supporting a regulatory system which would include public hearings, and wherein information would be withheld by exception, rather than the reverse.

Under the old cliché about justice not only being done, but being seen to be done, we are working toward a climate which is analogous to that in the physician-patient relationship. Most people trust their doctor to apply his knowledge and skills in their interests. While you are not handed a copy of every report, judgement or reference which the physician has available to assess your case, you could see these if you wished. What you would do with them, or even whether you could understand the material is another question.

As Clarence Day said in 1921:

"Information's pretty thin stuff, unless mixed with experience."

One other aspect of the information release dilemma arises from the question "Who can you believe?". Obviously, the critics of the nuclear industry have difficulty, to say the least, in believing any information.
which comes from the industry itself. I am not so sure that this disbelief would be altered by simply providing more information, even that which is now held proprietary, although it might gain some credibility by coming from a neutral, third party.

On the other side of the belief issue is the important concern we all share regarding the inaccuracies of the critics. Their half-truths and outright errors seem to propagate and perpetuate easily, appearing again and again like the chorus of a folk song. This is a serious matter because the nature of criticism is such that it commands the attention of and repetition in the news media, which then exposes a great many unsuspecting persons to error and misinterpretation.

If only it were easy to ignore misinformed critics, with the stoic approach of Winston Churchill who said:

"I do not resent criticism; even when, for the sake of emphasis, it parts for the time with reality."

He was more phlegmatic than a predecessor, Benjamin Disraeli, who intoned in 1860 that:

"It is much easier to be critical than to be correct."

Churchill was also less pointed than another British Prime Minister, Harold MacMillan, who in 1963 said:

"I have never found......that criticism is ever inhibited by ignorance."
If there is a single, knowledgeable body which may be developed as a source of information credible to both nuclear critics and supporters alike, then the AECB may be it. However, even though there is reason to believe that the Board currently bears a considerable measure of public trust, there are things we must do to enhance the credibility of the regulatory body over the long term.

**REGULATORY INDEPENDENCE AND ACCOUNTABILITY**

In his analysis of the regulatory process entitled "Public Policy Decision-Making and Regulation", Professor Douglas Hartle of the Institute for Policy Analysis, University of Toronto, states that "Regulation, in the broadest sense, is the essential function of government". Writing in quite generic terms, Professor Hartle identifies the independence of the regulatory process as the most fundamental question to be addressed. His proposals include the division of regulatory agencies into two categories. One would be advisory agencies which would function much like continuing royal commissions. The second category would be decision-making agencies whose independence would be spelled out in legislation. Although differing in matters of detail, Professor Hartle's proposals are in striking accord with the recommendations of the Royal Commission on Financial Management and Accountability chaired by Allan T. Lambert.

It should be noted that the basic rationale advanced by Professor Hartle and the Lambert Commission is inherent in the approach taken by
the Canadian Government when it tabled Bill C-14 "The Nuclear Control and Administration Act" on November 24, 1977. The Report of the Cluff Lake Board of Inquiry is instructive in this respect for it states, in part:

"The new Act represents a major effort on the part of the federal government to make the Atomic Energy Control Board more independent and open, and to reinforce the federal jurisdiction and the federal presence in nuclear (and uranium) matters."

In outlining the intent of Bill C-14 during the 18th Annual International Conference of the CNA last year, I briefly tabulated some of the major issues of primary interest and their attendant implications. Recent events suggest that these issues remain of fundamental importance and a further review would appear to be warranted:

1) the need for a credible source of regulatory information on the health, safety and environmental aspects of nuclear energy;

2) the need for increased public input into the regulatory process;

3) the need for further coordination of related regulatory activities at the federal and provincial level;

4) the need for authority and resources to ensure early and effective resolution of any nuclear safety matter which may arise; and
5) the need for a more comprehensive and regionalized regulatory compliance program.

The first two of these issues have been dealt with at some length in earlier parts of this address. With regard to the third, I am pleased to report that considerable progress has been made in recent months in identifying, clarifying and establishing further cooperative arrangements between federal and provincial agencies and departments. It is clear that additional effort will be required but the important point to recognize is that both the will and the means exist. A specific example is the joint program underway with respect to off-site contingency planning as a result of the initiative of Ontario authorities.

Implicit in the last two needs is the thrust for greater regulatory involvement in the nuclear field, and the papers to be presented in Session 7 of this Conference are examples of some of the steps that are being taken. In this connection the words of Plautus are relevant:

"In everything the middle course is best: all things in excess bring trouble to men."

Canada is not alone in this respect. One foreign regulatory agency responsible for occupational safety and health has published thousands of new standards. Among these standards is one that requires cowboys not to work more than one-quarter of a mile from toilet facilities. The impracticality of this requirement is illustrated by a spate of cartoons picturing cowboys carrying portable facilities behind their saddles.
Within the ever-present constraints imposed by the keepers of the public purse, the Atomic Energy Control Board is indeed moving toward a middle course in its regulatory commitments and capabilities. The task is quite simple to state, though complex in application: protect worker and public health and safety to the highest degree possible with respect to an industry that has risks associated with it, without imposing unreasonable demands on that industry.

In view of the tragic DC-10 crash at Chicago's O'Hare airport on May 25, a parallel with the commercial air transport industry may be drawn. The MacDonnel-Douglas aircraft which claimed 270-plus lives in a fiery plunge shortly after take-off could have been rendered "absolutely safe" by the authorities who regulate the aircraft industry. In the process, the addition of passenger restraints, redundant engines and hydraulic systems, fail-safe emergency landing systems and a fuselage capable of withstanding a crash would create a "safe" vehicle, but one either incapable of flight, or so inefficient as to be uneconomic to operate. The same is true about the nuclear industry: the only way to make it absolutely safe is to render it unable to operate.

"Hear, hear," say the nuclear opponents.

"Entirely unreasonable," say the nuclear proponents, particularly the public utilities who have a responsibility to provide their industrial and private customers with electricity at the most reasonable cost, and have run out of options; or the medical practitioners who are busy saving lives with therapeutic and diagnostic uses of radioisotopes.
It is very apparent that in order to realize the benefits of nuclear energy, in all its forms, we must impose a regulatory system which maintains the viability of the industry while ensuring the safety of workers and the public to an acceptable degree. Obviously, this implies some compromise, and the only way to do it in everyone's best interest is through close adherence to the democratic process, i.e. political accountability.

Society, through its duly elected representatives, must call the nuclear regulatory tune, and pay the piper. The AECB, as an agency of the elected government, will play whatever music is required of it, provided it is given the necessary instruments.

TOWARDS THE FUTURE

The next year or two should see some significant developments in the nuclear regulatory field in Canada, some of which I have already mentioned. In general, I would say that we are still in the period of transition initiated by the statement of intent of the draft Nuclear Control and Administration Act of 1977, but recent events have accelerated both the need for and desirability of change.

Though it is somewhat soon to predict the actions and priorities of the new government, we may expect to see some initiatives with regard to the now overdue revamping of legislation concerning nuclear energy and its regulation. There will certainly be modifications to the Regulations, although most of them will be relatively minor in nature. As previously mentioned, the Board and its staff generally feel that what is needed is
a brand new body on the regulatory vehicle, rather than a patch-job and touch-up on the old. As anyone knows who has tried to keep a reliable old car on the road, the problematic rust spots soon reappear no matter how carefully a cosmetic treatment is applied.

The controversial recommendations of the Inter-Organizational Working Group will be resolved in the coming months, to provide a clear and comprehensive statement of the principles and criteria to be applied in the licensing of new nuclear power plants. The proposed Darlington plant will be the first to use the end result of Board deliberations on the IOWG proposals, along with the professional and public comments which have been received on it.

What you will see happen is a statement of principle and intent followed by the publishing of draft Licensing Documents, formerly known as Licensing Guides. These documents will set down those aspects of the IOWG recommendations which the Board has considered to have merit in the light of comments submitted and the wisdom of independent advisors. Public and interest group input will be solicited on the draft Licensing Documents, just as it was for the initial IOWG report.

I expect by year-end we should have completed this process. I certainly hope that in so doing, we can rectify the appalling misconceptions about the meaning and intent of the IOWG proposals. After all, some 70 to 80 percent of the report to the Board simply consolidates and clearly indicates the regulatory principles and criteria which have evolved over the past 25 years or so. Regretably, without giving any apparent consideration to the IOWG proposals as a whole, certain critics
have focused their attention and that of the public on one or two aspects of the recommendations, with quite startling results. Not only has the AECA been accused of endangering the public with these proposals, which are of course not those of the AECA at all, but one cryptic remark on a submission received indicated that the IOWG's use of SI units was an attempt to make things look better than they are since the SI units are smaller! Even more startling, in the light of calls for more openness in the regulatory business, was the criticism that the IOWG report was issued complete with the controversial factor of 10 "escape" clause, despite reservations expressed on this matter during the drafting of the report. Here we have an example of the irrationality of critics at work - if the disputed footnote had been exorcised prior to publication, undoubtedly the AECA would have been charged with laundering the report. It is a no-win situation, and of course the critics would have it no other way.

CONCLUSION

I began this discourse with a quotation from Lewis Carroll, and it is perhaps appropriate that I finish with another.

In his 1865 classic, Alice's Adventures in Wonderland, Carroll wrote:

"Begin at the beginning, the King said, gravely, and go till you come to the end; then stop."

I shall stop, with a final brief word of encouragement to all those in the nuclear industry. It is indeed a time to talk of many things, candidly, openly, and as frequently as possible, for you have not come to the end.