

«**Review**»

## **The Canadian Nuclear Regulatory Philosophy**

J.H. Jennekens

(Atomic Energy Control Board Ottawa, Canada)

### **Abstract**

The principles and practices of national nuclear regulatory agencies around the world differ significantly. This paper outlines the philosophical approach to nuclear regulation of the Atomic Energy Control Board of Canada and attempts to explain the principles which have governed the Board's licensing and compliance programs during the past 37 years.

### **Introduction**

Although most businessmen object at one time or another to the various controls imposed upon them by governments, a little careful reflection will invariably reveal that these same businessmen look to governments regularly for assistance, encouragement and protection. Similarly, individuals often express the view that governments exert some form of influence or control over virtually every facet of their lives. However, if anyone suggests a reduction in one of the many health, educational, safety or other services rendered by governments the opposition to such a suggestion is swift and powerful. The fact is that in every industrialized society, government control and regulation is essential to their continuing development and strengthening. The complexities of the world economy and the need for government intervention have been amply demonstrated to all interested person during the past decade and it is within this context that a national nuclear regulatory agency must pursue its assigned responsibilities. The Atomic Energy Control

Board (AECB) is one such regulatory agency. Its responsibilities include licensing the production, possession and use of nuclear materials, equipment and facilities and enforcing compliance with licence conditions governing the health, safety, security and environmental protection aspects of the activities involved. The philosophical approach of the AECB and the manner in which it performs its various tasks differ substantially from those of other nuclear regulatory agencies. We believe that these differences are important contributors to the successful application of nuclear energy, and radionuclides to the broad spectrum of agricultural, industrial, medical, educational and research needs in Canada.

The AECB was established 37 years ago with the passage in August 1946 of the Atomic Energy Control Act. Like many administrative tribunals its role and functions and the regulatory process which it applies have evolved significantly during this period. The changes which have taken place over the years reflect not only the vast scientific and technological developments which have occurred but also the marked differences between contemporary society

and the social milieu of the mid-1940s. However, the basic philosophy of nuclear regulation in Canada and the underlying principles of the regulatory process have changed very little. Certainly, the process is far more open in terms of the general public, it has become appreciably more comprehensive and systematic in terms of the depth and extent of both the pre-and post-licensing technical evaluations which are conducted and the ensuing compliance program. Furthermore, it now applies to the whole of the nuclear fuel cycle as well as the industrial, agricultural and medical applications of radionuclides. Nevertheless the following fundamental principles remain unchanged:

- a. primary responsibility for achieving high standards of nuclear safety and environmental protection in the design, construction, commissioning and operation of nuclear facilities resides with the licensee;
- b. the credibility of the nuclear regulatory process depends not only upon its technical correctness and practicability, but also upon acceptance by the public-at-large of its perceived effectiveness and efficiency;
- c. regulatory criteria and principles should be concise, clearly stated and understandable;
- d. regulatory decision-making should be based upon stated criteria and principles taking into account pertinent scientific and technical facts only;
- e. fairness and impartiality must characterize all regulatory decision-making;
- f. the regulatory process should be subject to a comprehensive periodic review and evaluation to ensure that it continues to produce the desired results at justified costs.

### **Explanatory Notes**

The mere statement of a set of principles is a relatively simple task. Far more difficult is

the explanation of what these principles mean in practical terms.

To stipulate that a licensee bears the primary responsibility for achieving and maintaining high standards of nuclear safety and environmental protection may be regarded by some as an attempt by the regulatory agency to evade the responsibilities assigned to it. However, this is not the case. It is unrealistic for anyone to claim that a licensee only complies with accepted norms of public and occupational health and safety and of environmental protection because of the fear of prosecution. The vast majority of citizens conduct their affairs in a proper manner not because there is a law telling them to do so but because it is the ethical and responsible thing to do. This is equally true of corporations without denying the fact that in certain instances both individuals and corporations have been guilty of improper conduct. They are the exceptions and they provide one of the reasons for the existence of laws and law enforcement agencies.

A further reason for insisting upon the need to recognize the primary responsibility of the licensee is the fact that those persons conducting a particular operation are more knowledgeable about that operation than any one else. If this were not the case then the operation should never have been authorized in the first place. This is a basic tenet of the Canadian approach to nuclear regulation. A prerequisite for the issuance of licence to operate is confirmation of the competence of the operator. Continuing demonstration of such competence during subsequent operation is one of the elements of the follow-up compliance program.

A highly popular term these days is "credibility". Most persons use it in connection with government and industrial programs. Invariably, the credibility of the individuals who represent a particular government or industrial organiza-

tion becomes the centre of discussion, and as public opinion polls all too often reveal, the memory of past transgressions, real or alleged, dominates the debate. In the case of regulatory agencies the credibility issues most often cited are:

- a. independence from political and licensee influence;
- b. accountability to the public; and
- c. technical and administrative competence.

The independence of a national regulatory agency in terms of the avoidance of political influence is all too often considered to mean independence from government influence. It is evident that such agencies having been established by legislative action must act in accordance with the government policies upon which the legislation was based. As government policies change the legislation must be revised accordingly or some other mechanism established to ensure that the future activities of the agency are consistent with the new policies. This "influence" of the government is both due and proper. It is the hidden influence of a political nature that must be guarded against and the best protective measure is the enabling legislation itself combined with procedural safeguards whereby the agency may halt covert attempts to influence its decision-making.

Independence from licensees is a much misunderstood and maligned issue. The media and special interest groups have loudly trumpeted the allegation that regulatory agencies become the captive of their licensees. Invariably these allegations are made by persons who have never held either the position of regulator or licensee and choose to ignore the realities of the process. As stated earlier, the licensee should be the most knowledgeable of all about the operation of his facility and thus the decisions of the agency will ultimately reflect the technical facts presented to it. Certainly, this information must

be carefully evaluated and verified but in the end it cannot be ignored. Recently, I was told by an interested university researcher that the relationship between the AECB and its licensees was insufficiently adversarial. When I mentioned that his university was one of the AECB's 4,600 licensees he conceded that perhaps he had given the matter inadequate thought.

Accountability to the public, the second of the credibility issues, is multi-faceted. Federal administrative tribunals in Canada having been authorized by an Act of Parliament to exercise certain powers are accountable to parliament and thereby to the Canadian public. In the nuclear field, and in others, certain persons are not satisfied with this form of indirect accountability to the public and believe that more direct means should be adopted. The terms public involvement and public participation are usually used by "public interest" groups ostensibly seeking evidence of the accountability of regulatory agencies but in reality endeavouring to impose their own particular views.

Public interest representation in regulatory proceedings can be invaluable. However, misguided, partisan or special interest interventions can be excessively disruptive and result in a serious disservice to the overall public interest. Although there have been no less than 14 inquiries in Canada during the past six years dealing with various aspects of the nuclear field none of these have been regulatory proceedings. Consideration is currently underway regarding the possibility of certain regulatory inquiries but these will likely be limited to proceedings concerned with major licensing actions (e.g., the issuance of nuclear facility operating licences) or such fundamental questions as deep geologic disposal of high level radioactive wastes. A serious effort will be made to avoid the plethora of regulatory hearings such as that which has occurred in

the United States.

On two previous occasions, I have mentioned the point of licensee competence. This should not be misinterpreted as meaning that there is a minimal need for technical competence on the part of the regulatory agency. Both technical and administrative competence are essential prerequisites when considering regulatory credibility. However the technical competence of regulatory staff is required solely to establish regulatory principles and criteria, to enable the verification of information and analyses submitted by the licensee and to ensure continuing compliance with these principles and criteria. This technical competence and the administrative competence of the Agency must be evident not only to the public which it serves but also to the licensees which it regulates. Although critics will find it necessary to make charges of incestuous relationships, a mutual recognition of technical competence on the part of the regulator and licensee is essential.

It may appear to be self-evident that regulatory criteria and principles should be concise, clearly-stated and understandable. However, constant effort is required to achieve these objectives. The Canadian approach to nuclear regulation has been to establish a set of fundamental principles and basic criteria. The onus is then placed upon the licensee to develop the conceptual and detailed design, method of operation of a proposed facility and to demonstrate that the facility will be operated with a high standard of public and occupational health and safety, security and environmental control. This approach differs to a considerable degree from the approach of other nuclear regulatory agencies around the world. In many instances, the practice is to stipulate a vast number of detailed requirements thus forcing the licensee to think in terms of meeting regulatory specifications rather than in terms of a safe, efficient

and reliable plant. We term this "design and operation by regulation" and we are opposed to it.

It has been evident that nuclear regulatory proceedings around the world during the past decade or so have been delayed and disrupted, albeit to varying degrees, by the introduction of extraneous information and the reiteration of statements of "interest" which either have been dealt with previously or should be dealt with in a different forum. The responsibilities of the Atomic Energy Control Board extend only to considerations of health, safety, security and the environment. Nevertheless, interest groups have repeatedly requested the Board to refuse to issue a nuclear facility construction or operating licence or an export permit for nuclear materials or equipment simply because such groups are opposed to uranium mining, nuclear-electric power generation or the export of nuclear materials and equipment on moral and ethical grounds.

A decision to construct a nuclear power station in Canada is made by a utility. Most utilities in Canada are owned by the Province in which they are located. Thus, it is Provincial Governments which in effect decide whether or not nuclear-electric power generation should be part of the provincial energy program. Similarly, a company wishing to develop a uranium mine must obtain the necessary mineral rights and other approvals from the relevant provincial government. Once such decisions are made then it is up to the Atomic Energy Control Board to ensure that the proposed facility will comply with established health, safety, security and environmental requirements. In so doing, the Board restricts its consideration of a licence application to pertinent scientific and technical facts with a view to determining the acceptability of the application in terms of stated regulatory criteria and principles.

Needless to say, many of these criteria and principles are not unique to Canada. Because the early years in the nuclear field were primarily devoted to research and development activities and the medical and industrial applications of radionuclides, the findings and recommendations of the International Commission on Radiological Protection and of the United Nations Scientific Committee on the Effects of Atomic Radiation were a major influence in the development of Canada's nuclear safety philosophy. The avoidance of any unnecessary exposure to ionizing radiation, the ALARA (as low as reasonably achievable) principle and the concept of "acceptable risk" based upon a comparison with the standards achieved in what is generally regarded to be a "safe", non-nuclear industry were important early inputs to this philosophy. Similarly, developments in other fields involving public and occupational risks were taken into account. Perhaps of singular significance during more recent years has been the role of national and international consensus standards. Here again, the use of these standards has resulted in a commonality of approach.

The achievement of fairness and impartiality in regulatory decision-making is no simple task. To begin with, the process itself must be clearly understood by all involved, consistent in its implementation and in conformance with the relevant legal and administrative procedures developed within the framework of national laws and government policy. Implicit in the meaning of fairness and impartiality are the requirements for adherence to the principles of natural justice (i.e. "due process") and observance of the rights of the parties involved.

To cite a straightforward example, undue delays in the regulatory process are unacceptable not only because of the financial implications for the applicant but more importantly because, as the reports issued as a result of the public

inquiries on nuclear energy in Canada have shown, protracted delays do not lead to an enhancement of public understanding of the issues. On the contrary, such delays and the endless media coverage lead to a misinterpretation of the issues. All too often, the attitude of the public becomes one of "If the experts cannot agree then we should not have any part of the proposal". Thus, prompt and decisive action should characterize the nuclear regulatory process.

In recent years, considerable interest has been evoked in what might most briefly be termed "de-regulation". The thrust of the matter is a belief that over-regulation has resulted in serious economic penalties with broad multiplier effects combined with a concern that a number of regulatory processes have been counter-productive, ill-directed and therefore cost-ineffective.

Most government and industry programs are amenable to cost-effectiveness studies. However, the evaluation of nuclear regulatory programs on the basis of actual operational performance raises a somewhat different set of circumstances when endeavouring to quantify the actual risk of low probability/high consequence events such as a serious reactor accident.

Nevertheless, a periodic review and evaluation of the nuclear regulatory process is required to ensure that the objectives of the process are being achieved and at reasonable costs. In Canada, the provisions of the Financial Administration Act govern the budgetary and financial controls which are applied to departments and agencies of the government. These controls are further elaborated in the form of directives from the Treasury Board and Comptroller General.

In order to ascertain the costs imposed upon licensees, the Atomic Energy Control Board commissioned a study last year to develop a

method for identifying the health and safety costs incurred by a "prudent operator" (i.e., in the absence of any regulatory action) and those costs which result solely from regulatory requirements. The study covered uranium mining and milling, refining, fuel fabrication, nuclear electric power generation and industrial radioisotope applications. With respect to uranium mining and milling, operational costs for health and safety amounted to about 6.8% of estimated sales while capital costs were about 21.5% of sales. The "marginal cost of regulation" amounted to about one-third of each of these costs. What remains to be determined is whether or not the additional costs were justified. Needless to say, the AECB believes they were justified. However, what should not be overlooked is the fact that the "prudent operator" approach adopted by the Canadian uranium mining industry resulted in appreciable, self-imposed health and safety costs. Thus, it is important to recognize that important changes have taken place in the attitude of the industry towards health and safety matters. It would be a disservice to claim that these changes have resulted solely as a result of public, regulatory or collective bargaining pressures.

## CONCLUSION

As in the case of most regulatory processes, the nuclear regulatory process in Canada has developed from a parochial, introspective set of procedures in which a very few persons were involved to one which provides for public consultation and which relies extensively upon the cooperation of other federal and provincial agencies having public and occupational health and environmental protection responsibilities. Quite clearly, the process is not without its critics and continued effort will be required to ensure that any necessary changes are made.

Many of those involved in the Canadian nuclear program like to refer to our nuclear safety philosophy as unique. In reality, there are several unique features such as that of primary reliance upon the ingenuity and competence of operators to ensure a high standard of safety and environmental protection. However, many of the fundamental principles were derived on the basis of world-wide experience and it is our intention to continue to maintain an awareness of new developments and to take these into account, as appropriate, in future regulatory proceedings.