INTERPRETATION OF ALARA IN THE CANADIAN REGULATORY FRAMEWORK

Rod Utting
Atomic Energy Control Board
P.O. Box 1046
Ottawa, Ontario K1P 5S9
Canada

The Atomic Energy Control Board (AECB) is responsible for the regulation of all aspects of atomic energy in Canada. This includes the complete nuclear fuel cycle from uranium mining to long-term disposal of nuclear fuel, as well as the medical and industrial utilization of radioisotopes. Clearly, the regulatory approach will differ from practice to practice but, as far as possible, the AECB has attempted to minimize the degree of prescription of regulatory requirements. The traditional modus operandi of the AECB has been to have broad general principles enshrined in regulations with the requirement that licensees submit specific operating policies and procedures to the AECB for approval. In the large nuclear facilities with their sophisticated technical infrastructures, this policy has been largely successful although in a changing legal and political milieu the AECB is finding that a greater degree of proactive regulation is becoming necessary. With the smaller users, the AECB has for a long time found it necessary to have a greater degree of prescription in its regulatory function.

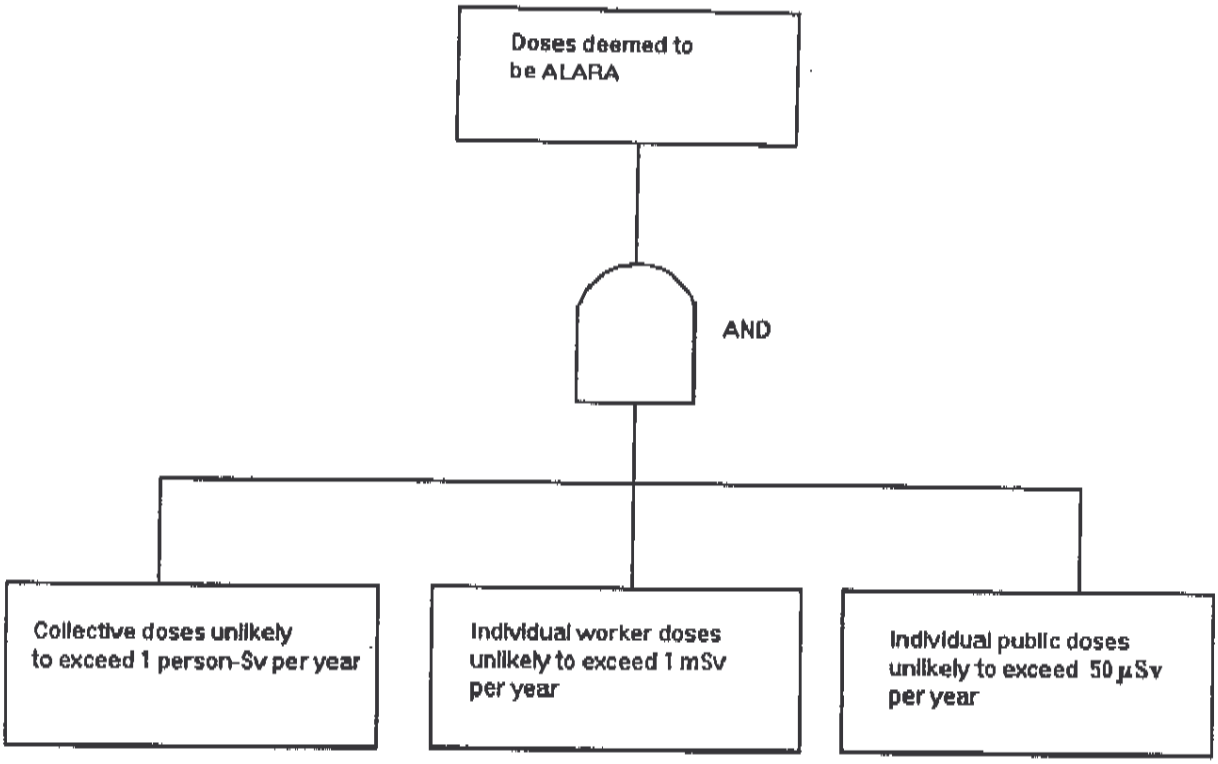
Forthcoming General Amendments to the Atomic Energy Control Regulations will, amongst other things, formally incorporate the concept of ALARA into the Canadian regulatory framework. Within the broad range of practices licensed by the AECB it is not practical to provide detailed guidance on optimisation that will be relevant and appropriate to all licensees, however the following general principles are proposed.

COMMITMENT

It is essential for good radiation protection that all levels of management, including the senior level of the organization, be committed to a policy of safety and good radiation protection. The AECB looks for evidence that senior management takes these commitments seriously and provides the means to carry them out. It is also essential that individual workers have a similar commitment to good radiation protection.

THRESHOLD VALUES BELOW WHICH DOSES ARE DEEMED TO BE ALARA

For many licensees where worker and public doses are already low it may not be reasonable to expect expenditure of resources to further reduce doses. To address such situations, the AECB has proposed the criteria illustrated in the following diagram. This diagram indicates that a)if the annual collective dose (occupational plus public) is unlikely to exceed 1 person-Sv, b) if individual occupational doses are unlikely to exceed 1 mSv per year and c) if doses to individual members of the public are unlikely to exceed 50 μSv per year, then existing exposures will be deemed to be as low as reasonably achievable without further evaluation. The value of one person-Sv is to a certain degree arbitrary but by assuming a value of a few tens of thousand dollars per person-Sv, a simple cost benefit calculation would indicate that one could not justify spending more than this to reduce this collective dose to zero. The cost of professional services to carry out the analysis would probably exceed this value even before any additional radiation protection measures could be implemented. The corresponding criteria regarding individual and public doses serves to highlight those situations where, even though the collective dose may not be large (i.e. less than 1 person-Sv), a limited number of people may still be receiving significant fractions of the individual or public dose limit. In such situations, additional radiation protection measures may still be required.



SYSTEMATIC PROGRAM

When the above criteria cannot be met, the AECB will expect licensees to adopt a systematic and well documented radiation protection program which addresses such issues as organization and management, facilities and equipment, policies and procedures and training programs. Where possible, these items should be reviewed and analyzed to determine if reasonable improvements can result in lower doses. A critical part of ensuring that doses are as low as reasonably achievable is the regular review of doses and other appropriate indicators such as contamination "events" and environmental monitoring results. The objective of these reviews is to identify trends so that the effectiveness of dose reduction efforts may be evaluated. As well as reviewing doses and other appropriate statistics, there should be a constant review of new technologies and procedures that might affect radiation protection.

JUDGEMENT OF REASONABLENESS

Following the above mentioned analyses, it must be determined if the benefit of action is worth the effort of doing it. Some problems may be quantifiable using techniques such as cost benefit analysis or other quantitative techniques. Many others will not and more qualitative judgements should be made. To substantiate the judgement, the licensee should conduct periodic reviews of the radiation protection program including review of such indicators as dose records, effluent releases, number of unplanned exposures etc. Such operational performance indicators can often identify problems that indicate that doses may not be as low as reasonably achievable.

The AECB will shortly publish a consultative document, number C-129, outlining its regulatory proposals on the requirement to keep all exposures as low as reasonably achievable.

Author Biography

Rod Utting is with the Atomic Energy Control Board (AECB) of Canada where he is the Head of the Operational Radiation Protection Section with responsibility for the evaluation of radiation protection programs in all types of licensed operations. During the mid-1980s, he was with the Nuclear Safety Division of the International Atomic Energy Agency (IAEA) in Vienna, where he was responsible for the development of a number of IAEA safety documents on Operational Radiation Protection and Optimization.

Prior to joining the AECB in 1977, Rod was with Ontario Hydro where he was involved with operational radiation protection at a number of different nuclear power plants. Rod started his health physics career at the Berkeley Nuclear Laboratories of the Central Electricity Generating Board in the United Kingdom in the 1960s.

Atomic Energy Control Board
P.O. Box 1046
Ottawa, Ontario K10 5S9
Canada

Phone: 613 995 1760
Fax: 613 995 5086