WORLD NUCLEAR ASSOCIATION

Environmental and Ethical Aspects

Radioactive Waste Management - Appendix 5

The first two statements were formulated and published in 1995 to confront the question of identifying the best and most appropriate means of managing and disposing of radioactive wastes from the civil nuclear fuel cycle. The third statement updates these to 1999.

The Principles of Radioactive Waste Management

A 1995 publication within the International Atomic Energy Agency's (IAEA's) Radioactive Waste Safety Standards (RADWASS) programme[1] defines the objective of radioactive waste management and the associated set of internationally agreed principles. The principles set out in the document are:

1. Protection of human health

Radioactive waste shall be managed in such a way as to secure an acceptable level of protection for human health.

2. Protection of the environment

Radioactive waste shall be managed in such a way as to provide an acceptable level of protection of the environment.

3. Protection beyond national borders

Radioactive waste shall be managed in such a way as to assure that possible effects on human health and the environment beyond national borders will be taken into account.

4. Protection of future generations

Radioactive waste shall be managed in such a way that predicted impacts on the health of future generations will not be greater than relevant levels of impact that are acceptable today.

5. Burdens on future generations

Radioactive waste shall be managed in such a way that will not impose undue burdens on future generations.

6. National legal framework

Radioactive waste shall be managed within an appropriate national legal framework including clear allocation of responsibilities and provision for independent regulatory functions.

7. Control of radioactive waste generation

Generation of radioactive waste shall be kept to the minimum practicable.

8. Radioactive waste generation and management interdependencies

Interdependencies among all steps in radioactive waste generation and management shall be appropriately taken into account.

9. Safety of facilities

The safety of facilities for radioactive waste management shall be appropriately assured during their lifetime.

The Environmental and Ethical Basis of the Geological Disposal of Long-Lived Radioactive Waste

At its Special Session in March 1995, the Radioactive Waste Management Committee (RWMC) of the OECD's Nuclear Energy Agency reassessed the basis for the geological disposal strategy from an environmental and ethical perspective.[2] After a careful review of the environmental and ethical issues, the members of the RWMC:

- consider that the ethical principles of intergenerational and intragenerational equity must be taken into account in assessing the acceptability of strategies for the long-term management of radioactive wastes;
- consider that from an ethical standpoint, including long-term safety considerations, our responsibilities to future generations are better discharged by a strategy of final disposal than by reliance on stores which require surveillance, bequeath long-term responsibilities of care, and may in due course be neglected by future societies whose structural stability should not be presumed;
- note that, after consideration of the options for achieving the required degree of isolation of such wastes from the biosphere, geological disposal is currently the most favoured strategy;
- believe that the strategy of geological disposal of long-lived radioactive wastes:
  - takes intergenerational equity issues into account, notably by applying the same standards of risk in the far future as it does to the present, and by limiting the liabilities bequeathed to future generations; and
  - takes intragenerational equity issues into account, notably by proposing implementation through an incremental process over several decades, considering the results of scientific progress; this process will allow consultation with interested parties, including the public, at all stages;
- note that the geological disposal concept does not require deliberate provision for retrieval of wastes from the repository, but that even after closure it would not be impossible to retrieve the wastes, albeit at a cost;
- caution that, in pursuing the reduction of risk from a geological disposal strategy for radioactive wastes, current generations should keep in perspective the resource deployment in other areas where there is potential for greater reduction of risks to humans or the environment, and consider whether resources may be used more effectively elsewhere;

Keeping these considerations in mind, the Committee members:

- confirm that the geological disposal strategy can be designed and implemented in a manner that is sensitive and responsive to fundamental ethical and environmental considerations;
- conclude that it is justified, both environmentally and ethically, to continue development of geological repositories for those long-lived radioactive wastes which should be isolated from the biosphere for more than a few hundred years; and
- conclude that stepwise implementation of plans for geological disposal leaves open the possibility of adaptation, in the light of scientific progress and social acceptability, over several decades, and does not exclude the possibility that other options could be developed at a later stage.

This opinion has been endorsed by the IAEA and the European Commission.

Progress Towards Geologic Disposal of Radioactive Waste

In 1999 the Radioactive Waste Management Committee of the OECD Nuclear Energy Agency surveyed member countries as well as the European Commission and the IAEA to review the adequacy and continuing relevance of earlier collective opinions such as that quoted above.[3] A very high level of consensus was found internationally among regulators and implementers.

Broad conclusions reached at the end of this review were that:

- Deep geologic disposal concepts have made significant progress in the past ten years, most especially in the technical areas concerning the understanding, characterisation and quantitative modelling of the natural and engineered safety-barrier systems.
- No radical changes in strategy or in applied methodologies have proven to be necessary. Although, refinements are still being made, deep geologic disposal is effectively a technology that is mature enough for deployment.
- In many programmes, more emphasis is being placed upon the contribution of the engineered barriers, but the natural or geologic barriers in a deep repository continue to play a crucial role in determining the achievable long-term safety.
- All national programmes continue to support deep geologic disposal as a necessary and a feasible technology, even though some countries wish to postpone implementation of repositories or to evaluate other options in parallel.
- There is a general common trend towards advocacy of prudent, stepwise approaches at the implementational and regulatory level to allow smaller incremental steps in the societal decision making process. Discrete, easily overviewed steps facilitate the traceability of decisions, allow feedback from the public and/or their representatives, promote the strengthening of public and political confidence in the safety of a facility along with trust in the competence of the regulators and implementers of disposal projects.
- Although one deep geologic repository, purpose-built for long-lived waste, is now operating, the timescales envisioned ten years ago for the development of deep geologic repositories were too optimistic. The delays that have occurred are partly due to operational causes, but mainly reflect institutional reasons, in large part associated with insufficient public confidence.
- There is an acute awareness in the waste management community of this lack of public confidence; efforts are needed by both implementers and regulators to communicate effectively to decision makers and the public their consensus view that safe disposal can be achieved.
- The implementers and regulators are more willing than ever to heed the wishes of the public in so far as these do not compromise the safety of disposal facilities. One common goal is to establish strategies and associated procedures that allow long-term monitoring, with the possibility of reversibility and retrievability. A number of programmes now consider these issues explicitly.
- In spite of the delays, no nation has rescinded its decision to pursue geologic disposal and the consensus for pursuing geologic disposal as the only feasible route for assuring permanent isolation of long-lived wastes from the human environment is unaffected.

Alternative means of radioactive waste disposal have often appeared to have promise prior to consideration of all aspects of the proposal. Several exotic options were studied earlier, and no longer seriously considered. There are those who, for a variety of reasons, strongly advocate surface storage or partitioning and transmutation. The waste management community does not however, regard extended or 'indefinite' surface storage as a real alternative to geological disposal; at best it offers a postponement of final disposal. Partitioning and transmutation is also not regarded as an alternative; at best it reduces the volume, or changes the isotope distribution, of wastes requiring disposal.

Further Information

References

1. The Principles of Radioactive Waste Management, Safety Series No. 111-F, a publication within the RADWASS programme, IAEA (1995). [Back]
2. The Collective Opinion of the Radioactive Waste Management Committee is part of the report titled The

Environmental and Ethical Basis of Geological Disposal of Long-Lived Radioactive Wastes, OECD Nuclear Energy Agency (1995). A PDF file of the the report is also available.[Back]

3. Progress Towards Geologic Disposal of Radioactive Waste: Where Do We Stand? An International Assessment, OECD Nuclear Energy Agency (1999). [Back]

Related information pages

Waste Management in the Nuclear Fuel Cycle

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