MOVING FORWARD WITH GEOLOGICAL DISPOSAL OF HIGH-ACTIVITY RADIOACTIVE WASTE – A COLLECTIVE STATEMENT OF THE NEA RWMC

AEN NEA
NUCLEAR·ENERGY·AGENCY

Radioactive Waste Management Committee

The NEA Radioactive Waste Management Committee (RWMC) is a forum of senior representatives from operators and industry, safety authorities, policy makers, and research and development institutions engaged in the management of radioactive materials and waste. With its broad representation and the wide range of external expertise that its members can muster, the RWMC is a uniquely placed international forum to assist OECD countries to address issues concerning the management of radioactive materials and waste. The Committee has underscored the environmental and ethical basis for geological disposal as well as its technical feasibility in a number of previous collective statements. In the intervening time there have been advances and evolving views regarding the relevant methodologies, policies, and decision-making processes, and much further practical experience has accumulated. The Committee expresses hereunder, in a concise form, its collective views on why geological disposal remains an appropriate waste management choice for the most hazardous and long-lived radioactive wastes, on the current status of geologic disposal, on challenges and opportunities to implementation, and on expectations for further developments.

Why is geological disposal appropriate for high-activity, long-lived radioactive waste?

§ Radioactive waste is associated with all phases of the nuclear fuel cycle and with the use of radioactive materials in industrial, medical, research and defence-related applications. All such waste must be managed safely and in a manner that protects humans and their environment.

§ The most hazardous and long-lived radioactive wastes, such as spent nuclear fuel and high-level waste from fuel reprocessing, must be contained and isolated from humans and the environment for many tens of thousands of years.

§ Whatever the future of nuclear power in the different countries, it is universally recognized that safe and acceptable disposal solutions must be pursued for existing and projected inventories of high-activity, long-lived radioactive waste from current practices.

§ A geological disposal system provides a unique level and duration of protection for high-activity, long-lived radioactive waste. The concept takes advantage of the capabilities of both the local geology and the engineered materials to fulfil specific safety functions in complementary fashion providing multiple and diverse barrier roles.

§ The overwhelming scientific consensus world-wide is that geological disposal is technically feasible. This is supported by the extensive experimental data accumulated for different geological formations and engineered materials from surface investigations, underground research facilities and demonstration equipment and facilities; by the current state-of-the-art in modelling techniques; by the experience in operating underground repositories for other classes of waste; and by the advances in best practice for performing safety assessments of potential disposal systems.

§ Disposal can be accommodated in a broad range of geological settings, as long as these settings are carefully selected and matched with an appropriate facility design and configuration and engineered barriers.

Where do we stand with geological disposal in OECD countries?

§ Having taken into account significant public and stakeholder involvement, many countries have adopted geological disposal as the reference long-term management solution for their high-activity, long-lived radioactive waste.

§ Progress towards implementation is evident in a number of countries. For countries that have faced challenges and setbacks with respect to implementation, geological disposal still remains the reference option.

§ With the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management, the Safety Standards of the International Atomic Energy Agency, and the recommendations of the International Commission on Radiological Protection there is now a common framework that guides national regulatory oversight and implementation of disposal.

§ For programmes that are most advanced, implementation of geological disposal builds on a strategy that accommodates continuous learning and includes a willingness to incorporate evolution in technical advances and societal requirements.

Please consult our website www.nea.fr to download our reports

OECD

§ The search for, and selection of, a site are critical steps that have proven to be politically and socially challenging. Recent successes show the benefit of open and transparent processes that allow sufficient time and include a concerted effort to assure that there is meaningful involvement of all stakeholders in the decision-making processes by following a flexible and adaptable strategy.

§ Ethical aspects, including considerations of fairness to current and future generations, are important for the development of disposal programmes.

§ Cultural, societal, and geographical similarities and differences have resulted in a variety of paths towards implementing national disposal solutions, but a common safety and security objective underlies all these paths.

Challenges and opportunities in practical implementation

§ Regulators, implementers and policy makers have increasingly become aware that confidence by the technical community in the safety of geological disposal is not, by itself, enough to gain public confidence and acceptance.

§ There is consensus that a broadly accepted national strategy is required. This strategy should address not only the technical means to construct the facility but also a framework and roadmap allowing decision makers and the concerned public the time and means to understand and evaluate the basis for various proposed decisions and, ultimately, to gauge whether they have confidence in the level of protection that is being indicated by the implementing organisation and evaluated by the regulator through its independent review.

§ Reversibility and retrievability are considered by some countries as being important parts of the waste management strategy. Reversibility implies a disposal programme that is implemented in stages and that keeps the options and choices open at each stage, and provides the capacity to manage the repository with flexibility over time under specified conditions. Retrievability is the possibility to reverse the step of waste emplacement. There is general recognition that it is important to clarify the meaning and role of reversibility and retrievability for each country, and that provision of reversibility and retrievability must not jeopardise long-term safety.

§ Technical development and implementation of disposal projects demand decades to realize. The long implementation times afford opportunities for programme adaptation and enhancement. The related challenge is to maintain the support at both local and national levels, the necessary infrastructure, and human resources for knowledge preservation and transfer.

§ Phased decision-making has come to the fore as the preferred approach to deal with the long implementation times. Besides allowing for continued research and learning, phased decision-making provides the opportunity to build broad societal confidence in the concept and to develop constructive relationships with the most affected regions. The related challenges are to maintain the processes and relationships, integrate advances, and ensure forward momentum.

Broad expectations on further development of geological disposal

§ Collective experience and knowledge transfer have been helpful in facilitating development. International cooperation and sharing of research projects, experiences and lessons learnt should continue.

§ Delaying work on geological disposal – i.e. by adopting a "wait and see" strategy – would require increasingly more demanding care for the waste and its storage facilities. Wastes stored at or near the surface will be more vulnerable over time to extreme natural events or terrorism than wastes disposed deep underground. Geological disposal thus provides an ethical basis for current generations to deal with the waste and it should be implemented.

Geological disposal provides a unique duration and level of protection for humans and the environment in a manner that does not require continued monitoring, maintenance and institutional control. Geological disposal is technically feasible and widely adaptable to diverse geological settings. It is being developed worldwide, with increasing involvement of stakeholders to assure that societal requirements are taken into account. Moving forward now with implementation of geological disposal is desirable from the point of view of both ethics and safety. Sufficient information exists now to take the first steps and put a plan in place commensurate with the current generation's responsibility.