

Management of Radioactive Waste

Objective

To achieve global harmonization in policies, criteria and standards governing waste safety and public and environmental protection, together with provisions for their application including state of the art technologies and methods for demonstrating their adequacy.

Status of Radioactive Waste Management around the World in 2008

The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (Joint Convention) is the main international instrument associated with the management of radioactive waste. With the addition of Senegal¹ and Tajikistan, the Joint Convention had 46 Contracting Parties at the end of 2008. The organizational meeting for the 3rd Review Meeting for the Joint Convention (scheduled for May 2009) took place in 2008.

Confidence in the safety of spent fuel and radioactive waste management is an important factor in the public acceptance of nuclear energy. However, difficulties in siting and putting into operation waste disposal facilities in many Member States led to a situation in which arrangements for extended storage had to be made.

As existing nuclear installations and other facilities using radioactive material continue to age, the time for their eventual decommissioning is approaching. Even though, from a technological perspective, there are a number of options available for safe decommissioning, in many cases decommissioning planning is far from complete. For a large number of facilities worldwide, decommissioning activities continue to be underfunded.

¹ The Joint Convention entered into force for Senegal on 24 March 2009.

Revised Classification of Radioactive Waste

The Agency updated a safety standard on the classification of radioactive waste. This standard covers all radioactive waste types and recognizes the clearance concept for identifying the boundary between waste that needs to be managed as radioactive waste and that which can be removed from regulatory control for management as conventional waste (Fig. 1).

Development of National Policy and Strategies for Radioactive Waste Management

The Joint Convention implies that States must have a policy related to the management of spent nuclear fuel and radioactive waste and strategies to implement the policy. These issues are also discussed in several Agency safety standards.

In 2008, the Agency organized a series of regional workshops to explain to decision makers and technical experts the importance

of having a national policy and related strategies in place for the safe management of radioactive waste and spent fuel. It also organized appraisals of policies and strategies in Bolivia, Costa Rica, Cuba, Namibia, Spain, Ukraine and Venezuela.

Safety Demonstration of Geological Disposal

The Agency launched the International Project on Demonstrating the Safety of Geological Disposal (GEOSAF) in 2008 to provide a forum for the exchange of experience and opinions in demonstrations of the safety of geological disposal. It also aims to provide a platform for knowledge transfer in view of the increasing number of countries contemplating nuclear power. The inaugural meeting took place in Paris in June 2008 and was hosted by the French Institute for Radiation Protection and Nuclear Safety. The project structure comprises two working groups, the first dealing primarily with safety demonstration methodology, and the second focusing on the regulatory process.

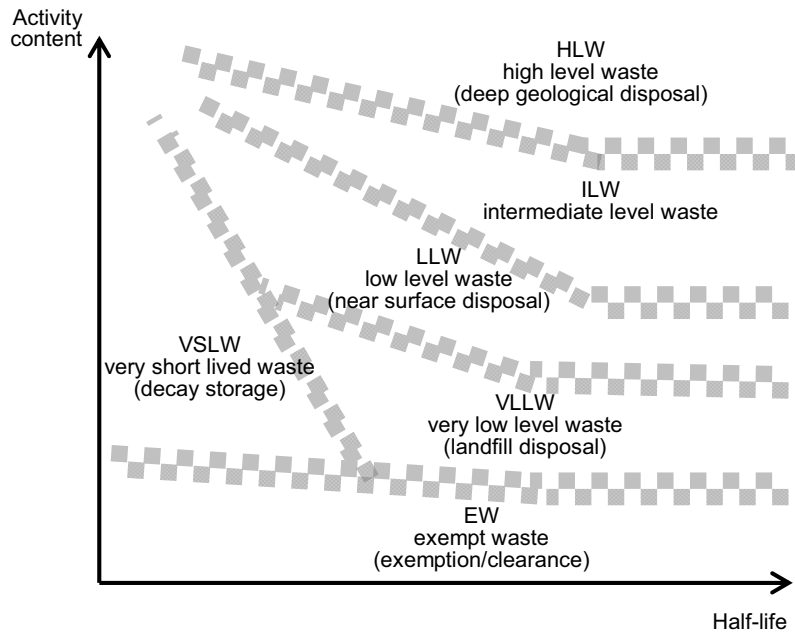


FIG. 1. Classification showing types of radioactive waste.

Several tasks for the two working groups have been identified, including a review of a report on a European pilot study on regulatory expectations for demonstrating the safety of geological disposal and carrying out a critical review of test cases.

The Radioecological Situation at Thule

At the request of the National Institute of Radiation Protection of Denmark, the Agency performed an international peer review of 'Project Thule 2007 – Investigations of Radioactive Contamination on Land'. This project refers to the

crash in 1968 of a US Air Force bomber carrying four nuclear weapons onto the frozen ocean approximately 10 km west of Thule Air Force Base in Greenland (Fig. 2). In the ensuing decades, several scientific campaigns monitored the long term fate of the plutonium dispersed during the accident, with an emphasis on the marine environment. However, since only a few monitoring activities had been performed in the terrestrial environment, Project Thule 2007 was intended to fill this gap. The Agency review team analysed the proposal and supporting documentation, and prepared a technical report with advice and recommendations on optimizing the proposed



FIG. 2. The former Thule Air Force Base in Greenland.

monitoring programme. The team concluded that the proposal had achievable goals and that the project was supported by qualified experts, proper equipment and resources.

Agency Review Services in 2008

At the request of the Nuclear Agency of Romania, the Agency reviewed the radiological situation of workers, the population and the environment surrounding the Cernavoda nuclear power plant. The general conclusion was that the plant has a radiation protection programme in place for workers, the public and the environment which is consistent with the recommendations of international safety standards. With regard to the protection of the public and the environment, the Agency concluded that the assessed dose results were below the dose limits, and the models and parameters adopted provided a high degree of conservatism. Based on the information available, the population and environment surrounding the Cernavoda nuclear power plant were not exposed to significant risk due to radioactive discharges, particularly of tritium, and that the levels of received doses were acceptable

and consistent with the system for radiological protection defined by the ICRP and the Agency's safety standards. With regard to the protection of workers, the review found that the relevant regulations and documentation of the nuclear power plant complied with ICRP recommendations as well as the safety standards of the Agency and the European Union, ensuring that doses were below the international accepted limits. Efforts were also being made to reduce occupational exposure.

The Agency conducted a peer review of the 'Technical Programme for the Development of the Slovenian National Repository for Low and Intermediate Level Radioactive Waste' at the request of Slovenia's national radioactive waste management agency. The review focused on three main areas: the repository design bases and the suitability of the basic engineering design for low and intermediate level waste disposal at the proposed site; the site selection process, site assessment criteria and site characterization; and the waste management agency's future activities that are intended to lead to a detailed engineering design and licence application.

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Decommissioning Peer Review

In 2008, the Agency conducted an International Peer Review of the Magnox Decommissioning Programme in the United Kingdom, focusing on the Bradwell nuclear power plant. The achievements and issues from the peer review were examined at an international meeting in November 2008. Magnox South valued the benchmarking process and encouraged other decommissioning operators to take advantage of it. The Agency will improve the review service using the lessons learned during this pilot case.

Assistance to Iraq

The Agency project to assist the Government of Iraq in the evaluation and decommissioning of the former facilities that used radioactive material has continued in 2008, with support from France, Germany, Italy, Ukraine, the United Kingdom and the USA. Decommissioning started at the first facility identified by the prioritization system agreed

to in 2007, the lightly contaminated LAMA building at Al-Tuwaitha, with the clearance of unexploded ordnance and scrap material from around the facility itself. These efforts were facilitated by the practical training given to the team at a contaminated site in the Chernobyl exclusion zone in Ukraine.

The International Decommissioning Network

Following its launch in 2007, the International Decommissioning Network (IDN) expanded its activities in 2008. For example, two hands-on workshops were held — one in Belgium on size reduction of components and one in Spain on materials management and clearance. Participants were able to examine working equipment in detail and interact with technical staff. The IDN also acted as a focal point for integrating complementary efforts in decommissioning — both within the Agency and with external groups.

The Contact Expert Group

International cooperation in solving nuclear legacy issues in the Russian Federation made



FIG. 3. Removal of submarine spent nuclear fuel from the former naval base at Gremikha for reprocessing at the Mayak plant in the Russian Federation.

substantial progress in 2008 through the Contact Expert Group (CEG). The CEG, with 13 participating Member States, supports and coordinates these activities, particularly those dealing with radioactive waste and spent nuclear fuel management, dismantling of nuclear submarines and remediation of nuclear sites. Recent projects completed by the Russian Federation and international partners include: a storage facility for submarine reactor compartments; storage for spent nuclear fuel that cannot be reprocessed; dismantling of the bulk of decommissioned nuclear submarines; technical solutions to their safe towing; and removal of the first part of spent nuclear fuel from the former Gremikha Naval Base (Fig. 3). In addition, participants at a CEG workshop made recommendations on the complex issue of the safe and secure management of radioactive waste at coastal sites in the north-west of the Russian Federation. Another workshop was devoted to decommissioning, and the replacement and disposal of radioisotope thermoelectric generators (RTGs). Following the CEG's recommendations, an international coordination group for RTGs was established to address the most urgent issues on a more regular basis. In 2008, Japan joined the CEG, highlighting the growing significance of the programme in Asia. The members also agreed to extend the term of the CEG for another two years (2010–2011).

The Uranium Mining and Production Industry

The increase in world demand for uranium was discussed at a round table event during the 52nd regular session of the General Conference in 2008. The discussion identified key safety and environmental issues associated with the recent increase in the uranium mining and production industry, legacy issues in the industry arising from poor past practices (Fig. 4), the shortage of experienced industry professionals in the areas of radiation protection, uranium exploration and mining engineering, and the lack of an adequate regulatory structure in many countries which are now involved in the exploitation of uranium for the first time. The Agency initiated several programmes to assist Member States involved in uranium exploration and production. The industry, in conjunction with the Agency, has also developed its own initiatives to assist operators in moving towards the goal of consistent global best practices and social responsibility in the uranium production industry.

Safe Use of Phosphogypsum in Agriculture, Construction, Roads and Landfills

Phosphate products, by-products and residues produced by the industry are widely used in



FIG. 4. A tailings pile and acid leach facility at an abandoned site in Taboshar, Tajikistan (note the village and school in the distance).

agriculture, building construction, roads and landfills. The global phosphate industry is also one of the largest producers of residues containing low levels of naturally occurring radioactive material such as phosphogypsum. In 2008, a collaborative approach coordinated by the Agency was adopted for a project to develop databases, demonstration

projects and centres of excellence. Other important aspects of the project are the development and use of realistic radiological assessment models and a global best practices model providing for an optimized approach to safety, regulation, residue and waste management in the phosphate industry.