

# Management of Radioactive Waste

## Objective

To increase global harmonization in the policies, criteria, standards and provisions for their application, as well as in methods and technologies, for achieving safety in radioactive waste management, in order to protect humans and their environment against health effects attributable to actual or potential exposure to radioactive waste.

## Waste Safety Standards

The Waste Safety Standards Committee (WASSC) was reconstituted for 2005–2007 with modified terms of reference that emphasize the use of standards and sharing of experience from their use.

In September 2005, the Board of Governors approved the *Plan of Activities on the Radiation Protection of the Environment*, which calls for greater coordination between the various international organizations involved, namely the Agency, European Commission, International Commission on Radiological Protection (ICRP), International Union of Radioecology, the OECD/NEA and UNSCEAR. Enhanced information exchange and the revision and application of relevant Agency safety standards are also features of the plan.

## Radioactive Waste Management

In October 2005, the Agency, in cooperation with the OECD/NEA and the Japan Nuclear Energy Safety Organization, organized an international conference

in Tokyo on the safety of radioactive waste disposal. The conference focused on national strategies for radioactive waste management and considered all possible disposal options, including near surface, intermediate depth, borehole and geological disposal facilities, as well as multilateral approaches. Participants discussed the situation at sites where large volumes of waste from the mining and milling of radioactive ores or from other industries producing waste containing natural radionuclides have been deposited on the Earth's surface.

Even though it contains a small fraction of the total activity of all radioactive waste produced globally, low and intermediate level waste (LILW) represents more than 90% of the total volume of such waste. Many disposal facilities were developed and began operation long before current regulatory requirements or technical and safety advances took effect. The Agency's project on Improving Long Term Safety Assessment Methodologies for Near Surface Radioactive Waste Disposal Facilities (ISAM) and related projects focus on the practical problems of near surface disposal, such as the development of design concepts, safety reassessments and the upgrading of existing facilities. As part of ISAM activities, the Agency published *Natural Activity Concentrations and Fluxes as Indicators for the Safety Assessment of Radioactive Waste Disposal* (IAEA-TECDOC-1464) and *Upgrading of Near Surface Repositories for Radioactive Waste* (Technical Reports Series No. 433), which consolidate the extensive international experience and information available on actions to upgrade disposal facilities.

During processing, radioactive waste is converted into waste packages and then sent for storage and ultimately for disposal. A records system for waste management should be in place that defines the

### The Agency's Safety Standards

During 2005, the Agency published two Safety Guides in the waste safety area:

- *Environmental and Source Monitoring for Purposes of Radiation Protection* (RS-G-1.8);
- *Management of Waste from the Use of Radioactive Materials in Medicine, Industry, Research, Agriculture and Education* (WS-G-2.7).

In addition, the Board of Governors approved a Safety Requirements publication, co-sponsored by the OECD/NEA, on geological disposal (WS-R-4).

data to be collected and stored at each step of waste processing and uses a reliable selection process. In this connection, a report was issued in 2005 — *Methods for Maintaining a Record of Waste Packages during Waste Processing and Storage* (Technical Reports Series No. 434).

Another Agency publication — *Disposal Options for Disused Radioactive Sources* (Technical Reports Series No. 436) — reviews technical factors and issues, as well as approaches and technologies leading to the identification of potential disposal options for disused radioactive sources. It also provides a road map for the disposal of disused radioactive sources, taking into consideration the high degree of variability in the radiological properties of such types of radioactive waste.

## Decommissioning of Nuclear Facilities

As the world's existing nuclear power plants continue to age, the Agency has devoted increasing attention to assisting Member States with their decommissioning, including the establishment of an expert group to focus on decommissioning issues important to Member States. As part of these efforts, in 2005 the Agency published *Financial Aspects of Decommissioning* (IAEA-TECDOC-1476) and *Selection of Decommissioning Strategies: Issues and Factors* (IAEA-TECDOC-1478), which identify relevant constraints and conditions for decommissioning strategies. The reports provide information that will enable policy makers to take note of specific decommissioning factors and constraints in order to provide support in the selection of a decommissioning strategy.

The content and format for decommissioning plans and supporting safety related documents were published in 2005 (Safety Reports Series No. 45). The report is applicable to all types of nuclear facilities, including nuclear power plants, reprocessing facilities, university laboratories and manufacturing plants. By using a graded approach in the application of this report, the owner of a facility can provide the information necessary to allow the regulatory body to determine whether the decommissioning activities have been properly evaluated with respect to safety.

A database was developed incorporating information from research reactor decommissioning projects. In addition, extension of PRIS to include nuclear power plants that have been shut down is available on-line for submission of data by Member States.

## Remediation of Contaminated Sites

The results of the preliminary radiological assessment of former French nuclear test sites at In Ekker and Reggane, in Algeria, were published. The report provided recommendations for consideration by the Algerian Government.

Dispersed low level contamination poses a particular challenge to those charged with its remediation. Many techniques are not efficient below certain concentration thresholds, or entail more severe impacts on certain environmental compartments than the contamination itself. A report published in 2005 by the Agency on *Remediation of Sites with Dispersed Radioactive Contamination* (Technical Reports Series No. 424) examines a variety of options for dealing with dispersed low level contamination broadly grouped into the three categories of non-intervention, containment and removal.

## Chernobyl Forum

The Chernobyl Forum was established to assist in the implementation of the UN project 'Human Consequences of the Chernobyl Accident — A Strategy for Recovery', launched in 2002. The Forum completed its work in 2005 and issued two consensus reports. These are discussed in greater detail in the first chapter, The Year in Review.

## Radioactive Waste Services

A peer review mission was requested by the Korean Hydro and Nuclear Power Company (KHNP) to assess the siting process for a LILW repository. The mission to Seoul, conducted in October–November 2005, consisted of four experts from the Czech Republic, France and the United Kingdom. The team visited Gyeongju, the candidate site selected in a public poll to accept the repository. The review team did not find any features disqualifying the proposed candidate sites from further consideration.

Lithuania's national organization for radioactive waste management, RATA, requested the Agency to organize a peer review mission to assess the long term safety aspects of its siting and site characterization programme for development of a disposal facility for short lived LILW. Consistent

with international practice, RATA is developing a near surface disposal concept. A large fraction of the radioactive waste arisings for the new disposal facility will be derived from the operation and decommissioning of the Ignalina nuclear power plant. The peer review meeting took place December 2005 in Vilnius, and included a visit to the three proposed sites near the Ignalina plant. The team concluded that the process of site characterization was being conducted according to good international practice and that the three sites being considered offer good prospects of meeting internationally recognized safety objectives and criteria. However, further work is necessary to improve site selection and confirm safety. The findings will be documented in a forthcoming Agency publication.

In Argentina, there were reports that the groundwater supply in the vicinity of the Ezeiza Atomic Center (EAC) was contaminated with anthropogenic radioactive substances, including enriched and depleted uranium. The Argentine Nuclear Regulatory Authority issued a report that found no contamination. To further reassure the local population, the Argentine Government requested the Agency to organize an independent appraisal. Experts from the Agency, FAO, PAHO, UNSCEAR and WHO, as well as the ICRP and the International Radiation Protection Association, participated in the appraisal. The first stage consisted of a technical field mission to the area in 2005. The final report to the Argentine Government is scheduled for 2006. ■