

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.

Support for International Conventions

The management of spent fuel and radioactive waste is a complex undertaking requiring concerted action by States and international bodies. The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management (the Joint Convention) had 53 Contracting Parties at the end of 2009. The third Review Meeting of the Contracting Parties took place in May. The meeting emphasized policy and technical issues on the disposal of waste, decommissioning, disused sealed sources, past practices, knowledge management, stakeholder involvement and international cooperation. Improvements for future Review Meetings were also identified.

In response to a request by the Contracting Parties to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other

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Matter (the London Convention), the Agency proposed a concept for radiological protection of the marine environment that includes humans and marine flora and fauna.

Review Services

The Agency expanded its review services in 2009 when it used its recently published safety requirements on predisposal management of radioactive waste (IAEA Safety Standards Series No. GSR Part 5) in a large scale review in Ukraine of all operating nuclear power plants and their waste related facilities. Other work carried out as

part of these services included a review of the Central Organisation for Radioactive Waste (COVRA) facilities that handle and store all radioactive waste in the Netherlands (Fig. 1). A particular objective

of the review was to provide an external evaluation of the compliance of COVRA's treatment and storage facilities with the Agency's safety standards.

The Agency conducted a review of the technical documentation for a proposed near surface disposal facility for low level waste (LLW) at Saligny, in Romania. This was done to support a submission for a siting licence application by the national radioactive waste management agency of Romania to the regulatory authority.



FIG. 1. A building for the interim storage of high level radioactive waste and spent fuel at the COVRA site, the Netherlands, which is designed to provide safe storage for at least 100 years.

A review was also performed of work undertaken by the Spanish Research Centre for Energy, Environment and Technology (CIEMAT) for the radiological characterization of the soil in the area of Palomares, Spain, where United States Air Force planes carrying nuclear weapons crashed in 1966 and the unexploded nuclear weapons contaminated the environment.

International Chernobyl Research and Information Network

In April, the International Chernobyl Research and Information Network (ICRIN) was launched as a joint initiative of the Agency, UNDP, UNICEF and WHO. Funded by the United Nations Trust Fund for Human Security, this three year initiative is designed to provide information and advice to affected communities in Belarus, the Russian Federation and Ukraine through education and training. Workshops were also arranged in Kiev and Moscow for improving dialogue between scientists, the public and the media.

Licensing Disposal Facilities for Radioactive Waste

During the General Conference in September 2009, the Swedish Radiation Safety Authority and the Agency organized a round-table discussion on the licensing of geological repositories. The participants concluded that the good progress achieved in geological disposal was the result of careful work in a number of countries that is focused on demonstrating a high level of safety in an open and transparent manner, with firm political commitment. To address some of the issues that have arisen during the development of safety standards for radioactive waste disposal, the Agency convened an international workshop entitled 'Demonstrating the Safety and Licensing of Radioactive Waste Disposal' in Cape Town in December. More than 90 international experts discussed developments in international standards and the activities of the Agency's intercomparison and harmonization projects on preparing the safety case for disposal facilities. The results of the workshop were subsequently presented at an international conference on 'Effective Nuclear Regulatory Systems: Further Enhancing the Global

Nuclear Safety and Security Regime', convened by the Agency in Cape Town in December.

DISPONET

Following the growing demand from Member States for assistance in the disposal of LLW, an international disposal network (DISPONET) was established by the Agency in April to facilitate the sharing of information in this area and the coordination of support to Member States with less advanced programmes. A workshop on post-operational environmental monitoring and surveillance of disposal facilities for radioactive waste held in September led to recommendations regarding termination of control, understanding of facility performance, early planning for monitoring and surveillance, and knowledge preservation.

Long Term Management of Disused Sealed Sources

Discussions at a workshop on 'Sustainable Management of Disused Sealed Sources – Working Towards Disposal', organized in Bangkok by the Agency and the Asian Nuclear Safety Network, centred on international cooperation, national policies and strategies for source management, storage and disposal, and associated regulatory aspects to strengthen the safety and security of disused sealed radioactive sources. The Borehole Disposal of Sealed Radioactive Sources (BOSS) system was recognized as a mature concept ready for implementation in candidate Member States, in particular those where disused sources prevail in radioactive waste inventories.

Source Recovery Operations

The Agency assisted seven Member States in managing a total of 597 radioactive sources, of which 54 were classified as high activity sources. Most of the sources were conditioned and stored in the centralized storage facilities of the countries concerned. Of particular significance was the deployment of a mobile hot cell for operations in Sudan and the United Republic of Tanzania (Fig. 2). This mobile facility is used in countries that do not have the required infrastructure to condition high activity sources by themselves.



FIG. 2. Mobile hot cell deployed in the United Republic of Tanzania.

Decommissioning of Facilities Using Radioactive Material

Within the project on the Use of Safety Assessment in Planning and Implementation of Decommissioning of Facilities Using Radioactive Material, working groups on decommissioning planning, conduct and termination concluded their activities in 2009 (Fig. 3). At the same time, working groups on the implementation of the safety assessment results and review of the implementation, modifications and evolutions of safety assessment results were launched.

International Decommissioning Network and the Research Reactor Decommissioning Demonstration Project

The Agency's International Decommissioning Network (IDN) and the Research Reactor

Decommissioning Demonstration Project (R2D2P) support countries with small scale programmes for the decommissioning of research reactors. A key objective is to provide practical examples and demonstration exercises. Workshops held in 2009 included a general training course on decommissioning at the Argonne National Laboratory, USA, a hands-on small reactor dismantling workshop at the Australian Nuclear Science and Technology Organisation in Sydney, and a group visit to the Dounreay and Sellafield nuclear installations in the United Kingdom for senior managers on decommissioning of sites with multiple facilities. The workshops also covered decommissioning cost estimation based on a simplified costing methodology developed for operators of smaller facilities, as well as characterization, dismantling and decontamination technologies, including materials management and clearance (Fig. 4).



FIG. 3. Remotely operated liner removal at the SILOE research reactor in Grenoble, France.



FIG. 4. Collecting data for the decommissioning cost estimate exercise at the Philippine Research Reactor PRR-1, Manila.

Remediation of Land Contaminated by Radioactive Material

One of the main topics at an international conference held in May in Astana, Kazakhstan, was uranium legacy issues in Central Asia. The primary objectives of the conference were to facilitate international cooperation within the region, and to promote the application of international safety standards and best practices. Recommendations from the conference included: strengthening of regulatory frameworks and capacity; development of training and educational programmes that support remediation activities; better coordination of international support; and establishment of an international network of regulators working in similar areas for sharing ideas and experience.

Central Asian Initiative on Remediation of Legacy Sites for Uranium Production

In response to requests for technical assistance from the Central Asian republics of Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan, and to address issues of legacy uranium production sites (Fig. 5), the Agency initiated several projects that include workshops and scientific visits to learn from similar projects in other countries. Sampling and analytical equipment was upgraded, and management and laboratory staff were trained. Experts worked with the four Member States to evaluate their monitoring and remediation activities and to assess the status and radiological impact of residues at the former uranium mining



FIG. 5. The Mailuu-Suu site in Kyrgyzstan. The tailings piles are in the centre of the photograph and the potential landslips are on the left (red soil) and across the river on the hillside.



FIG. 6. The defuelling of a damaged nuclear submarine involved removal of the reactor core with liquid metal cooling.

and milling sites. The Agency provided advice on the development of a regulatory framework and environmental monitoring programmes, and improvements to the national legislation were identified. A number of other international organizations are also active in the region with related projects (for example, the EBRD, the EuropeAid Co-operation Office, the OSCE, UNDP and the World Bank). Better integration of these efforts was sought through a series of coordination meetings. In 2009, the Agency also developed a report on uranium legacy sites in Central Asia to provide a technical basis for future planning by national and international organizations.

The Contact Expert Group

The Agency's Contact Expert Group (CEG) dealt with a wide range of nuclear legacy issues

in the Russian Federation in 2009, including the defuelling of a damaged nuclear submarine (Fig. 6), the removal of all undamaged submarine spent fuel from the former naval base at Gremikha and the transfer of two fuelled nuclear submarines from Kamchatka to Primorski Krai. Another achievement was the removal of all radioisotope thermoelectric generators from the Murmansk and Arkhangelsk regions and from the country's Pacific Coast. Also in 2009, the CEG held a workshop on safety and licensing issues in implementing the legacy programme in the Russian Federation, giving special attention to ensuring safe operation of the Mayak plant, where the legacy spent fuel is being reprocessed.