

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 human habitats against potential health effects attributable to actual or potential exposure to radioactive waste.

A Common Framework for Radioactive Waste Management

The concept of a common framework linking radioactive waste types to disposal options in a manner that respects international safety standards and that takes into account local circumstances has been evolving for a number of years. In 2007, an Agency workshop in Cape Town considered the concept and came to a number of important conclusions. There was consensus that international standards on radioactive waste classification should encompass all waste types, including those containing naturally occurring radionuclides and disused sealed sources, and should essentially be based on long term management. There was also agreement that defining radioactive waste with minimal amounts of radioactive content as very low level waste was a legitimate and useful concept and should be part of the classification scheme. It was also recognized that certain types of radioactive waste are not suitable for near surface disposal but do not warrant the degree of isolation and containment provided by geological disposal. For such material, disposal at intermediate depths (i.e. between a few tens of metres and several hundred metres) in a suitable geoclinical environment was considered appropriate. While classifying radioactive waste on the basis of disposal options was considered to offer many benefits, the workshop recognized that the safety of any particular disposal facility had to be demonstrated. The conclusions from the workshop will be used in the development of new safety standards publications.

Completion of the ASAM Project

The five year Application of Safety Assessment Methodologies (ASAM) Project concluded in 2007.

Five working groups, comprised of representatives from waste producers, disposers, regulators and others in over 30 countries, explored the application of the safety assessment methodology to a range of proposed and existing near surface radioactive waste disposal facilities. The groups also developed advice to assist regulators, operators and specialists in reviewing safety assessments. The ASAM Project confirmed that earlier methodologies provided a good framework for conducting safety assessments and that, in principle, they were also suitable for addressing the impacts of non-radioactive contaminants. The project formulated advice on several important safety assessment issues for mining, heterogeneous waste and re-assessment

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of existing facilities, and for disruptive events, engineered barrier performance, conservatism and realism in assessments.

Remediation Strategies and Long Term Management of Radioactive Waste after Accidental Radioactive Releases to the Environment

Twenty years after the Goiânia accident in Brazil, in September 1987, an international workshop in Santos, Brazil, considered the concepts and ideas that form the basis for the long term planning and management of the consequences of accidental releases of radioactivity to the environment. The participants worked on developing an internationally harmonized basis for remediation strategies and radioactive waste management policies that ensure long term safety.

Completion of the EMRAS Exercise

The Agency's Environmental Modelling for Radiation Safety (EMRAS) exercise ran from 2003 to 2007. It continued some of the work of previous international exercises in the field of radioecological modelling and focused on areas where uncertainties remain in the predictive capability of environmental models. Around 100 specialists from 30 Member States participated in EMRAS projects on the assessment of radioactive releases, the restoration of sites with radioactive residues, and protection of

the environment. The exercise created or validated a number of models and resulted in the revision of an Agency publication, *Handbook of Parameter Values for the Prediction of Radionuclide Transfer in Temperate Environments* (Technical Reports Series No. 364).

Evaluation and the DeSA Project

In response to Member State requests for recommendations for ensuring safety during decommissioning, over 50 experts from 30 Member States have been taking part in the Demonstration of Safety Assessment during Decommissioning of Nuclear Facilities (DeSA) project. Running from 2005 to its conclusion in 2007, this project demonstrated the use of the methodology for a nuclear power plant, research reactor and nuclear laboratory. It also developed: (i) a harmonized safety assessment methodology for decommissioning; (ii) guidance on the application of a graded approach to safety assessment; and (iii) a model for a standardized regulatory review procedure. Finally, the project established a forum and network of operators, regulators and other technical specialists involved in evaluation and demonstration or regulation of safety during the decommissioning of various types of facilities.

Increase in Uranium Mining Activities

The recent increase in the uranium mining industry has resulted in the creation of a number of new and smaller companies interested in exploring

for and developing uranium resources, many of which have little or limited experience of uranium resource development. In addition, many countries new to the uranium business — including those with few or no regulations, legislation or qualified staff to manage the proposed uranium mining activities — are being targeted for uranium exploration. The Agency, in partnership with WNA, convened a meeting in Vienna to bring together established regulators and mine operators from the major uranium producing countries. The participants agreed that a code of best practices for the uranium mining industry was needed to assist new players to operate in an appropriate manner from the first stages of development.

Development of a Mobile Hot Cell for High Activity Source Conditioning

While securing radioactive sources remains a declared priority for Member States, the actual conditions for doing so in the field look rather different. The procedure to secure spent sources, or indeed any other radioactive material, often requires the use of expensive, specialized facilities that are not widely available. In response, the Agency conceived the concept of a mobile unit for the conditioning of spent high activity radioactive sources. This concept consists of a mobile hot cell and storage container for the recovery, conditioning and packaging of high activity sources. The unit will allow engineers and technicians to condition sources where they were last used. In 2007, the first mobile hot cell was



FIG. 1. The Langer Heinrich uranium mine in Namibia.



FIG. 2. Active demonstration test of the mobile hot cell in South Africa in March 2007.

manufactured and tested by the Nuclear Energy Corporation of South Africa (NECSA) (Fig. 2). The technical demonstration established that the NECSA team is fully qualified to safely perform the required operations with the conditioning installation.

International Decommissioning Network

In September 2007, the Agency launched the International Decommissioning Network to provide a forum for the sharing of practical decommissioning experience among Member States. This was in response to the wish expressed at the International

Conference on Lessons Learned from the Decommissioning of Nuclear Facilities and the Safe Termination of Nuclear Activities, held in Athens in 2006. This network will bring together existing decommissioning initiatives both inside and outside the Agency. Organizations with a demonstrated record of excellence in a wide range of areas, with facilities suitable for demonstration or training and a willingness to share their experience, will be recognized under the network's Centres of Excellence in Decommissioning scheme. An initial programme for the network was developed at a technical meeting held in Vienna in 2007. Priorities for hands-on training and demonstrations were developed.