

NEAR SURFACE DISPOSAL FACILITIES - Chairperson K. Raj (India)

In the first presentation, the design and development of near surface disposal facilities was discussed and, in this context, examples were given of the existing facilities in different countries. The available technical options for different categories of low level radioactive waste, namely, short-lived, long-lived and very low level, were presented, with a summary of the possible reasons for adopting a particular disposal option and the limitations associated with it.

The second presentation addressed how the safety of near surface repositories should be demonstrated, with a particular focus on the assessment of the radiological impact of inadvertent human intrusion. The differing natures of the safety assessment during the various phases of the repository, identified as the Operational Phase, the Institutional Control Phase and the Long-term Safety Phase, were discussed. It was pointed out that the balance between quantitative and qualitative arguments changes with time; confidence in the radiological impact indicator “dose” decreases with time and this has to be counterbalanced by additional safety arguments, such as those based on defence in depth and robustness.

In the third presentation, several important differences between the disposal of waste containing naturally occurring radioactive material (NORM) as compared to other types of radioactive waste were noted. It was pointed out that the distinctive features of such waste arising from mining activities, i.e., low activity concentrations, large volumes and long half-lives, limit the available management options, in most cases, to near or above surface disposal. In particular, the long half-lives of the radionuclides in the waste mean that institutional control has to be retained, essentially, in perpetuity. For these reasons, the regulatory criteria cannot be fully consistent with those applied to near surface disposal facilities for other types of radioactive waste and a greater reliance has to be placed on the flexibility afforded by the concept of optimization of protection.

A summary and review of 26 contributed papers from 22 countries was presented by a rapporteur. These papers covered a wide range of topics pertaining to the safety of near surface disposal facilities, e.g., safety assessment (generic methodology, realistic and conservative scenarios, human intrusion and institutional controls; verification of computer codes), design and performance of covers and engineered barriers, realistic approaches for NORM disposal, repository design versus actual performance using environmental monitoring data, and heterogeneity and concentration averaging of radioactive waste.

The presentations were followed by a panel discussion on four major themes: a) human intrusion and institutional control, b) safety assessment, c) mining and minerals processing waste, and d) small disposal facilities for limited radioactive waste inventories.

The experience obtained during last 30-40 years in all facets of the disposal of radioactive waste in more than one hundred near surface disposal facilities represents a valuable potential resource. It would be useful to collect and analyze this experience with emphasis on documenting the lessons learned.

In the context of human intrusion and institutional control, it was observed that while the institutional control period may be projected during the initial phase of the licensing procedure, it may only be finally determined as a result of a step-by-step process of periodic review of the safety performance of the repository. Planned institutional control periods for existing near surface repositories vary from 100 to 300 years. It was pointed out that such times should not be seen as the times at which the site could be released from control but rather as the times for which institutional control can be relied upon to exist.

In the discussion on safety assessment it was noted that 'generic' safety assessment could have a role in the evaluation of the very small radioactive waste repositories which exist in some countries, for example, as a result of clean up or other intervention actions. A generic assessment framework could allow reference levels to be defined such that the requirements for site specific assessments could be simplified. In this context, the output of existing IAEA projects, such as ASAM, could provide the basis for international guidance.

In the context of generic assessments, it was pointed out that there is an absence of generic data on the performance of common materials, such as concrete, used in the construction of packaging and engineered barriers.

The conclusions of the discussion on the problems of the management of mining and minerals processing waste were generally supportive of those of the invited presentation on the subject. In this context, it was recognized that the international guidance on the safe management of this waste type is not yet adequate and it was recommended that it should be improved based, in the first instance, on the experience described in this session.

It was pointed out that there are apparent inconsistencies in the radiological criteria used for controlling different types of waste facility, for example, conventional near surface repositories versus mining and minerals processing waste deposits, and old versus new disposal facilities and that these inconsistencies tend to undermine the trust of the public in the regulatory process. It was generally agreed that there must be coherence and consistency in radiological criteria but that it would take time to achieve consistency for some situations, e.g., the legacy waste. In other situations, involving naturally occurring radionuclides, full coherence and consistency is not achievable and this has to be explained to the relevant stakeholders.

