

## **THE SAFETY OF RADIOACTIVE WASTE MANAGEMENT: THE CÓRDOBA CONFERENCE AND BEYOND**

**Mr. Phil Metcalf,  
National Nuclear Regulator (NNR), South Africa**

In March this year, the Agency convened an international conference on the safety of radioactive waste management in Córdoba, Spain. It was attended by representatives of the major international, regional and national organizations actively involved in developments associated with the safety of radioactive waste management. Senior regulators attended the meeting from countries with large, medium and small nuclear power programmes, from countries involved in the mining and processing of radioactive ores and minerals, from countries utilizing radioisotopes and also from countries operating research reactors. The meeting was convened recognizing that the “Joint Convention” will most likely come into force in the near future and it was therefore deemed timely for an international conference to focus on the associated safety, technical, legal and sociopolitical aspects with a view to identifying any areas requiring further attention. The conference came to a number of conclusions, summarized in the following paragraphs.

Fundamental in repository site selection is the need to develop public acceptance. Successful siting exercises have involved the establishment of clear national policies with gradual stepwise approaches conducted in an open, inclusive and consultative manner. Complex technical aspects must be expressed in a manner that can be understood by members of the public and, whilst media involvement is important, the commercial aspects of journalism must be appreciated. The concept of risk often features in siting considerations and the associated complexities and perceptions of risk by different groups need careful consideration.

Regarding legal and regulatory aspects, the “Joint Convention”, which binds parties to internationally endorsed standards and peer reviews, is expected to assist in developing confidence in national arrangements. States that have not yet signed and/or ratified the convention should be encouraged to do so. Whilst international consensus exists on a basis for forming legal and regulatory frameworks, national cultures will have different approaches. Nevertheless, regulatory processes must be independent of bias, and political interference in the regulatory process should be precluded by legislation. Although globalization leads to harmonization of standards, protection of national sovereignty often detracts from harmonization. Regulatory processes must ensure that a reasonable assurance of safety is established. What constitutes “reasonable assurance” for repositories will entail regulatory judgement - international co-operation in developing related guidance is considered important. Some parties have practical and ethical reservations about the ability of current generations to guarantee the safety of repositories for future generations. Limitations associated with long term predictions must be recognized and caution should be exercised in making claims which cannot be substantiated. Views were expressed that the focus should be directed to shorter time horizons without foreclosing future options. International repositories have been identified to have a number of positive benefits but their development will most likely only follow the establishment of a number of national repositories.

Technologies for pre-disposal management are well developed, although the increased transfer of such technology to developing countries is necessary. Future options may include partitioning and transmutation, but this will not preclude the need for disposal now or in the future. Delaying the disposal of radioactive waste is increasingly giving rise to problems in pre-disposal management and on the acceptability of storage facilities, which are being viewed as virtually permanent facilities. The question remains as to what type of waste does not need to be managed as radioactive waste. The concept of exemption is well understood and the concept of clearance is becoming established but its practical application needs to be agreed upon. Also, the application of the exemption and clearance concepts to materials containing naturally occurring radionuclides needs further consideration.

Near-surface repositories for the disposal of low and intermediate level waste have been successfully developed in a number of countries. The provision of effective safety with reasonable assurance has been achieved by limitation on the content of long lived radionuclides, natural and engineered barriers, monitoring and institutional controls. Nevertheless, there remains resistance both in a number of concerned public bodies and in some political circles against the development of new near-surface repositories. Consideration has been given to surface storage of low and intermediate level waste pending development of geological facilities and disposal at marginal costs. It is thought that this approach may engender a greater degree of public acceptance. Near- and on-surface disposal of stabilized mine tailings can also provide an adequate level of safety but the fact that the radionuclides have long half-lives implies perpetual institutional control. Different radiation protection criteria have been used for these disposal options, which is not ideal and the criteria need to be rationalized. Additionally, the concept of “institutional control in perpetuity” is problematic but, interpreted in terms of knowledge transfer to future generations, may be considered reasonable.

Geological disposal raises a number of safety and ethical issues. Nevertheless, high level and long lived waste exist and must be safely managed both now and in the future. There was general agreement that current generations must recognize the needs and safety of future generations and, in this regard, particular issues must be considered. Attention must be paid to demonstration of safety in the longer term, public acceptance, the implications of providing for monitoring and retrieval and international repositories. Delay is not a real option and whilst safe long term storage on the surface is technically feasible, it may be seen as “de facto” disposal and thereby provoke public antagonism. It is generally accepted that sufficient knowledge is available to enable geological repositories to be developed and prevent the burdening of future generations. However, public participation in the process of developing and approving repositories is essential and effective communication indispensable. Natural analogues could play an important role in communication with the public. Work to finalize internationally endorsed standards for geological disposal is of high priority. The provision for retrievability in repository designs is important for public confidence building, although the integrity of the repository must not be compromised nor must prospective safety assessment be delayed by such provision. Time frames for closure of repositories should not be dictated *a priori*; rather, time should be allowed for sufficient confidence to develop.

The safe management of disused radioactive sources was addressed by the Córdoba conference but this is the subject of a dedicated session in the “Scientific Forum”. The conference

also dealt with the issues of transboundary movement of radioactive waste. Such movements inevitably entail passing from one national legal regime to another and often through a number of transit states. Harmonization is clearly desirable but is aggravated by factors such as the absence of international consensus on what materials are to be considered as radioactive waste, and what is and is not to be included in the "Joint Convention". Uncertainties also arise in respect of liability provisions during transit and the non-binding nature of certain undertakings governing international transport of hazardous materials. Notwithstanding the above, the general safety record in the international movement of radioactive material has been exemplary.

In conclusion, the major challenge identified is that of building public confidence in approaches and technologies that have evolved for the safe management of radioactive waste. Major international initiatives will have to be mounted if this is to be achieved and all interested and affected parties will have to be involved. In this regard, the possible establishment of an international forum of concerned persons to explore and possibly resolve radioactive waste issues was proposed. Further development of consensual international standards is needed in a number of areas, and mechanisms to facilitate the harmonized application of the standards internationally must be established.