

Enhancing safety and security in a sharing society

**Neil Chapman and Charles McCombie,
Arius, Täferstrasse 11, CH 5405 Baden, Switzerland**

Safe and secure repositories for radwaste disposal are an absolute requirement. There are sound arguments in favour of some countries pooling resources and planning for shared repositories. By Neil Chapman and Charles McCombie

The November 2002 issue of NEI included an article giving the arguments for shared solutions for radioactive waste disposal. Shared repositories will be a necessary complement to the national repository programmes that are underway worldwide. Since then, there have been further important developments. One example is the SAPIERR (Support Action: Pilot Initiative for European Regional Repositories) study described later in this article. The project was proposed by Arius, Switzerland, together with Decom, Slovakia, to begin evaluating the feasibility of a European regional repository for long-lived wastes.

The growing importance of finding regional solutions for countries with small arisings of long-lived wastes from nuclear power generation has been emphasised repeatedly. The inevitability of having to work together is obvious and support for activities to explore how best to do so is increasing continually. At the beginning of 2003 an IAEA working group on multinational repositories produced a draft report (Developing and Implementing Multinational Repositories) that was discussed in a Technical Committee meeting this year. Publication is expected in 2004.

Some actual transfers of radioactive wastes between countries are taking place. For example, spent nuclear fuel from research reactors is being repatriated to its suppliers in the USA and Russia. There have been media reports of the potential willingness of some states to consider hosting an international repository; for example Kazakhstan has been mentioned as a potential host for low-level radioactive waste (LLW). For spent nuclear fuel, a high-profile initiative is gathering momentum in Russia, where the government supports plans for an international spent fuel repository. In April, the Russian atomic energy minister, Alexander Rumyantsev, reiterated the resolve of the government to accept spent nuclear fuel from other countries. This is allowed under a law passed in 2001, which permits import of spent nuclear fuel for storage and reprocessing. Wastes must, in principle, be returned to the original owners, but the government would like to have the option to dispose of the wastes permanently in a deep repository, and amendments to the law may make this possible. The Russian locations that have been

suggested for international storage and disposal are at Krasnoyarsk and Krasnokamensk, both in Siberia.

In May 2003, these plans were presented in Moscow at the symposium of the World Nuclear Association and at a special seminar on the topic, organised jointly by the Russian Academy of Sciences and the National Academies of the USA. Subsequently, a small group of experts visited the remote site at Krasnokamensk. The group could verify that an extensive infrastructure is available there, including an experienced and motivated work force, and that promising geological conditions exist in the granitic potential host rocks nearby. For Russian proposals to become a realistic option, substantial measures would be needed to increase the confidence of the international community- but open discussion of such initiatives may encourage other potential host countries to consider the possible environmental and economic benefits.

Security of Sealed Sources

A further challenge that could be addressed by a multinational approach concerns the security of disused radiation sources, which is of increasing concern. There are many research, industrial and medical users of sealed radioactive sources worldwide – millions of sources have been manufactured over the years and many spent sources are in storage awaiting recycling or disposal. This raises fears that some countries may not have the capability to track and control them properly, raising the possibility of their easy diversion for use in ‘dirty bombs’.

Co-disposal of the longer-lived and higher activity sources in a national deep geological repository for fuel cycle wastes is clearly a sensible solution for countries that are developing such facilities. However, many other countries with no nuclear power programme will not have a deep repository. An alternative currently being evaluated is the use of properly designed and managed borehole disposal facilities. This technology may be suited for providing a safe and affordable disposal route in developing countries, such as the numerous African states that use sealed sources. South Africa has played a leading role in developing the concept.

The development of regional or multinational facilities would enable a number of countries, each with only a small inventory of spent sources, to share a repository or a borehole disposal facility situated in one volunteer state. A larger country with significant volumes of waste requiring deep disposal might agree to help developing countries.

The potential for regional initiatives to ease the security hazard of spent sources was referred to by US energy secretary Spencer Abraham, who chaired an IAEA conference in March 2003 on this issue. He stated that the USA is “prepared to work with other countries to locate, consolidate, secure, and dispose of high-risk, orphan radiological sources by developing a system of national and regional repositories to consolidate and securely store these sources.”

European Solutions

In Europe, the main development concerning of regional repositories results from the implications of the package of nuclear directives. The proposals were adopted by the European Commission early this year and have since been commented upon by various bodies and have been discussed by European parliamentarians. The Directive on the Management of Spent Nuclear Fuel and Radioactive Waste provides that member states should establish, according to a pre-set timetable, a strategy to deal with all categories of radioactive waste – focusing on geological disposal as the safest method, given our present state of knowledge. The memo accompanying the draft directive notes that a

“regional approach, involving two or more countries, could also offer advantages, especially to countries that have no or limited nuclear programmes, insofar as it would provide a safe and less costly solution for all parties involved.”

The obvious need for European regional solutions led Arius and Decom to develop the SAPIERR project, which will take the first steps to identify the major factors that would control the feasibility of shared repositories. The project was submitted to the European Commission as part of the next Euratom round in the EU 6th Framework Programme. SAPIERR is a pilot initiative that will bring together interested member states and associated countries to help establish the boundaries of the issue, collating and integrating information in sufficient depth to allow potential regional options to be identified and any consequent R&D needs to be identified. Specific proposals for regional facilities, including potential siting, will not be part of this initial pilot study. Instead, the work is aimed at establishing the conditions for regional collaboration and the implications for an enlarged European community. SAPIERR will develop a collaboration framework and a database for regional waste disposal in the EU and propose mechanisms for developing strategy options in future EU programmes.

Organisations in many countries have indicated an interest in participating in the working group that will be involved in the project. These include those countries in which Arius members are located (Belgium, Bulgaria, Hungary, Italy, Japan and Switzerland) as well as the Czech Republic, Latvia, Lithuania, Netherlands, Norway, Romania, Slovakia and Slovenia.

Growing Acceptance

What are the prospects today for sharing the burden of final disposal of wastes? A few years ago, there was reluctance even to discuss the topic of international repositories. One factor that has changed this is that some national fuel cycle waste programmes have navigated their way through the shifting sands of finding acceptance and moved onto stable ground, where geological repository implementation now seems feasible. In the USA, the WIPP facility is operating smoothly and the Yucca Mountain licence application is being prepared. In Europe, Finland and Sweden have made real progress in siting and work has been resumed at the potential site at Bure, in France. These successes demonstrate, at the national level, that technically, socially and politically acceptable

answers to disposal challenges can be found. Today, those programmes that can fulfil their responsibilities for safe waste management only by working together in multinational disposal projects also want to establish the best way of moving forward.

The environmental goals of shared solutions have been widely recognized to be of great importance. More recently the objective of assuring access to shared disposal routes has also been recognized as being urgent as well as important. The problem of ensuring global nuclear security in a world characterised by safeguards controls that can only be applied unevenly and by widespread terrorism is an increasing worry with respect to some types of waste, and to some waste owners and producers around the world. Thus, there is a second factor raising support for international repositories or stores. This is the realisation that, if shared, centralised solutions can be found to ease these concerns, the world will become both safer and more secure.

This led the Director General of the IAEA, Mohammed ElBaradei, in his recent article in the October 2003 issue of “The Economist”, to the following conclusion:

“More than 50 countries have spent fuel stored in temporary sites, awaiting reprocessing or disposal. Not all countries have the right geology to store waste underground and, for many countries with small nuclear programmes for electricity generation or for research, the costs of such a facility are prohibitive. Considerable advantages--in cost, safety, security and non-proliferation--would be gained from international co-operation in these stages of the nuclear fuel cycle. These initiatives would not simply add more non-proliferation controls, to limit access to weapon-usable nuclear material; they would also provide access to the benefits of nuclear technology for more people in more countries.”