SIGNS OF PROGRESS

IAEA PERSPECTIVES ON RADIOACTIVE WASTE MANAGEMENT

BY MOHAMED ELBARADEI

From various perspectives, the issue of radioactive waste management is a compelling one. There are, for example, different levels and categories of waste, different storage and disposal methods, and different siting and environmental requirements.

The differences reflect the issue's complexity. Regrettably they also can serve to cloud public perceptions about the issue as a whole. We should not lose sight of communicating a broader "holistic approach" -- all types of generated radioactive wastes need to be managed safely -- and we should intensify efforts to clarify the complex picture and further advance public understanding.

The main goal we are pursuing is the protection of public health, safety, and the environment in which we live. Fortunately, notable progress is being made through international cooperation in radioactive waste management to resolve common problems and bring us closer toward achieving this goal for all types of radioactive wastes.

IMPORTANT SIGNS OF PROGRESS

The outcomes of major international conferences over the past year have emphasized key points integral to the safe management of radioactive wastes and the technological demonstration of solutions.

- *Technologies exist for managing radioactive wastes in ways that are safe, economical, and environmentally sound.* This key point was documented at the IAEA's International Symposium on Technologies for the Management of Radioactive Wastes from Nuclear Power Plants and Backend Nuclear Fuel Cycle Facilities in September 1999 in the Republic of Korea.
- *Countries are committed to working together to ensure that disposal of radioactive waste is conducted in a safe and environmentally sensitive manner.* This key point was made in the Joint Declaration at the conclusion of the International Conference on Geological Repositories in November 1999 in the United States.
- *Consensus is building to strengthen the international framework on the safety of radioactive waste management.* This key point, among others, emerged from the IAEA's International Conference on the Safety of Radioactive Waste Management in March 2000 in Spain. *(See related articles in this edition.)*

These and other signs of progress are beginning to more strongly influence the international dialogue. A Scientific Forum on Radioactive Waste Management at the IAEA General Conference this September is an important next step. The Forum brings together technical experts and policymakers, and seeks to build from experience and share the knowledge acquired in many countries. It particularly focuses on international dimensions of recent developments in this field, and on ways to work together to meet the challenges ahead.

While we must maintain a broad perspective covering the whole spectrum of wastes, an undeniable fact dominates the current scene: the amounts of high-level waste are steadily rising and decisive steps need to be taken towards the siting, construction, and operation of geological repositories. A fundamental challenge is to accelerate and sustain progress toward demonstrating solutions.

The solution generally proposed is the use of deep geological repositiories. Wastes would be safely isolated through natural barriers and an engineered system designed to

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provide primary physical and chemical waste containment. As reaffirmed at the Agency's symposium in Korea, the opinion of most specialists is that such geological disposal can be implemented safely, economically and in an environmentally sound manner, using technologies that already are available.

One facility, the Waste Isolation Pilot Plant (WIPP) in the United States, is pointing the way forward. Though it is not licensed to receive wastes classified as high level, WIPP is the world's first operating geological repository designed for permanent disposal of long-lived radioactive wastes.

GLOBAL CHALLENGES

In most countries, the development of repository siting programmes is facing difficulties. One big hurdle they share is a lack of public acceptance of the disposal concept, resulting from fears about safety, lack of confidence in the technology, and lack of knowledge about the options.

Other hurdles also hinder progress. Some countries, notably those not having large nuclear power programmes, cite the cost of implementation as a curtailing factor in waste management. Although this cost is normally only a small percentage of the total costs for electricity production, some States experience difficulties in allocating the necessary resources.

Some countries also lack the specialists, equipment and technical infrastructure needed to embark on waste management programmes. Still others may not have the

appropriate geological make-up for the development of repositories.

While investigation of options continues, a number of countries have made concrete steps towards designing and constructing disposal repositories. Several of them have developed or are developing underground research facilities. In addition, several countries have active site screening and investigation programmes, and also are developing legal and regulatory frameworks to ensure the safety of geological disposal.

Questions on whether, how, and when to implement a geological disposal programme are national decisions, part of each State's responsibility for safely managing their radioactive wastes. Such decisions have technical, economic, social, and legal implications. Although it may be difficult to reach a consensus on all aspects in any one country, progress at the national level can be assisted and guided considerably by the development of an international consensus on common approaches and strategies.

INTERNATIONAL COOPERATION

Global cooperation in areas of radioactive waste management extends to all three main pillars of the IAEA's work: technology, safety, and safeguards.

Technology. The IAEA carries out a range of activities to facilitate technology transfer and the exchange of technical information and experience related to waste management, including the geological disposal of high-level wastes. They include international conferences and symposia on the technical and safety aspects of geological disposal, coordinated research projects to bring experts from different States together to share ideas and experiences, and the publication of reports on the latest technologies.

The Agency also organizes peer reviews, upon request, of national radioactive waste management programmes. Countries where reviews have been carried out in areas of waste management and geological disposal include the Czech Republic, Finland, Sweden, the United Kingdom, and the United States.

Safety. The Agency has given special attention to the need for agreed norms and standards in the waste management area. In this regard, a Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management was opened for signature in September 1997.

Photo: A public tour takes visitors inside the USA's Waste Isolation Pilot Plant, mined in an ancient salt formation.
(Credit: US DOE).

We now have just over half the ratifications needed for it to enter into force. The Convention establishes commonly shared safety objectives and sets out the specific obligations of Contracting Parties aimed at achieving those objectives. When it enters into force, adherence to these national obligations will be monitored through an international process of peer review by the Contracting Parties.

Another major area of global cooperation is the development and application of internationally accepted standards of safety. Geological disposal is covered by the IAEA corpus of safety standards. Relevant standards are being reviewed and updated, and greater efforts are being made to strengthen international consensus in this area.

Safeguards. The IAEA is also concerned with the application of its safeguards system with respect to the geological disposal of high-level waste containing nuclear material of safeguards relevance.

A multinational Member State support programme for the Development of Safeguards for Final Disposal of Spent Fuel in Geological Repositories has been launched to foster technological advancement in this area. The aim is to ensure that the safeguards systems developed for the final disposal of spent fuel effectively meet the objectives of IAEA safeguards, optimize resources and make the best use of existing technologies while still meeting the objectives of safety and environmental protection.

BUILDING A STRONGER FRAMEWORK

So what can be done to build from experience and sustain progress?

I am confident that research and development will keep leading to improvements in waste technologies. Yet the core challenge is likely to remain the readiness of the public and policy makers to accept the solutions. We need to be prepared to engage in open and constructive dialogue to obtain the confidence and trust of all those who are potentially affected by plans to store, transport, and dispose of waste.

It is notable that in the countries where progress is being made towards final disposal, the directly affected communities have increasing confidence and trust in the responsible authorities. Such a situation is not easy to achieve. It requires determined and patient efforts, primarily in the country and region where the disposal site is to be located.

IAEA Initiatives. The Agency is taking a number of initiatives to strengthen the international exchange of experience and views, and to build the consensus that will be required for assuring steady progress in fields of radioactive waste management.

One initiative is the promotion of international collaboration at existing underground research facilities for radioactive waste disposal. This could, among other things, serve to demonstrate to the public the safety and the feasibility of the technologies required for the isolation of radioactive wastes for long periods of time.

A second initiative responds to the need for establishing an international framework to deal more effectively with common problems. The IAEA can serve as a catalyst for such a framework on radioactive waste safety. The framework's basic components would include:

- *The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management.*
- *The completion of a full set of international waste safety standards, particularly in relation to waste disposal.*
- *International mechanisms to provide for the effective application of these standards.*
- *International cooperation in demonstrating the implementation of technologies in priority areas of radioactive waste management and disposal.*

Over the past decades, radioactive waste management has proven to be a difficult societal issue. Overall, sound technologies are in place and a good safety record has been established. But more needs to be done to address common problems, demonstrate solutions in waste disposal and other key areas, and strengthen the international safety framework.

As States move forward, I am confident that these and other IAEA initiatives will benefit global efforts. Their results should serve to sustain progress, contribute to greater understanding of issues, and strengthen the international cooperative framework in ways that help to ensure the safe management of all types of radioactive waste. ❐