

Progress with Initiatives for Multinational Disposal of Radioactive Wastes

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Abstract. Since the last IAEA conference in this series, in Tokyo in 2005, there have been significant developments related to concepts for the multinational disposal of radioactive wastes. This paper takes up the story, starting from IAEA's 2004 TECDOC 1413, and briefly reviews the major initiatives worldwide, drawing conclusions on possible future advances on the path towards one or more shared disposal facilities.

Key Words: multinational; multilateral; disposal; Arius, ERDO.

1. Introduction

Since the last major IAEA conference in this series (Tokyo, 2005), there have been significant developments in concepts for multinational disposal of radioactive wastes. This paper takes up the story of multinational radioactive waste management (RWM), starting from the key 2004 IAEA document [1] that summarised the status of multinational approaches (MNA) and initiatives at that time. The report brought together the arguments for and against such initiatives, proposed studies that should be carried out and recommended continued evaluation by potentially interested countries – pointing out that such involvement could take place without any commitment to hosting a multinational facility.

Since then, the IAEA has continued to contribute strongly to the debate, from its major 2005 report [2] on '*Multilateral Approaches to the Nuclear Fuel Cycle*', through to the recently published document [3], '*Framework and Challenges for Initiating Multinational Cooperation for the Development of Radioactive Waste Repositories*', and other organisations, including the EC and a number of US bodies, have also become involved. Below, we assess what has been happening over the last decade.

2. Europe

The most structured advances towards multinational or regional solutions have been in Europe. The comprehensive SAPIERR projects, which ran from 2005-9, assessed all the technical, economic, legal, security, political and societal aspects of developing shared European storage and geological disposal facilities. The work was financed by the European Commission (EC) and carried out by a consortium of specialists from fourteen EU countries. The projects resulted in a proposal for a staged, adaptive implementation strategy for a European Repository Development Organisation (ERDO). The first step was the establishment of a Working Group (ERDO-WG) of interested countries to carry out precursor work to enable a consensus model for an ERDO to be agreed, using the SAPIERR findings as a starting point. This model [4, 5] has been presented to potentially interested countries, so that they can decide whether and when to set up the ERDO. The ERDO-WG has had intensive exchanges with the EC, including co-organisation of meetings, discussions with Commissioners and staff, and with the relevant committee of the European Parliament.

The '*dual track*' concept emerged from these European projects. Its basis is that any nation pursuing a multinational solution must also have a parallel repository programme that could lead to a national solution. Two drivers were influential in establishing this approach, which is

now cited specifically as the national RWM model by several countries: countering any accusation of ‘wait and see’, plus the requirement to satisfy international legal obligations. On the first, it is not credible for a national RWM programme to rely entirely on a solution that is not totally within its control and is not assured. On the second, the earliest international obligation concerns the IAEA Joint Convention, where signatories must present a credible national strategy and timeline for RWM. For the EU countries, the need to have a clear and credible strategy was formalised in Council Directive 2011/70/EURATOM, which sets out a legal timetable for Member States to establish a RWM programme. This legal document also explicitly acknowledges the legality of transferring radioactive wastes between countries for the purposes of disposal. The Directive effectively restricts this freedom to transfers to other Member States; for transfers outside the EU, a host country would need to have a deep geological repository in operation: unlikely for a long time, for any potential host state.

Recent emphasis of ERDO has been on trying to convince the EC that more resources should be devoted to promoting regional cooperation on strategic issues. It is important to understand that the ERDO developments have taken place from the bottom upwards. The position of the EC and the European Parliament is that such developments must come from like-minded countries working together. Although the seed funding came from the EC (for SAPIERR), there has been no strategic push or leadership from the EU political institution and its agencies to encourage the idea of a shared European repository. In practice, EC financial support in RWM has been provided almost exclusively for cooperative projects focused on technical R&D - projects that benefit primarily the advanced nuclear programmes. The EC apparently has less flexibility in funding initiatives of a more strategic nature.

The ERDO itself will be established when and if a sufficient number of partner nations agrees to the final proposals; it will operate as a sister organization to waste agencies that have opted for a purely national repository programme. The step between national organisations discussing the possibility and its political endorsement within the EU is inevitably the highest hurdle that ERDO must overcome.

3. MENA and Asia

The inherent value of the ERDO-WG work and the potential for application of the same principles elsewhere began to be recognized in the last 5 years. Arius received grants from two charitable foundations in the USA (William and Flora Hewlett Foundation; Alfred P. Sloan Foundation) to enable extension of the concept to other parts of the world – specifically, the Middle East and North Africa (MENA) and Asian regions. In the former region, Arius contributed to strategic waste management planning activities in the UAE and had direct discussions with Gulf Co-ordination Council groups. In 2012, a "*Workshop on Regional Collaboration on Radioactive Waste Management in MENA Countries*" was hosted by the UAE authorities and organised by the IAEA and Arius, with significant input from the Arab Atomic Energy Agency (AAEA). Follow up workshops were hosted in Tunisia in 2012 and 2013 by the AAEA, co-organised with the assistance of Arius and the IAEA. Participants were largely from Arab countries that have no immediate nuclear power plans. It was clear that priorities in Arab regions with active nuclear power developments differ from those in less wealthy Arab states that are concerned mainly with ensuring safe storage and disposal of spent radiation sources, NORM and other materials. At present, political unrest and financial difficulties in some parts of the MENA region effectively block efforts to implement more secure waste management programmes. However, in both the GCC and MENA regions, there is a strong interest in partnering initiatives that pool resources and benefit from economies of

scale. In the six countries comprising the GCC region, consideration is also being given to launching a joint project on the feasibility of shared storage and/or disposal facilities.

Developments have been less focused in the ten ASEAN countries, where discussions on MNA to RWM are only at a formative stage, even though several member States are actively pursuing nuclear power development. Other possible regional groupings could include Central and South America, and Africa.

4. Other International Working Groups and Projects

Current interest in MNAs to the back end of the fuel cycle is at a renewed high level:

- The International Framework For Nuclear Energy Cooperation (IFNEC) Working Group on Reliable Nuclear Fuel Services has initiated a multi-year study *‘Practical Considerations to Begin Resolving the Final Spent Fuel Disposal Pathway for Countries with Small Nuclear Programs’*, assessing how small nuclear programmes might progress back-end planning most effectively using a “dual track” approach.
- The IAEA International Project on Innovative Nuclear Reactors and Fuel Cycles (INPRO) has launched a multi-year study on *‘Cooperative Approaches to the Back End of the Nuclear Fuel Cycle’*.
- The American Association for Arts and Sciences has run a related project on *‘Global Nuclear Futures’*, with workshops in the UAE and Vietnam.
- The Nuclear Threat Initiative (NTI) project on *‘New Approaches to the Nuclear Fuel Cycle’* has looked at the impact of multinational solutions on nuclear power globally.

5. The South Australian Initiative

The most prominent current analysis of the potential benefits of hosting a multinational storage and disposal facility was run by the South Australia Nuclear Fuel Cycle Royal Commission, established by the Government of South Australia to consider the pros and cons of expanding nuclear fuel cycle activities. The Royal Commission reported in May 2016 [6]. A central finding was that establishment of commercially based waste storage and disposal facilities for international clients would be feasible and of great benefit to South Australia. The economic scale of the project that was modelled, for a waste inventory representative of a significant number of the world’s smaller nuclear power programmes, estimated a resource turnover of some hundreds of billions of dollars. The Government will respond to the findings around the end of 2016. An opinion poll carried out while the Commission was at work reported an almost even split between those in favour and those against. The response of the Government will be a critical barometer for multinational initiatives. As we commented earlier this year [7]: *“If a state-sponsored multinational initiative in a country with the high global political status and credentials of Australia were to be available, it would change the worldwide paradigm of radioactive waste management forever and for all RWM programmes in almost every country”*.

6. Conclusions

New and expanding nuclear programmes realise the necessity of developing a credible waste management strategy as a pre-requisite for public acceptance of nuclear power. For new and smaller nuclear power programmes in particular, there are strong technical, economic and strategic arguments for having access to shared or multinational storage and disposal, and it

seems prudent to keep two options open, in a “dual track” approach. Most commentators can readily see the advantages this would afford, but most are cautious about the possibility of delivering such a solution, owing to the cross-national political challenges that clearly exist.

At the time of TECDOC-1413, there was optimism based on the level of international interest and activity in multinational RWM possibilities. All RWM programmes take time and all GDF projects have experienced delays and restarts, with the slow development of multinational RWM projects being no different. Today, the situation in national programmes is improving and the challenges to MNAs look less problematic than they did ten years ago. The balance between challenges and advantages has swung towards a wider appreciation of what such facilities have to offer globally.

We expect to see strengthening of the regional European activities of ERDO, as two or three national repositories become operational and the smaller nuclear power nations begin to work more confidently together. It is also conceivable that a national European repository could begin to offer services to other European countries, especially non-nuclear power countries with just a few cubic metres of waste to dispose of. In other regions of the world, we expect progress to be more hesitant, with an eye to developments elsewhere. The Australian initiative will be a major test of the political practicalities of establishing a multinational facility. If the South Australian Government decides to move forwards and endorse the establishment of an international storage and disposal service, then this may be the only multinational facility that is needed globally for the foreseeable future.

Multinational RWM solutions are now firmly embedded within the international nuclear power development landscape and, with the considerable security and economic advantages that they offer, they will be seen as the norm for many countries in the future.

7. References

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