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DEVELOPMENTS IN MULTINATIONAL DISPOSAL INITIATIVES

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ABSTRACT

Since the beginning of this decade, there has been a resurgence of interest in multinational disposal concepts, after early 1970s proposals for such facilities remained undeveloped for many years. Increased nuclear security and proliferation concerns have made obvious the need to keep radioactive and fissile material under close control at all times – including the period after these have been declared as wastes to be disposed of in geological repositories.

The past years were marked by strong support from multinational organisations for shared repositories. In particular, the IAEA published an overview on the topic, emphasised the potential advantages in several top-level speeches and also initiated a large international expert group on Multinational Approaches (MNA), that is considering initiatives for both the front- and back-end of the fuel cycle. The European Commission (EC) also included the topic of shared regional European repositories in the Nuclear Package of legislation that it tried (as yet unsuccessfully) to put through parliament. More specifically, the EC provided direct support for the multinational project SAPIERR which involves a working group of representatives from 14 nations in a pilot project on regional repositories in Europe.

Further international cooperative efforts have been organised by the not-for-profit Association, Arius, which currently includes organisational members from 8 countries. The Arius work is complemented by an informal grouping of representatives of government waste management organisations in a number of contiguous Central and Eastern European nations (the so-called Ljubljana Initiative Group).

In addition to the above initiatives based on “partnering” concepts, one major nuclear nation, Russia, has at governmental level expressed interest in possibly hosting an

international repository. In 2005, two Russian based meetings are taking place to explore this initiative further.

INTRODUCTION

Virtually all countries in the world with nuclear power programmes have concluded that geological disposal is a necessity, if we are to make the nuclear fuel cycle safe and environmentally acceptable without putting undue burdens on future generations (IAEA 2002). There will be no SNF/HLW repository in operation until the next decade and many countries are looking towards the middle of the century.

For the larger, advanced nuclear programmes the problems are mainly societal issues associated with achieving sufficient public and political acceptance for specific sites for a national repository. For small countries, however, or countries with limited nuclear power programmes or countries with no nuclear power but long-lived wastes from other applications, a national deep geological repository may be ruled out on economic or environmental grounds. If SNF and HLW are not to remain dispersed for indefinite periods in dozens of surface stores around the world, these small countries need access to geological repositories.

This implies that multinational facilities for disposal of SNF/HLW are a prerequisite for the sustainable, safe and environmentally friendly use of nuclear power and other nuclear applications. Other activities in the nuclear fuel cycle – uranium supply, enrichment, fuel fabrication, reactor construction, reprocessing – are all provided as international services. The same status must be achieved for disposal.

NON-PROLIFERATION AND SECURITY OF INCREASING IMPORTANCE

In addition to the economic, safety and environmental benefits that multinational repositories can offer, the non-proliferation advantages have often been stressed (IAEA 2004, Stoll and McCombie 2001). In recent years, in particular following the series of terrorist attacks from 2001 onwards, increasing attention has focussed on both non-proliferation and security aspects (see Alvarez et al 2003, USNRC 2003, NRC 2005). Repeated statements by the Director General of the IAEA have pointed out the need to control the most sensitive parts of the fuel cycle (e.g. ElBaradei 2003). It is important to note that these include not only enrichment of fissile uranium and reprocessing, to separate plutonium, but also long term storage and disposal of SNF/HLW. This point is made clear in the February 2005 report published by the Multinational Approaches (MNA) Expert Group that the DG set up in mid-2004 (IAEA 2005a). The MNA report addresses the security and non-proliferation issues in a manner directly applicable all aspects of the nuclear fuel cycle, and suggests five specific approaches for multinational initiatives.

The assurance of non-proliferation sought by the MNA Group is best attained by early implementation of shared storage facilities, with the essential ingredient of an agreed further step of disposal in multilateral repositories – either in the countries storing the waste or in a limited number of other volunteering host nations. The MNA Group recommends that the IAEA supports the concept “by assuming political leadership to encourage such undertakings”. Specific ways forward are possible based on both of the multinational repository scenarios defined by the IAEA – “partnering” and “add-on” (by a large nuclear nation), as documented in TECDOC 1314 (IAEA 2004). These possibilities are discussed below.

SCENARIOS FOR MULTINATIONAL APPROACHES TO DISPOSAL

The “add-on” scenario

The “add-on” scenario is one in which a large nuclear programme accepts wastes from smaller ones. There are several conditions that could enhance the probability of an add-on scenario being successfully implemented:

- The international community should recognise that any country offering storage or disposal services is potentially a contributor to global safety and security.
- A willing host country (or countries) must come forward, and should be able to demonstrate to the international community that they have the necessary level of support for the project within the host country.
- Appropriate benefits for the host(s) must be agreed. These need not be purely financial; strategic and political issues may also be involved.

- The potential user countries of a multinational repository should develop mechanisms to assure that the safety standards in a multinational repository are not lower than those that each would accept for a national repository.
- International or supranational bodies (e.g. the IAEA or the EC) must be willing to play an active role in developing and controlling the multinational initiatives.
- Existing backlogs of stored spent fuel, HLW and LL-ILW must also be transferred, since complete avoidance of the need for an expensive deep repository will be the driver.

In recent times most discussion on the add-on option has revolved around concepts in which Russia acts as host country. Over the past few years Russia has been seriously examining the issue of spent fuel import and is currently the only country supporting this at government level.

The “partnering” scenario

For the “partnering” scenario, in which a group of usually smaller countries cooperate to move towards shared disposal facilities, exploratory studies have been performed most recently by the Arius Association, which also co-manages the European Commission SAPIERR project on regional repositories (Arius 2005, SAPIERR 2005).

The following stages can be envisioned for a partnering scenario. It is interesting that they do not differ greatly from steps taken within a federally organised state to seek a national disposal solution.

Pilot feasibility studies: A sufficient number of interested national organisations cooperate to organise and fund pilot studies.

A formalised study consortium and dedicated Regional Repository Project Team To progress to the detailed level of study needed, a structured project team must be created, staffed and funded at the appropriate level.

Siting studies leading to candidate siting areas in different partner countries: The siting study is clearly the most sensitive work area. Optimally, it should involve working in parallel on a volunteering strategy and on a technical/societal study aimed at ranking options and keeping multiple options open.

Establishment of a Business Consortium or a Joint Venture: The purpose of this organisation is to organise and fund the characterisation of sites, to finalise agreements on the key issue of compensation for host communities and countries, to select a short list of preferred sites and to interact with political and regulatory bodies in the candidate countries.

Establish a construction and operation company: This is specific to the hosting country or countries with respect to legal structures, shared liabilities, funding mechanisms, etc

Repository operation: During the decades for which the repository will operate, the relationships between the partners can be of various types. Given the nature of the facility,

international oversight by the IAEA will be a necessity (and the EC for a European repository).

Closure and post-closure: At some time in the far-future, the multinational repository will be closed and possibly monitored for some long time. As with the shared benefits, agreements for sharing liabilities must be agreed long before this final stage is reached.

The scenario sketched above is one of many possible variants. At the heart of a successful project lies the siting issue. However, this is a difficult problem even in national programmes – but this has not prevented local communities in some countries agreeing to host repositories. The MNA group of the IAEA also recommends an initial cooperation phase, with participating countries working on a “Siteless Pilot Project” – which is, of course, the precise course taken by the European SAPIERR project.

WHAT PROGRESS IS BEING MADE?

In the past few years, there have been significant developments towards multinational repositories in several respects. The key points are listed briefly below.

IAEA support

- A series of public statements by the Director General emphasizing the need for multinational approaches;
- Publication of a technical document on multinational disposal and one on regional storage;
- Establishment of the Multinational Approaches Expert Group mentioned above;
- Sponsorship of the meetings mentioned below on international storage and disposal in Russia.

European Commission support

- Inclusion of regional repository concepts in the draft EC Waste Directive;
- Support of the SAPIERR project mentioned below.

Further international developments

- Support by US workers at MIT working on a project on “The Future of Nuclear Power”;
- Financing by the independent Russell Foundation of US Academy of Sciences-Russian Academy of Science meeting on international repositories in Vienna;
- The topic of multinational disposal is integrated into numerous international Conferences on waste management at the technical and also the legal level.

The Arius Association

- Increased membership and a new President;
- Progress with the SAPIERR project, described below;
- Preparation of a follow-on EC project.

The SAPIERR project

- Publication of two interim reports on European inventories and on legal positions;

- Preparation of a report on future initiatives for European regional repositories;
- Preparation of an open concluding seminar in Brussels in November 2005.

Russian developments

- Government efforts to establish the legal basis for import;
- Joint Russian Academy of Science – US National Academies Workshop held in Vienna in June 2005 as a follow-on from the Moscow 2003 meeting;
- Dedicated conference sponsored by the Russian Ministry of Atomic Energy and the IAEA in Moscow in July 2005.

POLITICAL/PUBLIC ATTITUDES

There are no legal obstacles to countries deciding that they will implement a common repository in a willing host country. If this course is chosen, then lawyers from the partner countries involved can develop a legal framework for the cooperation. The feasibility of realising a regional repository is thus not strongly influenced by legal constraints.

The feasibility is, however, strongly dependent upon the political and public attitudes in both host and user countries and the issue remains a sensitive political topic in various countries – in particular in those that fear the prospect of a regional solution could disrupt national programmes. This could, some believe, happen in either of two ways. Concern that a national repository might be compelled to accept foreign wastes might make acceptance of a site by a local community more problematic. The prospect of being able to export wastes to a regional repository might lead national politicians or waste owners to reduce the priority on (and the funding for) a national disposal programme. The former concern should be allayed by the firm assertions from the IAEA, the EC and from some national governments that waste import cannot be forced upon any country. The latter concern has not prevented various countries from pursuing a “dual track” option, keeping both national and regional alternatives open. This strategy is not a difficult path to follow since implementation of either option lies relatively far into the future and similar national expertise must be built up and maintained for evaluating either option.

Distinct from, but related to, the political attitudes in EU countries are the views of the public in each country on the desirability of a multinational, regional disposal option. This question has been put to the public in the scope of the EUROBAROMETER polling done for the EC (EC 2002). The polling work done in 1998 and 2001 showed that, whilst the majority still favour national disposal solutions, increasing numbers recognize the advantages of shared solutions. In some individual EU countries there have also been dedicated polls on the issue. Interesting results have, for instance, been published from Germany, a country whose political leadership is strongly opposed to multinational repositories.

Opinion surveys on waste disposal in Germany carried out by the Institute for Technology Assessment and Systems Analysis in Karlsruhe (Hocke-Bergler and Stoll 2003), included

questions on the topic of international disposal. Only 31.5% of those questioned favoured a national solution, with 55.6% preferring an international option. The supporters of an international solution were to 70% in favour of an EU solution as opposed to a repository outside the EU. Questioned about whether this multinational EU repository could be in Germany 40% agreed, 40% disagreed and the rest were undecided. Significantly, however, 80% were against the repository being sited in their own region of Germany – whether the facility be national or international.

The results of all polling exercises indicate clearly that achieving local acceptance for a repository remains a very challenging task, even for a national facility. This is borne out by actual experience. Only in Finland and Sweden have local communities democratically agreed to host a geological repository, provided that it could be shown to be safe. In both cases, the local communities already host nuclear power plants and have a long history of interacting with the repository implementing body. In France, a local region at Bure, with no prior nuclear experience, has agreed to host an underground laboratory that may later be developed into a repository. In various countries (e.g. France, Sweden, Switzerland, UK), local publics have also rejected specific proposed facilities.

For a multinational, shared repository it can only be expected that the challenge of interacting constructively with the public is still greater than in the national setting. The fear that opposition would increase massively has certainly led to advanced programmes explicitly excluding import of foreign waste as an option. The polling results quoted, however, indicate that there is a growing minority of the public who already recognise the potential advantages of shared regional repositories.

CONCLUSIONS

There is clear recognition internationally that multinational approaches in the overall nuclear fuel cycle can enhance security and can help hinder proliferation. Despite earlier controversies, the potential advantages are also recognised for multinational storage and disposal facilities. Concrete steps can be taken now to move beyond empty expressions of support towards specific practical initiatives.

Specific repository projects involving technical and societal efforts towards siting and constructing a shared repository will need closer coordination, direct involvement of the interested countries and the international agencies, and significantly increased resources. Most of the small countries that could benefit most directly from shared repositories have not yet accumulated sufficient funds to implement a national repository. However, there are certainly sufficient resources available in these countries, if pooled, to support a serious joint waste disposal programme. Initially, this would be aimed at clarifying the options for a shared regional facility. However, more support for backend studies on storage and disposal is needed. The relatively large funding which is proposed for tackling security issues at the front end could be complemented by increased – although still comparatively modest – financial support for progressing shared repository projects for

commercial reactor fuels. The “partnering” scenario outlined earlier in this paper exemplifies one possible practical approach.

However, the biggest, potentially fully international, storage/disposal initiative that could be grasped and developed immediately is that proposed by Russia. A combination of fuel leasing, allowing take-back of Russian origin fuels, and acceptance of foreign fuels requiring USA consent under existing fuel-flagging rules would be a first step. In our view, however, the Russian storage initiative will only be acceptable if the endpoint of disposal is available – this means actually available, or specifically planned and financed, rather than held out as a vague future prospect. Currently, some movement in this direction is taking place, as evidenced by the Conferences this year in Vienna and Moscow. In return for the support of the international community, Russia should agree to a new level of transparency and international oversight in the development work. Only in this way can the trust of the international community be enhanced to a level needed for other countries to enter into long-term commitments to transfer fuel to the Russian Federation.

In the ways suggested above, real progress could be made over the next few years with projects based both on the partnering and the add-on scenarios. We need bold initiatives for global solutions if we are to achieve the global improvements in safety, security and economics that multinational repositories can bring.

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