

# IAEA's involvement in multinational backend initiatives

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**IAEA**

International Atomic Energy Agency

# Rationale

- Multilateral approaches are dealing with different aspects of the NFC
  - Reasons:
    - Capability for safe implementation of NWM programmes
    - Availability of human/financial resources, of host formations (disposal)
  - Advantages
    - Economy of scale
    - Environmental and safety considerations
    - Security and non-proliferation
- Few progress to date in shared repositories due to the lack of potential and capable countries willing to host multinational repositories. Reference scenarios: Add-on scenario, Cooperation scenario, International scenario.
- Need to further develop proposed scenarios, regarding the conditions for their successful implementation and the benefits and challenges inherent to such facilities (policy, legal, security, economic and technological incentives and disincentives)

# IAEA Documents

IAEA-TECDOC-1413

*Developing multinational  
radioactive waste repositories:  
Infrastructural framework and  
scenarios of cooperation*



October 2004

## Multilateral Approaches to the Nuclear Fuel Cycle

Expert Group Report to the Director General of the IAEA



IAEA-TECDOC-1482

*Technical, economic and  
institutional aspects of  
regional spent fuel storage facilities*



November 2005



IAEA-TECDOC-1413

***Developing multinational  
radioactive waste repositories:  
Infrastructural framework and  
scenarios of cooperation***



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## Historical perspective w.r.t. trans-boundary waste transfers

- Early 80's
  - Trans-boundary waste transfers (research reactor fuels)
- From 1976
  - Return of waste after reprocessing (F, UK) and swaps (substitutions) for more effective waste shipments
- 1986
  - Bilateral exchange agreements (e.g. Germany/Sweden)
- 2000
  - Acceptance of specific waste streams (e.g. LLW containing Ra from Spain to Handford)
- On-going
  - Sealed sources

## Specific initiatives for international storage/disposal

- Desk studies on RFCC's (1975) -economic/safety/safeguards/security aspects
- Expert group (1980) on the concept of international SNF storage but no demand
- Expert group (1982) on plutonium storage under international control, reactivated in 1993 (GC) : Concept of IMRSS (International Monitored Retrievable Storage, -SNF & Pu) initiated by Germany and the USA
- Multilateral exchanges encouraged by the JC (2001). Shared initiatives is an opportunity for WMA to fulfil their tasks and responsibilities
- International arrangements by the Russian Government for import/storage of SNF, not for disposal (on-going)
- ARIUS initiative, EU SAPIERR (CATT) projects, etc

## Key issues

- Technical and institutional challenges
  - Variety of waste, technologies and QMS
  - Variety of entities, responsibilities, regulations, DMP
  - Cultural and societal considerations
  - MNR life may extend beyond life of institutions in host/partners countries
- Sensitive issues (requesting treaties, conventions)
  - Siting & transportation
  - Long term liabilities
  - Waste ownership
  - Licensing (waste compliance with WAC)
  - Financial aspects (risk in development phase)
- Applications (outweighing benefits/drawbacks)
  - Experience gained in NPP Krsko (SLO/CRO)
  - Other cases including dual approaches
  - Potential role of IAEA through the development of a multinational repository

## Future studies proposed in TECDOC 1413

- Agreements/Liabilities (host/partner)
  - Host country assumes all future liabilities for the waste for a prepayment of the disposal price
  - Partner country retains ownership but both countries share future liabilities with respect to disposal
  - Easier for waste than spent fuel (having potentially future economic value)
- Legal and regulatory issues
  - Compatibilities between countries. (SAPIERR action)
- Economics of disposal systems
  - Cost of national disposal projects and cost structure (SAPIERR action)
- Data on inventory and conditioning of RW
  - Database available at the Agency
- Storage versus disposal and retrievability issues
  - Impact/Implications on multinational repositories
    - » See also TECDOC 1482





# Multilateral Approaches to the Nuclear Fuel Cycle

Expert Group Report to the Director General of the IAEA



## Expert Group Report to the DG

- The discussion on multilateral options for technologies is considering U enrichment, SNF reprocessing, storage and disposal.
- SNF storage that is in operation in many countries is a candidate for multilateral approaches, primarily at regional level.  
No international market yet but...
- Undertakings for SNF disposal should be encouraged. Sharing disposal facilities must be looked as one element of a broader strategy of parallel options.
- Similar openness is recommended for small countries, be it only to maintain the minimum national technical competence necessary to act in an international context.
- The combined option Fuel leasing/Fuel take back should require guarantees implying a more active role for IAEA

## *FIVE SUGGESTED APPROACHES (1)*

The objective of increasing non-proliferation assurances concerning civilian nuclear fuel cycles, while preserving assurances of supply and services around the world could be achieved through a set of gradually introduced MNAs:

1. Reinforcing **existing commercial market mechanisms** on a case by case basis through long term contracts and transparent suppliers' arrangements with government backing. Examples would be: fuel leasing and fuel take-back, commercial offers to store and dispose of spent fuel and commercial fuel banks.
2. Developing and implementing **international supply guarantees** with IAEA participation. Different models should be investigated, notably with the **IAEA as guarantor** of service supplies, e.g. as administrator of a fuel bank.

## Expert Group Report to the DG

### *FIVE SUGGESTED APPROACHES (2)*

3. Promoting voluntary conversion of **existing facilities to MNAs**, and pursuing them as **confidence building measures**, with the participation of NPT NNWS and NWS, and non-NPT States.

4. Creating, through voluntary agreements and contracts, **multinational, and in particular regional, MNAs for new facilities** based on joint ownership, drawing rights or co-management for front end and back end nuclear facilities, such as: uranium enrichment; fuel reprocessing; and disposal and storage of spent fuel (and combinations thereof). Integrated nuclear power parks would also serve this objective.

5. The scenario of a further expansion of nuclear energy around the world might call for the development of a **nuclear fuel cycle with stronger multilateral arrangements** — by region or by continent — **and broader cooperation**, involving the IAEA and the international community.

- Viability of
- sharing facilities
- for the
- disposition of
- spent fuel and
- nuclear wastes

## Viability of sharing disposal facilities - Objectives

- To give an updated overview of changing global attitudes towards nuclear power and of potential developments in the nuclear fuel cycle, with a view to assessing how and when these changes may influence the viability of establishing multinational disposition approaches for spent fuel
- To summarise recent international developments specifically aimed at enhancing multinational cooperation in the nuclear fuel cycle in general, and particularly in concepts related to final disposition of spent nuclear fuel
- To address in more detail some of the key open technical and strategic issues that were identified already in earlier IAEA work and that strongly affect the credibility of multinational approaches
- To identify areas in which further work could be done to advance the progress of multinational approaches towards the final disposition of spent nuclear fuel.

## Viability of sharing disposal facilities - Outcomes

- A comprehensive and updated overview of initiatives in relation with the regional or multinational disposal options/scenarios for SNF (GNEP, GNPI, RUS/US National Academies, STUK, Conferences, WNA, etc). At present, concepts are more skewed towards the commercial, strategic and political interests and views of the providers than towards users benefits...
- A detailed discussion on approaches, agreements and challenges linked to a successful implementation of such facilities, with special focus on technical and institutional aspects, including legal and regulatory issues, and liabilities
- A road-map with milestones taking into account limitations and constraints of potentially interested MS using available experience, inter-comparison exercises/simulations and ranking priorities for further actions