Experience, Status, Issues and Prospects of Collaboration Among Countries in Back-end of the Nuclear Fuel Cycle

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Nuclear fuel cycle
International effort in Fuel Cycle

- **Main driving forces:**
  - Security and environmental safety,
  - Non-proliferation
  - Economics and finance

- **Major challenge:**
  - Disposal of SF and HLW
Early initiatives for International disposal

• Regional Nuclear Fuel Cycle Centres (RFCC) group in 1975-1977 examined the possibility of joining together to set up fuel cycle centres at selected sites.

• The International Nuclear Fuel Cycle Evaluation (INFCE) study of 1977-1980 discussed the possibility of regional fuel-cycle facilities and prospects for multilateral cooperation on plutonium storage.
Early initiatives for International disposal

- The IAEA Expert Group on International Plutonium Storage (IPS) in 1978-1982 and the IAEA Committee on Assurances of Supply (CAS) in 1980
  - abandoned the discussion of regional fuel-cycle centres
  - examined the prospects for IAEA-supervised management, storage, and disposition of spent nuclear fuel
Other initiatives

- **Mongolia** (2011 discussion of US, Japanese and Mongolian officials, Mongolia: NO)
- **Pangea** (stopped 2002) Arius born
- EU – 2011 EU directive – strength condition when SF/W exported outside EU
- **ERDO**
• DG proposed that multilateral approaches, based on improved nuclear technology control, greater operational transparency, and nuclear fuel and power plant supply assurances, could serve to strengthen the nuclear non-proliferation regime
Strengthening nuclear non-proliferation regime

“the wide dissemination of the most proliferation sensitive parts of the nuclear fuel cycle…could be the ‘Achilles’ heel’ of the nuclear non-proliferation regime. It is important to tighten control over these operations, which could be done by bringing them under some form of multilateral control, in a limited number of regional centres…. aware that this is a complex issue, and that a variety of views exist on the feasibility or possible modalities of such a multilateral approach. However… we owe it to ourselves to examine all possible options available to us”

Introductory Statement to the IAEA Board of Governors by the Director General, March 2004
“For countries with limited waste or without access to geologically suitable disposal sites, multinational disposal at sites with good geology might be an option. Several studies have identified the potential benefits, in terms of possible economic, non-proliferation, safety and security advantages, of multinational disposal as well as institutional and political issues standing in the way. The IAEA could help States arrive at a solution that fits their needs.”
IAEA reports addressing multilateral issues

- IAEA TECDOC-1153: Technical, institutional and economic factors important for developing a multinational radioactive waste repository (1998)
Planned: Institutional considerations in the development of a multinational repository

- **Objective:** to brief countries considering sharing a disposal facility on the prerequisites for and formal aspects of such decision, in particular on legal and institutional aspects, contractual obligations among partners, (including third parties who might be affected), economic and financial arrangements, liabilities, nuclear security, regulatory and legislative aspects, selected technical matters, retrievability, waste acceptance and waste tracking measures, waste transportation arrangements and formalities, project and facility management, and social matters.

- **Audience:** politicians, topical decision makers and planners
IAEA position to MNA in SNF/HLW disposal

• The IAEA emphasises the national responsibility (JC)
• The IAEA can actively encourage and support regional or multilateral cooperation in relevant R&D
• The IAEA recognizes that in certain circumstances, safe and efficient SNF/RWM might be fostered through agreements among Contracting Parties to use facilities in one of them for the benefit of the other Parties (JC)
IAEA position to MNA in SNF/HLW disposal

• The IAEA will behave sensitively not to undercut by support of MA approaches running national efforts

• The Multinational Approach concept shall never be an excuse for a country to do nothing in the expectation that others will accept its waste

• Reflecting expansion of nuclear power the IAEA will support existing and newcomers MS’s in their effort to find joint solutions for RW disposal
Potential scenarios of cooperation

• Three basic concepts (TECDOC-1413):
  - **Cooperation scenario** – partner countries cooperate in developing a repository jointly, one of them becomes a hosting country or each country takes one type of waste
  - **Add-on scenario** – the host country has already implemented a national repository and offers to dispose of imported waste from other countries
  - **International or supranational scenario** – repository fully in the hands of international or supranational body, the host country effectively cede the control of the siting area
Issues

• Siting strategies
• Regulatory and legal aspects
• Liabilities and long term rights
• Fair funding mechanism
• Safety and Security
• Timing of repository implementation
• Public and Political Attitudes
• Potential impact on national programmes
Main conclusions (TECDOC 1413, 1658)

- Safe and secure disposition is a necessity for the future of nuclear power
- Implementation challenging but feasible
- Enhances safety and security by making disposal options timely available
- Benefits potentially large and possibly outweighing drawbacks
- Discussion on multinational concepts can be initiated by interested countries without prior definition of host country
Concerns and controversies

- Advanced programmes afraid that their national programmes would be jeopardized
- Several countries introduced ban on RW import and export
- Political decision and support is needed for implementing regional/multinational repository
- Small programmes interested in principle but no serious commitment and so far no interest to host repository
- Concerns that multinational initiatives just misused to remain in-active in searching for disposal solutions
Approaches Suggested by Expert group

- Reinforce existing commercial market mechanism
  - Fuel leasing
  - SF take back
  - Commercial offers to store and dispose of SF
- Promoting voluntary conversion of existing facilities to MNAs
- Creating new multinational/regional facilities
Current situation

- **No real progress** in sharing repositories among established nuclear programmes:
  - Initiative limited mainly to geological disposal
  - Time distant plans for Geological Disposal – no time pressure for action now
  - No national geological repository implemented yet
  - No real political support
  - Negative public perception
- **But:**
  - New countries coming on board (10-60 countries)
  - Renewed concerns about security, safety and non-proliferations
- **And waste issue?**
  - Newcomers focused on energy build, awareness of the need to address RWM low
Can it be different for newcomers?

- Several countries – e.g. GCC, ASEAN – facing similar problems at the same time
- Similar requirements for WM infrastructure in those countries – an opportunity for cooperation
- Regional cooperation can consider
  - all WM facilities - processing, packaging, encapsulation, storage and disposal
  - R&D, sharing knowledge/capacities (support to operators x regulators)
- Agreements should be established at an early stage
To sum up

- Shared approaches display technical benefits but are dependent on political willingness
- Promotion of cooperative actions may result in development of joint facilities
- International institutions should promote cooperative approaches and collect/disseminate background information enhancing their implementation
Thank you for your attention