

Regional Cooperation on Spent Fuel management Status and Prospects in Europe, Arab Regions and Asia

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An Integrated Approach to the Back End of the Fuel Cycle
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Why do we need multinational solutions for managing spent fuel?

- ◆ Nuclear safety, security must be assured - globally
 - Spent fuel (and other long lived radioactive wastes) should not end up in numerous locations around the globe
 - Fewer storage and disposal facilities will lead to enhanced global safety and security
- ◆ Geological disposal is the biggest challenge
 - The **only** feasible solution - for all NFCs and for all NPPs
 - Long timescales to implement, difficult to site, expensive - especially for small inventories
 - Small nuclear power nations may not have suitable locations, adequate financing or sufficient technical know-how

Joint Convention 5th Summary Report 2015

- ◆ “Use of a shared disposal facility may be an appealing solution for some Contracting Parties ... Implementation of a shared facility faces many potential challenges”
- ◆ “Some Contracting Parties consider that a multinational disposal option may have relevance in some situations”
- ◆ “Many Contracting Parties are very sceptical whether such a solution is implementable; and.....”
- ◆ “Finding a willing host Contracting Party would be difficult”

Support for Multinational Cooperation in RWM

◆ IAEA

- Joint Convention; Reports on Multinational Storage and Disposal; TC projects; INPRO

◆ EC

- Support of Parliament and Commission; Cooperation Projects; Waste Directive

◆ Arius Association

- Multiple projects since 2002

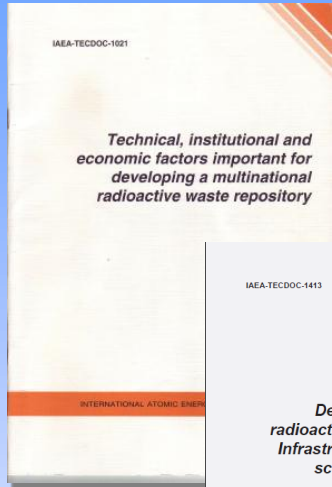
◆ ERDO-WG

- National governments' support since 2009

◆ Other Organisations

- US Foundations (Hewlett, Sloan); NTI, AAAS, NAS, AAEA; BRC in USA; UK Royal Society

IAEA reports addressing multilateral issues



1998

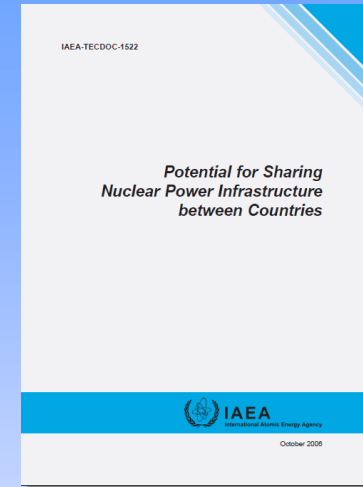


2004

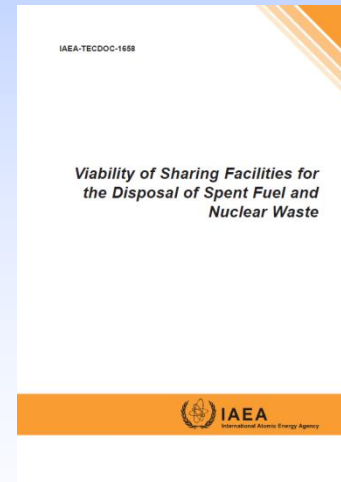


2005

2005



2006



2011



2015

Framework and Challenges for Initiating Multinational Cooperation ...

- ◆ Builds on all of the previous work by providing to politicians and decision makers concise information on overarching issues
- ◆ Describes the phased approach that would be needed, pointing out at each phase the decision processes
- ◆ Covers wide range of legal and institutional aspects - emphasises siting strategy
- ◆ Directly address the risks facing a multinational disposal project and consider the approaches that may mitigate these risks

Framework and Challenges for Initiating Multinational Cooperation ...Conclusions

- ◆ “There are almost no challenges faced by multinational disposal initiatives that are not also faced by purely national disposal programmes in democratic countries”
- ◆ “The technical and economic challenges may be more easily addressed by multinational partners than by a single, possibly small, nation on its own”
- ◆ “For the socio-political issues ..., experience can be gained from volunteer siting in States with powerful sub-units (e.g. USA, CH, UK)”
- ◆ “A multinational repository could be a viable undertaking, and could offer substantial benefits to the countries involved” [*these benefits are then listed*]

European Interest in Multinational/Regional Solutions

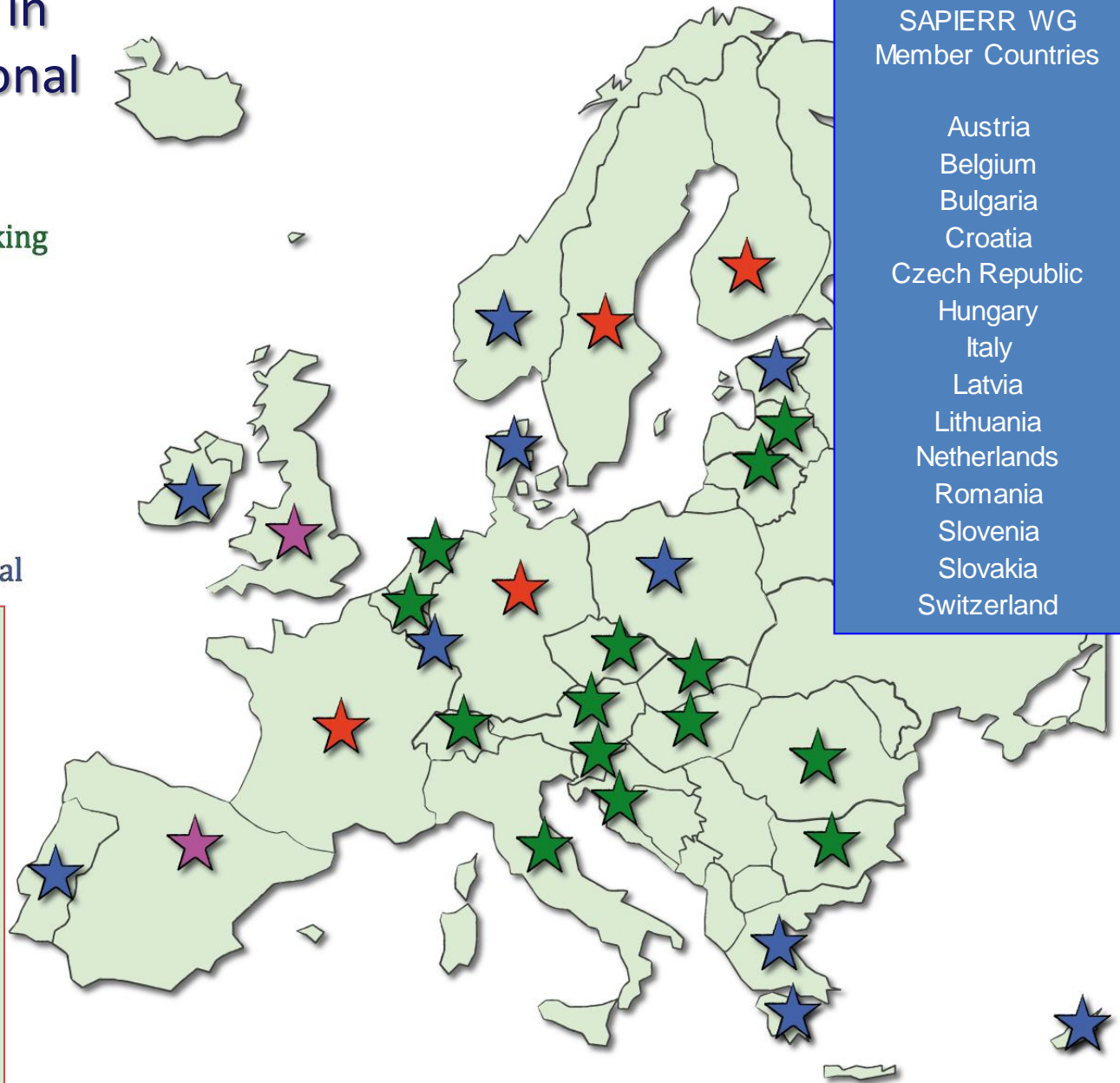
-  The 14 SAPIERR working group members
-  National disposal programme only
-  No formal official policy
-  No NPP but some waste for deep disposal

Past and current involvement with ERDO-WG

- Austria
- Bulgaria
- Denmark
- Ireland
- Italy
- Lithuania
- Netherlands
- Poland
- Romania
- Slovakia
- Slovenia

SAPIERR WG Member Countries

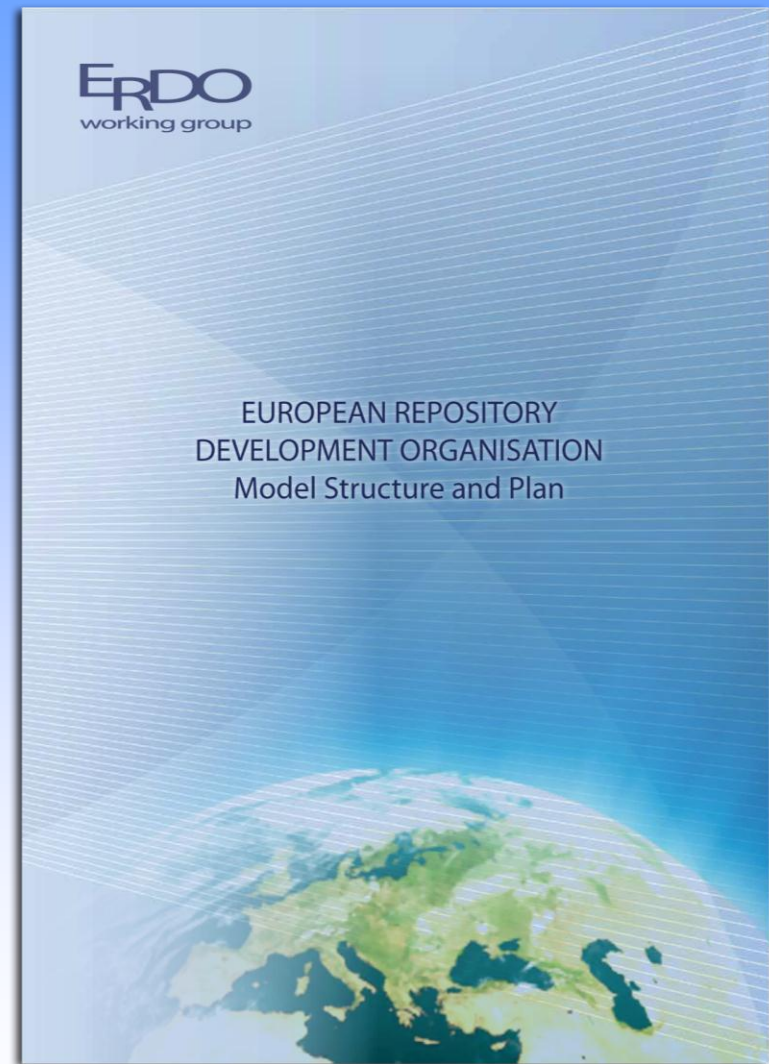
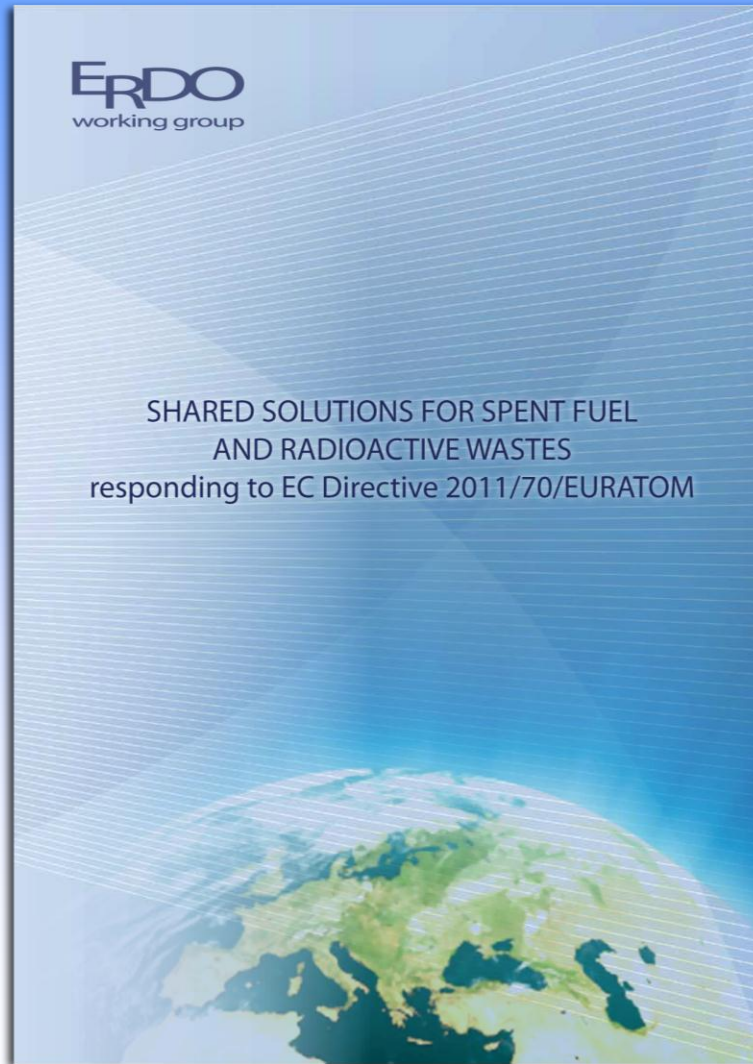
- Austria
- Belgium
- Bulgaria
- Croatia
- Czech Republic
- Hungary
- Italy
- Latvia
- Lithuania
- Netherlands
- Romania
- Slovenia
- Slovakia
- Switzerland



EC RWM Cooperation

- ◆ SAPIERR Projects
 - Comprehensive studies on issues affecting joint repository development
- ◆ Currently (too much) focus on RD&D
 - IGD-TP
 - PLANDIS
 - JOPRAD
- ◆ But - EC Waste Directive recognises potential for shared regional EU repositories

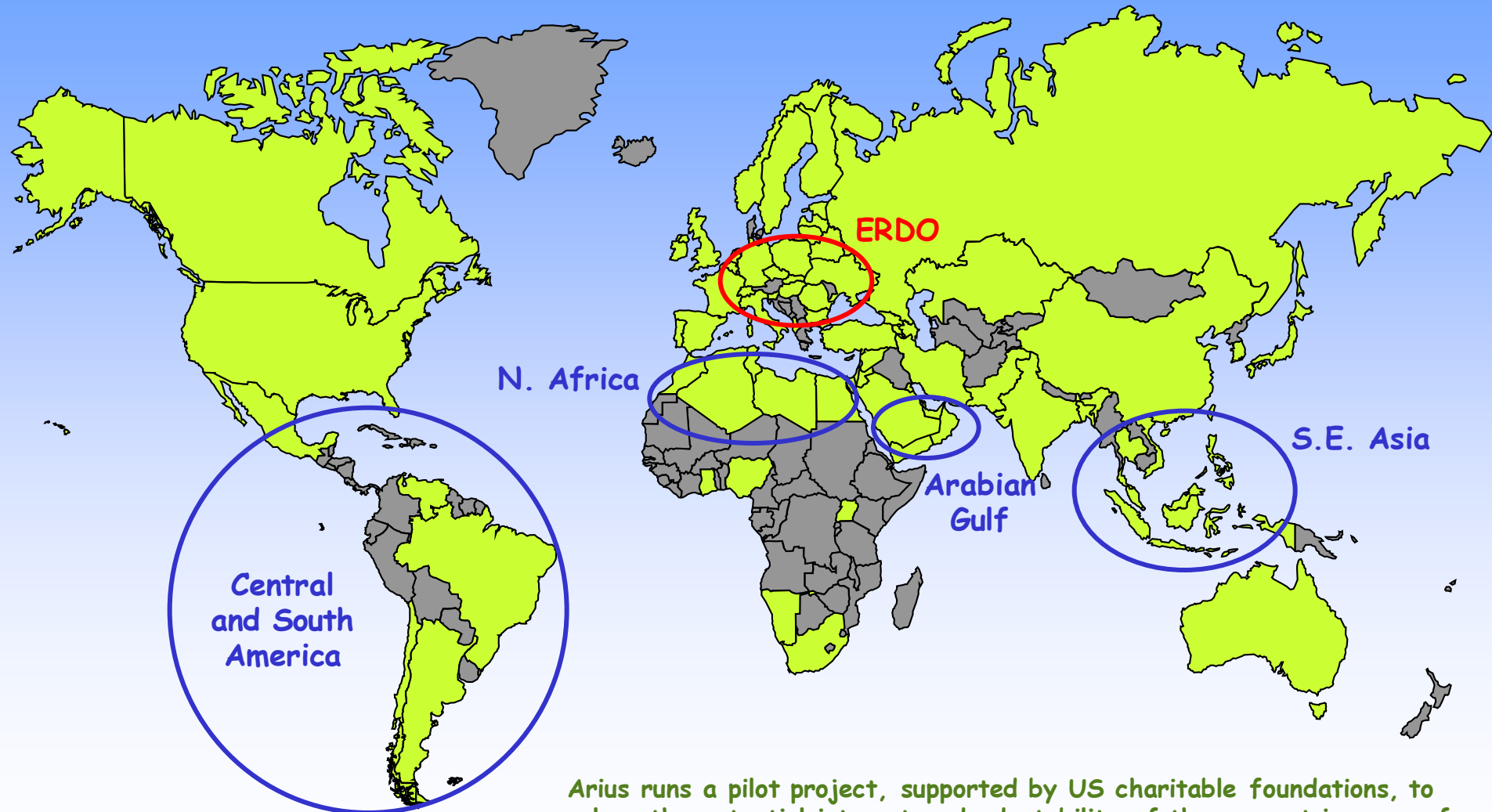
2011: ERDO-WG Submission to Governments of the EU Member States



Arius Input to Regional Initiatives

- ◆ EUROPE - ERDO-WG
- ◆ IAEA Reports
 - Multinational Repositories (Tecdoc 1413); Regional Storage (Tecdoc 1482); Viability (Tecdoc 1658); New nuclear nations report (NW-T-1.24)
- ◆ South East Asia: ASEAN
 - IAEA Consultancies Sep 2010 and Feb 2011
 - AAAS and NTI Initiatives
- ◆ Middle East and North Africa: GCC and MENA
 - Workshops in UAE and Tunisia
 - GCC contacts in Riyadh

Existing and potential new nuclear power nations: can the ERDO model be adapted for use in other regions?



from www.ncitd.org

Sources: IAEA, NEA, WNA, IEA, et. al., 2008

Arius runs a pilot project, supported by US charitable foundations, to explore the potential interest and adaptability of the concept in some of these regions

Prospects for further progress

- ◆ Europe
- ◆ Arab regions
- ◆ Asia
- ◆ Other global regions

Prospects for further progress: Europe

- ◆ ERDO-WG converts to European WMO?
 - Small dedicated staff domiciled in one of the participant countries (without, however, prejudicing the later choice of repository sites)
- ◆ Some smaller nuclear power programmes, such as the Netherlands and Slovenia, may be close to being able to make such commitments; others will require more time
- ◆ EC Waste Directive is a good driver; more EC support would help - but currently EC focus is on R&D issues rather than strategic planning

Prospects for further progress: Arab Regions

- ◆ UAE has most dynamic programme; could act as a role model; has publicly announced that they are following a “dual track” disposal
- ◆ 6 GCC countries could launch a joint project on sharing facilities
- ◆ Several non-nuclear countries in North Africa have expressed interest in introducing nuclear power and have also been involved, through the AAEA and the IAEA, in joint discussions on waste management.

Prospects for further progress: **Asia**

- ◆ The region includes major NPP users (Japan, South Korea, Taiwan, and China) - some with storage and disposal problems
- ◆ Bangladesh has definite nuclear plans and Turkey, Mongolia and Kazakhstan are interested in NPP
- ◆ Cooperation Forums exist
 - ASEAN network: Vietnam, Indonesia, Malaysia, Thailand, Philippines, Singapore, Cambodia, Brunei, Laos and Myanmar
 - Forum for Nuclear Cooperation in Asia (FNCA): Australia, Bangladesh, China, Indonesia, Japan, Kazakhstan, Korea, Malaysia, Mongolia, the Philippines, Thailand and Vietnam
- ◆ Australia: Royal Commission - **see next slide**

South Australian Royal Commission – some of the good questions...

- ◆ “Would the holders of nuclear or radioactive waste outside Australia seek to store or dispose of that waste in South Australia?”
- ◆ “What would the holders be willing to pay and under what arrangements?”
- ◆ “What sorts of mechanisms would need to be established to fund the costs ... ?”
- ◆ “What mechanisms need to be put in place to increase the likelihood that the South Australian community, and relevant parts of it, derive a benefit from that activity?”
- ◆ “Would the establishment and operation of such facilities give rise to impacts on other sectors of the economy?”

Prospects for further progress: **Other Regions**

◆ Central and South America

- Mexico could send its spent fuel to the USA
- Argentina and Brazil will develop further nuclear power reactors jointly; cooperation at the back-end would be sensible
- Venezuela has established a nuclear cooperation agreement with Russia; Chile has established cooperation with France.

◆ Sub-Saharan Africa

- NPP interest from Kenya, Nigeria and Namibia
- An obvious approach would be for South Africa to take a leading role in promoting cooperation, if and when the intentions of these countries turn into specific plans.

Next Steps?

- ◆ Re-affirm the feasibility and necessity of geological disposal - and long-term storage, but NO "wait and see"
- ◆ Create formalised, stable groupings of countries interested in cooperating on back-end issues (bottom up) and in pursuing a dual track approach to disposal (and storage)
- ◆ Strengthen support of international organisations, large national programmes and nuclear supplier organisations

Joint Convention 5th Summary Report

May 2015

- ◆ Proposal that in future reports to the Convention the Contracting Parties address the potential for multinational approaches in their consideration of, and planning for, the management and disposal of spent fuel
- ◆ The OEWG recommends the organization of a Topical Meeting dealing with safety challenges and responsibility issues, in the framework of the Joint Convention, related to the disposal of spent fuel or radioactive waste in a country other than the one where they were generated.

Take Home Messages

- ◆ Geological disposal - correctly implemented and at a suitable site - is SAFE
- ◆ We need geological disposal - no matter what nuclear fuel cycle we choose
- ◆ Multinational / regional disposal facilities will be not only beneficial - but also a necessity
- ◆ Regional repositories can be feasible IF:
 - Small and new nuclear nations cooperate
 - Large nuclear nations do not oppose
 - International organisations support

The End – Thank you!