Implementing Geological Disposal of Radioactive Waste Technology Platform (IGD-TP)

Key Topics and Cross-cutting Activities of the SRA

Exchange Forum, 08/02/2011

L. Johnson, Nagra
Overview of the history of the SRA

• Jan. 2010 – Executive Group of the IGD-TP established the SRA group (8 representatives) and outlined broad directives
• Jan. to Jun. 2010 – inputs from members based on the country RD&D needs
• Jun. 2010 – SRA Seminar in Brussels – presentation of the SRA Key topics and discussion on inputs to the SRA
• Jun. to Nov. 2010 - Revision of Key Topics list and drafting of SRA document
• 8 Nov. 2010 – release of SRA Preview Document on the IGD-TP website for review
• Dec. 2010 – Revision based on review comments and input from EG and completion of draft SRA document
• Dec. 23 – Posting of the complete draft SRA document on the IGD-TP website
Preliminary remarks (..some ground rules)

• RD&D needs of the programmes closest to implementation received particular attention in SRA development as these will be critical for the achievement of the vision.
• But….SRA must also produce results that are useful for other programmes
• The topic descriptions should not refer to specific national programmes; instead focus on main areas of possible convergence of interests.
• Consequence: certain issues of importance to some programmes are not very prominent in the SRA (at least not as Key Topics) – this doesn’t mean they aren’t being worked on
• SRA should not duplicate the work of other forums, but should ensure their integration into deployment (we implicitly acknowledge ongoing work outside the SRA in the selection of topics).
• SRA is “living” and continuing revisions will be made.
June 2010 Seminar version of the SRA

1. Safety case methodology
   improvement of tools
   treatment of uncertainties
   specifics (scenario related)
Scientific and technological basis for long-term safety
2. high burn-up – spent fuel
3. long-term behaviour of sealing materials
Design engineering and construction
4. design adaptation and optimisation
5. optimisation and demonstration of construction technology for repository components
6. closure – plugging and sealing
Cross-cutting and other issues
7. operational safety
8. monitoring
9. stakeholder involvement and governance
Feedback / Comments on the SRA Topics

• First feedback on the Key Topics was provided at the IGD-TP SRA seminar of 16 June 2010 in Brussels

• Comments were at two levels
  – broad structure, top level priorities and organisation
  – detailed suggestions to be considered for incorporation into the Key topics (many suggestions)

• Topics and their contents modified as a result of the June 2010 SRA Seminar and through further review within the WMOs.
Revisions to the SRA key topics (1)

- The Key Topics list was significantly restructured in response to comments
- The scope of each topic was developed with a standard structure
  - Definition
  - Objectives
  - Rationale and benefits
  - Priorities
    - Importance and urgency were evaluated
Revisions to the SRA key topics (2)

• The broadest, highest level comments were dealt with – some of these led to the complete restructuring of Key topics and reorganisation of the content

• Many comments were quite detailed – this or that topic or issue should be included in the Key topic
  – A significant number of these were incorporated into the list of topics under each Key Topic.
The SRA Key topics

• Key Topic 1: Safety case
• Key Topic 2: Waste forms and their behaviour
• Key Topic 3: Technical feasibility and long-term performance of repository components
• Key Topic 4: Development strategy of the repository
• Key Topic 5: Safety of construction and operations
• Key Topic 6: Monitoring
• Key Topic 7: Governance and Stakeholder involvement
Chapter 4 of the SRA also covers

• Cross-cutting Activities
  – Dialogue with the regulators
  – Competence maintenance, education and training
  – Knowledge management
  – Communication and use of research results

• Waste management programme-specific activities
  – Site characterisation issues
  – Transportation
  – Requirements management systems
  – Waste acceptance (quality assurance and safeguard issues)
  – Industrial scheme
  – Costing
Some issues in the review comments (1)

- Several reviewers remarked on the fact that site characterization and geoscience issues were not highlighted as key topics.
  - Site characterisation and confirmation of site suitability are obviously important elements for programmes implementing in 2025.
  - But technical R&D issues related to site characterisation are not the primary challenge (the techniques are good).
  - Work will continue for many years to confirm site suitability during the excavation and construction phase and is quite site-specific.
  - The approach or methodology used by these programmes may be of interest to those that are much earlier in their siting process.
Some issues in the review comments (2)

• About 50 comments on the Preview document of the SRA (8 Nov. 2010)
• Majority were positive regarding the scope and selection of topics
• Many specific detailed changes were made for clarification as a result of the reviews
• There were many different perspectives on Governance and Stakeholder involvement
• There were a number of comments on some of the cross-cutting issues and regarding what role the SRA should play regarding communication, training, knowledge management
Review comments on SRA topics and revisions
Key Topic 1: Safety case

• Importance of handling of uncertainties in safety cases has been emphasized by many (desire for consistent methods and approaches)

• Several comments on the role of process models and their uncertainties, the results of which are abstracted into safety assessment models
  – Few details in the SRA, as the importance of processes is system-specific, but they are a continuing area of research in WMOs and in EU Projects and in certain international forums and we will address process-related areas where needed during deployment
Key Topic 2: Waste forms and their behaviour

- The topic has been broadened to cover all waste forms and the priorities were clarified and modified
  - High priority
    - RN release from spent fuel (esp. high burn-up)
    - Behaviour of Long-lived ILW
  - Medium priority
    - MOX fuel
    - Burn-up credit methodology
  - Low priority
    - HLW glass
Key Topic 3: Technical Feasibility and Long-term Performance of Repository components

- The topic is much more comprehensive and now covers demonstration, construction and long-term performance of all repository components.
- Many specific topics or issues raised at the June 2010 SRA Seminar can be found in the list of topics.
  - Total of 17 topics related to demonstration, construction, process understanding related to backfill, sealing, canisters, etc., arranged according to priorities.
Key Topic 4: Development strategy of the repository

• Deals with the integration of new developments during the lifetime of a geological repository (construction and operation periods up to closure)
  – Optimisation and integration of new industrial methods
  – Development of the associated strategy, e.g. guidelines on consequences of changes in approaches
Key Topic 5: Safety of construction and operations

• Objective - to improve consistency in areas such as methodological approaches, strategies and procedures
  – Develop a more integrated approach to
    • Nuclear engineering practice and radiation protection;
    • Classical industrial safety aspects; and
    • Geotechnical and rock engineering in underground works (including practical mining experience when applicable)

• Topics
  – Improve methodology for assessing risk
  – Further develop strategies to evaluate the impacts of operational issues

• Comments
  – Link to safety case needed
Key Topic 6: Monitoring

- **Objective** – development of requirements, strategies and techniques related to repository monitoring

- **Topics**
  - Monitoring strategies related to performance confirmation
  - Overall methodology and assessment of monitoring technologies and techniques.
  - Monitoring of the environmental reference state
  - Monitoring of engineered barrier systems (EBS) during operations
  - Post-closure monitoring - determination of conditions at closure and the possible parameters for monitoring during the post-closure stage until the end of institutional control
Key Topic 7: Governance and Stakeholder Involvement

• The topic was significantly revised. The need for effective and sustained engagement with all relevant stakeholders throughout all stages of a geological disposal facility is acknowledged.

• Note - The Forum for Stakeholder Confidence meets annually and is the main source of information exchange on national approaches

• Also, some EC Projects are in progress that refer directly to the IGD-TP and its SRA and seek our involvement.
  • Implementing Public Participation Approaches in Radioactive Waste Disposal (IPPA)
  • International Socio-technical challenges for implementing geological disposal (InSOTEC)
Recent review comments

• Several recent comments have emphasized the need to make clearer the process used to develop the topics

• Further need to explain how SRA priorities complement national programme priorities and ongoing EU projects or other initiatives
Summary comments

• The SRA aims to set out some priority areas where
  – enhanced cooperation could support the vision
  – practical achievements may be possible
  – programmes implementing both in ~2025 and much later will benefit

• The SRA group is aware of many ongoing relevant activities and has tried to avoid giving priority to topics already well served by other forums

• The SRA will need continuing consideration and revision as programmes progress
Actions underway related to the SRA

• Already several projects have contacted the IGD-TP to discuss how coordination could take place in areas of mutual interest (e.g. IPPA and InSOTEC in the area of public participation and governance – representatives from the WMOs attend meetings of these projects to explore coordination)

• One EU project now in progress (LUCOEX) grew out of the very early deliberations of the SRA group

• Several potential project proposals under discussion for submission in April 2011 have already drawn on the SRA as a core justification in their proposals and have sought input from WMOs to participate in their end-user groups