Panel 1: R&D for the future
Point of view of (a) WMO

IGD-TP

7th Exchange Forum

October 25-26th 2016 Cordoba, Spain-18 11/10/2016

The research leading to the [illegible] Community's (Euratom) Seventh Framework programme FP7 (2007-2013) under grant agreements n°249396, SecIGD, and n°323260, SecIGD2.

R&D for future - Context

Towards implementation in Europe

- 1 geological repository for SF has just been licensed, several other EU Members are close to implementation
  - Finland, Sweden, France
- Shift towards demonstration, operational issues, industrialization, optimization, etc.
  - **At the same time, numerous newcomer EU Members are at very early stages of development**
- Different timescales
  - **(Finland, Sweden, France) (2015-2030) ; others countries ≥ 2050 or >> 2050**

Operating period

- Step by step development, **over several tens years to one hundred years before closure**

Need for RD&D in support to geological disposal (1)

- The priorities of RD&D depend upon the stage of the programme's lifecycle and change with progress of the programme.
  - **Development of basic concepts**, combined with an evaluation of safety and of technological feasibility in principle, taking into account the country-specific boundary conditions
    - Period of intensive RD&D mainly focussed on site and post closure safety

  - **System optimisation**, with the main emphasis on post-closure safety

  - Then **practical issues** such as construction procedures, operational safety, and optimisation of technology (including "industrialisation" of repository operation).
    - Period of intensive RD&D mainly focussed on Operating

  - Them **Step by step development and REX** during operating period

Need for RD&D in support to geological disposal (2)

- Considerable scientific and technological knowledge base acquired over more than 40 years of RD&D, globally sufficient to progress towards licensing.
  - **Post closure safety was demonstrated for (at least) countries involved in Licensing**

However

- RD&D effort will continue to be necessary throughout the lifecycle of radioactive waste management in order to ensure optimisation of management routes in general and of disposal solutions in particular
- RD&D will also continue to be compulsory to address evolving regulatory concerns.
- Stakeholders' concerns regarding the safety of geological disposal and the protection of the environment must be addressed in a systematic way and the commitment of local communities hosting geological disposal facilities

Need for RD&D in support to geological disposal (3)

- RD&D serves several purposes:
  - Input to system design and optimisation and makes essential contributions to siting of the repositories
  - Achieving a sufficient level of system understanding to allow an adequate evaluation of safety
  - Maintaining competences and knowledge over so long operating period
  - Sharing knowledge
  - Allowing innovation (window to scientific and technological progress)
  - Input for dialogue with stakeholders

RD&D for future – Examples of objectives and topics

- Under discussion in JOPRAD Project

- **To promote optimization**
  - Characterization, treatment and conditioning of radwaste
  - New material for engineering components
  - …
- **To maintain competences, to increase confidence**
  - Radionuclide behaviour in solution and gas form
  - Diffusion process in rock matrix
  - Source terms
  - …
- **To promote innovation**
  - Monitoring, big data
  - Numerical simulation
  - …

- Prioritization in time (short term and long term)
- Level of effort (financial, end-user…)

under discussions