WG2: Canister Design
Summary & common interests

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Working Group 2

• 9 presentations
  – 3 WMOs
  – 4 Research institutes
  – 2 Manufacturers/commercial

• 22 participants in total
Objectives

• Information exchange on design requirements (regulatory, host rock specific, repository concept specific)

• Information exchange on state of the art on design, manufacturing and demonstration

• Information exchange on waste canister coating and lid/head welding

• Identification of RD&D needs for waste canister design, manufacturing and demonstration
Canister requirements: currently

Safety concept is the driver for deriving reqs.

• Required basis for successful design
• Sources: regulatory, long-term safety, operational safety
• Separate sets of reqs. per country
• Focus mainly on long-term safety
• No international standards, codes or guidelines
Canister requirements: RD&D potential

• Compilation of existing requirements is deemed useful
• Interactions between requirements and design
• Canister concepts are open for modification/optimization
• Potential for collaboration on definition of generic requirements from technical p.o.v.
• How do we comply to (changing) requirements?
Materials properties

- Sufficient knowledge of “legacy” materials (carbon steel, copper, ...)
- New tech and materials not evaluated sufficiently
- Ageing over operational timeframes (retrieval)?
- Ageing over repository timeframes is addressed with conservative bounding assumptions. Extrapolation? Uncertainties?
- Cooperation potential in deriving set of generic data.
- Completion of material database not deemed urgent
Design tools

• Available tools sufficient for current approach
• Outcome depends on quality of data
• Improvement of tools always desirable, but we can’t drive it.
• General interest in coupling of multiple phenomena, treatment of uncertainty and sensitivity.
Manufacturing & welding

• Manufacturing technology available for metals (not ceramics).
• Early input from manufacturers is important (inherent variability of processes)
• Welding feasibility ensured, optimization needed
• Open questions: inspection, residual stresses, other materials (cast iron...), remote operation (hot cell), repair
Coatings

• New field, big interest by WMOs (CAN, KOR, CH, UK, JP, CZ...), large optimization potential
• Feasibility is ensured. Adaptability?
• Open questions: NDT, porosity and density, dislocation, material properties & characterization, transport and handling, substrate materials, functionally graded or multi-barrier coatings...
• What are the requirements for coatings???
General remarks

• WMOs have clearly identified needs, challenges, fields of cooperation
• Research institutes have necessary expertise
• Manufacturers are ready and interested

• Feasibility ok, **optimization needed**
Suggestion

• Elaboration of the potential of and RD&D project on *coated canisters*

• Necessary project steps:
  – Definition of requirements on materials and processes
  – Assessment of materials and design options
  – Process optimization
  – Production and inspection
  – Characterization and testing (in-situ...)
  – Input to safety concept and performance assessment