

AS41: Safeguards for Dry Storage and Repositories

Sandia National Laboratories (SNL)

Lawrence Livermore National Laboratory (LLNL)

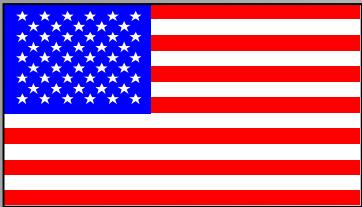
Korea Atomic Energy Research Institute (KAERI)

Korea Institute for Nuclear Nonproliferation and Control (KINAC)

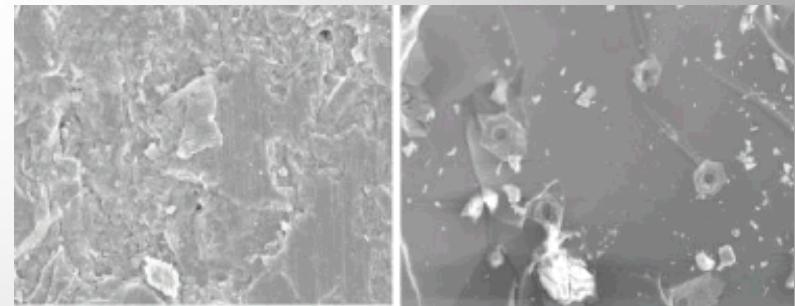
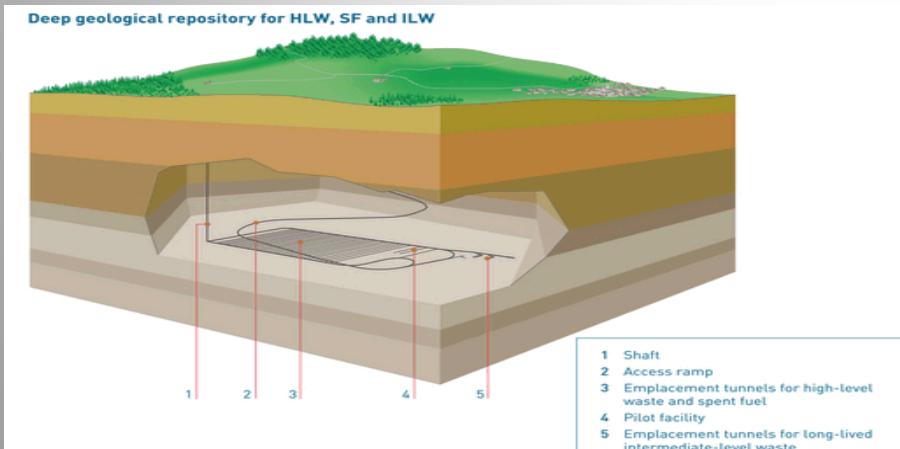
17th DOE/NNSA – ROK Permanent Coordinating Group Meeting

July 28-29, 2014

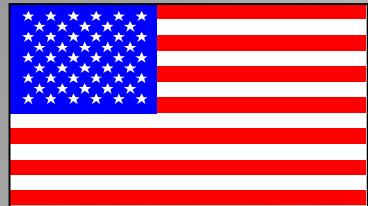
Los Alamos, NM USA



Safeguards for Repositories



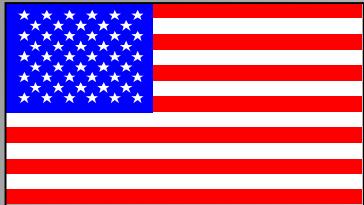
Scanning electron micrographs of ZIT ceramic and borosilicate glass.
B.G. Ahn, H. S. Park, KAERI/ELSEVIER Science Direct 2011



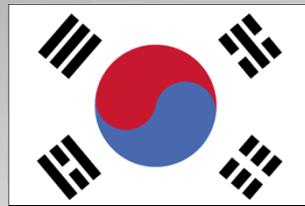
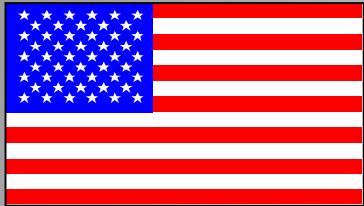
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• Safeguards Objective

- Explore and identify safeguards issues related to repositories and provide recommendations and guidance on safeguards needs.
- Address a multilateral safeguards issue related to spent fuel management, U.S.-ROK 123 Agreement, INFCIRC 153, STR-250, Policy Paper 14, ROK-IAEA Safeguards Agreement
- Document status of repository safeguards
- Understand waste forms destined for repositories
- Develop potential safeguards requirements for electrochemical waste streams



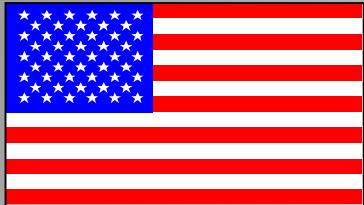
- Alignment with NA-24/INSEP mission statement
- **INSEP Mission:** “...work with international partners to support and enhance nuclear safeguards implementation at all stages of civil nuclear development.” – *INSEP 2014 Brochure*
- AS41: Collaborate and engage international partners to support and enhance nuclear safeguards by better understanding safeguards for repositories and waste forms from the electrochemical recycling process destined for repositories, and making recommendations.



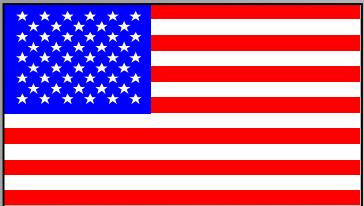
Programmatic/Technical Description

Repositories:

- **Programmatic/Technical Issue:** Explore safeguards needs at geological repositories and possible safeguards requirements for waste forms destined for permanent storage.
- **Scope:** 1-yr study on safeguards for repositories, waste forms destined for repositories and potential safeguards approaches for wastes containing non-negligible quantities of Special Nuclear Material (SNM) or termination of safeguards on the waste.
- **Addresses programmatic/technical issue:** Research and Analysis based on open source, published information.
- **How/where work will be performed:** Electronic and face-to-face collaboration between ROK and U.S.
- **Roles/Responsibilities:**
 - U.S. – SNL
 - ROK - KAERI & KINAC



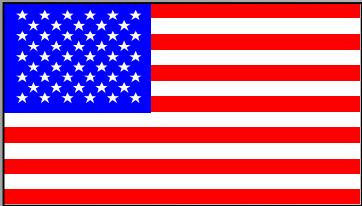
- **Safeguards Approach at Repositories**
 - Model Integrated Approach (SG-PR 1306, 2011) safeguards objectives:
 - Verify design information during life of repository
 - Maintain continuity of knowledge (CoK) of nuclear material inventories in above-ground areas and in repository; and
 - Detect potential undeclared activities that could be associated with diversion.
 - To provide assurance that undeclared removal of nuclear materials has not occurred, safeguards should monitor all transportation into/out of repository, all relevant access routes and confirm continued integrity of containment provided by geological formation within restricted zone.



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Tasks and Schedule

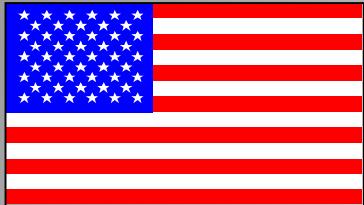
#	Task	Deadline
1.	Document current status of repository safeguards including identification of major items that drive development of safeguards approach.	Q1 CY2014
2.	Work with the ERWG to identify the relevant characteristics of the electrochemical recycling waste streams.	Q1 CY2014
3.	Based on tasks 1 & 2, develop potential safeguards requirements for electrochemical recycling waste streams	Q3 CY2014
4.	Summary report describing findings and potential safeguards needs	Q4 CY2014



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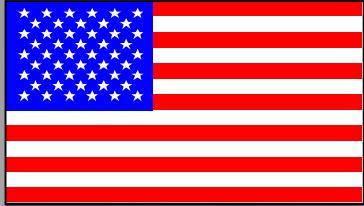
Status

- **Task 1:** Document current status of repository safeguards including identification of major items that drive development of a safeguards approach.
 - **Status:** In progress
- **Task 2:** Work with ERWG to identify relevant characteristics of electrochemical recycling waste streams
 - **Status:** In progress
- **Task 3:** Based on tasks 1 & 2, develop potential safeguards requirements for electrochemical recycling waste streams
 - **Status:** Not yet started
- **Task 4:** Summary report describing findings and potential safeguards needs
 - **Status:** In progress



Repositories Status cont.

- **Schedule:** Waste form section to be completed by September 30; final paper complete by December 2014
- **Metrics:** Completed first three sections on schedule
- **Next steps:** Continue research/writing, schedule telecon, get input from ERWG (waste form group)
- **Potential Problems:** Suitability for JFCS or separate cooperation?
- **Potential follow-on:** Explore existing gaps in safeguards for geological repositories, present joint paper at ASTOR 2015; Conduct quantitative assay of waste forms in JFCS Phase III



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Questions?