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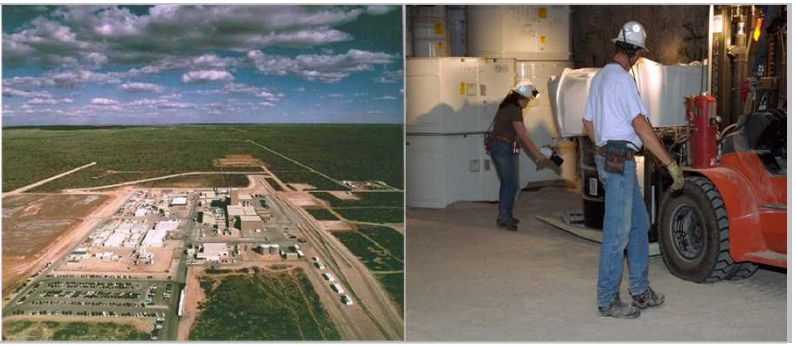

A Perspective on Removal, Retrieval and Reversibility as they relate to the Waste Isolation Pilot Plant

Steve Wagner – John Hart and Associates

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Outline

- With respect to waste removal, retrieval or reversibility within the WIPP project, the overall concept can be addressed by answering general questions:
  - What is required
  - What did the project said they would do
  - What has the project actually done

- This presentation will answer these and other questions as they apply to the Waste Isolation Pilot Plant (WIPP) radioactive waste disposal project.

Waste Isolation Pilot Plant Facts

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- WIPP is geologic disposal facility designed to dispose ~176,000 m^3 of transuranic waste from defense-related activities
- Waste area is mined in a bedded salt formation, ~ 2,150 ft (655 m) Below the Ground Surface
- Plutonium & Americium are major radionuclides in the waste
- US Congress established the Environmental Protection Agency (EPA) as the radioactive waste disposal regulating authority; the Department of Energy is the site developer
- Early disposal concepts of “Pilot Project” included Retrievability Requirement (1970’s)

RR&R – What is Required?

- US Government's first radioactive waste geologic disposal concept was a "Pilot Project" based on National Academy of Science recommendations (1957)
- Originally Self-Regulated – Atomic Energy Commission
- To gain acceptance from State and Local Municipalities, the disposal concept would first have a "test period" where all waste would be retrievable should the concept not meet disposal objectives

RR&R – What is Required?

- In 1976 the EPA was given the responsibility to develop general radioactive waste disposal regulations
- Retrieval requirements were included in the final regulation
- Retrieval concept became necessary past “test period”
- Additionally, the U.S. Congress and the State of New Mexico required test-phase Retrieval demonstrations (LWA, Consultation and Cooperation Agreement)

RR&R – What is Required?

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EPA Regulations for WIPP

EPA 40 CFR 191

Generic Radioactive Waste Disposal Standards

- **Assurance Requirement 191.14(f): Disposal systems shall be selected so that removal of most of the waste is not precluded for a reasonable period of time after disposal**

EPA 40 CFR 194

Site-Specific Certification Criteria

- **Removal of waste must be feasible using existing technology**
- **Waste must be retrieved to the extent practicable if EPA revokes certification**

RR&R – What is Required?

- EPA RR&R Perspective
- EPA Certification Criteria (40 CFR 194.46)
  - "Any compliance application shall include documentation which demonstrates that removal of waste from the disposal system is feasible for a reasonable period of time after disposal. Such documentation shall include an analysis of the technological feasibility of mining the sealed disposal system, given technology levels at the time a compliance application is prepared"

What We Said We Would Do

- For US Congress and State of New Mexico Requirements
  - DOE documented a mock test waste retrieval demonstration on April 27, 1992 using remote controlled devices (video available)
- For EPA Disposal Requirements
  - DOE document the results of a feasibility of waste removal after closure in Appendix WRAC of the EPA compliance application
  - DOE acknowledges that EPA requires waste retrieval if the certification were to be revoked.
    - "If the Administrator revokes the certification, the Department shall retrieve, as soon as practicable and to the extent practicable, any waste emplaced in the disposal system." 40 CFR 194.4(b)(1)

What We Actually Have Done

- DOE has retrieved emplaced containers from the underground
  - The State of New Mexico required DOE to retrieve a waste container in August, 2007
  - DOE decided to retrieve a waste container in June, 2008
- Drums were returned to the generator sites for remediation because they did not fully meet the waste acceptance criteria, they were not returned for health/safety reasons

International Perspective

- Most international disposal concepts are similar to what was developed in the U.S.
  - most programs include the requirement for waste retrieval during the repositories operational period.
- Recent attention has been given to the concept of reversibility.
  - The intent is to include reversibility in the disposal system design. Whereas the U.S. concept only requires it to be feasible to remove waste after closure, reversibility requires a repository design that allows for waste removal during any phase of a disposal program.

Lessons Learned

- RISK
  - The WIPP regulations associated with waste retrieval/removal do not address risk or benefit and are silent as to the conditions that warrant retrieval/removal.
  - The project has no recourse when regulators require retrieval of waste containers that may be deficient but can be shown to not have any impact on overall repository performance, the environment or public safety.
- Recommendation
  - Recommend that disposal program's regulations outline specific risk vs. benefit elements in decisions that lead to waste retrieval.
  - The actual risk of retrieval, in many cases, have associated risks relating to occupational health, dose and transportation/accident risks that are real and may be greater than the risks associated with the newly discovered condition of the waste or repository.