



# Waste Isolation Pilot Plant's Passive Institutional Controls Program – Implementing the RK&M Initiative

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Russell Patterson, U.S. Department of Energy, Carlsbad Field Office  
Tom Klein, AECOM, Technical Solutions

Track 6.2 - Preserving and Making Critical Information Accessible to  
Future Generations



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# Background

- The United States government set forth in 40CFR194.43 requirements for “Passive Institutional Controls” for Nuclear Waste Repositories.
  - Requirements include:
    - A detailed plan of measures to be employed to preserve knowledge about the location, design, and contents of a disposal system.
  - The U.S. Department of Energy (DOE) Waste Isolation Pilot Plant (WIPP) developed and proposed in the 1996 Compliance Certification Application (CCA) a Passive Institutional Controls (PICs) program.
  - The U.S. Environmental Protection Agency (EPA) identified Passive Institutional Controls as Condition 4 of the WIPP Certification Decision in 1998.
  - Condition 4 of the Certification requires DOE to show that the PICs will be implemented “as soon as possible following closure of the WIPP” and all measures will be presented in the last Compliance Recertification Application (CRA).

# WIPP PICs Program

- PICs program consists of three parts:
  - 1) Records: Documentation to describe the repository and the potential hazard of the disposed waste.
    - Intended to minimize inadvertent human intrusion.
    - Support future research and intentional intrusion.
    - Establish an accessible legal record.
  - 2) Awareness Triggers: Documentation to inform as many people as possible of the location and function of the repository.
    - Increase public awareness of the repository through multimedia sources.
    - Keep awareness and memory of the repository alive in the short/medium term through wide dissemination of data.

# WIPP PICs Program Cont.

- PICs program consists of (cont.):
  - 3) Permanent Markers: Permanently mark the site to indicate past human activity, the scope and intent of that activity, and reduce the likelihood of inadvertent human intrusion.
    - Includes physical markers and human activity indicators.
    - Indicates an area of influence, power, or danger.
    - Contains written and physical indicators of activity and potential danger.
    - Expected to be as permanent as practicable.

# RK&M Initiative

- The Organization for Economic Co-operation and Development – Nuclear Energy Agency (OECD/NEA) initiative on the preservation of Records, Knowledge and Memory (RK&M) across generations.
  - Has run in two phases, starting in 2011, with the second phase ending in April of 2018. A third phase may be implemented.
  - Provides guidance on compiling and preserving RK&M for radioactive waste repositories.
  - An integrated set of mechanisms and techniques that can be applied to foster communication across centuries and millennia.
  - Presents a set of Strategic Elements which form a “menu” of tools and techniques that can be applied for memory keeping.
- Participants from 13 countries and the International Atomic Energy Agency (IAEA).

# Records Management for PICs at the WIPP Facility

- Indicates the location of the WIPP repository.
- Reduces the likelihood of inadvertent human intrusion.
- Survive “as long as possible” using “available technology and materials”.
- Includes the development of records packages, selection of data storage materials and methods, and a determination of records retention/storage locations.



# Records Management for PICs at the WIPP Facility (Cont.)

- **From the NEA/RK&M Menu:** Define and assemble a set of essential records (SER) for WIPP.
  - The SER will be composed of a number of actual records related to the facility. These will be selected on the basis that, when taken together, they provide sufficient information to understand the repository system and its performance.
- **Author's Recommendation:** Follow PICs Implementation Plan and develop records management plans/processes ASAP to have in place for the last CRA at WIPP closure.



# Awareness Triggers Plan for PICs at the WIPP Facility

- Wide dissemination of data through electronic or physical media.
- Two-phase plan laid out in WIPP PICs Implementation Plan.
- Previous schedules have the development of an Awareness Triggers Implementation Plan, and implementation of the two phases will last approximately 20 years, starting in 2006. A request to revise this schedule has been provided to EPA.

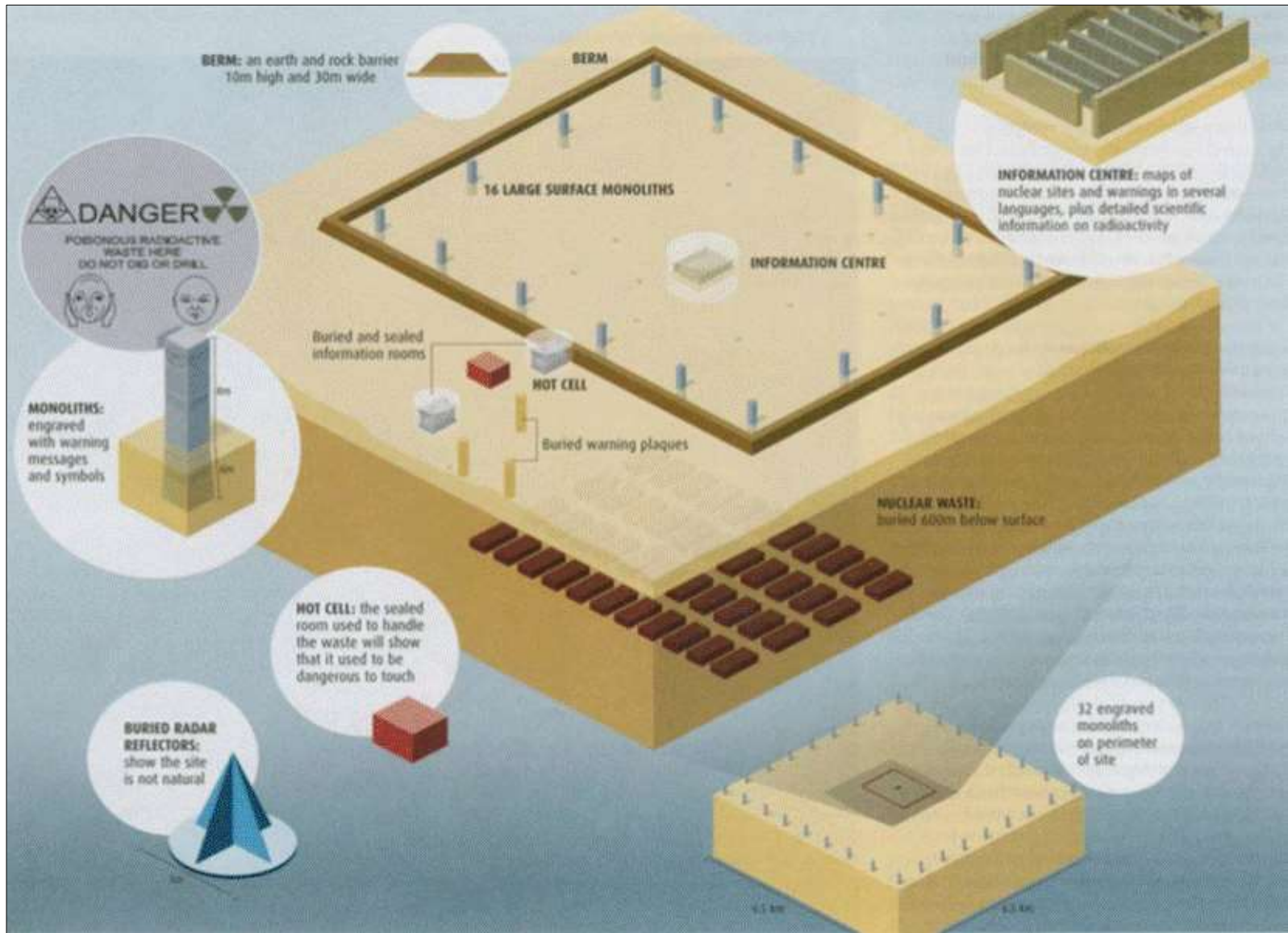


# Awareness Triggers Plan for PICs at the WIPP Facility (Cont.)

- **From the NEA/RK&M Menu:** Develop the Key Information File (KIF) for WIPP.
  - The KIF is designed to capture basic information on the repository and the waste it contains in a single document, and at a level that is accessible to people with no specific knowledge of radioactive waste management.
- **Author's Recommendation:** Follow the PICs Implementation Plan for this activity ASAP to have it completed in time for the last CRA at WIPP closure.

# Permanent Markers Program for PICs at the WIPP Facility

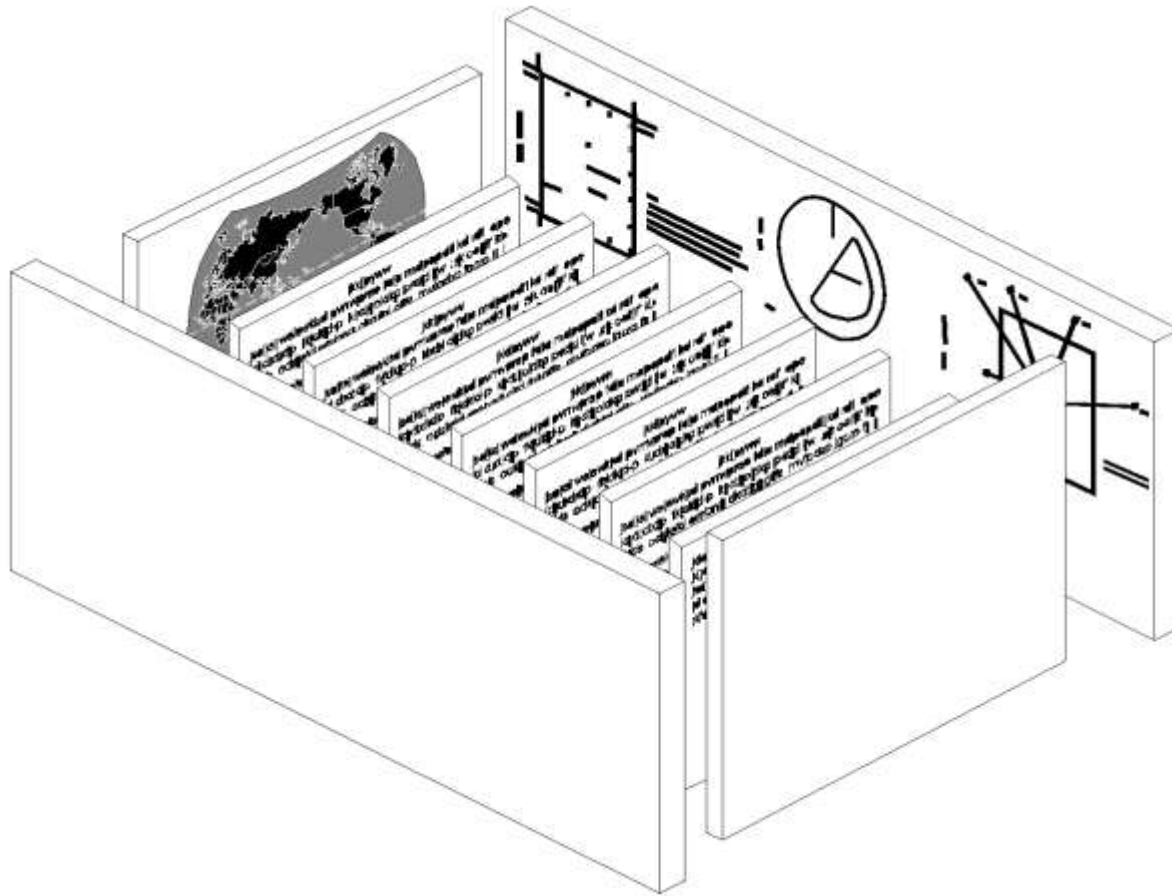
- A series of physical structures both exposed and unexposed designed to provide a potential intruder with sufficient information to prevent inadvertent intrusion into the repository.
- Some markers will have messages engraved/inscribed to provide the finder with information on the design, location, and contents of the disposal system.
- WIPP PICs proposed plan includes:
  - Identify and test suitable marker materials.
  - Submit plans and designs of marker prototypes.
  - Construct and test/monitor berm and test markers.
  - Finalize marker message content/comprehension.



**Drawing – WIPP Proposed Permanent Markers**



# Permanent Markers Program for PICs at the WIPP Facility – Cont.



- Use of alternate materials should be reviewed in conjunction with modified long-term control designs, such as cylindrical information room made of concrete.
- Current estimated costs of present design, even in present day dollars, is very high.
- Generational equity question: Is it warranted for WIPP given the relatively low potential risk?

# Permanent Markers Program for PICs at the WIPP Facility – Cont.

- **From the NEA/RK&M:** The third phase of the RK&M program (if sponsored to continue by NEA) is looking to formulate common approaches on disposal system markers. Guidance was not developed during the first two phases of the initiative.
- All activities in the permanent markers program at WIPP have been put on hold awaiting international discussion and repository scheduling decisions.

# Author Recommended Future PICs Activities

- **Revise Conceptual Plan**
  - Current concept is 25+ years old. New material science, information technologies, and computing resources are available.
  - Convene a new expert panel and have peer review.
  - Submit a new PICs conceptual plan to the regulator for approval.
  - Develop a new implementation schedule and begin testing of the new design.
- **Continue to monitor and participate in international RK&M initiative (if continued).**



# Conclusion

- The WIPP PICs Records Plan is appropriate with the addition of focusing on the SER as suggested by the RK&M Initiative. It should be revived and the steps followed.
- The WIPP PICs Awareness Triggers Plan is appropriate with the addition of the RK&M KIF. It should be revived and the plan followed.
- The WIPP PICs Permanent Markers program should be re-evaluated by an expert panel and through peer review.
- The “new” WIPP Permanent Markers Program should take into consideration international research and guidance, intergenerational equity, constructability, and cost.
- An approved Permanent Markers plan is required for the final CRA at WIPP closure.
- WIPP closure is baselined for 2033, but it could take place at anytime.