

Risk Considerations for WIPP Passive Institutional Controls - 15173

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**Steve Wagner
John Hart and Associates
Sandia National Laboratories**



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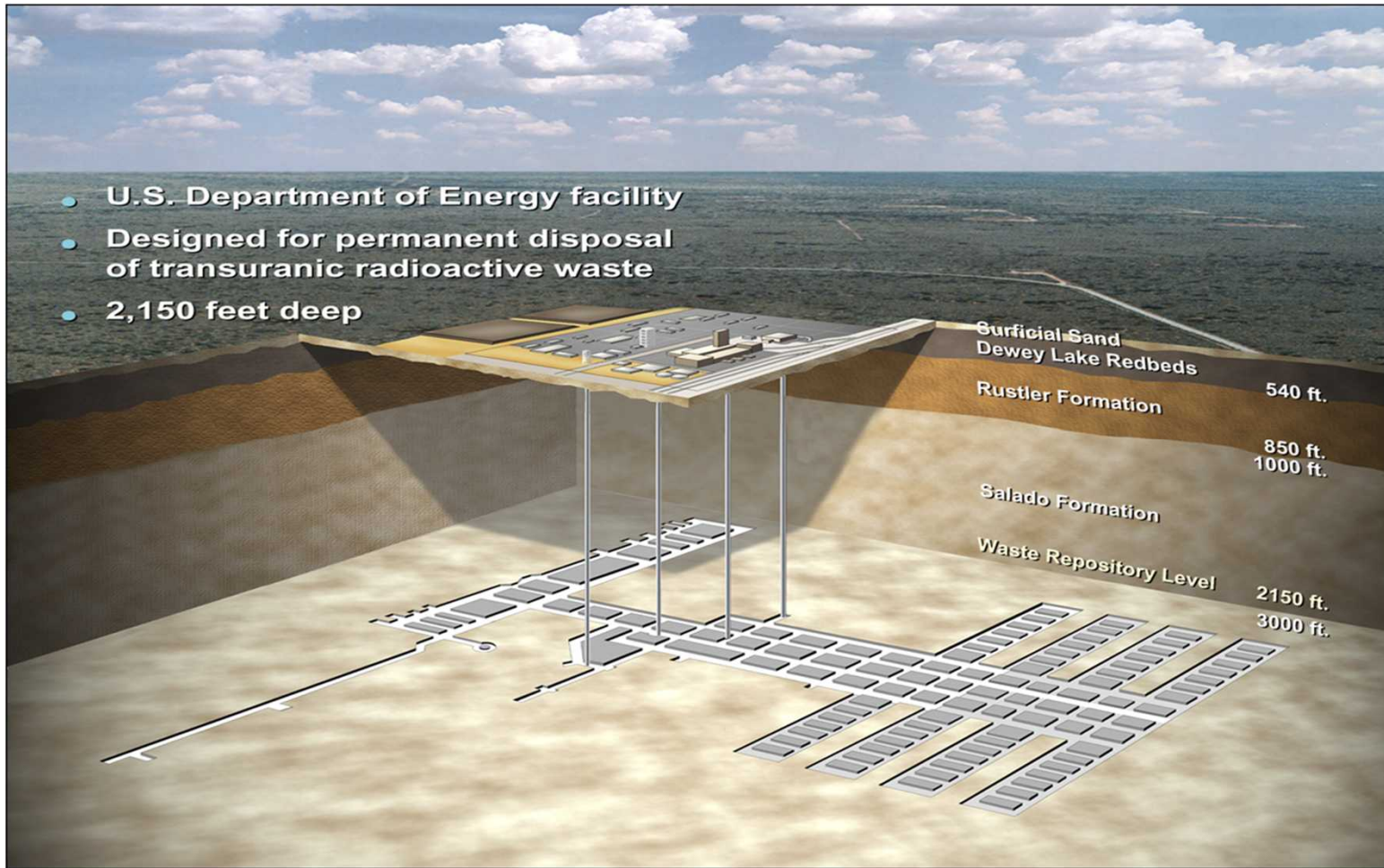


Introduction

- **The Waste Isolation Pilot Plant (WIPP) is a geologic radioactive waste disposal facility intended to isolate transuranic waste from the accessible environment.**
- **The repository is designed such that it should not pose a significant risk to future populations.**
- **The project included Records, Knowledge and Memory elements intended to reduce the likelihood of unintentionally intruding the repository – specifically Passive Institutional Controls.**

The WIPP Disposal System

- U.S. Department of Energy facility
- Designed for permanent disposal of transuranic radioactive waste
- 2,150 feet deep



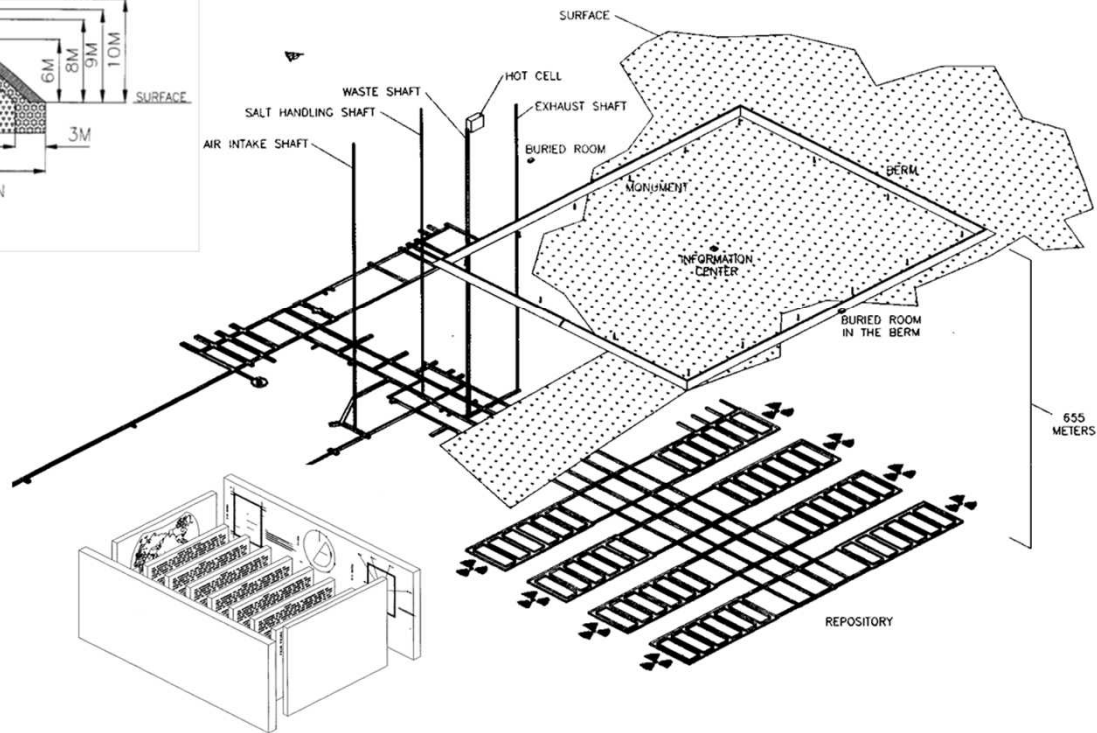
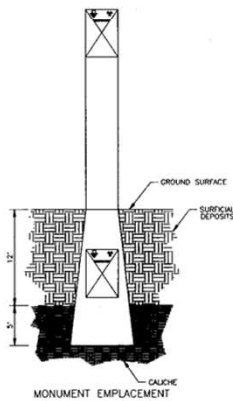
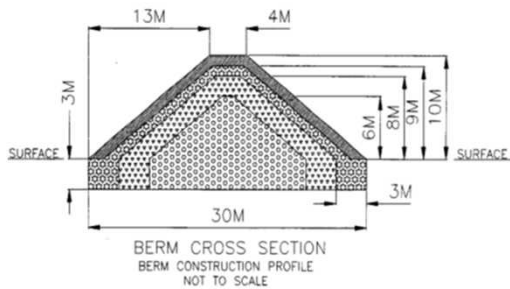


WIPP Passive Institutional Controls

- **Human intrusion was believed to be the only credible release scenario of consequence.**
 - **Project identified Passive Institutional Controls as a deterrent for human intrusion.**
 - **Why?**
 - **PICs should communicate the existence and hazards of WIPP to future generations.**
 - **What? How?**
 - **In the early 1990's, the project addressed these questions using expert panels.**
 - **Resulted in a proposed design in 1995.**

WIPP Passive Institutional Controls

Design includes Permanent Markers, On and Off-site Records and continued Government Ownership





Risk

- **WIPP regulations requires passive controls as one assurance measure to deter human intrusion.**
 - **Preserve knowledge about the location, design and content of the disposal system.**
 - **Identify the controlled area by markers to be as permanent as practicable.**
 - **Records in archives.**
 - **Application to include period the passive controls are expected to endure and be understood.**
- **No consideration for risks was given in the regulations.**
 - **Potential reduction in risks due to their existence.**
 - **Potential risks imposed by implementation of passive controls.**



Risk Consideration

- **The intent of the regulatory Assurance Requirements and passive controls is to provide additional confidence that the repository will perform as expected after closure.**
- **Credit for the reduction in potential drilling intrusions can be applied to performance assessment.**
- **The design has also been demonstrated through many performance assessment analyses to not pose a significant risk to future generations even if it is intruded upon by multiple inadvertent drilling intrusions.**
 - **No credit for passive controls is currently used in PA.**



Risk Considerations

- **The risks incurred during the fabrication and construction of the permanent markers system may be greater than the overall reduction in risk to future generations due to their existence.**
- **If true, implementation of the current passive controls design may be counter to the intention of the regulatory requirement to include such assurance measures.**
- **Risks should be considered in the final passive controls design.**



Need to Quantify Risks

- **Construction**
 - Monuments
 - Information Centers
 - Earthen berm
- **Transportation of materials**
- **Environmental impacts from mining & quarrying**
- **Reduction in potential intrusions**
 - Reduce releases
 - Reduced dose
- **Loss of memory**
 - Who, what, where, why....



Recommendation

- **The risks of the WIPP PICs design and implementation should be considered and mitigated prior to actual construction.**
- **This can be accomplished by either performing an analysis that assesses the risks imposed by the current design or considering them as part of the final redesign process.**
 - **The analysis would develop criteria to determine the types of risks that should be considered/compared and an acceptable limit for these risks.**



Recommendation

- **Direct comparison of risk of PICs against the long-term performance of the repository using the PA results is not possible because the PA results are not specifically risk-based, they are based on radionuclide containment performance.**
 - **Other disposal programs may be directly comparable**
- **Future risk analyses must identify the types of risks that are related to PICs implementation and determine how they may be related and compared to the long-term risks of the repository.**
 - **Other disposal programs should consider risks of Records Knowledge & Memory.**



Conclusion

- **Although WIPP PICs may not be needed to demonstrate compliance with the release limits, it is not recommended to remove passive controls requirements at WIPP.**
- **PICs will arguably communicate the existence and hazards of the waste for hundreds to thousands of years.**
- **Communicating the existence of WIPP is a responsibility of this generation, introducing additional risks to the current population is not.**
- **Therefore it is justifiable to assess the risks of passive controls measures when determining the actual design that will be constructed when WIPP is closed decades from now.**