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THE CARLSBAD AREA OFFICE NATIONAL REMOTE-HANDLED TRANSURANIC WASTE PROGRAM STRATEGIC PLANNING

M. R. Brown, U.S. Department of Energy, Carlsbad Area Office, Carlsbad, NM
S. S. Countiss, U.S. Department of Energy, Carlsbad Area Office, Carlsbad, NM
S. A. Lott, Commodore Advanced Sciences, Inc., Carlsbad, NM
J. P. Harvill, Commodore Advanced Sciences, Inc., Carlsbad, NM

ABSTRACT

Since the Waste Isolation Pilot Plant (WIPP) opened for receipt of non-mixed contact-handled (CH) transuranic (TRU) waste on March 26, 1999, planning for the receipt of remote-handled (RH) TRU waste has been revitalized. WIPP is scheduled to begin receiving RH-TRU waste in January 2002. Before the first receipt and disposal of RH waste at WIPP, the following must be coordinated: the RH-TRU waste management programs at the TRU-waste sites must be approved, the WIPP RH-72B packaging and transportation system must be in place and operational, the WIPP RH facility must be operational, and the Hazardous Waste Facility Permit must be modified so that RH-TRU waste can be accepted at WIPP. As part of the RH-TRU management programs, the four primary TRU-waste sites (the Los Alamos National Laboratory [LANL], the Oak Ridge National Laboratory [ORNL], the Hanford Site, and the Idaho National Engineering and Environmental Laboratory [INEEL]) will build, modify, and/or maintain RH-TRU waste management facilities to retrieve, characterize, certify, store, and package RH-TRU waste. The RH transportation system for shipment to WIPP requires a U.S. Nuclear Regulatory Commission (NRC) certified Type B packaging; the RH-72B cask is currently undergoing the NRC certification process. The WIPP disposal system has three components: aboveground operations (which will be refurbished and enhanced), transfer to the underground, and underground operations. The permit modification process was initiated shortly after receipt of the Hazardous Waste Facility Permit. Successful implementation of the National RH-TRU Waste Program will require that a commitment to sustained funding and full support of the entire U.S. Department of Energy (DOE) TRU waste complex be maintained.

INTRODUCTION

Since the WIPP opened for non-mixed CH-TRU waste receipt on March 26, 1999, planning for the receipt of RH-TRU waste has been revitalized. WIPP is scheduled to begin receiving RH-TRU waste in January 2002, but first must be permitted to accept RH-TRU waste. The disposal of RH-TRU waste must be coordinated with the waste management plans at the TRU-waste sites, the packaging and transportation system must be in place and operational, and the WIPP RH facility must be operational.

The DOE Carlsbad Area Office (CAO) is pursuing the revitalization of the National RH-TRU Waste Program. The WIPP Hazardous Waste Facility Permit prohibits the acceptance of RH-TRU waste at WIPP and will require modification. The National TRU Program is taking this opportunity to address the binding agreements that the RH-TRU waste sites must meet and their capabilities for characterizing RH-TRU waste.

DESCRIPTION OF THE DISPOSAL TECHNICAL BASELINE

The disposal technical baseline for WIPP has three systems: (1) the TRU-waste site waste management system, (2) the transportation system, and (3) the WIPP disposal system. For the TRU-waste site management systems, the baseline calls for the four primary TRU-waste sites (Hanford, ORNL, LANL, and INEEL) to build, modify, and/or maintain waste management facilities to retrieve, characterize (treat if necessary), certify, store, and package RH-TRU waste.

The RH transportation system for shipment to WIPP requires an NRC-certified Type B packaging. The packaging currently included in the baseline for WIPP-bound RH-TRU waste is the RH-72B shipping cask, which has been designed to meet the NRC requirements. A safety analysis report for packaging has been prepared, and DOE has applied to the NRC for a Certificate of Compliance.

Disposal operations have three components at WIPP: aboveground operations, transfer to the underground, and underground operations (1). Initially, the aboveground operations consisted of the arrival of the RH-TRU waste in a single DOT Type A container (the RH canister) in the RH-72B shipping cask. The new method for handling the RH-TRU waste when it arrives at WIPP in a shipping cask will be to take the shipping cask into the RH building, remove the impact limiters, unbolt and remove the bolts of the outer containment vessel, and remove the outer lid. The road cask will then be moved to an unloading room, where the inner lid will be removed and the canister will be unloaded directly into the facility cask, transferred underground, and emplaced into horizontal boreholes. This cask-to-cask transfer will be more efficient than going through the shielded cell as was originally planned.

DEVELOPMENT AND USE OF REMOTE SYSTEMS AT THE WIPP

Remote systems that could potentially be used for RH-TRU waste handling at WIPP include the detensioning and removal of the bolts on the inner lid. An existing device is being assessed for this use. Also, the inside of the empty cask will need to be swiped to make sure it is clean before sending it off to a site for another shipment. Use of the existing robot arm outfitted with the swiping equipment is being considered for this purpose. The WIPP management and operating contractor is working with the Sandia National Laboratories Robotics Division to develop these remote systems.

SYSTEMS IN DEVELOPMENT FOR USE AT THE RH-TRU WASTE SITES

No assay systems currently exist that can assay the RH canister, which is a 10-foot 1-inch-long, 26-inch-diameter Type A steel container. RH-TRU waste is typically assayed in small containers and then placed into 55-gallon drums, which are then placed into the RH-TRU canisters. This method was used to load the 17 RH-TRU canisters in retrievable storage at LANL.

New developments for RH-TRU waste nondestructive assay (NDA) include the Radiofrequency Quadrupole Nondestructive Assay for TRU Waste Project. This activity focuses on completing the development and demonstration of an assay system to measure RH-TRU waste having neutron emission rates ranging from 10E6 to 10E8 neutrons per second. A prototype differential

dieaway technique system using a radiofrequency quadrupole particle accelerator will be demonstrated for the assay and examination of RH-TRU waste and CH-TRU waste with high concentrations of TRU radionuclides (2).

Another NDA project involves developing and evaluating high-speed neutron detectors that are resistant to high emission rates of RH-TRU waste. Three technologies will be investigated: 1) the boron-loaded plastic scintillator/bismuth germanate detector, 2) the boron-loaded plastic fiber scintillator, and 3) the fast neutron telescope. Based on the results of these investigations, one of the technologies will be selected and a full-scale prototype instrument will be developed (3).

A mobile RH-TRU waste packaging system is being developed that will provide a unique and cost-effective capability for loading RH-TRU waste into the RH canisters and then leak testing the canister before shipment.

As characterization and acceptance requirements become known for RH-TRU waste, other techniques, technologies, and equipment will be developed.

CONCLUSION

Successful implementation of the National RH-TRU Waste Program will require that a commitment to sustained funding and full support of the entire DOE TRU waste complex be maintained. Implementation will also require effective application of capital assets, human resources, and a continued effort to identify and resolve programmatic and technical issues. Involvement of regulatory agencies, stakeholders, and affected tribal nations in decision-making processes will have a positive affect on successful implementation.

REFERENCES

1. U.S DEPARTMENT OF ENERGY, "Waste Isolation Pilot Plant Remote-Handled Transuranic Waste Disposal Strategy," DOE/WIPP-95-1090, March 1995.

2. Technical Task Plan Summary for the Radiofrequency Quadrupole NDA of TRU Waste, June 1998. Tech ID 2056 (http://ost.em.doe.gov/tms)

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