Opening the Doors at WIPP to RH TRU Waste - 8012

William A. Most Robert F. Kehrman

Washington Regulatory and Environmental Services 4021 National Parks Highway Carlsbad, New Mexico 88220

ABSTRACT

On October 16, 2006, the Governor of New Mexico and Secretary of the New Mexico Environment Department (**NMED**) jointly approved a hazardous waste permit modification[1] allowing the Waste Isolation Pilot Plant (**WIPP**) to manage, store, and dispose of remote-handled (**RH**) transuranic (**TRU**) mixed waste. RH TRU mixed waste is TRU waste that requires shielding for safe handling. Accordingly, some equipment and operations that are used to handle contact-handled (CH) TRU waste were not adequate to safely handle the RH TRU waste. Changes were needed at WIPP to accommodate the expanded waste envelope.

To evaluate facility readiness to handle RH TRU waste, the Department of Energy (**DOE**) headquarters performed an operational readiness review (**ORR**). But even before the DOE planned the ORR, Washington TRU Solutions (**WTS**), the Managing and Operating Contractor (**MOC**) for the WIPP, performed its own Line Management Assessment (**LMA**) and Contractor ORR.

Upon successful completion of the RH LMA, line management affirmed to the WTS general manager that they were ready to proceed with the Contractor ORR. A team of independent subject matter experts from around the nation gathered to formally assess whether the MOC was indeed ready to receive, manage, store, and dispose of RH TRU waste at the WIPP. The Contractor ORR evaluated in detail, seven guiding principles set forth in DOE Order for *Startup and Restart of Nuclear Facilities*[2] considering the DOE Standard for *Planning and Conduct of Operational Readiness Reviews*[3].

Through DOE Headquarters, the DOE gathered its own team of subject matter experts to assess the WIPP's readiness for RH TRU waste operations. Upon completion of the DOE RH ORR the DOE Team reported back to Headquarters and made the recommendation that WIPP proceed with RH TRU waste operations.

LINE MANAGEMENT ASSESSMENT

The RH TRU Waste Line Management Assessment (LMA) began in November 2005, and was conducted in accordance with the MOC's *Line Management Assessment Plan*[4]. The LMA served as a basis for declaring readiness to start the Contractor ORR and documented the evidence of the contractor's readiness to begin RH operations. In doing so, the LMA demonstrated that the Prerequisites in the *RH Waste Disposal Operations Contractor Operational Readiness Review Plan of Action*[5] (POA) were met and the Contractor ORR could commence. Of the three reviews that lead to the approval of RH operations at the WIPP, the LMA was the lengthiest as it was the most detailed review for RH TRU waste readiness.

WM2008 Conference, February 24 – 28, 2008, Phoenix, AZ

The first step in the LMA was to establish an organization who would drive the LMA process. Therefore, the Plant Management Team (**PMT**) was assembled from the appropriate disciplines:

- Operations
- Integrated Waste Handling
- RH Waste Handling
- Nuclear Safety
- Industrial Safety and Health
- Quality Assurance
- Environmental Compliance and Permitting
- Training

The seven guiding principles of an Integrated Safety Management System (**ISMS**) where used to provide a foundation for the LMA. Each guiding principle has minimum core requirements, as outlined in DOE Order 425.1C, *Startup and Restart of Nuclear Facilities*, which were used to evaluate whether and to the extent each ISMS guiding principle had been met. Accordingly, there are also "prerequisites" and "criteria" that must be met to ensure the facility met the guiding principles of an ISMS for the operation of the facility. The relationship of readiness elements are illustrated in Figure 1.

A key duty of the RH Facility Readiness Manager and the MOC's cognizant managers was the development of criteria to determine readiness. Criteria are rules and tests against which the quality of performance for a fundamental area or topic (or core requirement) is assessed to determine whether a facility can be operated safely. Evaluating core requirements for readiness in the LMA ensures that the breadth of the scope of the RH ORR is sufficient to determine readiness of facility personnel, programs, procedures, and equipment to conduct work safely. Therefore, the core requirements are related to these seven guiding principles of integrated safety management:

- 1. Line management is responsible for the protection of employees, the public, and the environment
- 2. There are clear and unambiguous lines of authority and responsibility
- 3. Personnel possess the appropriate experience, knowledge, skills, and abilities
- 4. Resources are effectively allocated
- 5. Hazards are evaluated and standards and requirements established prior to work performance
- 6. Administrative and engineering controls are in place to prevent and/or mitigate hazards
- 7. The conditions and requirements for safe operations are established and agreed upon by DOE and the contractor in a Safety Management System

The duties, functions, and responsibilities of the RH ORR Plant Management Team are described in *Start-Up and Restart of the WIPP Facility*[6], and the *Line Management Assessment Plan*. The PMT ensures consistency in preparation of Line Management affidavits, assigns a Criteria Lead when appropriate, provides guidance to address assessment process issues and approves any exceptions to the LMA Plan. The PMT addresses non-nuclear safety-related issues resulting from the LMA and provides guidance to the facility for resolving those issues.

Aside from the review and approval of criterion affidavits, the PMT's duties include:

- Tracks LMA progress against the schedule
- Provides guidance to address LMA process issues

WM2008 Conference, February 24 - 28, 2008, Phoenix, AZ

- Approves exceptions to the Line Management Assessment Plan
- Reviews completed affidavits for consistency and adequacy
- Designates specific criterion to be revalidated when required
- Assigns Criteria Leads when needed
- Resolves jurisdictional disputes
- Approves changes to criterion and/or assigned Department Managers and Cognizant Managers
- Tracks completion of corrective action plans

The PMT established and approved the criteria for each LMA prerequisite and assigned the criteria to the responsible department and cognizant managers. Working with the departmental managers, a schedule was developed for the completion of the criteria within the frame work of the overall LMA schedule. The LMA had to be completed not later than July 2006, to support RH receipt schedule. Success meant that development of the LMA schedule <u>had</u> to be coordinated with the cognizant mangers. The cognizant mangers duties to the schedule were to identify the constraints needed to develop schedule logic ties. It was also necessary to identify activities that need to complete before you can start assessment of your criterion (e.g., need of a DOE-approved DSA) as well as identify activities that need to be completed before you can finish your assessment (e.g., team training or emergency drills). Once the prerequisites were met, the manager then need to identify the duration of the assessment. Individual schedules had to be submitted to the Facility Readiness Manager no later than November 23, 2005.

Figure 1: Relationship of Readiness Elements



WM2008 Conference, February 24 – 28, 2008, Phoenix, AZ

In order to successfully complete the criteria, one or more affidavits were prepared and verified by the department manager. The PMT then reviewed the affidavits. Affidavits then went to cognizant managers and cognizant individuals to address the criteria.

Completed affidavit statements documented conformance with, or deviation from, established evaluation criteria. If, after review, the cognizant manager was satisfied that the affidavit completely addressed the criteria and the evidence supported the statements in the affidavit, the affidavit, through the department manager went to the PMT. All completed affidavits were retained by the Facility Readiness Manager in the evidence files so members of the Contractor ORR may use them in their evaluation of readiness.

If any reviewer determined that the criteria was not met, then a corrective action plan was developed and tracked. The corrective actions were either classified as a Pre-start or Post-start item. Prior to the Contractor ORR, all pre-start findings were addressed. The LMA was concluded successfully with a small number of pre-start and post-start corrective actions being tracked and worked to completion. The DOE/CBFO provided oversight of all LMA affidavits during the LMA process and continued to review the completion of corrective actions. The oversight was documented in the *Carlsbad Field Office WIPP Remote Handled TRU Waste Readiness Oversight Report*[7] When corrective actions were completed they were so noted in the database commitment tracking system and verification of corrective action plan close-out presented to the CBFO by the RH Facility Readiness Manager or by cognizant contractor personnel.

INTEGRATED FACILITY CHECKOUT

The Integrated Facility Checkout (IFC) was a start-to-finish operational review of the RH waste receipt and disposal process conducted by the Plant Management Team. The IFC was performed according the *Integrated Facility Checkout Plan for the Start-Up of Remote-Handled TRU Waste Receipt and Disposal at WIPP*[8]. The results of the IFC, taken together with the completed affidavits, formed the basis of the MOC's decision to authorize the start of the Contractor ORR. The IFC was conducted in three phases to demonstrate the three distinct RH TRU waste disposal processes . Those three phases represented the critical elements of the RH TRU waste receipt and disposal process and tested the readiness of RH waste handling personnel, procedures, and equipment. The three phases demonstrated :

- RH borehole drilling
- Receipt and disposal (RH 72B process)
- Receipt and disposal (CNS 10-160B process)

The RH ORR PMT evaluated the readiness of underground personnel to drill RH boreholes, the availability and reliability of equipment, and the adequacy of implementing procedures or work control documents. The IFC for boreholes began with a review of relevant operational procedures by the PMT. Prior to the demonstration, a pre-job briefing was held to remind the operators of the procedural steps, reinforce safe operations to operators and observers (and any specific safety issue associated with borehole drilling) and the nature and purpose of IFC borehole drilling.

The borehole machine was already set up on the location and drilling operations proceeded. PMT members took notes as they observed the process. No communications with the operators was allowed

WM2008 Conference, February 24 - 28, 2008, Phoenix, AZ

unless a safety concern needed to be addressed. After the operations were completed, PMT observers could ask questions of the operators. Written notes included general comments, statements on the procedural provisions and procedural efficiency, and any recommendations to improve the overall process or safety aspects.

A review session of the borehole drilling operation was held immediately afterwards so observations and questions were still fresh in the PMT member's mind. CBFO representatives were also invited to observe the drilling operations and attend the review session. The individual PMT members notes were formalized and submitted to the LMA project manager and made part of the LMA record.

Next, of the IFC demonstrated readiness to receive, manage, and dispose of RH TRU waste using the RH 72B road cask process. The facility was operated as if RH TRU waste was actually being received and emplaced, including completion of the required inspections, paperwork, and WIPP Waste Information System (**WWIS**) demonstration module. Additionally, response to selected off-normal events were included in the readiness assessment. Finally, the IFC demonstrated readiness to receive and emplace RH TRU waste using the CNS 10-160B process.

The IFC concluded with the administrative closeout of the shipment, which ends when the waste container emplacement information is entered into the WIPP Waste Information System (WWIS). The IFC review team also evaluated the training and readiness of RH waste handling personnel and the adequacy of WIPP safety management programs as described in the RH Documented Safety Analysis.

CONTRACTOR OPERATIONAL READINESS REVIEW

The MOC completed a Contractor Operational Readiness Review (CORR) pertaining to activities associated with the receipt and disposal of remote-handled RH TRU mixed wastes. The CORR for RH TRU mixed waste disposal operations was designated as a New Start ORR. The WIPP has been classified as a Hazard Category 2 facility as documented in the RH Documented Safety Analysis (DSA) [9]. This classification was based on the radionuclide inventory of the waste containers to be processed for disposal.

The preparation for the DOE RH ORR began with the MOC developing the *RH Waste Disposal Operations Contractor Operational Readiness Review Plan of Action* (**POA**). The POA documents the breadth, the prerequisites, and the facility for the Contractor ORR (**CORR**) of the RH TRU waste disposal operations at WIPP. This CORR was conducted during August 25-31, 2006, by the Contractor ORR team comprised of independent MOC and subcontractor personnel and conducted to the requirements of DOE Order 425.1C, Startup and Restart of Nuclear Facilities.

The breadth of the CORR was defined in the POA and includes the core requirements specified in DOE Order 425.1C. The depth of the CORR is defined by the criteria and review approach documents (**CRAD**s). The CRADs served as the principal means by which the CORR Team verified the readiness of procedures, systems, and equipment operate safely. All areas of the WIPP facility associated with the RH TRU waste receipt and disposal were evaluated.

The Contractor ORR was successfully completed on August 31, 2006, and the MOC sent a letter to DOE/CBFO that they were ready to proceed with RH receipt and disposal activities. Eleven pre-start findings were identified during the CORR. At the time of the MOC's declaration of readiness, all of the pre-start findings have were completed with the exception of two that remained open. Specifically,

WM2008 Conference, February 24 – 28, 2008, Phoenix, AZ

the Contractor ORR pre-start items open at the time of the transmittal of the Readiness to Proceed Memorandum were:

- Inconsistencies in the RH Documented Safety Analysis and Technical Safety Requirements
- Suspect/Counterfeit Items inspections were not completed

The inconsistencies in the DSA and Technical Safety Requirements and completion of the balance of inspections for Suspect/Counterfeit Items were completed prior to the start of the DOE ORR.

DEPARTMENT OF ENERGY RH OPERATIONAL READINESS REVIEW

The Department of Energy RH Operational Readiness Review (**DORR**) was delayed until the WIPP Hazardous Waste Facility Permit was modified to remove the RH TRU waste prohibition. The modification also allowed for characterization and confirmation efficiencies in its Waste Analysis Plan. The permit modification was signed on October 16, 2006, and the DORR began on December 4, 2006, and concluded on December 13, 2006. Prior to the DORR, the DORR Team Leader toured the WIPP facility and talked with CBFO Site Operations Manager along with the MOC RH Waste Handling and RH Facility Readiness managers to familiarize himself with the operations and discuss logistical issues associated with the upcoming DORR.

Some of the team members made information requests prior to the DORR. In this manner, team members could prepare for document reviews, personnel interviews, and system walk-downs. Once the team was assembled in Carlsbad, New Mexico, they were given a tour of the surface and underground facilities. Review activities included staff interviews, document reviews, observations of normal and upset facility operations, and an emergency exercise. The DOE ORR Team also reviewed and assessed the adequacy of the Contractor ORR and the Line Management Assessment performed by the Carlsbad Field Office.

Procedures, program documents, and plans were made available electronically as well as in hard-copy to facilitate individual review team preferences. Key members of the contractor's staff made themselves available to team members for interviews when not preparing for operational demonstrations of the RH TRU waste receipt, waste handling, management, and disposal processes.

There are two different RH TRU waste handling processes to accommodate the two different shipping casks in which RH TRU waste is received. One shipping cask is the RH 72B containing one RH canister. The other shipping cask, the CNS 10-160B, contains ten 55-gallon drums of RH TRU waste. Two waste handling process are used for the unloading and preparation to move the waste underground for disposal in a horizontal borehole. However, once radiological swipes are taken and analyzed, and, in the case of the 10-160B process, the three 55-gallon drums are repackaged in an RH facility canister, the processes are the same for transporting the waste to the underground and into the borehole. Having two process means that the will be some additional procedures, waste handling operations, and administrative processes.

In their review of procedures, technical documents, personnel interviews, and observations of RH waste handling operations, the DOE ORR team members identified seven noteworthy practices, seven pre-start findings, 13 post-start findings, and 38 observations. A finding is defined as a deficiency. Observations are items that are not findings but, if addressed, would lead to excellence in operations. RH-TRU project personnel demonstrated the ability to safely operate the facility. The DOE ORR team

WM2008 Conference, February 24 - 28, 2008, Phoenix, AZ

noted that operations and operations support personnel were extremely proficient. The team also determined that operating procedures were adequate to operate the facility safely. The DOE ORR Team recommended that DOE-Environmental Management (**DOE-EM**) grant approval to start remote-handled transuranic waste disposal operations at WIPP contingent upon the successful completion of the following two conditions:

- 1. completion of corrective actions, including CBFO verification, for all pre-start findings and
- 2. completion of multiple "comprehensive integrated demonstration runs of RH-TRU waste disposal" to ensure equipment functionality is satisfactory.

A list of noteworthy practices, findings and observations, sorted by functional area, was provided to CBFO in the DOE RH ORR close-out meeting and in the *Final Report for the Operational Readiness Review for Startup of RH Waste Handling Operations at the Waste Isolation Pilot Plant*[10]. Pre-start findings were to be corrected prior to startup of remote-handled TRU waste disposal operations. Pre-start findings were noted in four functional areas: engineering support, nuclear safety, operations, and procedures. Corrective actions were identified and those completed actions were reviewed and approved by both the MOC and CBFO. The MOC operations group at WIPP notified the MOC general manager that the DORR was successfully completed that all pre-start finding were successfully resolved on January 17, 2007. First receipt of RH TRU waste occurred on January 25, 2007. In the Post-start findings, corrective action plans also included a description of the risks and any mitigating actions to be taken during the interim that will reduce the risks to an acceptable level before final correction.

DISCUSSION

The Line Management Assessment performed prior to the Contactor Operational Readiness Review served as a detailed evaluation method to demonstrate the facility's readiness to begin RH TRU waste receipt, management, and disposal. The MOC line management performed a thorough review of the criteria necessary to begin the ORR process. The Plant Management Team outlined the critical requirements and provided guidance to line management to ensure criteria were fully addressed and any corrective actions identified and completed to support the DOE RH ORR schedule. The assessment by CBFO of the LMA and Contractor ORR led to and endorsement by CBFO to DOE-EM to begin the DOE ORR. Efforts to coordinate the DOE ORR team's staff interviews, document reviews, observations of normal and upset facility operations, and an emergency exercise allowed the facility to demonstrate its position of readiness to commence RH operations.

CONCLUSION

The systematic evaluation of readiness criteria spanned the disciplines necessary to operate the RH TRU waste facility at WIPP. This evaluation demonstrated that the WIPP RH TRU waste operations support the Integrated Safety Management System guiding principles and the WIPP was ready to commence RH TRU waste operations. Teamwork by MOC line management and staff, along with CBFO oversight of the LMA and CORR process made it possible for the WIPP to achieve readiness a readiness position working to complex and aggressive schedules shaped by regulatory approvals of authorization basis documents and DOE programmatic objectives.

REFERENCES

- 1. WIPP Hazardous Waste Facility Permit Modification, *Combined Remote Handled TRU Waste* and Section 311 Permit Modification Request, April 29, 2005.
- 2. Startup and Restart of Nuclear Facilities, DOE O 425.1C
- 3. Planning and Conduct of Operational Readiness Reviews, DOE STD 3006-2000
- 4. Line Management Assessment Plan, WP 15-OR.01
- 5. *RH Waste Disposal Operations Contractor Operational Readiness Review Plan of Action*, DOE/WIPP 05-3328, Revision 0
- 6. Start-Up and Restart of the WIPP Facility, WP 15-MD3101
- 7. Carlsbad Field Office WIPP Remote-Handled TRU Waste Readiness Oversight Report, Office of Site Operations, November 2006
- 8. Integrated Facility Checkout Plan for the Start-Up of Remote-Handled TRU Waste Receipt and Disposal at WIPP, WP 15-IF.03, Revision 1
- 9. Waste Isolation Pilot Plant Remote Handled (RH) Documented Safety Analysis DOE/WIPP-06-3174, Rev. 0
- 10. Final Report for the Operational Readiness Review for Startup of RH Waste Handling Operations at the Waste Isolation Pilot Plant, U. S. Department of Energy Carlsbad Field Office, December 2006