

WM2015 Conference Panel Report

PANEL SESSION 016: Lessons Learned and Return to Operations Following the 2014 Operational Incidents at WIPP

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A panel of representatives from across the Department of Energy's TRU waste complex was convened at the Waste Management Symposium on March 16, 2015. The panel focused on the WIPP equipment fire and airborne radiation release incidents in February 2014. Topics discussed were lessons learned, ongoing recovery activities, and impacts on affected DOE TRU waste complex sites. WIPP Recovery Officials from the field and headquarters discussed the recovery plans as well as status and plans for resumption of TRU waste operations across the DOE complex.

Summary of Presentations:

The February 2014 salt truck fire and radiological release events were significant. While no harm to workers, public or the environment resulted, these events could be considered as a "wake up call. Almost fifteen years of performing routine operations day after day without any challenging events eroded the WIPP nuclear safety culture. Nuclear safety assurance requires continual questioning attitudes on the part of all workers, whether at WIPP or in the pipeline that ships waste to WIPP for permanent disposal. The challenge is to actively and consistently promote continual improvement in operational safety and efficiency.

The WIPP underground is being systematically made habitable for safe operations and protective of workers with resumption of critical mine safety and maintenance. Operations include simultaneous activities in contaminated and uncontaminated sections of the mine. Ventilation will be increased in phases back to its pre-incident airflow capacity, the mine will be surveyed and made habitable for workers, and the workforce will be retrained for contaminated operations and cross-trained for recovery activities.

The schedule to commence waste emplacement operations is the first quarter of calendar year 2016, with the intent to incrementally increase waste emplacement operations over time. Options are being explored to determine if some actions can be accelerated. The Department is committed to ensuring the safety and continued progress of the TRU waste programs at the

WM2015 Conference Panel Report

generator sites in order to fulfill commitments to the host states. The Department is continuing to characterize and certify TRU waste for eventual shipment to WIPP, and the generator sites are continuing to store TRU waste safely on-site until WIPP operations are resumed. A Recovery Plan has been developed and provides reasonable confidence for resumption of WIPP disposal operations by: (1) safely isolating the waste of concern; (2) initial closure of the affected waste disposal panels; (3) responding to weaknesses identified by the Accident Investigation Board reports through comprehensive upgrades to programs, procedures, and training; (4) upgrading equipment, infrastructure, and facilities; and (5) ensuring that waste generators have rigorous characterization, treatment, and packaging processes and procedures and that all waste meets WIPP Waste Acceptance Criteria before routine disposal operations resume.

Synopsis of Panel Discussion

Deputy Assistant Secretary for Waste Management, Frank Marcinowski provided opening remarks to the panel and the audience of about 200 attendees. He praised progress that has been made in the past year – including immediate response to the incidents, evaluation and investigation into the events, defining and implementing required corrective actions, developing an overarching recovery strategy and developing a detailed baseline plan to implement that strategy. He acknowledged that the community and a wide range of stakeholders were kept informed along the way. He reiterated what the Secretary of Energy stated at a February hearing on the fiscal year 2016 budget. The Department's request provides sufficient funding to meet the Department's commitment to resume waste emplacement operations in the first quarter of calendar year 2016, but DOE will only resume operations when it is safe to do so. He described how the Accident Investigation Board identified a number of weaknesses in the safety basis and safety programs at WIPP that must be thoroughly addressed. He explained that DOE will methodically work through establishing the safety envelope, rigorous training on new procedures and processes, and responding to all oversight organizations' concerns (this includes NMED, EPA, DNFSB, MSHA, and DOE's Office of Enterprise Assessment), and committed to conduct comprehensive operational readiness reviews at the contractor and Federal levels, prior to restart. He pledged that DOE will continue working with regulators and stakeholders around the country as resumption of operations at WIPP proceeds. He thanked the DOE sites and their regulators for working collaboratively to mitigate the impact of the perturbation in the national TRU complex.

The February 2014 Events at WIPP

The underground fire involved a salt haul truck, a diesel-powered vehicle used to move mined salt. All 86 personnel underground evacuated from the mine safely. The fire burned the engine compartment and consumed the front tires, contributing significantly to the amount of smoke and soot generated. The vehicle caught fire directly in front of the primary air intake drift as it split to flow both north and south, thereby affecting the entire underground. Soot was deposited on the mine's walls, shafts, and underground equipment, including the waste hoist tower. Soot and smoke adversely affected key equipment and facilities, and required a widespread cleanup effort throughout the underground.

Nine days later, on February 14, 2014, a continuous air monitor detected a radiological release in the underground. As designed, the underground ventilation system automatically switched to HEPA filtration and the damper was manually opened and adjusted to achieve designated airflow. Slightly elevated levels of airborne radioactive concentrations were subsequently

WM2015 Conference Panel Report

detected outside the WIPP facility due to leakage through closed ventilation filter bypass dampers. Actions were taken immediately following the incident to stabilize the facility and to determine the extent of impact to WIPP personnel, the public, and the environment.

In response to stakeholder requests, the Department initiated a comprehensive public outreach and communications strategy that included weekly town hall meetings, upgrading the WIPP recovery website, starting WIPP Update email notifications, and conducting regular, formal and informal discussions with WIPP's regulators.

On February 7, 2014, the Department appointed an Accident Investigation Board (AIB) to determine the cause of the fire incident and to develop recommendations for corrective actions to prevent recurrence. The AIB independently performed a rigorous accident investigation and prepared its report according to DOE Order 225.1B, Accident Investigations, released March 13, 2014 [1]. The report cited weaknesses in the fire protection, emergency management, maintenance, and oversight by DOE. DOE and the WIPP's management and operating contractor developed corrective action plans responding to the AIB report, and implementation of the corrective actions is well underway.

On February 27, 2014, the Department appointed a second AIB to determine the cause of the radiological release and develop recommendations for corrective actions. This second AIB used a two-phased approach. The first phase focused on the response to the radioactive material release, including related exposure to aboveground workers and the response actions, while the second phase, which is ongoing, is evaluating the cause of the underground radiological release event. The first phase is complete, and the report was issued April 24, 2014 [2]. According to the Phase 1 report, the cumulative effect of inadequacies in ventilation system design and operability compounded by degradation of key safety management programs and safety culture resulted in the release of a minimal amount of radioactive material from the underground to the environment.

In May 2014, efforts to examine waste in Panel 7, Room 7 (using video cameras extended out on a long boom to view from above) identified that a waste container originating from LANL had been breached. Subsequent AIB visual surveys confirmed that only one container was involved. The waste stream of interest originated from repackaging nitrate salts by mixing with an organic-based absorbent to eliminate residual neutralized acidic liquids. This oxidizer and fuel combination was subsequently (post incident) found to exhibit the characteristic of ignitability (D001) under provisions of the Resource Conservation and Recovery Act. A subsequent effort by the AIB employed a specially constructed boom mounted camera that could extend the full reach of the waste in Panel 7 to verify that no other waste containers had been involved in the February 14 event.

Impacts to TRU Waste Generator Sites

DOE is continuing to characterize and certify TRU waste at the Idaho National Laboratory, Oak Ridge National Laboratory, the Savannah River Site, and Argonne National Laboratory for eventual shipment to WIPP. DOE is carefully evaluating and analyzing the impacts on storage requirements and commitments with state regulators at the generator sites. These efforts will inform decisions related to the availability of storage for certified TRU waste until waste shipments to WIPP can resume. Each site is ensuring that their respective regulators and stakeholders are kept informed of actions being taken to accommodate the delay.

WM2015 Conference Panel Report

At the Los Alamos National Laboratory (LANL), the nitrate salt waste stream containers have been isolated, over-packed in larger containers, and stored in facilities with fire suppression and HEPA filtration. Daily inspection and continuous monitoring are required under the provisions of an Administrative Compliance Order from the New Mexico Environment Department. LANL science and technology activities continue to generate TRU waste, with new generation projections from ongoing NNSA mission work of about 300-600 drums per year. Storage capacity is sufficient at TA-54 to accommodate newly generated TRU. LANL is evaluating increased use of pipe overpack containers for increased safety margin in storage, and decontamination of oversize TRU to LLW so it may be shipped off LANL site soon after generation. Below grade retrievals of buried TRU at LANL are on hold pending resumption of WIPP shipping.

In parallel with the ongoing AIB Phase 2 investigation into the direct cause and contributing causes of the release, generator site certification programs are being assessed to ensure the programs certify waste meeting the WIPP Waste Acceptance Criteria. After issuance of the AIB Phase 2 report, the need for any additional corrective actions will be assessed and implemented at generator sites. All waste generators will have rigorous characterization, treatment, and packaging processes and procedures in place to ensure compliance with WIPP Waste Acceptance Criteria. DOE has surveyed the TRU waste generator sites and evaluated their waste stream documentation and determined that there are no other waste containers having the specific characteristics of the Los Alamos National Laboratory nitrate salt waste stream.

Resumption of WIPP Disposal Operations

Airflow is the major limitation to recovery operations for a significant portion of the recovery schedule. This means that many underground recovery activities, especially those involving diesel equipment, will need to be conducted in series, rather than concurrently, until additional ventilation capacity is obtained. The first phase in augmenting filtered ventilation to the underground (interim operations) will provide an additional capacity of 1,500 m³ per minute, for a total of about 3,200 m³ per minute. HEPA skid and fan units are on schedule for initial operation by April 2015.

The second phase, or supplemental ventilation system, reconfigures the mine ventilation pathways using bulkheads, overcasts, airlocks, and bulkhead ventilation regulators augmented with supplementary underground fans to provide additional flow through the mine. The combined interim and supplemental ventilation systems will provide 5,100 m³ per minute. Once in place, this second phase will provide sufficient ventilation flow to support limited waste emplacement operations, which are planned by the end of the first calendar quarter of 2016.

Resumption of routine disposal operations depends on the need for a new permanent underground ventilation system capable of providing 12,000 m³ per minute airflow, restoring the facility back to full, unrestricted operation. This will provide the ventilation required to simultaneously conduct mine stability activities, mining, maintenance, waste emplacement, and research and development activities. An alternatives analysis is underway to guide the DOE order 413.3B process by which the permanent ventilation requirements will be met. One uncertainty that complicates the alternatives analysis is the degree that the underground can be decontaminated. Ongoing decontamination efforts using fresh water washing in the WIPP underground are proving very effective. The details of a permanent ventilation system for an

WM2015 Conference Panel Report

uncontaminated repository may be different than that for a facility with residual contamination levels.