WM2017 Conference Panel Report

PANEL SESSION 18: **US DOE WIPP: Lessons Learned and Return to Operations Following 2014 Operational Incidents**

Co-Chairs: **Phillip Breidenbach**, *Nuclear Waste Partnership LLC*
Todd Shrader, *Manager, Carlsbad Field Office, U.S. DOE*

Panel Reporter: **Robert Jubin**, *Oak Ridge National Laboratory*
Sharon Robinson, *Oak Ridge National Laboratory*

Panelists:

1. **Phillip Breidenbach**, *Nuclear Waste Partnership LLC*
2. **J.R. Stroble**, *Director, National TRU Program Compliance Division, US DOE*
3. **Jim Blankenhorn**, *Deputy General Manager, Nuclear Waste Partnership AECOM*
4. **Todd Shrader**, *Manager, Carlsbad Field Office, U.S. DOE*

About 100 people attended a panel session co-chaired by **Phil Breidenbach** and **Todd Shrader** which focused on the major changes that have been implemented at the Waste Isolation Pilot Plant (WIPP) in response to the 2014 accident. Changes described include the new DOE Carlsbad Field Office organization, the National TRU Program, WIPP Waste Acceptance Criteria (WAC), WIPP Documented Safety Analysis (DSA), the uniqueness of WIPP as both a DOE nuclear facility and a salt mine, WIPP Operational Readiness Reviews and the future of WIPP and the National TRU Program. The near-term projections of shipments of TRU waste to WIPP were also discussed. Presentations were made by four panelists who provided a comprehensive overview of the lessons learned and progress towards operations. This was followed by a question and answer session which included questions on the WIPP restart.

Summary of Presentations

Phillip Breidenbach, President and project manager of Nuclear Waste Partnership, highlighted the key difference between this panel session and its predecessor at WM2016. That difference is "last year we said we have a plan; this year we get to tell you what we did." He highlighted the significant improvements in the safety culture, the closure of the action items arising from the accident investigation boards, and the team approach used for the development of the new DSA. He also highlighted lessons learned, both positive and negative.

It was unfortunate that there was a fire and radiological event at WIPP in Feb 2014. However, the repository safety systems worked. No one was hurt, and there were no significant releases to the envrioment. Since then there have been three accident evaluations which resulted in 143 total actions, all of which have been closed. A major emphasis has been placed on improving the safety culture at WIPP. This has included building values and expectations into the way people do daily business, developing a WIPP fundamentals handbook, leadership training including formal leadership academy training followed by routine on-the-job leadership forums as part of implementation, human performance improvement initiatives – people will be supported for doing the right thing, positive reinforcement – daily hero awards where $50 or $100 cash is handed out within an hour of seeing a positive activity, management in the field where field

observations are used to track value-added activities, and communications at multiple levels – written, posters, verbal. Safety management programs improvements have been implemented.

Resumption of waste operations was done by a heroic team effort that involved sacrifice by all involved. The update of the DSA was a team approach with DOE-HQ, CBFO and NWP. This resulted in approvals and implementation to progress smoothly and quickly. An interim ventilation system was brought on line last fall to deliver an additional 54,000 cfm of air underground. This provided adequate air flow for waste emplacement operations and increases airflow for ground control and maintenance operations. Rebuilding public confidence required transparency and openly sharing information.

There is a dramatic difference between how WIPP operated in 2014 and today. WIPP is taking a controlled, deliberate approach to resuming operations. Several lessons have been learned from this experience. The following things worked well: the focus on values and expectations, workshops to gain alignment of all stakeholders, and use of corporate reach back to address emergent issues. Things that did not work well included: the large number of redundant assessments impacted progress with little value added, some misalignment of expectations, and inconsistent understanding of competing hazards which impacted prioritization of action items.

J. R. Stroble provided significant detail on the changes to the National TRU Program which includes enhancements to the new WIPP DSA and WAC. A key aspect of this is the development of the Basis of Knowledge (BoK) which will be used to determine the acceptability of waste packages containing oxidizing chemicals at WIPP in the future. **J. R.** also highlighted that WIPP has reopened, but waste receipt will face several limitations over the next few years. These will include low receipt rates of contact-handled packages while acceptance of remote-handled packages and waste containing oxidizing chemicals remain on hold.

Changes in the WIPP WAC are being driven by the new DSA requirements and operating permit for WIPP. The new WIPP WAC includes enhanced acceptable knowledge (AK), oxidizer limitations, new program reviews at generator sites, and additional DOE and contractor oversight. The new DSA will require documentation that each waste drum meets the WIPP WAC. Previously WIPP relied on AK for waste streams and QA at the generator site rather than container specific certification. Generator program re-certification will implement enhanced AK, including oxidizer screening and will require submitting chemical compatibility analyses by waste stream for CBFO approval. New oversight requirements will result in more procedure approvals and generator site technical reviews with CBFO field observations and DOE headquarter reviews.

Conditions for acceptance of waste streams containing oxidizing chemicals are presently being evaluated. As noted earlier a BoK is being developed to limit oxidizers to reduce the risk of the spread of a fire in the repository near the waste beyond the analyzed accidents in the new WIPP DSA. The BoK will be independent of waste stream's hazardous waste determination, which is the generator site's responsibility.

WIPP has reopened and will soon be accepting contact-handled waste packages at reduced rate. Over 25,000 containers were certified under the old WAC and are presently in storage at the generator sites. These must now meet the new certification requirements, which were implemented in summer 2016, before the waste can be shipped to WIPP. This will require the sites to store more waste for longer periods of time. WIPP will return to the pre-incident baseline shipping rates when the new ventilation systems are operational, but that will be years away. WIPP is attempting to minimize the impact by implementing a surface storage project to increase their operational flexibility.

Future actions include developing plans for handling waste streams that do not pass oxidizer screening and the restart of remote handled TRU waste disposal. WIPP will complete the DOE EM legacy TRU waste mission and then begin to shift to newly-generated TRU waste missions from other programs. They plan to extend life of WIPP from 2030 to at least 2050 to accept these waste streams.

Jim Blankenhorn discussed the uniqueness of the WIPP facility which is the US's only deep geological repository for permanent disposal of defense-generated transuranic waste. He provided insight into the challenges resulting from operating in the salt formation environment. A salt formation was chosen for WIPP because of the stable geological area, salt is relatively easy to mine, and its plastic qualities allow it to encapsulate waste drums. However, the continual movement of the salt also requires daily inspections and re-milling to address the potential of rock falls. Dealing with radiological contamination from the 2014 accident in a salt environment is also challenging for monitoring and decontamination. Water spraying encapsulates contamination in the salt matrix due to its hydroscopic properties, but it is a slow process. In the near term, mining is required to physically remove contaminated salt surfaces.

He also indicated that the ventilation system is the limiting resource in the operation of WIPP. The system previously ran 520,000 cfm unfiltered. After the accident, WIPP is filtering all air at a rate of 114,000 cfm with the addition of a 54,000 cfm interim filtered ventilation system. Even with this additional capacity there is the need to reconfigure the ventilation system daily to the locations where work is being performed.

Another unique aspect of operating a waste facility in a salt formation was that previously two independent safety cultures existed: nuclear and mining. Today the two are working together to balance competing priorities: maintenance of underground systems, down posting of contaminated area, preparing for resumption of mining operations for new panels, ventilation system upgrades, waste emplacement, and maintaining the aging facility.

Todd Sharader provided a look forward for the WIPP facility. This included projections for the near-term (next 12 months) and longer term (1 – 5 years). The next 12 months will focus on contact handled TRU waste emplacement operations in Panel 7 and withdrawing from south end of mine where the 2014 accident occurred. Shipments are expected to resume in April 2017. Shipments are expected to resume at two per weeks ramping up to four per week. WIPP anticipates receipt of approximately 128 shipments between April 2017 and the end of January 2018. **Todd** noted that current efforts are underway for reestablishing shipping corridors from generator sites to WIPP.

Initial shipments will be from Waste Control Specialists, Idaho, and Savannah River. The next sites to resume shipments will be Oak Ridge and Los Alamos National Laboratory. The next 1 – 5 years will focus on adding surface storage, increasing ventilation system capacity (CD-4 expected in December 2020) and developing a conceptual model for an additional disposal area. The construction of a new permanent 540,000 cfm ventilation system will provide a new safety confinement system that will allow WIPP to operate at full capacity.

Questions and Answer

- How do you deal with morale? Everyone was focused on restarting WIPP. Workers stayed dedicated and focused, and morale stayed pretty high. The low point was when a rock fall occurred in WIPP, but when assessments of the incident came back positive, morale and confidence came back up quickly.
- What is the order of generator sites for restarting shipments to WIPP? There is no prioritized order between the first three sites, which will be Waste Control Specialists, Idaho, and Savannah River. Oak Ridge and Los Alamos will be next.
- Can waste be shipped before the BoK is finished? Waste with no oxidizers can be shipped prior to it being completed. The BoK will establish the screening requirements for oxidizers so waste with oxidizers can't be shipped until after it is complete. The date for completion has not been set, but the plan is to stay ahead of shipment schedule.