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ABSTRACT

The Hanford Site presents unique challenges in meeting the U.S. Department of Energy Richland Operations Office (DOE-RL) 2015 Cleanup Vision. CH2M HILL Plateau Remediation Company (CHPRC), its subcontractors, and DOE-RL were challenged to retrieve, transport and remediate a wide range of waste materials. Through a collaborative effort by all Hanford Onsite Central Plateau Cleanup Team Members, disposition pathways for diverse and seemingly impossible to ship wastes were developed under a DOE Order 460.1C-compliant Hanford Onsite Transportation Safety Program. The team determined an effective method for transporting oversized compliant waste payloads to processing and disposition facilities. The use of the onsite TSD packaging authorizations proved to be vital to safely transporting these materials for processing and eventual final disposition. The American Recovery and Reinvestment Act of 2009 (ARRA) provided additional resources to expedite planning and execution of these important cleanup milestones.

INTRODUCTION

The Hanford Site presents unique challenges in meeting the U.S. Department of Energy Richland Operations Office (DOE-RL) 2015 Cleanup Vision. CH2M HILL Plateau Remediation Company (CHPRC), its subcontractors, and DOE-RL were challenged to retrieve, transport and remediate a wide range of waste materials including approximately 9,000 cubic meters (m$^3$) of waste on the Hanford Central Plateau defined as “no-path-forward waste.” A significant portion of this waste (7,650 m$^3$) was composed of wastes containing up to 50 grams of special nuclear materials (SNM) in large glove boxes removed from the Plutonium Finishing Plant (PFP) and oversized packages recovered during retrieval operations. Other items that required innovative transportation solutions included contaminated railcars, large process vessels, and building structures. Through a collaborative effort by all Hanford Onsite Central Plateau Cleanup Team Members, disposition pathways for the diverse and seemingly impossible-to-ship wastes were developed under the DOE Order 460.1C-compliant Hanford Onsite Transportation Safety Document (TSD).
DISCUSSION

Some of the challenges facing CHPRC in meeting its 2015 Cleanup milestones included:

1. Numerous, varied and complex waste streams requiring remediation including large pieces of contaminated soil and equipment, weapons production reactor components, spent fuel, sludge, trench and burial ground waste, reactor buildings, degraded retrieved packages, sludge and grouted monoliths;
2. Coordinating transportation activities between shipping and receiving facilities, processing and interim storage sites and regulators;
3. Accelerated schedules; and
4. Limited resources to execute work.

The Nuclear Safety Rule (10 CFR 830) establishes requirements for activities that may affect the safety of DOE Nuclear Facilities, including onsite transportation and packaging activities. 10 CFR 830 establishes a DOE Order 460.1, Safe Harbor for onsite transportation. All onsite transportation and packaging activities involving DOE Nuclear Facilities can either fully comply with Department of Transportation (DOT) regulations, or with a 10 CFR 830 compliant TSD developed in accordance with DOE Order 460.1C. If utilized, the TSD must provide safety equivalent to compliance with DOT regulations. At Hanford, all onsite shipments either comply with DOT regulations or the Hanford Sitewide TSD (DOE/RL-2001-0036).

The Hanford TSD is issued and maintained by DOE to ensure consistency across all contractors on the Hanford Site. The Hanford TSD describes the methodology and compliance process used to provide equivalent safety to the DOT regulations for onsite shipments. Equivalent safety is provided through use of a number of different onsite transportation safety documents (TSDs). Those documents include the following:

1. Package-Specific Safety Documents (PSSDs) – these are similar to Safety Analysis Reports for Packaging (SARPs) used for DOT-compliant offsite shipments of Type B quantities of radioactive material. A PSSD includes significant analyses (e.g., structural, thermal, gas generation, shielding, criticality) that demonstrate compliance with the Hanford TSD. These are the most complex transportation safety documents and at present, only one PSSD is used by CHPRC. A PSSD may be either deterministic or probabilistic (Risk Based).

2. One-Time Request for Shipment (OTRS) – these are specific exceptions to the TSD and/or PSSD that are approved by the DOE Field Office Manager to provide special authorization to ship on a limited basis. They are similar in function to a Justification for Continued Operation (JCO) in Facility Nuclear Safety Space. (Note: an OTRS must continue to meet the requirements of 10 CFR 830 and provide equivalent safety.) The OTRS must adequately analyze the proposed
Figure 1. After two years of planning, preparation and mock-ups the D-10 Tank was safely removed from U Canyon using the contaminated equipment SPA as the authorization basis, clearing the way for final demolition of the facility.

As described above, SPAs were by far the most frequently used onsite transportation document to meet ARRA cleanup milestones. SPAs were initially introduced in 2006 because the development of PSSDs or SARPs was becoming prohibitively expensive and time consuming. SPAs were included as appendices to the Hanford TSD and greatly reduced the need to develop documentation of new transportation safety analyses. SPAs include controls to prevent or mitigate the frequency and consequences of various transportation accidents, and may rely on use of standard 49 CFR 173 DOT-compliant Type A or Industrial Packaging as components of the SPA packaging system. To utilize a SPA for a new waste stream, CHPRC develops a checklist that documents how the proposed waste stream meets the bounding SPA evaluation and identifies the packaging configuration proposed for use. CHPRC typically collaborates with DOE in advance of the checklist development to ensure the proposed activity will meet all SPA requirements, and those discussions frequently lead to mutually-agreed-to changes and efficiencies in the transportation and packaging process. Once the SPA checklist is developed, CHPRC currently submits the documentation to DOE for review prior to its first use. Upon DOE concurrence, CHPRC then develops and implements waste stream-specific controls and procedures to ensure all SPA requirements are met for each shipment.

In accordance with the TSD provisions SPAs have been critical to CHPRC's success in meeting contract milestones. For example, the...
Contaminated Equipment SPA (CE-SPA) was recently used as the basis shipping a 2.13-meter-tall, 6,804 kilogram, dangerously radioactive storage tank which contained over a kilogram of transuranic (TRU) waste from the U Plant Canyon (Fig. 1). The tank, Tank D-10, was the last tank standing between U Plant Canyon and demolition-ready status. Using the CE-SPA, the D-10 tank was transported by crane down the 243.8-meter-long canyon deck and deposited into a custom-made shipping container staged in the building’s railroad entry tunnel. The package was then sealed, surveyed and shipped to the Central Waste Complex for further disposition. Within 60 days of removing the tank the grouting for this first-of-a-kind demolition, in which the canyon’s void spaces were filled with over 15,291 cubic meters of grout, was completed.

As another example, the flexibility offered through use of the TSD and its associated SPAs was demonstrated by the efficient disposition of Hanford’s suspect transuranic wastes using point-of-generation methodologies. Specifically, high-activity glove boxes from decontamination and decommissioning activities at the Plutonium Finishing Plant (PFP) and highly degraded retrieval packages were transported directly from the point of generation (i.e., PFP or the retrieval trench face) to a commercial facility adjacent to the Hanford Site using the onsite program for processing and disposition in full compliance with the contaminated equipment SPA and retrieval SPA, respectively (Fig. 2).

Another key feature in using the SPAs is their ability to authorize transport of oversized equipment safely, efficiently and compliantly, while minimizing the amount of size reduction required by facility project personnel, as well as avoiding excess costs and schedule impacts created by having to handle wastes multiple times.

Finally, the SPA process was recently used to support the demolition activities at the 209E facility on the Hanford Site. During facility characterization a series of tanks were found that had been used in the criticality laboratory section of the building. It was determined that these tanks, thought to have been thoroughly flushed many years ago, proved to be highly contaminated and contained a significant amount of TRU waste. Since the facility was already in demolition, stopping to handle the tanks was not an effective option. Rather than jeopardizing the project demolition schedule, the tanks
were removed, packaged and transported in accordance with the SPA to the Central Waste Complex to await further disposition. Again, the inherent flexibility of the SPA concept kept the project on schedule for demolition while ensuring a safe and compliant method of transportation both to interim storage and final disposition.

SUMMARY

Through the innovative and creative use of the TSD, the Hanford Onsite Central Plateau Cleanup Team Members have developed and are executing an integrated project plan that enables the safe and compliant transport of a wide variety of difficult-to-transport waste items, accelerating previous cleanup schedules to meet cleanup milestones.

REFERENCES


