

The Integration of the 241-Z Building Decontamination and Decommissioning Under CERCLA with RCRA Closure at the Plutonium Finishing Plant

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ABSTRACT

The 241-Z treatment and storage tanks, a hazardous waste Treatment, Storage and Disposal (TSD) unit permitted pursuant to the *Resource Conservation and Recovery Act of 1976* (RCRA) and Washington State *Hazardous Waste Management Act*, RCW 70.105, , have been deactivated and are being actively decommissioned under the provisions of the *Hanford Federal Facility Agreement and Consent Order* (HFFACO) [Ref. 1], RCRA and *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) 42 U.S.C. 9601 *et seq.* The 241-Z TSD unit managed non-listed radioactive contaminated waste water, containing trace RCRA characteristic constituents.

The 241-Z TSD unit consists of below grade tanks (D-4, D-5, D-7, D-8, and an overflow tank) located in a concrete containment vault, sample glovebox GB-2-241-ZA, and associated ancillary piping and equipment. The tank system is located beneath the 241-Z building. The 241-Z building is not a portion of the TSD unit. The sample glovebox is housed in the above-grade building. Waste managed at the TSD unit was received via underground piping from Plutonium Finishing Plant (PFP) sources. Tank D-6, located in the D-6 vault cell, is a past-practice tank that was taken out of service in 1972 and has never operated as a portion of the RCRA TSD unit. CERCLA actions will address Tank D-6, its containment vault cell, and soil beneath the cell that was potentially contaminated during past-practice operations and any other potential past-practice contamination identified during 241-Z closure, while outside the scope of the *Hanford Facility Dangerous Waste Closure Plan, 241-Z Treatment and Storage Tanks*, [Ref. 2].

Under the RCRA closure plan, the 241-Z TSD unit is anticipated to undergo clean closure to the performance standards of the State of Washington with respect to dangerous waste contamination from RCRA operations. The TSD unit will be clean closed if physical closure activities identified in the plan achieve clean closure standards for all 241-Z locations. Clean closed 241-Z treatment and storage tanks, equipment and/or structures will remain after RCRA clean closure for future disposition in conjunction with PFP decommissioning activities which are integrated with CERCLA.

INTRODUCTION

The 241-Z TSD unit is part of the Plutonium Finishing Plant (PFP) complex (63 buildings). Construction of PFP began in 1948 and was completed in 1951. The 241-Z Liquid Waste Treatment Facility was placed into service in 1949. The PFP was the final link in the plutonium manufacturing chain on the Hanford Site that processed plutonium-bearing chemical solutions into metal and oxide. This process ended in May 1989. The 241-Z facility became a RCRA permitted TSD unit in 1987 and continued to receive, store, and treat process waste generated during PFP decommissioning activities until 2004. Closing a TSD unit within a CERCLA removal action required integration of regulatory documents as well as work activities.

The 241-Z Liquid Waste Treatment Facility consists of five 5,000 gallon stainless steel tanks (10 ft high by 10 ft diameter), ancillary piping and equipment; and containment vault. The tanks are housed individually in a ventilated below grade, reinforced concrete vault that is divided into five separate cells. The tank cells are each 17 ft square and 22 ft deep. Access to the below grade cells is via either a 2.5 ft square man hatch or a 3.25 ft diameter port opening in the center cover block. An above grade, pre-engineered corrugated metal enclosure was built in 1981 to provide weather protection for the vault, ventilation system high-efficiency particulate air filters, and other equipment. This enclosure is part of the CERCLA removal action and not part of the RCRA Closure. The 241-Z facility is approximately 28 ft wide, 92 ft long and 24 ft high and is located about 300 ft south of PFP's 234-5Z Building. A graphical overview of the 241-Z facility is provided in Figure 1.

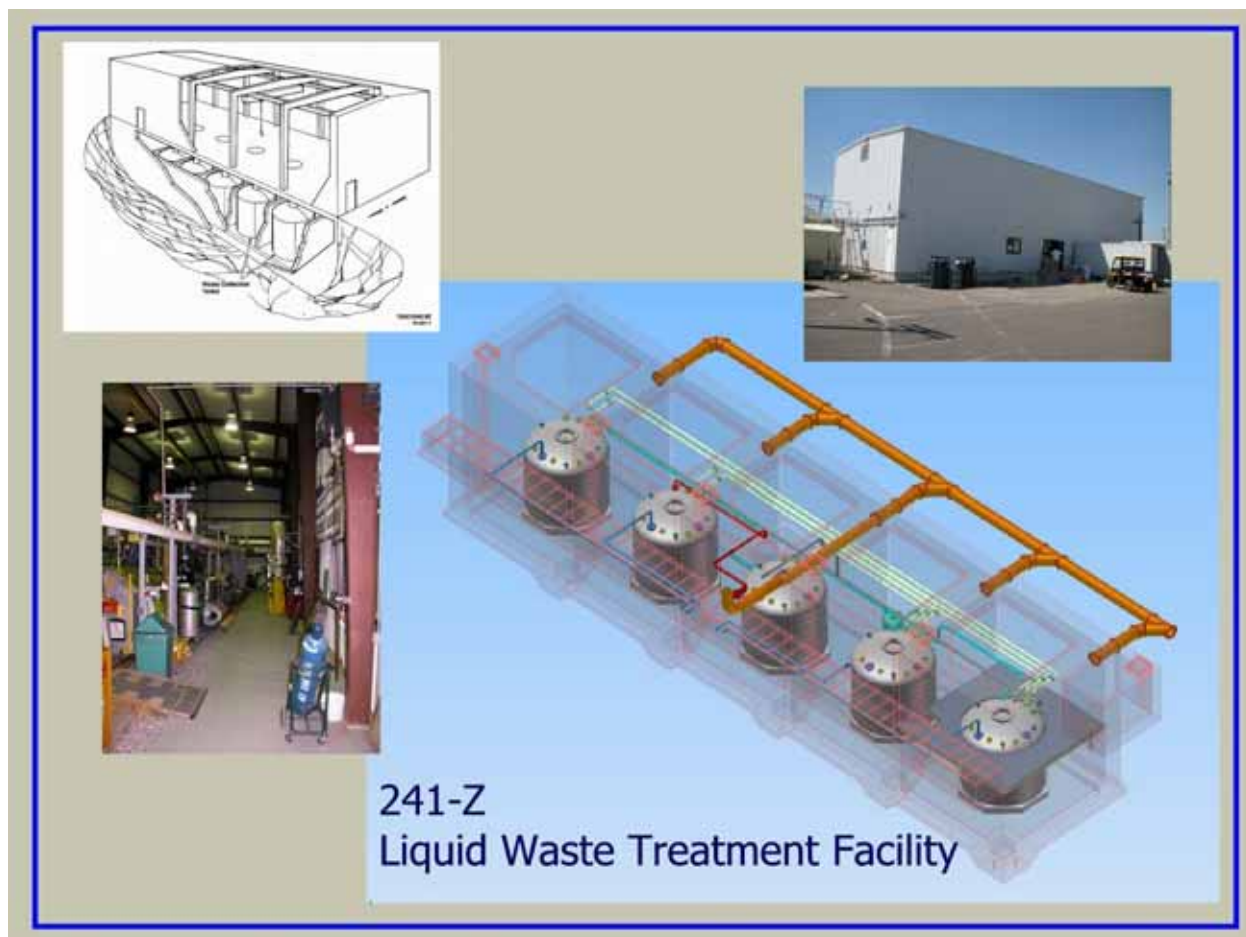


Figure 1 – Graphical overview of the 241-Z facility

PFM liquid waste was stored and treated at the 241-Z tank system before it was transferred to the double shell tanks (DST System) for storage until final disposition. Process leaks, tank overflows, and tank failures over the operating history of this facility have resulted in the below grade cells having high levels of alpha contamination. The below grade cells are a permitted confined space area. Additionally, the high contamination levels have historically required personnel to use supplied air respiratory protection to work in these areas.

The 241-Z RCRA-permitted TSD tank system consists of four of the five below grade waste tanks, the sample glovebox, and ancillary piping and equipment. The center tank, Tank D-6, is not RCRA permitted as it was taken out of service in 1972 and will be disposed under CERCLA. RCRA closure activities formally started in September of 2005 and were completed in September of 2006.

The RCRA closure and CERCLA decontamination and decommissioning (D&D) activities in the 241-Z facility to-date have been performed under very challenging conditions. The work is physically demanding in addition to requiring extreme rigor in the planning and execution due to the hazardous environment. The work team has to continually utilize contamination control techniques such as fixatives and directed air flow to manage the levels of airborne alpha

contamination. The work in the below grade tank cells was completed in February of 2007. Over 428 confined space entries into the below grade tank cells were made to size reduce and remove approximately 7,500 lbs. of process piping, access and manually clean the five large waste tanks, seal exterior wall penetrations, clean the cell floor and sumps, and permanently fix any remaining contamination on exposed surfaces.

RCRA constituents of concern (non-radioactive) for clean closure and the CERCLA cleanup actions have been physically worked at the same time. Due to the working conditions it was very important not to duplicate the work. The coordination of work activities for the cleanup and the understanding of the regulatory requirements and end states helped to achieve this goal.

There are two HFFACO milestones, one to complete RCRA closure of the 241-Z TSD unit and the other to complete transition and dismantlement of the 241-Z facility, both of which are due by September 30, 2011. RCRA closure activities of the 241-Z TSD unit were completed in September of 2006, ahead of the HFFACO milestone. Transition and dismantlement of the 241-Z facility is scheduled to be completed by September 2007. The above grade portion of the 241-Z facility is currently being addressed as part of the *Action Memorandum for the Plutonium Finishing Plant Above-Grade Structures Non-Time Critical Removal Action* [Ref. 3]. CERCLA actions for the 241-Z sub-grade are addressed in the *Engineering Evaluation/Cost Analysis for the Plutonium Finishing Plant Sub-Grade Structures and Installations* [Ref. 4]. The vault area, including remaining tanks and ancillary piping and equipment, are evaluated as part of these removal actions. The vault area and any remaining contents will also be subject to an eventual and future record of decision for the PFP complex area. A timeline for the 241-Z facility planned RCRA and CERCLA response actions is provided in Table 1.

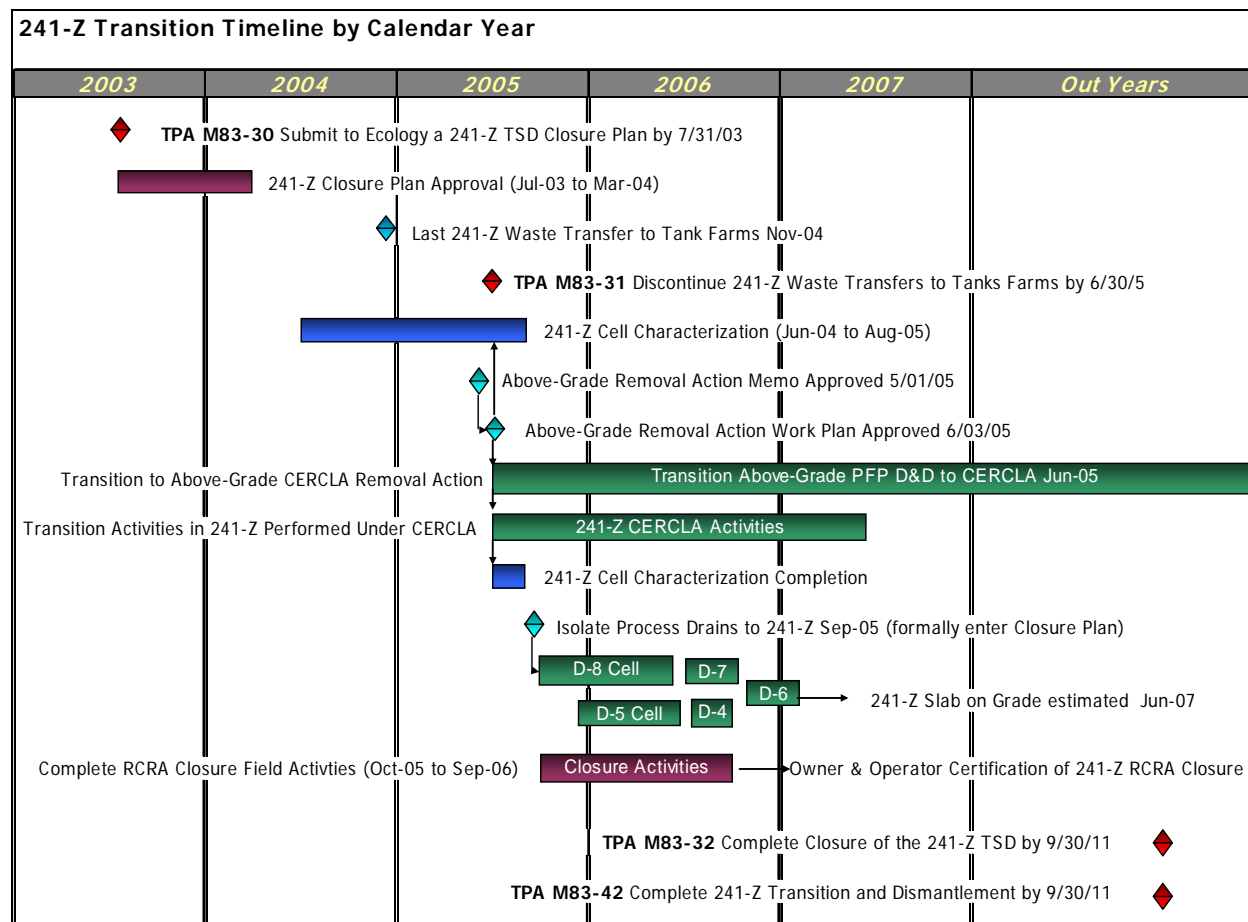


Table 1 – Timeline for 241-Z planned RCRA and CERCLA response actions

CERCLA/RCRA INTEGRATION

The 241-Z treatment and storage tanks were regulated under RCRA for all actions associated with the treatment of liquid wastes at the PFP. An operations plan dictated the manner in which the wastes were accepted, treated, sampled and analyzed and eventually transported to tank farms for further storage.

When the decision to close the tank system to further waste treatment was made, the RCRA closure plan was developed for the treatment and storage tanks, sample glovebox GB-2-241-ZA, and ancillary piping and equipment. Figure 2 shows a photograph during RCRA closure activities of the removal of the sample glovebox.

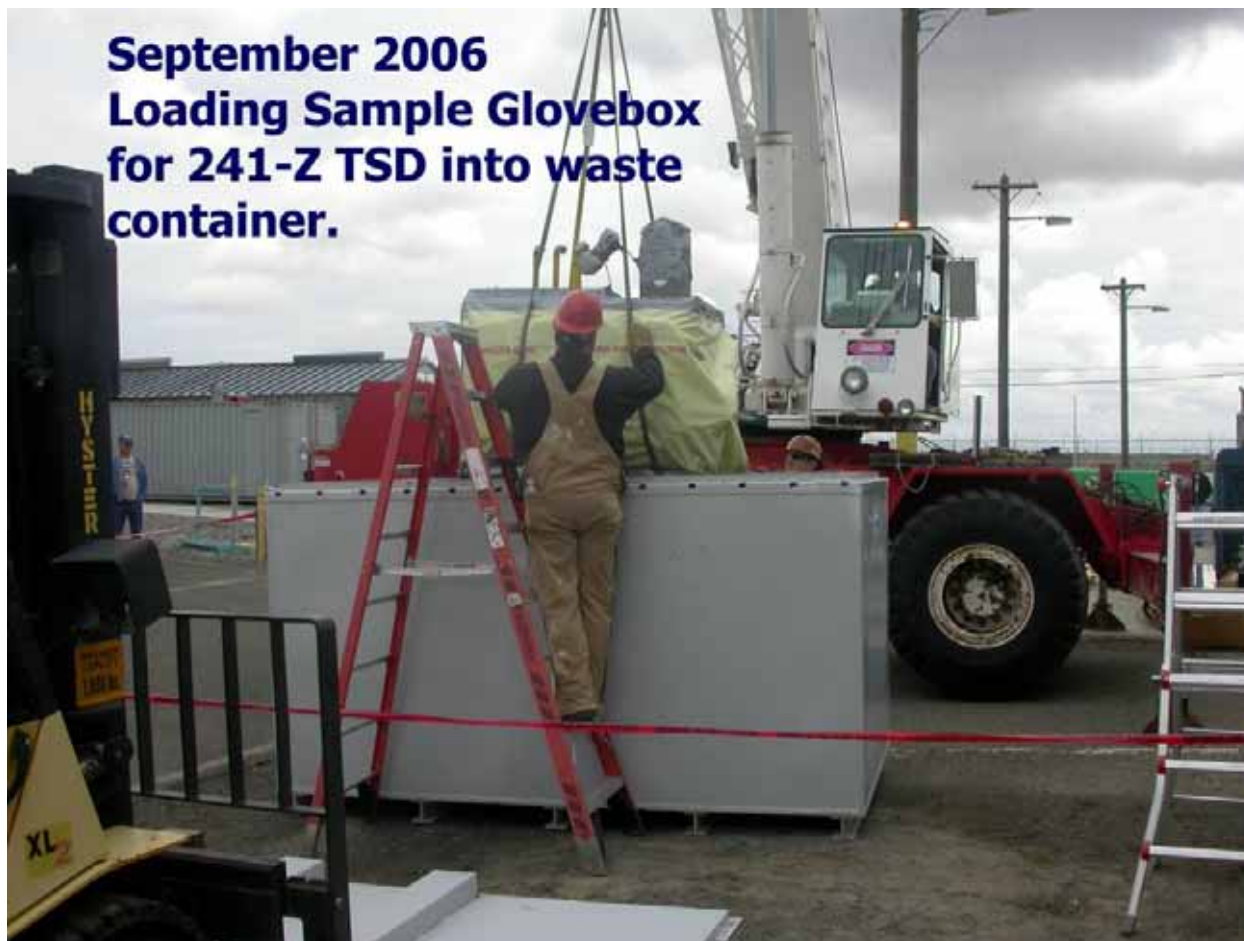


Figure 2- RCRA closure activities: removing sample glovebox

The remainder of the facility was scheduled to undergo deactivation and demolition under CERCLA. The above grade portions are undergoing D&D under the Action Memorandum for the PFP above grade structures.

When an individual waste management unit scoped within an EE/CA is regulated under RCRA, the analysis under the engineering evaluation integrates the requirements of RCRA with the proposed CERCLA removal action. This is applicable to the 241-Z tank system.

The 241-Z TSD unit closure plan provides the process for closing the RCRA Storage Facility Permit for the 241-Z tank system at PFP, and describes the process for the integration of the closure activities with CERCLA as appropriate. Under this closure plan, the 241-Z TSD unit is undergoing clean closure to the performance standards of the *Washington Administrative Code* (WAC), with respect to dangerous waste contamination from RCRA operations. Figure 3 shows a photograph during RCRA closure activities of workers cutting an access hole in a tank wall. Figure 4 shows photographs of a tank interior before and after tank cleaning.

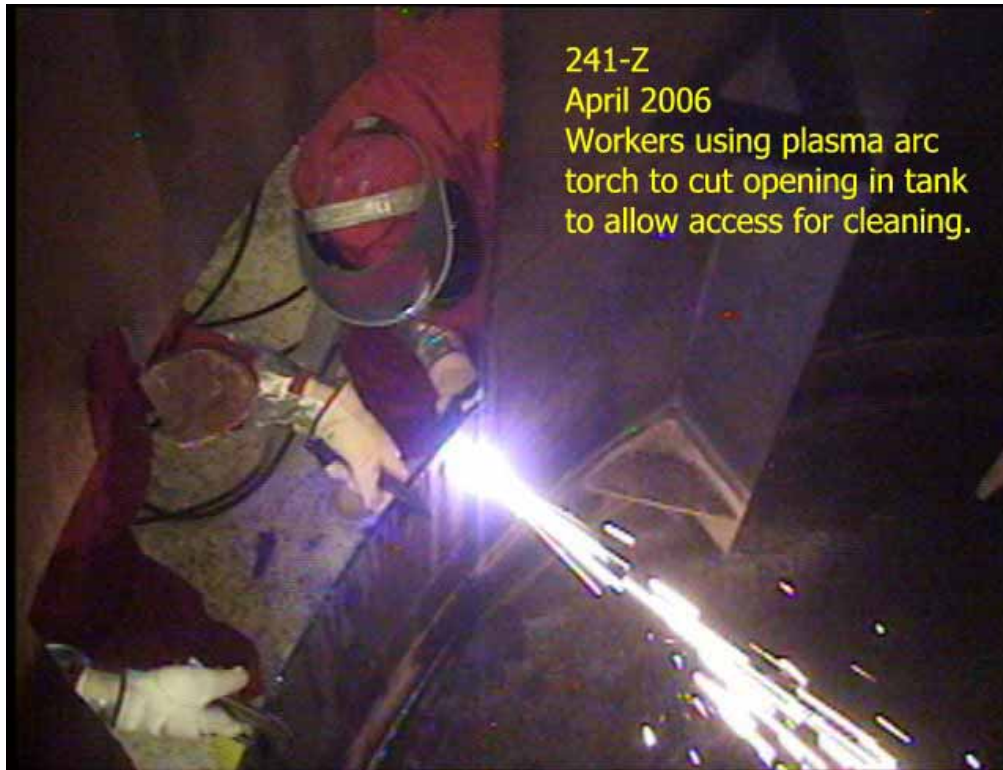


Figure 3- RCRA closure activities: cutting access hole in tank wall



Figure 4 - RCRA closure activities: cleaning tank interior

The PFP above grade structures action memorandum provides the authority for the completion of the non-time critical removal action that will result in the following:

- Removal of the non-radiological and radiological hazardous substances in the exposed portions of the facility including tank D-6
- The fixing of contamination
- The isolation of all systems
- The removal of the above-grade structures to grade level
- The sealing of all penetrations to prevent intrusion
- The demolition of remaining structure to grade
- The stabilization of the area
- The construction of a protective cover
- The periodic surveillance and maintenance activities to ensure stability of the remaining cover and structural stability of the vault area for 20 years

Remaining tanks, ancillary piping and other below-grade structures and installations have been evaluated for disposition under the PFP sub-grade structures and installations removal action. In addition, soils beneath the 241-Z vault that were contaminated during past-practice activities were also evaluated as part of the PFP engineering evaluation/cost analysis (EE/CA) for the sub-grade structures and installations in *An Estimate of the Leakage from the 241-Z Liquid Waste Treatment Facility* [Ref. 5].

Integration of RCRA and CERCLA activities is consistent with HFFACO Section 6.0 and the *Hanford Facility Resource Conservation and Recovery Act Permit* [Ref. 6], Section II.K.7, which encourages coordination of RCRA unit closure with other statutorily mandated cleanups to avoid duplication of effort, and with HFFACO Interim Milestone M-083-32, which reflects coordination of CERCLA actions(s) with 241-Z closure activities as needed.

CONCLUSION

The 241-Z RCRA closure plan provided the process for closing the RCRA Storage Facility Permit for the 241-Z tank system at PFP, and describes the process for the integration of the closure activities with CERCLA as appropriate. The above grade portions of the facility will be demolished under the CERCLA above grade action memorandum for PFP. The *Engineering Evaluation/Cost Analysis for the Plutonium Finishing Plant Sub-Grade Structures and Installations* evaluates CERCLA hazardous constituents remaining in the sub-grade piping and installation of the facility. These two CERCLA removal actions are interim actions. An anticipated final action to be conducted under a CERCLA Record of Decision (ROD) will complete the actions at 241-Z.

REFERENCES

1. Ecology, EPA, and DOE, 1989, *Hanford Federal Facility Agreement and Consent Order*, U.S. Environmental Protection, U.S. Department of Energy, Washington State Department of Ecology, Olympia, Washington.
2. DOE/RL-96-82, *Hanford Facility Dangerous Waste Closure Plan, 241-Z Treatment and Storage Tanks*, Rev. 1, 2004, U.S. Department of Energy, Richland Operations Office, Richland, Washington.
3. DOE/RL-2005-13, *Action Memorandum for the Plutonium Finishing Plant Above-Grade Structures Non-Time Critical Removal Action*, Rev. 0, 2005, U.S. Department of Energy, Richland Operations Office, Richland, Washington.
4. DOE/RL-2006-53, *Engineering Evaluation/Cost Analysis for the Plutonium Finishing Plant Sub-Grade Structures and Installations*, Rev. 0, 2006, U.S. Department of Energy, Richland Operations Office, Richland, Washington.
5. HNF-30654, *An Estimate of the Leakage from the 241-Z Liquid Waste Treatment Facility*, J. A. Teal, August 2006, Fluor Hanford, Richland, Washington.
6. WA7890008967, *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion*, as revised.