

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

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February 3, 2016

16-NWP-021

By certified mail

Ms. Stacy Charboneau, Manager
Richland Operations Office
United States Department of Energy
PO Box 550, MSIN: A7-50
Richland, Washington 99352

Mr. John A. Ciucci, President and CEO
CH2M HILL Plateau Remediation Company
PO Box 1600, MSIN: H7-30
Richland, Washington 99352

Re: Dangerous Waste Compliance Inspection on March 12, 2015 at the Hanford Site PUREX Plant and Storage Tunnels, Resource Conservation and Recovery Act (RCRA) Site ID: WA7890008967, Nuclear Waste Program (NWP) Compliance Index No. 15.517

Dear Ms. Charboneau and Mr. Ciucci:

Thank you for your staff's time during the Department of Ecology's (Ecology) compliance inspection. The purpose of our inspection was to determine compliance with the Washington State Dangerous Waste Regulations (Chapter 173-303 Washington Administrative Code), the Hanford Facility RCRA Permit, Dangerous Waste Portion, Revision 8C, and the *Hanford Federal Facility Agreement and Consent Order* (HFFACO), at the PUREX Plant and Storage Tunnels. The regulations, permit, and the HFFACO establish a system for safe and responsible management of dangerous waste.

Ecology's compliance report for the PUREX Plant and Storage Tunnels inspection is enclosed. This report cites five areas of non-compliance and five areas of concern. The five areas of non-compliance and the actions required for a return to compliance are listed in the Compliance Problems section of the report.

To return to compliance, complete the actions required and respond to Ecology within 60 days of receipt of the compliance report. Include all supporting documentation such as photographs, records, and statements explaining the actions taken and dates a return to compliance was completed. Submit the above paperwork along with any requested documentation, to me at 3100 Port of Benton Boulevard, Richland, Washington 99354.

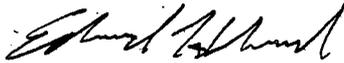
Failure to correct the deficiencies may result in an administrative order, a penalty, or both, as provided by the Hazardous Waste Management Act (Revised Code of Washington 70.105.080 and .095). Persons who fail to comply with any provision of this chapter are subject to penalties of up to \$10,000 per day per violation.

Ms. Charboneau and Mr. Ciucci
February 3, 2016
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16-NWP-021
PUREX Plant and Storage Tunnels
RCRA Site ID: WA7890008967
NWP Compliance Index No.: 15.517
Inspection Date: March 12, 2015

If you have questions or need further information, please contact me at (509) 372-7909 or edward.holbrook@ecy.wa.gov.

Sincerely,



Edward Holbrook
Dangerous Waste Compliance Inspector
Nuclear Waste Program

tkb

Enclosure

cc electronic w/enc:

Dave Bartus, EPA
Jack Boller, EPA
Dennis Faulk, EPA
Cliff Clark, USDOE
Michael Collins, USDOE
Tony McKarns, USDOE
Allison Wright, USDOE
Joel Williams, Jr., CHPRC
Jon Perry, MSA
Ken Niles, ODOE
Debra Alexander, Ecology
Kathy Conaway, Ecology
Suzanne Dahl, Ecology
Kelly Elsethagen, Ecology
Jane Hedges, Ecology
Edward Holbrook, Ecology
Jared Mathey, Ecology
John Price, Ecology
John Temple, Ecology
Stephanie Schleif, Ecology
Ron Skinnarland, Ecology
Environmental Portal
Hanford Facility Operating Record

cc w/enc:

Steve Hudson, HAB
Administrative Record
CHPRC Correspondence Control
NWP Compliance Index File: 15.517

cc w/o enc:

Rod Skeen, CTUIR
Gabriel Bohnee, NPT
Russell, Jim, YN
NWP Reader File

S-2-1

**Washington Department of Ecology
Nuclear Waste Program
Compliance Report**

Site: Plutonium-Uranium Extraction (PUREX) Plant & Storage Tunnels
RCRA Site ID: WA7890008967
Inspection Date: March 12, 2015
Site Contacts: Joel Williams Jr., CH2M Hill Plateau Remediation Company (CHPRC)
Tony McKarns, United States Department of Energy (USDOE)
Phone: (509) 376-4782, Joel Williams Jr.
FAX: (509) 372-2828, Joel Williams Jr.
Site Location: Hanford Site
At This Site Since: 1956 **NAICS#:** 56221, 924110, 54171
Current Site Status: Treatment, Storage, and Disposal (TSD) Facility
Operating Unit Group No. 2 and Closure Unit Group No. 25
Compliance Index #: 15.517

Ecology

Lead Contact: Edward Holbrook **Phone:** (509) 372-7909 **FAX:** (509) 372-7971
Other Representatives: Jared Mathey (Support Inspector) and John Temple (Project Support)
Report Date: February 3, 2016
Report By: Edward Holbrook


(Signed)

2/3/16
(Date)

Site Location

The Hanford Site was assigned a single United States Environmental Protection Agency (EPA) identification number, and is considered a single Resource Conservation and Recovery Act of 1976 (RCRA) facility, even though the Hanford Site contains numerous processing areas spread over a large geographic area. The Hanford Site is approximately a 586 square mile tract of land located in Benton County, Washington. It is divided into a number of dangerous waste management units (DWMUs) that are administratively organized into "unit groups." A unit group may contain only one DWMU or many. Currently, there are 37 unit groups at the Hanford Site. Individual DWMUs use only a few small portions of the Hanford Site. Additional descriptive information on the individual DWMUs is contained in unit group permit applications and in Parts III, V, and VI of the *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, WA78900008967, Revision 8C*, (hereafter referred to as the Permit).

Owner/Operator Information

The USDOE is the owner and operator of the PUREX Plant and Storage Tunnels and oversees waste management and cleanup activities ongoing at the Hanford Site. CHPRC is contracted by the USDOE to co-operate the PUREX Plant and Storage Tunnels.

Facility Background

The DWMUs for the PUREX Plant, which is also known as Closure Unit Group No. 25, are identified in the October 1, 2008, *Washington State Department of Ecology, PUREX Plant, Revision 12, Dangerous Waste Permit Application Part A Form (PUREX Plant Part A)*. The PUREX Storage Tunnels 1 & 2, which is also known as Operating Unit Group No. 2, are identified in the October 1, 2008, *Washington*

State Department of Ecology, PUREX Storage Tunnels, Revision 7, Dangerous Waste Permit Application Part A Form (PUREX Tunnels Part A). According to the PUREX Plant Part A, the canyon building (202-A) contains the majority of the DWMUs. The PUREX Plant does not have an approved Part B Permit Application.

Further information on the status of the PUREX Plant can be found in the *Hanford Federal Facility Agreement and Consent Order*, DOE/RL-89-10, as amended through December 16, 2015, also known as the Tri-Party Agreement (TPA). The TPA Action Plan, Section 8, Facility Disposition Process, describes PUREX as a "Tier 1" and "Key Facility." According to Section 8, PUREX follows a phased facility disposition process.

- 1) Transition
- 2) Surveillance and Maintenance (S&M)
- 3) Disposition

I observed in *Table 8-1 Status of "Key Facilities" as of March 2010*, "PUREX" under "Canyon Buildings," of the TPA Action Plan, Section 8, which states,

- Deactivated in accordance with PUREX/UO3 Deactivation Project Management Plan (WHC-SP-1011D) and PUREX Deactivation End Point Criteria (WHC-SD-TPP-053).
- S&M performed in accordance with S&M Plan for the PUREX Facility (DOE/RL-98-35).
- Final disposition to be addressed using CERCLA remedial action coordinated with RCRA closure. Completion schedules to be established with Remedial Investigation/Feasibility Study (RI/FS) Work Plans and Remedial Design/Remedial Action (RD/RA) Work Plans in accordance with Action Plan Section 11.6 (M-85 milestones) and closure conditions/schedules established in the Hanford Facility Dangerous Waste Permit.

The following is stated under the TPA Action Plan §8.1,

Notwithstanding any other provision of Section 8, EPA and Ecology reserve the right to require closure in accordance with Federal and State hazardous waste law, and the Agreement, and to require response or corrective actions in accordance with RCRA and CERCLA and the Agreement, at any time. During the facility disposition process, USDOE shall comply with all applicable environmental, safety and health, and security requirements.

The TPA Action Plan Appendix J, Central Plateau Facilities, identifies The Washington State Department of Ecology, Nuclear Waste Program (Ecology) as the lead regulatory agency for most of the buildings under the PUREX Geographic Area section. Ecology requirements for the PUREX Storage Tunnels are in Part III of the Permit.

The phased approach for decommissioning and demolition (D&D) of the PUREX Plant has the following Appendix D milestones:

- Milestone Number (M-085-00): Complete response actions for the canyon facilities and associated past practice waste sites, other Tier 1 Central Plateau facilities not covered by existing milestones, and Tier 2 Central Plateau facilities.

This includes B Plant, PUREX, and REDOX canyons and associated past practice waste sites in 200-CB-1, 200-CP-1, and 200-CR-1 Operating Units. The milestone does not include U Plant or T Plant canyons. The due date is "TBD" (to be determined).

- Milestone Number (M-085-01): Submit a change package to establish a date for major milestone M-085-00. The due date is currently September 30, 2022.
- Milestone Number (M-085-02): Submit a change package to establish a schedule for submittal of the RI/FS Work Plans for the 200-CB-1, 200-CP-1, and 200-CR-1 Operable Units and a schedule for submittal of the Removal Action Work Plans for 224B and 224T Plutonium Concentration Facilities. The due date is currently September 30, 2015. This milestone is associated with the TPA change request M-85-15-02, which is undergoing public comment ending January 15, 2016.

According to the *Surveillance and Maintenance Plan for the Plutonium-Uranium Extraction (PUREX) Facility DOE/RL-98-35, Revision 3*, dated January 10, 2008 (PUREX S&M Plan), construction of the PUREX Facility began in 1952. The facility began recovery of plutonium, uranium, and neptunium from irradiated fuel elements in 1956. The fuel came from the 100 N Reactor and other single-pass reactors on the Hanford Site. Between 1956 and 1992, the PUREX Plant progressed through a series of operating and stand-by statuses:

- Recovery Operation: 1956-1972
- Wet Stand-by Mode: 1972-1978
- Cold Start-up Tests and Resumed Operations: 1978-1983
- Recovery Operation: 1983-1988
- Transitioning to Cold Stand-by Mode: 1988-1992
- Cold Stand-by Mode: September 1992-December 1992

The Transition Phase was from December 1992 through 1998. The S&M Phase began in 1998 and is currently in effect.

The PUREX Plant and Storage Tunnels can be seen as three categorical systems.

- Tank Systems: 45 tanks and vessels as identified in the PUREX Plant Part A.
- Containment Building: Includes the canyon deck and F cell. According to the *Calendar Year 2013 Hanford Site Mixed Waste Land Disposal Restriction Summary Report, DOE/RL-2014-14, Revision 0*, Dated March 11, 2014 (2013 LDR Report), PUREX Plant currently stores one cubic meter of concrete debris contaminated with chromium.
- Storage Tunnels (Miscellaneous Unit): According to the PUREX Storage Tunnels Permit (Operating Unit Group No. 2), Tunnel 1 [Contains eight (8) railcars of mixed waste (MW)] and Tunnel 2 [Contains twenty eight (28) railcars of MW]. Cadmium and lead contaminated MW was removed from the containment building and stored in PUREX Storage Tunnel 2. Tunnel 1 has a storage capacity of 8 railcars and Tunnel 2 has a storage capacity of 40 railcars. According to the 2013 LDR Report, the Storage Tunnels are currently storing 2,800 cubic meters of MW.

The PUREX Plant (Tank Systems and Containment Building) and Storage Tunnels (Miscellaneous Unit) DWMUs are located in the following structures:

- 202-A: PUREX Canyon Building
- 203-A: Acid Pump House / Acid Storage and Handling Facility
- 204-A: U Cell / Acid Storage Vault
- 211-A: Bulk Cold Chemical Tank Farm
- 218-E-14: PUREX Storage Tunnel 1
- 218-E-15: PUREX Storage Tunnel 2
- 276-A: R Cell
- Aqueous Makeup Unit (AMU)

The last Ecology inspection of the PUREX Plant included numerous site meetings and field inspections between April 20th and May 6th of 1994. At the time of the inspection only a fraction of the 45 tanks and vessels systems were identified on the PUREX Plant Part A. The tank systems included TK-E5, TK-F15, TK-F16, TK-F18, TK-G7, TK-U3, and TK-U4. Also included was the Concentrator E-F11 and the containment building. The owner of the PUREX Plant in 1994 was USDOE and the operator was the Westinghouse Hanford Company (WHC). Refer to the compliance report's observations and findings (Compliance Index Number 94.042) for further information.

Inspection Summary

On March 10, 2015, Ecology notified USDOE and CHPRC that we would be conducting an inspection of the PUREX Plant and Storage Tunnels on March 12, 2015. The Washington State Hazardous Waste Management Act, Chapter 70.105, Revised Code of Washington (RCW), and the rules declared in Chapter 173-303 of the Washington Administrative Code (WAC), are the requirements for the management of dangerous waste (DW) in Washington State. The inspection was conducted to review USDOE's and CHPRC's compliance pursuant to:

- WAC 173-303-400, including those sections of the General TSD Facility Requirements (WAC 173-303-280 through WAC 173-303-395) incorporated by reference and the sections of 40 Code of Federal Regulation (CFR) Part 265 incorporated by reference.
- Hanford Federal Facility Agreement and Consent Order.
- *The Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, WA78900008967, Revision 8C.*

On March 12, 2015, I led the inspection while Mr. Mathey and Mr. Temple provided support. We arrived at building MO-294 at 9:30 a.m. where we proceeded to a conference room for introductions and a safety briefing. I provided an inspection briefing to the following attendees, regarding the field inspection, questions, and document review.

- Allison Wright, USDOE
- Wade Woolery, USDOE
- Brian Dixon, CHPRC
- Dan Turlington, CHPRC
- Darin Corriell, CHPRC
- Jennie Seaver, CHPRC
- Joel Williams, CHPRC

I requested an overview from USDOE and CHPRC regarding DW management activities at the PUREX Plant and Storage Tunnels. Mr. Corriell said the following regarding current S&M Phase activities. An annual surveillance is completed for the PUREX Plant and Storage Tunnels. The last annual surveillance occurred around August and September of 2014. Activities conducted can be found in the PUREX S&M Plan and the *Technical Procedure, Surveillance of PUREX Facility 2CP-SUR-A-04002 Revision 3, Change 8*, dated December 08, 2014 (PUREX Surveillance Procedure).

According to the PUREX Surveillance Procedure, 2CP-SUR-A-04002, the scope of the annual surveillance includes the "202-A building and exhaust system, Tunnel No. 1, and Tunnel No. 2." Details of routes taken by personnel and surveillance objectives are described in the procedure. Information regarding the annual surveillance, types of maintenance, and frequency are described in Sections 2 and 3 of the PUREX S&M Plan. Annual surveillance for the PUREX Storage Tunnels are to be conducted in accordance with the Permit Part III, Operating Unit Group (OUG)-2, Addendum I,

Inspection Requirements. Mr. Corriell said that CHPRC S&M personnel perform preventative maintenance on the ventilation and lighting systems for the PUREX Facility.

I asked about MW being accepted, volumes remaining, and types of MW in the PUREX Plant and Storage Tunnels. Mr. Dixon said the PUREX Plant and Storage Tunnels have not accepted MW since the S&M Phase began. Ms. Seaver said the tank systems were flushed but not closed through the RCRA closure process. She also said the containment building's description can be found in the PUREX Plant Part A, and the storage tunnels description can be found in the PUREX Storage Tunnels Part A.

I asked about the tank and vessel systems identified in the PUREX Plant Part A and the *PUREX Facility Preclosure Work Plan, DOE/RL-95-78, Revision 1*, dated April 1997 (PUREX Preclosure Work Plan). I explained that the PUREX Preclosure Work Plan lists 41 other tank and vessel systems that are not listed in the PUREX Plant Part A. Mr. Dixon said that there was a process used for identifying tanks and vessels that would be DWMUs, the details of which he would have to provide for me later. I asked how many DWMUs are above ground tanks and vessels located outside of the canyon building. Mr. Dixon said TK-40 and TK-P4 are identified in the PUREX Plant Part A.

Note: Transition Phase documents describe how tank and vessel systems were identified as DWMUs.

I asked about dangerous waste closure plans including schedules for the PUREX Plant and Storage Tunnels. Mr. Dixon said the PUREX Preclosure Work Plan provides the basis for when a closure plan will be submitted, in accordance with the TPA Action Plan, Section 8. He said the closure plan for the PUREX Storage Tunnels is located in the Permit, Part III, Chapter 11, Closure and Financial Assurance.

I asked about DW generator activities taking place at the PUREX Plant and Storage Tunnels. Mr. Corriell said, he believes that light bulbs have been changed out, generating universal waste (UW). Mr. Dixon said there is one satellite accumulation area (SAA) for the accumulation of used "draeger air sampling tubes."

I asked about security for the PUREX Plant and Storage Tunnels, in regards to entry control and signage. Mr. Corriell said that a fence surrounds the PUREX Complex with signs attached to the fence. He also said Hanford Patrol, patrols the exterior of the PUREX Complex. I asked if the fence line surrounds the PUREX Storage Tunnels, and Mr. Williams said the tunnels extend out pass the fence line. Before the inspection, I observed in the PUREX Storage Tunnels Part A, the diagram of Storage Tunnel 2 extending pass the security fence line.

I asked if there were other types or frequencies for surveillance and maintenance other than the annual surveillance. Mr. Corriell said S&M personnel check on the ventilation system and the main stack. Mr. Turlington said roof inspections are conducted every five years, unless an integrity issue is identified.

I asked about the training program, the training plan, and requested training records of a Nuclear Chemical Officer (NCO), Field Work Supervisor (FWS), Environmental Compliance Officer (ECO), and a Building Emergency Director (BED). Mr. Dixon said he is the functional manager and directs the training program, and Ms. Seaver is the technical authority. Mr. Corriell said personnel for the PUREX Plant and Storage Tunnels use the same training plan.

I asked about the facility's contingency plans, emergency procedures, and emergency preparedness. Mr. Dixon said the PUREX Plant uses the *Building Emergency Plan for Surveillance & Maintenance, HNF-IP-0263-CP Revision 16*, dated February 5, 2015 (S&M BEP), and the PUREX Storage Tunnels use *Addendum J, Contingency Plan* in the Permit. When I asked about spills or releases within the last three years, he said there have been no releases of DW or MW within the last three years, which

implemented the S&M BEP or Contingency Plan. Mr. Mathey asked who the current BED on duty was for the PUREX Plant and Storage Tunnels. Mr. Corriell said there are five BEDs on rotation. Mr. Dixon said the BED is responsible for PUREX, B Plant, REDOX, U Plant, and the 400 Area. I requested and observed the list of names and contact information for the five BEDs. Mr. Corriell pointed to the name of the BED on duty, Dan Wierczorkowski, for the PUREX Plant and Storage Tunnels during the inspection.

At approximately 1:00 p.m. the Ecology inspection team, USDOE and CHPRC personnel arrived at the North side gate for a field inspection of the PUREX Plant and Storage Tunnels. Mr. Stevens, CHPRC Design Authority Engineer, joined us for the field inspection.

We walked to the Tank TK-40, which according to the PUREX Plant Part A, Tank TK-40 is a part of 211-A. The PUREX S&M Plan describes 211-A as the Bulk Cold Chemical Tank Farm. The PUREX Preclosure Work Plan states,

Following the completion of all vessel system flushing, the liquid level in the vessels will be left at the lowest level possible (the residual heels vary between approximately 70 and 400 liters) using existing jets and/or pumps.

I didn't observe a current DW or MW inventory for individual tank or vessel systems in the PUREX Preclosure Work Plan, PUREX S&M Plan, or the PUREX Plant Part A. The statement above from the PUREX Preclosure Work Plan appears to address all tank and vessel systems in the PUREX Plant.

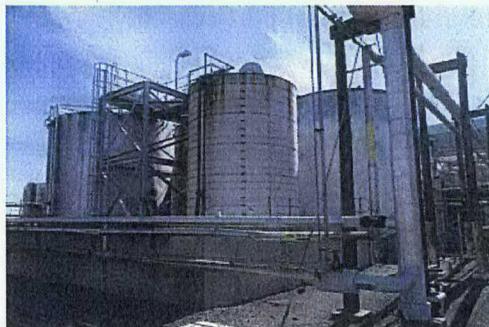


Photo 1: 211-A Bulk Cold Chemical Tank Farm (North of 202-A)

We walked to the Tank TK-P4, which according to the PUREX Plant Part A, Tank TK-P4 is a part of 203-A. In the PUREX S&M Plan 203-A is described as the Acid Pump House/Acid Storage and Handling Facility.



Photo 2: 203-A Acid Pump House/Acid Storage and Handling Facility (North of 202-A)

We walked by the Aqueous Makeup Unit (AMU) and then to R-Cell on the Northwest corner of the 202-A canyon building. According to the PUREX Plant Part A, Tanks TK-R1, TK-R2, TK-R7, and Tower T-R2 are located in R-Cell. In the PUREX S&M Plan, R-Cell is also known as 276-A.



Photo 3: 276-A R-Cell (Northwest side, adjacent to 202-A)



Photo 4: Aqueous Makeup Unit (Northside of 202-A)

We walked around the West side of R-Cell and I observed the South side of the 202-A canyon building. According to the PUREX Plant Part A, the containment building and 37 tank and vessel systems are located in the 202-A canyon building cells (D, E, F, G, H, J, K, L, M, and Q), canyon deck, and AMU. In the PUREX S&M Plan, 202-A is described as the PUREX Canyon Building. The 2013 LDR Report describes the containment building as storing one cubic meter of MW.

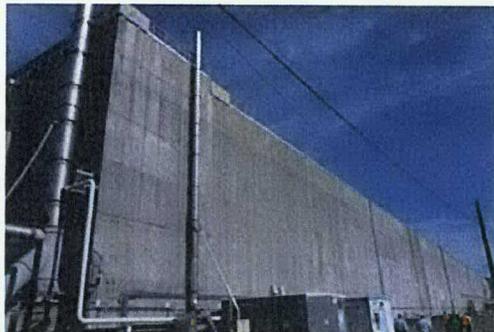


Photo 5: Southwest corner of the 202-A Canyon Building

We walked to the SAA in the 221-A Storage Building, South of 202-A. I observed two plastic containers with one container labelled as "Hazardous Waste" and marked "Corrosive/Toxic," and the other labelled as "Washington State DW" with the waste code "WSC2." I observed that both containers appeared to be closed and in good condition.



Photo 6: 221-A SAA (South of 202-A)



Photo 7: 221-A SAA Air Sampling Tube (South of 202-A)

We walked to our next location, where I saw the PUREX Plant ventilation system. The PUREX S&M Plan states, "The major portions of the 202-A Building ventilation system that remain active are deep-

bed Filter No.2, portions of the No.4 Filter bank (291-A-1 stack HEPA filters in the 291-AE Building), 291-A Building electric exhaust fans, air tunnels, 292-AB building, and sampling instrumentation.” I observed the HEPA filters in 291-AE, the outside of 291-A, the 291-A-1 stack and the Surveillance, Monitoring, and Control System (SAMCONS) Instrument and Control Unit in Building 217-A.

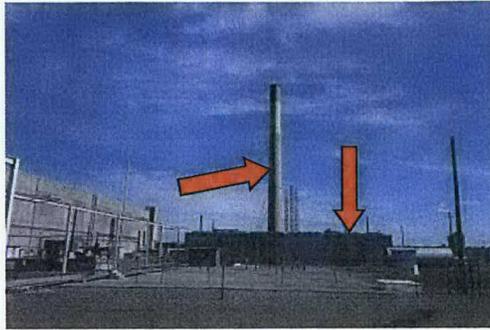


Photo 7: 291-AE in front and 291-A-1 Stack in back (South of 202-A)

We walked to our next location, where I saw the PUREX Storage Tunnels. According to the PUREX Storage Tunnels Part A, Tunnel 1 (218-E-14) has 8 modified railroad cars, which were placed in the tunnel between 1960 and 1965. The PUREX Storage Tunnels Part A also indicates that Tunnel 2 (218-E-15) started receiving railcars in 1967 and as of 2000, Tunnel 2 had 28 modified railroad cars.



Photo 8: Tunnel 1 front and center, Tunnel 2 on the Right.

We walked to U-Cell, which according to the PUREX Plant Part A, Tanks TK-U3 and TK-U4 are located in U-Cell. In the PUREX S&M Plan U-Cell is also known as 204-A Acid Storage Vault. U-Cell was not visible from our location, but it is situated behind the concrete structure identified below, adjacent to the 202-A Canyon Building.



Photo 9: U Cell / Acid Storage Vault (Northwest side, adjacent to 202-A)

Before meeting back at the MO-294 conference room, Mr. Williams escorted us by vehicle to the South end of the PUREX Storage Tunnel 2. We drove along the road next to Storage Tunnel 2, first traveling

North on the East side of the tunnel, then returning to the South end. We then drove North on the West side of the tunnel, until we came to the fence line for the PUREX Complex. I observed approximately two thirds of Storage Tunnel 2 located outside of the fence line that surrounds the PUREX Plant, Storage Tunnel 1 and the North end of Storage Tunnel 2.



Photo 10 & 11: Shutdown Exhaust System (South end of PUREX Storage Tunnel 2)

At approximately 2:20 p.m. we ended the field inspection and returned to the MO-294 conference room. I asked Mr. Wierzorkowski, questions regarding the spill response capabilities of the S&M Program, emergency response personnel, and emergency procedures followed during an emergency event. Mr. Wierzorkowski, showed us the portable emergency equipment and explained the following:

The “BED Rig” is a mobile alternate Incident Command Post (ICP) and building MO-294 is the primary ICP for facilities covered by the S&M BEP. He said depending on the work being performed, the BED Rig would accompany S&M personnel when visiting S&M facilities. He said the BED Rig would accompany personnel on annual S&M inspections, since contaminated areas would be accessed.



Photo 12 & 13: Emergency Equipment (Southeast corner in MO-294) and the “BED Rig” (South parking lot for MO-294)

After speaking with Mr. Wierzorkowski and observing the contents of the BED Rig, we walked back to the conference room in MO-294, where I conducted an out-briefing. The inspection ended at 2:42 p.m.

Document Review

S&M BEP / Permit, Part III, OUG-2 Addendum J, Contingency Plan (Contingency Plan)–

According to the S&M BEP, the B Plant Complex, REDOX Complex, PUREX Complex, 224-B, 224-T, 242-B/BL, 291-U Sand Filter, MO-294 and less than 90-day accumulation area(s) are addressed in the plan. The PUREX Storage Tunnels are addressed in the Addendum J, Contingency Plan.

I observed that the S&M BEP was missing evacuation routes or alternative evacuation routes for the PUREX Plant. I observed the Addendum J, Contingency Plan has evacuation routes in Figure J.1 for the storage tunnels.

I observed S&M BEP, Section 3, states that during off-hours, the BED on call list is distributed by "Emergency Preparedness." The S&M BEP doesn't clearly identify who or what "Emergency Preparedness" is, how to contact them, or how they distribute the list. §3.1 states that a list of BEDs by title, work location, and work number is in Section 13. I observed the table in Section 13, had columns for title as "Facility Operations," location as "MO294 / 200E," and work number as "(509) 373-1355."

The PUREX Storage Tunnels Contingency Plan makes no mention of "Emergency Preparedness" distributing lists of BEDs. The Contingency Plan does designate "373-1355" as the number to call for the "Primary" BED. Both the S&M BEP and Contingency Plan refer to "373-3800" to contact the BED.

I observed in the S&M BEP, §5.3, Dangerous/Mixed Waste, that the < 90 day accumulation areas and SAAs may be set up, and the list of locations are maintained by the ECO.

I reviewed the emergency equipment sections of the S&M BEP and the Contingency Plan. I observed that the S&M BEP does not identify the types of fire extinguishers. Also the location of the "S&M project off-road vehicles" is not described, only that the vehicles are listed as a "location." I observed that the BEP did not include a list of equipment for the "emergency response kits." The location of the emergency response kit is described as "MO-294; 2269E; FFTF." The §9.2, Portable Emergency Equipment, does not what equipment is in the kits for the "BED Rig" or "S&M project off-road vehicle." The location of the spill kit equipment is described as, "Located as needed with each active < 90 Day Waste Storage Area or Satellite Accumulation Area." I observed that the BEP did not include a description of equipment for the "spill kit." I observed some equipment is described as located in the PUREX Plant. For example, the "Anti Cs" at the "Guard Shack; Emergency Response Kits," which is used "for radiological contamination protection."

I observed that the Contingency Plan does not provide a list of emergency equipment or location for the PUREX Storage Tunnels. For emergency equipment, the plan states,

Because personnel only enter the storage tunnels during material placement operations, no permanent emergency equipment, communications equipment, warning systems, personal protective equipment, or spill control and containment supplies are located in the tunnels.

During storage tunnel operations or an emergency response event, personnel use portable emergency equipment, which could include heavy equipment and cranes (Section J.3.2). Also, for such operations, work plans are followed and pre-job safety meetings take place.

The Contingency Plan, Section J.3.2, states, "Should the fire continue to spread, heavy equipment and cranes will be called to the scene to cover areas of the tunnels that might collapse." The list of heavy equipment and cranes, location, physical description, and capabilities are not included.

DW Training Plan and Training Records – Mr. Mathey reviewed the personnel training records of Tim R. Malley – NCO, Daniel V. Wierczorkowski – BED, David L. Gray – FWS, and Daniel R. Turlington – ECO on March 12, 2015.

After his review, Mr. Mathey said that the required training for the personnel above had appeared to be completed in accordance with the *Central Plateau Project Surveillance and Maintenance Dangerous Waste Training Plan, PRC-STD-TQ-40236, Revision 1, Change 2*, dated May 7, 2013 (S&M DWTP).

The S&M DWTP's scope addresses the following facilities:

- PUREX Storage Tunnels
- B Plant Complex
- PUREX Plant
- 241-CX Tank System
- Hexone Storage and Treatment Facility
- 400 Area Waste Management Unit

- 216-A-29 Ditch
- 216-A-36B Crib
- 216-A-37-1 Crib
- 216-B-3 Pond/216-B-3-3 Ditch
- 216-B-63 Trench
- 216-S-10 Pond & Ditch
- Non-Radioactive DW Landfill

The S&M DWTP lists the following titles and positions:

- Non-Hanford Facility Personnel
- Hanford Facility Personnel not assigned waste management duties
- Non-resident Oversight personnel
- Maintenance Crafts
- Radiological Control Technician
- Building Emergency Director
- Nuclear Chemical Operator
- Stationary Operating Engineer
- D&D Worker
- Operations Manager
- Field Work Supervisor
- Environmental Compliance Officer
- Waste Service Provider
- Sampler

The Permit, Part III, OUG-2, Addendum G, Personnel Training lists the following titles and positions:

- Nuclear Chemical Operator
- D&D worker
- Operations Manager
- Field Work Supervisor
- Environmental Compliance Officer
- Building Emergency Director

End Point Document Review – The *PUREX Deactivation End Point Criteria, WHC-SD-WM-TPP-053, Revision 1* (PUREX End Point Document) was released August 23, 1995.

I observed that the end point criteria make no specific reference to WAC 173-303-400 requirements for interim status standards or closure of the DWMUs. The Introduction in Section III states,

For each facility, the overall objective of transition is to achieve a safe, stable and environmentally sound condition, suitable for an extended period, as quickly and economically as possible. Once transitioned, the facility is kept in its stable condition by means of a methodical surveillance and maintenance (S&M) program, pending ultimate disposition.

I observed the following under Section II, Background,

A large volume of process and flush solutions remained in the PUREX plant during standby in preparation for continued operations. These solutions could not be disposed of within 90-days of the letter from USDOE ordering that the plant be transitioned, so the solutions became waste. Several of the main facility transition activities involve disposing these solutions. Extensive discussions were conducted with Ecology, EPA and DOH about permitting, emptying, flushing and sampling the PUREX vessels containing these solutions in a cost effective manner while maintaining the goals of environmental protection, especially waste minimization.

Many of the vessels containing the process and flush solutions from standby cannot be completely emptied since solutions are removed from the top using turbine pumps or jets, leaving a solution heel ranging from several liters to several hundred liters. Discussions were conducted to determine to what extent the vessels would be flushed. These discussions were conducted using a process referred to as Data Quality Objectives and are documented in "Data Quality Objectives for PUREX

Deactivation Flushing" (WHC-SD-EN-TI-283). The document also discusses sampling and analytical methodology to be used during vessel flushing activities.

Discussions were held with Ecology and EPA to discuss PUREX transition and the individual deactivation activities. Milestones have been incorporated into the TPA after the public and other interested groups were given the opportunity to review and comment on them. The milestones cover a broad range of transition activities from preparing documentation to removing the process and flush solutions from the plant.

The End Point Principles under Section IV of the PUREX End Point Document, states the following.

It is not known when or what the ultimate facility disposition will be. Therefore, end point decisions should not be driven by dispositioning presumptions. This does not preclude insightful decisions being made to prevent hinderance during the final dispositioning process.

The PUREX End Point Document describes objectives and Task Area (TA) definitions that appear to make no specific reference to interim status standards or closure requirements for the PUREX Plant and Storage Tunnel DWMUs. The objectives and TA definitions are in Section V, End Point Methodology.

Objectives:

- Protecting the public and the environment.
- Facilitating S&M.
- Facilitating the ultimate D&D work.
- Complying with regulations and requirements.
- Following through on commitments to stakeholders.

Task Areas:

- TA-1 Hazards
- TA-2 Radiation Fields
- TA-3 Contamination
- TA-4 Waste
- TA-5 Isolate and Contain
- TA-6 Monitor and Control
- TA-7 Refurbish or Install
- TA-8 Document and Label

The PUREX End Point Document provides criteria to complete individual end point actions. These action criteria are subsets to the TAs and are assigned to individual building sections. The description for completing and verifying actions, starts with the operators presenting the action and supporting documentation to the "Transition Administration." Upon completion of an end point, a WHC field representative would initial complete on the field copy of the PUREX End Point Document. A Bechtel Hanford Inc. (BHI) field representative would then verify acceptable completion of the same action. Verification included a possible review of documents, letters, photos, work packages, work plans, or visually. When all the end points actions for a section of the facility had been completed and verified, designated WHC and BHI management would sign for completion and acceptance end points actions.

The following information from the PUREX End Point Document are the listed building sections which appear to be associated with the DWMUs.

Case 1 for Internal Spaces, Routine Access Required

- Q-Cell AMU

Case 2 for Internal Spaces, No Access Expected

- 203-A Control Room & Pump House
- 211-A
- Canyon
- Canyon F-Cell Deck Access Airlock
- M-Cell
- M-Cell Pipe Chase
- M-Cell Vault
- Q-Cell Vault Room
- R-Cell
- U-Cell

Case 3 for External Spaces, Including Building Exterior Envelopes

- 202-A Facility Exterior
- 202-A Pump & Trap Pits
- 203-A Diked Area
- 203-A Truck Pad
- 211-A Exterior
- R-Cell Exterior

Case 4 for Systems – Operational

- 202-A Ventilation
- Canyon Lighting
- Q-Cell Lighting
- R-Cell Lighting

Case 6 for Systems, Abandoned in Place

- 202-A Pump & Trap Pits Equipment
- 203-A Control Room & Pump House Equipment
- 203-A Truck Pad Piping
- 203-A Vessels
- 211-A Vessels
- 211-A Exterior Piping
- Canyon F11 System Vessels
- Canyon G & R Cell Vessels
- Canyon Headend Vessels
- Canyon K-Cell Vessels
- Canyon L-Cell Vessels
- Canyon Vessels Tks-D5, E6, F15 & F16
- M-Cell Pipe Chase Vessels
- M-Cell Vault Vessels
- M-Cell Vessels
- Q-Cell Lead-out Vessels
- Q-Cell Vault Vessels
- Q-Cell Vessels
- R-Cell Equipment
- U-Cell Equipment
- U-Cell Support Vessels
- U-Cell Vessels

Below are end point actions to be completed for cases 1-4 and 6, listed above. I have documented below, only actions with the objective "comply with regulations and requirements" for cases 1-4 and 6.

- TA-1: Fire protection and detection will be determined in the Fire Hazard Analysis.
- TA-1: Document compliance with the "Hazardous Communication Program" as defined in WHC-CM-4-40, Industrial Hygiene Manual for inclusion in the turnover package.
- TA-1: Document compliance with the "Asbestos Control Program" as defined in WHC-CM-4-40 for inclusion in the turnover package.
- TA-1: Document compliance with "Confined Space Entry" in accordance with WHC-CM-4-40 for inclusion in the turnover package.
- TA-2: Remove temporary radiological zones.

- TA-2: Post radiological conditions in accordance with the Hanford Site Radiological Control Manual (HSRCM)-1.
- TA-3: Post radiological conditions in accordance with HSRCM- 1.
- TA-4: Remove emergency lantern batteries and fire extinguishers.
- TA-4: Remove and dispose of radioactive, DW, and MW in accordance with approved waste handling procedures.
- TA-4: Identify accumulation areas for waste generated by operational systems and include in the turnover package (i.e. general waste awaiting characterization and designation).
- TA-5: Ensure engineered barriers and seals are in place to prevent migration of both hazardous and radioactive contamination to the environment.
- TA-6: The environmental monitoring program (area ambient air samplers) will continue to comply with defined guidance and requirements. This item is supplied for information only as it is outside the control of the PUREX facility.
- TA-6: Deactivate sump monitoring since fluid sources (water and steam) will be isolated from the facility.
- TA-6: Define system calibration and preventive maintenance requirements.
- TA-6: Define system discharge monitoring and instrumentation requirements.
- TA-7: Newly installed electrical distribution will be in accordance with National Electric Code requirements.
- TA-8: Document space and associated system(s) dose rates and contamination levels in the final radiological survey report and map per HSRCM-1 for inclusion in the turnover package.
- TA-8: Define instrumentation reading frequency for inclusion in the turnover package.
- TA-8: Document amount and location of remaining hazardous substances and DW.

For complete details of objectives and TAs for case 1-4 and 6, refer to the PUREX End Point Document.

TA-1 actions listed above, refer to "WHC-CM-4-40, Industrial Hygiene Manual" and Fire Hazard Analysis criteria for completion. TA-2 and TA-3 actions listed above, refer to the "Hanford Site Radiological Control Manual" criteria for completion. TA-4 actions listed above, refer to an unspecified "Waste Handling Procedures" for removal and disposal criteria and make no mention of removal and disposition criteria in accordance with a closure plan. TA-5 actions listed above, refer to the "Meet Commitment to Stakeholders" objective under the same case section and provided no specific instructions, other than to "Ensure engineered barriers/seals are in place to prevent migration of both hazardous and radioactive contamination to the environment." TA-6 actions listed above, refer to an unspecified guidance and requirements for calibration, preventative maintenance, and monitoring. TA-7 actions listed above, refer to the National Electric Code Requirements. TA-8 actions listed above, refer to the "Hanford Site Radiological Control Manual" and the general instruction to document the amount and location of remaining hazardous substances and DW; also defining the frequency of instrumentation reading for TA action completion. I observed that the PUREX End Point Document does not appear to address all of the interim status standards or closure requirements for the DWMUs.

The PUREX End Point Document contains checklists that are divided into a hierarchy of cases, buildings, and sections. Each checklist contains objectives, TAs, and end point criteria and actions. Each criteria and action has a section labeled "EP Closure," which provides signature blocks for the

WHC and BHI representatives, a date block, and "Ref" block. I observed no indication that the WHC or BHI representatives are Independent Qualified Registered Professional Engineers. I observed no checklists with signatures, dates, or "Refs" written in.

Task Area (TA-4): Waste							
Objective	End Point					EP Closure	
Comply with Regulations & Requirements	*	See - Meet Commitments to Stakeholders					
Meet Commitments to Stakeholders	A	Flush/drain chemical addition piping to minimize the residual material using existing equipment configuration. Verify end points, as defined in the Vessel Listing Table, for the following vessels have been met.					WHC _____ BHI _____
		Tk-G1	T-G2	Tk-G2	Tk-G5	Tk-G6	Date _____
		Tk-G7	Tk-G8	Tk-R1	T-R2	Tk-R2	Ref: _____
		Tk-R5	Tk-R6	Tk-R7	Tk-R8		

Excerpt 1: PUREX End Point Document, From Page 446 of 984

The end point criteria and actions refer to the "Vessel Listing Table" for vessels and tanks systems, which includes DWMUs. The table includes the vessel identification, cell, location, end point, comment, and TPA related titled columns.

PUREX END POINT CRITERIA
 Attachment
 Vessel Listing Table

WHC-SD-WM-TFP-053
 Rev. 1

VESSEL ID	CELL	LOCATION	END POINT	COMMENT	TPA RELATED
TK-G7	G	Canyon	Meet RCRA Sample Requirements Empty	Part A Permit	M-90-06
TK-G8	G	Canyon	Meet RCRA Sample Requirements Empty	Part A Permit	M-90-06

Excerpt 2: PUREX End Point Document, Vessel Listing Table

It is unclear if the TA criteria and actions defined in the "Vessel Listing Table" were completed since the PUREX End Point Document checklists were left blank on the copies provided to me.

PUREX Facility Preclosure Work Plan- I reviewed the *PUREX Facility Preclosure Work Plan DOE/RL-95-78, Revision 1*, dated April 1997.

I observed the following about the "PUREX Facility" in Section 1, Introduction.

For purposes of this documentation, the PUREX Facility does not include the PUREX Storage Tunnels (DOE/RL-90/24). Information concerning solid waste management units is discussed in the Hanford Facility Dangerous Waste Permit Application, General Information Portion (DOE/RL-91-28, 11 Appendix 2D).

There are 10 treatment and/or storage vessel systems and 35 storage vessel systems addressed in this preclosure work plan [refer to Part A (DOE/RL-88-21)].

This phased approach to closure allows for an expedient full deactivation of the PUREX Facility in a manner that is safe and cost effective, while minimizing the risk to human health and the environment, per WAC 173-303-610(2).

For more information on the PUREX Storage Tunnels, refer to the Hanford Facility Resource Conservation and Recovery Act (RCRA) Permit, Dangerous Waste Portion Revision 8C Part III, includes OUG-2, PUREX Storage Tunnels. I observed that the Permit addenda includes the Permit

Conditions, Part A Form, Process Information, Waste Analysis Plan, Inspection Requirements, Personnel Training, Security, Preparedness and Prevention, Contingency Plan, and Closure Plan.

Currently the “10 treatment and/or storage vessel systems and 35 storage vessel systems” that are addressed in the PUREX Preclosure Work Plan are the same tank and vessel systems identified in the PUREX Plant Part A for Closure Unit Group 25.

As stated in the PUREX Preclosure Work Plan, the phased approach is based upon the closure requirements per WAC 173-303-610(2), which states the following.

- (2) *Closure performance standard. The owner or operator must close the facility in a manner that:*
- (a)(i) *Minimizes the need for further maintenance;*
 - (ii) *Controls, minimizes or eliminates to the extent necessary to protect human health and the environment, post-closure escape of dangerous waste, dangerous constituents, leachate, contaminated runoff, or dangerous waste decomposition products to the ground, surface water, groundwater, or the atmosphere; and*
 - (iii) *Returns the land to the appearance and use of surrounding land areas to the degree possible given the nature of the previous dangerous waste activity.*
- (b) *Where the closure requirements of this section, or of WAC 173-303-630(10), 173-303-640(8), 173-303-650(6), 173-303-655(6), 173-303-655(8), 173-303-660(9), 173-303-665(6), 173-303-670(8), 173-303-680 (2) through (4), or 40 C.F.R. 264.1102 (incorporated by reference at WAC 173-303-695) call for the removal or decontamination of dangerous wastes, waste residues, or equipment, bases, liners, soils or other materials containing or contaminated with dangerous wastes or waste residue, then such removal or decontamination must assure that the levels of dangerous waste or dangerous waste constituents or residues do not exceed:*
- (i) *For soils, groundwater, surface water, and air, the numeric cleanup levels calculated using unrestricted use exposure assumptions according to the Model Toxics Control Act Regulations, chapter 173-340 WAC as of the effective date or hereafter amended. Primarily, these will be numeric cleanup levels calculated according to MTCA Method B, although MTCA Method A may be used as appropriate, see WAC 173-340-700 through 173-340-760, excluding WAC 173-340-745; and*
 - (ii) *For all structures, equipment, bases, liners, etc., clean closure standards will be set by the department on a case-by-case basis in accordance with the closure performance standards of WAC 173-303-610 (2)(a)(ii) and in a manner that minimizes or eliminates post-closure escape of dangerous waste constituents.*

I observed the PUREX Preclosure Work Plan, Section 2, Facility Description, describes the general PUREX Plant, treatment and storage areas (primarily treatment and/or storage vessel systems), the containment building and security information. Under §2.2.1, Treatment and/or Storage Vessel Systems the following is stated.

The 35 storage vessel systems were used specifically to support transition phase activities. Because these vessels were used only for storage of dangerous solutions (mainly flush solutions) until the solutions could be treated and transferred to the DST System, these vessels are not described in detail.

Only the ten vessel systems, which were identified to have treated and/or stored MW were specifically described. The 10 tank and vessel systems are as follows.

- Tank E5 (cladding removal waste treatment system)
- Tanks F15 and F16 (neutralized zirflex acid waste treatment system)
- Tank F18 (miscellaneous MW treatment system)
- Tank G7 and Concentrator E-F11 (headend waste treatment system)
- Tanks U3 and U4 (miscellaneous headend waste treatment system)
- Tanks Q21 and Q22 (Q Cell AMU tanks)

I observed the PUREX Preclosure Work Plan, §2.2.1.1 through 2.2.1.6, provides information, such as location, volume capacity, construction material, height, design descriptions, ancillary equipment descriptions, discharge pathways, construction dates, service start dates, and replacement dates.

I observed the PUREX Preclosure Work Plan, §2.2.2, PUREX Plant Containment Building, describes the location as "...a section of the canyon deck adjacent to D Cell and the F17 position in F Cell." The section further describes the containment building as "...subject to the requirements of WAC 173-303-400 (40 CFR 265, Subpart DD)." The MW on the canyon deck consisted of lead and cadmium, which was transferred to PUREX Storage Tunnel 2, during the Transition Phase. The MW in F Cell "consists mainly of concrete and tank dunnage corrosion products." The end of §2.2.2 states, "...A qualified registered professional engineer has certified that the PUREX Plant canyon area meets the required design - standards as specified in 40 CFR 265.1101(a) (Giller 1992)."

I observed the PUREX Preclosure Work Plan, §2.3, Security Information, only briefly describes the "Hanford Facility" as one contiguous facility and does not mention security measures implemented at the PUREX Plant or Storage Tunnels.

I observed the PUREX Preclosure Work Plan, §3.2, Vessel Systems, describes that the PUREX Plant liquid waste generated was accepted for storage in the Double Shell Tank (DST) System. Treatment of the waste included DST System corrosion acceptance criteria, which involved pH adjustments with sodium hydroxide (NaOH) and adding sodium nitrite. Further information regarding tank and vessel system processes and chemical constituents can be found in the PUREX Preclosure Work Plan, Table 3-1, PUREX Plant Process and Main Chemicals.

I observed in the PUREX Preclosure Work Plan, Section 3, Process Information, descriptions for the following tank and vessel systems:

- Cladding Removal Waste Treatment System
- Neutralized Zirflex Acid Waste Treatment System
- Miscellaneous MW Treatment System
- Headend Waste Treatment System
- Miscellaneous Headend Waste Treatment System

The tanks and vessels associated with the five systems above are Tanks F18, G7, U3, U4, E5, F15, F16, and Concentrator E-F11, which are described in PUREX Plant Preclosure Work Plan, Section 2. Tanks Q21 and Q22 (Q Cell AMU tanks) and the 35 other tanks and vessels are described in §3.3, Transition Phase Vessel Systems, as follows.

During the transition phase, tanks Q21 and Q22 were permitted for treatment and storage when the tanks were found to contain corrosive solutions. The treatment in tanks Q21 and Q22 consisted of a one-time addition of NaOH to neutralize the corrosive solutions. These tanks were not flushed or

sampled because both tanks have bottom drains, which left no heel. The tanks were drained to tank F18 and the waste transferred to the DST System.

An additional 35 vessels were permitted for storage during transition activities, when a determination was made that corrosive solutions had been stored in the vessels. These vessel systems were drained, or flushed and sampled, and the waste transferred to the DST System.

I observed in the PUREX Preclosure Work Plan, Section 4, Waste Characteristics, the descriptions of transfers, flushes, and sampling activities. The following is stated in §4.1, Vessel Systems.

The vessel systems were each identified as part of 12 loops (Figures 4-1 through 4-12) designated for flushing. Flush solutions were cascaded within each vessel. Samples were taken in a tank at the end of the flush loop. In addition to the 12 flush loops, tanks F4, M2, P4, and U3, individually were flushed and sampled. Tanks 40, Q21, and Q22 were not sampled because the tanks have bottom drains, which left no heel.

According to the PUREX Preclosure Work Plan, §4.1, Vessel Systems, other than the 7 individual tank systems described above, the other 38 tanks were flushed in accordance with the PUREX Preclosure Work Plan, Figures 4-1 through 4-12.

- Figure 4-1, Flush K Cell Vessels
- Figure 4-2, Flush L Cell Vessels
- Figure 4-3, Flush Headend Feed Vessels, H1, H2, and F Cell Vessels
- Figure 4-4, Flush G and R Cell Vessels (Part 1)
- Figure 4-5, Flush G and R Cell Vessels (Part 2)
- Figure 4-6, Flush Back cycle Waste and Neptunium Package Vessels
- Figure 4-7, Flush U Cell Vessels
- Figure 4-8, Flush Cladding Waste Vessels
- Figure 4-9, Flush Tank D5, Tank E6, Tank F13, Tank F15, and Tank F16 Vessels
- Figure 4-10, Flush F11 System Vessels
- Figure 4-11, Flush Tank G5A, Tank G7, and Tank G8 Vessels
- Figure 4-12, Flush AMU Tank 156

I observed in the figures that each flush loop does not include sampling of individual tanks or vessels. The sampling point is marked by an asterisk in Figures 4-1 through 4-12. I observed all the sampling points were marked as the last tank described in each flush, except for Figure 4-12, which marks the sampling point at Tank TK-156. I also observed that flushing activities continued by reflushing "...until results indicated the flush solution no longer designated as dangerous waste." Sampling results for 42 out of the 45 tanks and vessel systems are identified in Table 4-1, Vessels Systems Analytical Data.

I observed the PUREX Preclosure Work Plan, Section 5, Groundwater, refers to the TPA and the 200-PO-1 operable unit for investigation and remediation. The section further states that the PUREX Preclosure Work Plan will not address the groundwater investigation and remediation.

I observed the PUREX Preclosure Work Plan, Section 6, Transition Phase Strategy, states the following:

Preclosure of the PUREX Facility vessel systems will occur in 'conjunction with the overall decommissioning of the PUREX Facility. The transition phase activities places the PUREX Facility

in a deactivated state where all vessels are flushed until the solutions do not designate as dangerous waste. Any hazardous substances (e.g., lead shielding, etc.) left in place will be identified during the transition phase and managed during the disposition phase. The S&M phase will maintain the PUREX Facility in a safe and environmentally secure configuration for 10 or more years for a planning horizon. The disposition phase will address final closure activities (for portions of the PUREX Facility identified in the Part A, Form 3, Permit Application (DOE/RL-88-21)) in accordance with WAC 173-303. If required, postclosure care requirements would be documented in a postclosure plan and integrated with the post-remediation groundwater monitoring requirements established for the 200-PO-1 operable unit.

I observed the PUREX Preclosure Work Plan, §6.1, Surveillance and Maintenance and §6.2, Disposition, further describes management and planning that will occur during those two phases. I observed in §6.1, the PUREX Plant will be unoccupied and locked, with the “consolidated” ventilation system for the PUREX Plant remaining active. §6.1 states the following about the S&M Phase.

The S&M plan outlines activities taken to address monitoring of essential systems and to maintain the area in a safe condition that presents no significant threat of release of hazardous substances into the environment and no significant risk to human health and the environment until final disposition is completed. The completion of these activities are necessary before the final disposition of the PUREX Facility can be implemented.

§6.2 states the following about the Disposition Phase.

All aspects of closure not covered during the transition or S&M phases will occur during the disposition phase (i.e., end' state of the systems, hazardous substances left in place, end state of the canyon structure, and integration with the CERCLA remedial activities).

According to the PUREX S&M Plan, the Transition Phase was from 1992 through 1998. The S&M Phase has remained in effect since 1998. Criteria for closure plans are described in 40 CFR Part 265, Subpart G, Closure and Post-Closure states, in part, the following.

§265.112 Closure plan; amendment of plan. (a) Written plan. By May 19, 1981, or by six months after the effective date of the rule that first subjects a facility to provisions of this section, the owner or operator of a hazardous waste management facility must have a written closure plan. Until final closure is completed and certified in accordance with §265.115, a copy of the most current plan must be furnished to the Regional Administrator upon request, including request by mail. In addition, for facilities without approved plans, it must also be provided during site inspections, on the day of inspection, to any officer, employee, or representative of the Agency who is duly designated by the Administrator.

The PUREX Preclosure Work Plan is not clear on the requirement to maintain a closure plan during the Transition Phase or S&M Phase. The language identified in the TPA, Section 8, dated March 28, 1997, which was towards the end of the PUREX Plant Transition Phase, states in part, the following.

§8.8 Preclosure Work Plan and RCRA Closure Plan

...The Nature of the decommissioning process has led DOE, Ecology, and EPA to evaluate the timing of RCRA closure at key facilities. The phased decommissioning process combined with the requirements of NEPA and future land use determinations will often make completion of RCRA closure activities during the transition or S&M phase impracticable. In cases where timely completion of RCRA TSD unit closure is practicable, DOE will prepare, and submit to Ecology for review and approval, a complete closure plan for implementation during the transition phase. In

cases where physical conditions and/or unknowns prevent timely completion of closure, DOE will prepare, and submit to Ecology for review and approval, a preclosure work plan for implementation during the transition phase...

...The content of the preclosure work plan and its relationship to the RCRA closure plan are summarized in Table 8-2. The transition phase will not be considered complete until DOE has either completed RCRA closure and/or implemented a lead regulatory agency approved preclosure work plan. In cases where closure is not completed during the transition phase, the S&M plan for the key facility will address RCRA compliance. It is anticipated that, for such units, RCRA closure will be conducted during the disposition phase, however, Ecology may, at any time, choose to accelerate closure timing and/or initiate final closure in order to assure timely protection of human health and the environment. Agreement negotiations during the transition and disposition phases will establish Agreement milestones and target dates applicable to preclosure and closure activities.

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Table 8-2 Preclosure Work Plan and Closure Plan Elements *

Cpt	Description	Preclosure Work Plan Submitted During Transition Phase	Closure Plan on Submittal, e.g., During Disposition Phase
1	Introduction	ALL	ALL
2	Facility Description	ALL	ALL
3	Process Information	ALL	ALL
4	Waste Characteristics	ALL	ALL
5	Groundwater Monitoring	Documents the nature and extent of groundwater contamination that has occurred and describes actions necessary during the S&M phase	Documents details of groundwater investigation, necessary remediation and monitoring (may be conducted in conjunction with applicable CERCLA operable unit and RI/FS process)
6	Closure Strategy and Performance Standards	Documents the preclosure strategy, end point criteria performance standards and necessary transition phase preclosure activities. This chapter will contain a qualitative assessment of anticipated closure and postclosure outcomes, if known (i.e., clean closure or otherwise)	Remaining details including closure of secondary containment, end state of systems and material left in place, final disposition of vessels, end state of canyon structures and integration with CERCLA remedial activities. Includes cross references to surveillance and maintenance plan
7	Closure Activities	Detailed description of any closure activities and schedule(s)	Describes the remaining closure information/activities related to disposition phase
8	Postclosure Plan	Postclosure activities will be addressed to the extent known	Detailed Postclosure plan if decision is made to leave waste in place
9	References	Includes references used in transition phase of the preclosure work plan	Includes all remaining references

* Requirements of a RCRA closure plan are specified in 40 CFR 264 and Chapter 173-303 WAC, and are only briefly summarized here

Excerpt 3: TPA Section 8 Table 8-2, Preclosure Work Plan and Closure Plan Elements

Between 1997 and 2015 numerous change control forms were submitted, which removed, altered, and in some cases added information to the TPA, Section 8. I observed §8.8 and Table 8-2 are not included in the current TPA Section 8, dated July 18, 2011.

I observed in the Preclosure Work Plan, Section 7, Transition Phase Activities describes the removal of DW residue and contaminated materials, sampling, and analysis. According to Section 7, the objective of the Transition Phase, was to place the facility into a "...safe configuration with respect to human health and the environment..." for a "...S&M phase of 10 or more years until disposition phase activities commence." The section further states, "The closure plan for the PUREX Facility will be prepared during the disposition phase."

I observed the PUREX Preclosure Work Plan, §7.1 describes the following tank and vessel activities during the Transition Phase.

- *Removing residual solutions.*
- *Flushing vessel systems until the heels do not exhibit dangerous waste characteristics.*
- *Conducting protocol sampling and analysis of final (record) flushes of vessel systems as defined in Section 7.2.1.*
- *Emptying vessels to the maximum extent practicable using existing pumps and/or jets.*
- *Emptying cell sumps to the normal heel using existing jets and/or pumps.*
- *Isolating (blanking) all liquid feed and/or drain lines to vessel systems.*

The "final (record) flushes of vessel systems" definition is unclear. I did not observe a "Section 7.2.1" in the PUREX Preclosure Work Plan and §7.1 states the following.

Following the completion of all vessel system flushing, the liquid level in the vessels will be left at the lowest level possible (the residual heels vary between approximately 70 and 400 liters) using existing jets and/or pumps.

I observed §7.2, Sampling and Analysis states the following.

The vessel systems will be flushed until the heels do not exhibit dangerous waste characteristics (WHC 1995d). Flushing the vessel systems ultimately will lead to deactivation of the vessel systems that are regulated by WAC 173-303.

The DQO planning process was used to develop the sampling and analysis approach used during transition activities (WHC 1995c).

Soil sampling and analysis will occur as part of the corrective action investigation process of the 200-PO-2 operable unit.

The reference to "WHC 1995d" is unclear since the document is not referenced under Section 9.

Note: I was unable to locate documentation describing 200-PO-2. The documents associated with 200-PO-2 in the USDOE Hanford Site Administrative Record appear to not mention the unit. The work associated with 200-PO-2 appears to have not been complete to date.

I observed in Section 8, Postclosure Plan, the disposition scenarios, if waste is left in place and reference to a CERCLA RI/FS as specified in the TPA for groundwater contamination.

PUREX S&M Plan- My review of the PUREX S&M Plan was focused on the following sections.

- Section 2, Facility Activities
- Section 3, Facility Maintenance
- Section 5, Training and Qualification

- Section 6, Environmental Compliance / Protection (including sections referenced in Section 6)
- Appendix A, Hazardous Material (HM) Remaining at the PUREX Facility

I observed the following in the PUREX S&M Plan under Section 2, Facility Activities. §2.1, Historical Background, states “Not all the hazardous materials were removed during the transition phase.” and refers to Appendix A for further details.

I observed §2.2.2, Operational Systems Description, states the following:

The canyon ventilation system, electrical system, the surveillance, monitoring, and control system (SAMCONS); and surveillance lighting system are the only systems operating during the PUREX S&M phase.

Descriptions of the electrical system (lighting, heating, cooling, and monitoring equipment), canyon ventilation system, and the SAMCONS are found under Section 2.

I observed the PUREX S&M Plan, §2.3, Surveillance Activities, describes both routine and non-routine surveillance activities, which include an annual surveillance, ventilation system monitoring, and other routine surveillances. §2.3.2, Annual Surveillance includes the following criteria.

- Internal / external structural defects
- Roof deterioration
- Posting deficiencies
- Contamination migration
- Suspect HMs
- Hazardous conditions
- Electrical hazards
- Unidentified friable asbestos
- Failed lights
- Doors unlocked
- Water leaks
- Excess combustable materials
- Excess equipment or material
- Ground subsidence
- Inadequate housekeeping
- Occupational hazards
- Previously unidentified hazards
- Unidentified or unlabeled containers
- Animal or insect intrusion

The walk through for the indoor annual surveillances consists of “202-A, 202-A annex, maintenance shops, pipe and operating gallery level, storage gallery level, AMU basement, office and lunchroom area, the hot cell lobby, N-Cell (upper and lower levels), product removal (PR) corridor, PR room, Q-Cell, canyon lobby, white room, and the west stairwell.” The walk through for the outdoor annual surveillance consists of “external monitoring and visual inspections of the facility’s ancillary buildings and supporting areas including the outdoor contaminated areas.” Additionally, a “qualified contractor structural engineer” will conduct inspections of the roof and other structures providing a “passive confinement function.” I observed other routine surveillances are not documented in the PUREX S&M Plan, the plan refers to “S&M contractor’s documents” for frequencies and activities.

I observed the PUREX S&M Plan, Section 3, Facility Maintenance, describes preventative maintenance and corrective maintenance. §3.1, Maintenance Organization and Administration, states elements that should be part of the maintenance management program for the PUREX Plant.

I observed the PUREX S&M Plan, §3.3, Types of Maintenance and Frequency, appears to describe ventilation system maintenance, as documented below.

- Inspect and lube canyon exhaust fans and bearings EF-1 and-3: As recommended in procedures.

- Calibration of equipment controlled by canyon ventilation instrumentation and control system: As recommended in procedures.
- High-efficiency particulate air (HEPA) change out: As determined from surveillances.
- HEPA aerosol test: Determined from regulatory requirements.
- Vent and balance on canyon ventilation HEPA filters: As determined from surveillances.
- Replace canyon ventilation HEPA filters: As determined from surveillances.
- Canyon ventilation stack monitoring system inspections: Determined from regulatory requirements.
- Potential cold weather protection: As defined in the Project Hanford Management Contract cold weather protection program.

The frequencies of maintenance, listed above, are not specifically documented in the PUREX S&M Plan and instead, refer to unspecified procedures and regulations.

I observed the PUREX S&M Plan, Section 5, Training and Qualification, refers to WAC 173-303-330, Section 6, and Table 6.1. Section 6, Environmental Compliance/Protection, states the following.

This section identifies environmental compliance/protection requirements that are applicable to the S&M scope of work and has been prepared in accordance with the Tri-Party Agreement Action Plan, Section 8.6, "Surveillance and Maintenance Phase," S&M phase for facilities.

The S&M contractor is required to comply with all environmental laws, regulations, and procedures applicable to the work being performed under the Contract. This includes, but is not limited to, compliance with applicable federal, state and local laws and regulations, interagency agreements such as the Tri-Party Agreement, consent orders, consent decrees, and settlement agreements between DOE and federal and state regulatory agencies.

I did not observe §8.6 in the current TPA; §8.6 is in the March 28, 1997 dated version of the TPA, which states the following.

8.6 Surveillance and Maintenance Phase

The surveillance and maintenance (S&M) phase for facilities is conducted in accordance with the S&M plan developed for each facility. For facilities transitioned under Section 8.5, the S&M Plan is developed as part of the transition phase. For key facilities (See Section 8.1.2), which did not proceed through formal transition, but which have been transferred to DOES Environmental Restoration Program, S&M Plan(s) will be submitted in accordance with established Agreement milestones. The S&M phase is shown in Figure 8-4. The objectives of the S&M phase are to ensure adequate containment of any contaminants left in place and to provide physical safety and security controls and to maintain the facility in a manner that will present no significant risk to human health or the environment.

S&M plans will be prepared by DOE and will detail facility aspects and associated requirements including the following: (1) surveillance, (2) maintenance, (3) quality assurance, (4) radiological controls, (5) hazardous substance inventory management and protection, (6) health and safety / emergency preparedness, (7) safeguards and security, and (8) cost and schedule. DOE shall comply with all applicable environmental, safety and health, and security requirements throughout the S&M phase.

8.6.1 Initiation of S&M Phase

The S&M Phase will start after plant operators have verified the transition end points, the lead regulatory agency and DOE-HQ have received the verification, and all appropriate approvals have been received. Initiation of the S&M phase is shown as the first box in Figure 8-4.

8.6.2 Biennial Evaluations of Disposition Priorities

Throughout the S&M phase, biennial evaluations of long term S&M and disposition plans and schedules will be performed. These evaluations will be performed in conjunction with the biennial reviews discussed in Section 8.3.3 and Agreement negotiations to identify, evaluate and assess the status of Hanford Site priorities as well as tribal and stakeholder values. S&M surplus facilities will be included in the evaluation of disposition priorities.

8.6.3 Ongoing S&M Activities

Ongoing S&M activities will be conducted in accordance with the approved S&M plan and associated Agreement commitments until a decision is made by DOE-HQ to initiate the disposition phase, or actions are required by the lead regulatory agency pursuant to the terms of Sections 8.3.3 or 8.1.

I observed in the PUREX S&M Plan, §6.2, Records Keeping/Documentation, a list of the following documents maintained in the S&M contractor's record area. I also observed §6.2 refers to WAC 173-303-210, Generator Recordkeeping and WAC 173-303-220, Generator Reporting.

- Canyon cell arrangement drawings
- Certified vendor information of operating and mothballed systems
- PUREX Facility HM Remaining after Deactivation List
- Pre-Closure Work Plan
- Deactivation work plans
- Descriptions/photos of Case 2 spaces, internal/no access expected
- Electrical distribution drawings of new operational systems
- Index identifying drawings and corresponding titles of essential and downgraded facility drawings
- Final radiological surveys and maps
- Fire Hazard Analysis
- Radiological control surveillances and data of current postings
- Identified industrial space hazards
- Resolution of remaining outstanding TPA (Ecology, et al, 2003) and regulatory commitments
- S&M safety evaluations documentation
- S&M Phase updated Facility Environmental Monitoring Plan
- S&M Phase updated BEP
- S&M Phase updated Safety Equipment List
- S&M Phase updated Final Safety Analysis/Safety Authorization Basis documentation
- Special nuclear material inventory
- Structural and roof evaluations
- S&M procedures
- Unusual occurrence reports considered relevant and informative for S&M
- PUREX Plant DW Part A Permit Application
- PUREX Storage Tunnels DW Permit Application

- Prevention of Significant Deterioration for NOx Emissions Permit
- WDOH Radioactive Air Emissions Permit, FF-01
- Waste characterization data for egress waste, historical radiation survey data, and other radiological records
- An administrative record was established for the PUREX Facility as described on Table 9-3 of the TPA Action Plan (Ecology et al. 2003). The administrative record for PUREX contains:
 - RCRA Analytical Data for PUREX TSDs
 - PUREX Pre-Closure Work Plan
 - Hanford Facility DW Permit Application, PUREX Storage Tunnels, DOE/RL-90-24, Rev. 2

I observed the following in the PUREX S&M Plan *Table 6-1, PUREX Regulatory Compliance during Surveillance and Maintenance*.

I observed that “Notice of Intent WAC 173-303-280” in Table 6-1 is incorrectly identified. WAC 173-303-280 addresses, “General requirements for dangerous waste management facilities.” The column titled “S&M Compliance Applicability” states “Not applicable during the PUREX S&M phase.” It appears the applicability table intended to state Notice of Intent WAC 173-303-281 is not applicable, which would indicate WAC 173-303-280 is not addressed in Table 6-1.

The “General Waste Analysis, WAC 173-303-300” row states in part, the following:

The purpose of this section is to confirm knowledge about dangerous waste before treatment, storage, and/or disposal. Appendix A lists the mixed waste remaining in the PUREX Complex TSD units...

Note: Refer to the observations documented later in this report regarding the reference to Appendix A.

I observed the “Security, WAC 173-303-310” row refers to Section 10, Safeguards and Security, for addressing requirements. Section 10 has a statement about the Hanford Site and refers to “CRD M 473.1-1 (Supplemented Rev. 0), *Physical Protection Program Manual*.”

The “General Inspection, WAC 173-303-320” row states the following.

Routine Surveillances are performed as identified in this S&M plan. No TSD unit inspections or surveillances are performed since all of the TSD units are in un-accessible portions of the PUREX Complex.

The PUREX Preclosure Work Plan and the PUREX S&M Plan do not describe Tanks TK-P4 and TK-40 as not accessible. The PUREX End Point Document, lists both the 203-A and 211-A areas, as “Case 2 for Internal Spaces, No Access Expected,” and “Case 3 for External Spaces, Including Building Exterior Envelopes.” The PUREX S&M Plan, §2.3, Annual Surveillance, describes the following areas as accessed during the annual surveillance.

202-A, 202-A annex, maintenance shops, pipe and operating gallery level, storage gallery level, AMU basement, office and lunchroom area, the hot cell lobby, N-Cell (upper and lower levels), product removal (PR) corridor, PR room, Q-Cell, canyon lobby, white room, and the west stairwell.

The "Personnel Training, WAC 173-303-330" row states the following.

Training is provided to meet the dangerous waste management duties identified in this table relating to WAC 173-303-330 compliance. A training plan will be maintained in accordance with WAC 173-303-330(2).

Note: Refer to the observations documented earlier in this compliance report about the S&M DWTP.

The "Preparedness and Prevention WAC 173-303-340" and "Contingency Plan/Emergency Procedures WAC 173-303-350" rows states the following.

Addressed in Section 8.0, Emergency Management, of this S&M plan.

I observed Section 8, Emergency Management, refers to the Hanford Emergency Management Plan, Emergency Plan Implementing Procedures, and an unspecified "S&M Contractor PUREX-specific emergency plan," which includes the "RCRA contingency plan requirements."

Note: Refer to observations made in this compliance report about the S&M BEP and Contingency Plan.

I observed Table 6-1 does not include WAC 173-303-360, Emergencies.

The "Facility Record Keeping, WAC 173-303-380" row states the following.

Dangerous waste generation is not expected during S&M. However, operating records for mixed waste generated or managed at the facility are compliant with the S&M contractor's waste management procedures And Section 6.0 of this S&M Plan.

Note: Refer to the observations documented later in this compliance report about Appendix A.

The Interim Status Treatment, Storage, and Disposal Facility Standards WAC 173-303-400, 40 CFR 265.1101(c)(4), and 40 CFR 255 Subpart J row states the following:

Tank Systems

During the PUREX deactivation, TSD tanks and vessels identified in the PUREX Plant Dangerous Waste Permit Application, Part A Form were flushed until the solutions no longer designated as dangerous waste. These tank systems are identified in the PUREX Plant Vessel Table in the Part A Form.

These solutions were removed leaving a non-dangerous heel per the Data Quality Objectives for PUREX Deactivation Flushing, WHC-SD-EN-TI-283, Rev. 0. Removal of the dangerous waste solutions ensured that the vessels were left in a state for minimum surveillance and maintenance until subsequent closure. Therefore, per the Tri-Party Agreement M-80-94-01 agreement, no surveillances of the dangerous waste units or ancillary equipment are performed.

Containment Building

The PUREX Containment Building, the 202-A canyon will continue to store dangerous waste per the PUREX Plant Part A Permit Application during the S&M phase. Monitoring the differential pressure of the canyon during S&M will satisfy the 40 CFR 265.1101(c)(4) requirement to maintain the containment building's integrity. No additional surveillance of the dangerous waste or ancillary equipment will be performed to satisfy this requirement.

Table 6-1 refers to the 40 CFR 265.1101(c)(4), which states the following:

Inspect and record in the facility's operating record at least once every seven days, except for Performance Track member facilities, that must inspect up to once each month, upon approval of the

director, data gathered from monitoring and leak detection equipment as well as the containment building and the area immediately surrounding the containment building to detect signs of releases of hazardous waste. To apply for reduced inspection frequency, the Performance Track member facility must follow the procedures described in §265.15(b)(5).

The PUREX S&M Plan does not describe the frequency or criteria for monitoring the containment building integrity or refer to a procedure for monitoring the differential pressure:

I reviewed the *Data Quality Objectives for PUREX Deactivation Flushing, WHC-SD-EN-TI-283, Revision 0*, dated July 1994 and reviewed an Ecology letter titled PUREX Data Quality Objective Document Review, 0039532, dated November 14, 1994, with a receive stamp dated December 1994. The letter states the following.

I have reviewed the Data Quality Objectives for PUREX Deactivation Flushing Draft Document (WHC-SD-EN-TI-283 Draft A) and have found it deficient in a number of areas which need to be addressed.

The letter outlines eight concerns regarding missing or deficient information throughout WHC-SD-EN-TI-283. The concerns address sampling methods, process knowledge verification, and the lack of sufficient explanations in certain sections.

The final section I reviewed in the PUREX S&M Plan was Appendix A, Hazardous Material Remaining at the PUREX Facility, which states the following.

The information for this appendix was taken directly from the submittal to document closure of the end point described as, "Remaining Hazardous Substances/Dangerous Waste Documentation," per the PUREX End Points Document, WHC-SD-WM-TPP-053.

The inventory table has three columns labeled "Location (*)," "Material description," and "Quantity /state." The first row provides a location as "General," and states the following material description.

Lead as a solid component, such as paint, light bulb contacts, washers affixing transite, sanitary water line joints packed with lead mesh; steam, air, and water safety relief valve seals; components of control panels all abandoned in place and stable during surveillance and maintenance (S&M).

Zinc used in galvanized piping; zinc, silver, and lead contacts are used in the electrical system. Lead and zinc were used as soldering in the electrical and plumbing systems. All stable during S&M.

Mercury in thermostats and in electronic switches (i.e., electronic switches) throughout 202-A. Mercury vapor lights were also used for exterior lighting.

Asbestos abandoned throughout the plant as a solid component such as in transite siding, utility line insulation, and gasket material. Asbestos is especially notable in 206-A and 293-A. Refer to Asbestos Assessment for additional descriptions of asbestos remaining at the Plutonium-Uranium Extraction (PUREX) Facility.

Unknown organic in liquid films, greases, and solid residues in bearings and gearboxes throughout the plant. Stable during S&M period.

Leaks of small amounts of chemicals to the floors during operations and S&M.

Undetermined quantities of polychlorinated biphenyls (PCB) exist in transformers, ballasts, and lubricants/gear oil once used throughout the plant.

This first row is referred to numerous times for other locations with the material description stating.

See "General" Section on this list for description of remaining material.

These following locations refer back to "General" for the material description.

- 202-A Exterior, 291-AK, and West PRV
- 202-A Facility Exterior
- 202-A Pump and Trap Pits
- 203-A Control Room, Pump-House, and 203-A Truck Pad
- Fractionator Equipment
- Fractionator Instrument Shack 1, Shack 2, and Exterior
- 211-A Exterior
- 212-A Exterior
- 213-A and 213-A Exterior
- 214-A/B/C/D
- 216-A-42 Diversion Basin
- 216-A-42A Pump Station
- 216-A-42B Valve Box
- 216-A-42C Valve Box
- 216-A-42D Diversion Box
- 216-A-42E Diversion Box
- 291-A Steam Turbine and Exhaust Fan Pad
- 291-AD/291-AD Monitoring Equipment
- 291-AE, Filters, and Exterior
- 291-AH/291-AH Monitoring Equipment
- 292-AB Exterior
- 293-A Equipment
- 294-A and 294-A Systems
- 2701-AB Badge house/Exterior
- 2711-A/2712-A and Equipment
- 2714-A
- 2714-U Shed and Exterior
- AMU, AMU Elevator, and AMU 4th Floor
- 295-A ASD Shack
- ASD System, Caisson, and Valve Pit
- Canyon East Crane/Canyon Slave Crane
- Canyon C Cell Deck Access Airlock
- Canyon Lobby
- Change Room
- Compressor Room Process/Instrument Air
- Control Rooms, Offices, and Maintenance Shops
- Head End, Central Power Control Rooms and Offices
- Head End, Central Power Control Rooms and Offices Lighting
- 271-AB and 271-AB Lighting
- Maintenance Shops
- SWP Lobby
- 295-AC CSL Shack
- CSL System and CSL Caisson S
- 295-AD CWL Shack
- CWL System and CWL Caisson
- East Switch Gear Room
- Hot Shop
- Lab Center Corridor, Change Room, Lunch Room, HVAC Equipment, ICP Filter, Counting Room Equipment, Hoods, and Dock
- Loading Docks
- M Cell
- Mobile Offices
- N Cell Room Exhaust
- Paint Shop
- 295-AB PDD Shack
- PDD System and Sample Pit
- New PDD Shack
- Pipe & Operating Gallery
- Pipe & Operating Gallery Systems
- PIV Room

- PR Room Exhaust
- Q Cell Control Room, Load out Room, AMU, Maintenance Hood Room, and Vault
- R Cell Equipment and Exterior

A number of the locations listed above, appear to be associated with areas where DWMUs are located. Whether any of the locations above are associated with DWMUs is unclear. The quantities and state of the HMs is not documented for these locations.

These locations contain material descriptions that appear to be associated with DWMUs.

- 203-A Control Room and Pump-House Equipment
- 203-A Diked Area
- 211-A
- Canyon/D-Cell
- Canyon/E-Cell
- Canyon/F-Cell
- Canyon/G-Cell
- Canyon/H-Cell
- Canyon/J-Cell
- Canyon/K-Cell
- Canyon/L-Cell
- Canyon/M-Cell
- Q-Cell AMU
- U-Cell

The material descriptions related to these locations listed above, state the following. *Vessels located in (...) are listed in the PUREX Plant Vessel Table in the Part A Form.* Descriptions associated with DWMU "Vessels" appeared to not have "Quantity/State" information.

The material descriptions identified for the locations listed above, include the following:

- *All tanks in the 203-A area have been flushed and emptied to a minimum heel and their associated piping drained. However, there may exist the potential for residual nitric acid in these areas.*
- *All tanks in the 211-A area have been flushed and emptied to a minimum heel and their associated piping drained. However, there may exist the potential for residual nitric acid, sulfuric acid, KOH, NOH, Tri-Butyl Phosphate (TBP), Normal Paraffin Hydrocarbon (NPH), Ammonium Fluoride / Ammonium Nitrate (AFAN) and ANN in these areas.*
- *Lead counterweights.*
- *Jumpers.*
- *Shielding.*
- *A steel open top skid containing concrete chips from the floor of E Cell is stored in F Cell floor Cell. The solid MW in the canyon could consist of contaminated discarded canyon process equipment, jumpers (or isolated components thereof) or other material from the various onsite sources. Chromium in floor debris: concrete solids contaminated with solutions from E Cell process.*
- *Potential PCBs in Pulsar lubricant.*
- *Cadmium: 4 Neutron monitor pigs (1 from J4, 3 from J6).*
- *Lead sheets on deck: (2) 2'x4'x1/16".*

These descriptions listed either measurable weights (See Appendix A) or one of the following descriptive statements:

- *Unknown quantity; once used for lubrication.*
- *Trace amounts throughout E Cell floor.*
- *Trace amounts to none.*

I observed the Appendix A does not clearly identify the location, material descriptions, quantities, or states of the HM left in place and whether the materials are MW, DW, or HM.

Technical Procedure CPSM-PRO-OP-50668, Surveillance of PUREX Facility – The Technical Procedure CPSM-PRO-OP-50668, §1.1, Purpose, states, the following.

This procedure provides a safe and uniform method for performing surveillances of the PUREX building and associated facilities, including the PUREX storage tunnels.

§1.2.2, objectives of the surveillance states the following:

- *Ensure adequate containment of any contaminants left in place.*
- *Provide physical safety and access controls.*
- *Maintain the facility in a manner that will minimize risk to human health or the environment.*

The areas covered by the annual surveillance are stated under §1.3.3 as follows. The maps and routes planned are described in Appendix A of CPSM-PRO-OP-50668.

- Operable Systems
- N Cell and Q Cell
- PUREX Analytical Laboratory
- PR Room
- Pipe & Operating (P&O) Gallery
- Yard Area (exterior surveillance only)
- Annexes (physically connected to 202-A)
- Storm Drains
- AMU Rooms
- 203-A Tank Farm
- Storage Gallery
- 206-A (exterior surveillance only)
- PIV Room
- 211-A and 211-A Neutralization Unit
- Contamination/Radiation Areas
- Electrical
- White Room
- South Side of 202-A
- 193-A (exterior surveillance only)
- PUREX Rail Cut and Storage Tunnels

§1.3.4, references to the following template inspection records.

- *§4.1–PUREX Complex Exterior Surveillance, Data Sheet 1 – PUREX Exterior Surveillance*
- *§4.2–PUREX Main Building (202-A) Surveillance, Data Sheet 2 – PUREX Interior Surveillance*

The Technical Procedure CPSM-PRO-OP-50668 also provides facility descriptions for the areas listed above. Section 2 provides precautions and limitations that personnel should be aware of when conducting the annual surveillance. Section 3 provides prerequisites, which include a list of tools, equipment, materials, and special personnel requirements. Section 4 provides performance standards and direction for the annual surveillance of the PUREX Complex Exterior, PUREX Main Building (202-A), and the PUREX Rail Cut and Storage Tunnels. There are also directions on how to complete the records (Data Sheets) provided within CPSM-PRO-OP-50668.

Data Sheet 1 – PUREX Exterior Surveillance, lists the following areas, which appear to be associated with DWMUs.

- 276-A, R Cell
- 203-A, UNH Pump House, Control Room, and Tank Farm
- 211-A, Demineralizer Building
- 211-A, Neutralizing Unit
- 202-A Building
- 217-A SAMCON Unit
- Burial Tunnel

Criteria inspected during the annual surveillance include the following:

- Building/Area Secure
- Structure Integrity
- Animal Pest Intrusion
- Electrical Hazards
- Ground Subsidence (exterior)
- Housekeeping
- Occupational Hazards
- Signage
- Water Intrusion (Leaks)
- Containers
- Combustible Material Storage
- Combustible Loading

Detailed descriptions of the criteria are on the Data Sheet 1 – PUREX Exterior Surveillance. The data sheet also provides a space for the printed name, signature, and date of surveillance “Performed by NCO 1,” “Performed by NCO 2,” and “FWS Review.”

Data Sheet 2 – PUREX Interior Surveillance, lists the following areas, which appear to be associated with DWMUs.

Interior – 202-A Building

- **Path 1:** Change Rooms, Compressor Room, Head End, Power Control Rooms and Offices, Maintenance Shops, Process Blower Room, Service Blower Room, SWP Lobby, East Switch Gear Room
- **Path 2:** Lab Center Corridor, Change /Lunch Rooms, Lab HVAC Room
- **Path 3:** P&O Gallery
- **Path 4:** Canyon Lobby & White Room
- **Path 5:** Storage Gallery
- **Path 6:** N Cell and Mezzanine, PIV Room, Q Cell Control Room, Q Cell Load out Room, Q Cell Maintenance Hood Room, West Stairwell
- **Path 7:** AMU (2nd & 3rd floors)

Criteria inspected during the annual surveillance include the following:

- Building/Area Secure
- Structural Integrity
- Animal/Pest Intrusion
- Electrical Hazards
- Ground Subsidence (exterior)
- Lighting System
- Housekeeping
- Occupational Hazards
- Signage
- Water Intrusion (Leaks)
- Containers
- Combustible Material Storage
- Combustible Loading
- Egress (for interior surveillances)

Further descriptions of the criteria are on the Data Sheet 2 – PUREX Interior Surveillance. The data sheet also provides a space for the printed name, signature, and date of surveillance “Performed by NCO 1,” “Performed by NCO 2,” and the “FWS Review.”

Data Sheet 3 – PUREX Rail Cut and Storage Tunnels Surveillance, lists the Operable Systems, Rail Cut, and Tunnel areas, which appear to be associated with DWMUs. Criteria inspected during the annual surveillance include the following.

- Building/Area Secure
- Structural Integrity
- Animal/Pest Intrusion
- Electrical Hazards
- Ground Subsidence (exterior)
- Housekeeping
- Occupational Hazards
- Signage
- Water Intrusion (Leaks)
- Containers
- Combustible Material Storage
- Combustible Loading
- Egress (for exterior surveillances)

Detailed descriptions of the criteria are on the Data Sheet 3 – PUREX Rail Cut and Storage Tunnels Surveillance. The data sheets also provides a space for the printed name, signature, and date of surveillance “Performed by NCO 1,” “Performed by NCO 2,” and “FWS Review.”

Data Sheet 4 – PUREX Facility Surveillance – Comments Sheet, provides space to document “Identify Deficiency – Description – Location – Actions Taken” and “Work Document #.” There is also space for the printed name, signatures, date and time work was performed by personnel, and the FWS review.

The Annual Surveillance Records for 2014 – I observed that Data Sheet 1, PUREX Exterior Surveillance, was initialed “TM,” with four exterior areas dated “8-25-14” and 40 exterior areas dated “10-29-14.” The 211-A NU, Neutralization Unit was initialed “JH” and dated “10-29-14.”

I observed all of the criteria were marked yes, except for “Occupational Hazards – Criteria: There are no occupational hazards that may endanger personnel, e.g., tripping and slipping hazards, broken steps, missing handrails, exit door egress locked or obstructed.” Which was marked “NO” with a written “1” circled. I observed a printed name, signature, and date of “11-6-14” in the space for “Performed by NCO 1.” I also observed the NCO conducted this annual surveillance as OJT (On the Job Training) under the supervision of another personnel. I did not observe the time of the inspections conducted on “8-25-14” or “10-29-14.”

On the Data Sheet 4 – PUREX Facility Surveillance – Comments Sheet I observed a written “1,” with the following written statement, “Damaged PACM need to be cleaned up not a new condition.”

I also observed the full printed name, a signature of the inspector under the “Performed By” space, which included the date “11-11-14,” and the recorded time as “0645.”

Further down in the digital document (Itm2c2 – 2014 PUREX Annual Surveillance Package.pdf) is a page titled “Purex Annual Surveillance 2014, SM-14-04067.” The following excerpt is listed in the tracking table for observations made during the PUREX exterior annual surveillance.

	Exterior	1 Damaged PACM needs to be cleaned up (not a new condition)	Review w/ DA, IH/Safety / ENO (J.T. 4/13/15)
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Excerpt 4: Purex Annual Surveillance 2014, SM-14-04067

The location, statement “not a new condition,” and no specific reference to a documented nature of any repair or remedial action appears to show this is an ongoing concern.

I observed the Data Sheet 3 – PUREX Rail Cut and Storage Tunnels Surveillance, had the initial “WMW,” next to “Operable Systems” with a written date “12/16/14.” I also observed the initial “WMW,” next to “Rail cut” and “Tunnel” with a written date “12/17.” The criteria marked “No” is as follows.

- Building/Area Secure: Next to the mark under “No” is a circled “1.”
- Housekeeping: Next to the mark under “No” is a circled “2.”
- Signage: Next to the mark under “No” is a circled “3.”

The criteria “Build/Area Secure” and “Housekeeping” were also marked “Yes” with the initials “WMW” and dated “12-17-14”. It is unclear if this mark indicates the date of a repair, remedial action, or a correction. I observed the printed name and signature as the first and middle initial with the full last name written. I also observed the date recorded as 12-17-14. I did not observe the time of the inspections conducted on “12/16/14” or “12/17.”

I observed the Data Sheet 4 – PUREX Facility Surveillance – Comments Sheet, had written comments, identifying the deficiencies and locations. I did not observe the date and nature of any repairs or remedial actions taken on the Data Sheet 4. I observed this is the same Data Sheet 4 used to record comments of the Data Sheet 1, PUREX Exterior Surveillance. I observed the printed name and signature as the first and middle initial with the full last name written, and the date recorded as 12-17-14.

I observed multiple Data Sheet 2 – PUREX Interior Surveillance records, for Paths 1-7 inspections.

On the Path 1, Data Sheet 2, I observe Structural Integrity, Animal/Pest Control, Lighting System, Housekeeping, Signage, and Water Intrusion (Leaks) all marked “No,” numbered 1-6 respectively. I observed the printed name, signature, and date “10/15/14” written on the Path 1, Data Sheet 2. I did not observe the time of the inspection. I observed the following comments on the Data Sheet 4 – PUREX Facility Surveillance – Comments Sheet.

PUREX SURVEILLANCE – COMMENTS	
Identify Deficiency – Description – Location – Actions Taken	Work Document #
① PACM in Blower room (Picture) on spray pump heat exchanger	
② Picked up 2 dead Birds	
③ 3 Lights out (hallway, m.e.c. room) Hanging EMER Light (P.C.)	
④ Removed 2 ladders. Removed rubber airshoes from E. Switchgear room.	
⑤ Missing BCA sign in switchgear room (Door 21). Question on confined space sign (non Permit CF 2A-114) (pictures)	
⑥ Water leaking in under Double doors in Blower room N. Side (picture)	

Excerpt 5: Data Sheet 4 - PUREX Facility Surveillance – Comment Sheet

I did not observe the date and nature of any repairs or remedial actions taken on the Data Sheet 4. I observed the printed name, signature, the date as “10-15-14,” and the time as “1450.” The time recorded appears to be the approximate time of the inspection, although it is still unclear.

The “PUREX Annual Surveillance 2014, SM-14-04067” table references the following associated 6 deficiencies noted above.

Purex Annual Surveillance 2014
 SM-14-04067

Facility	Location	#	Issue	Action to be taken
PUREX	Path 1 Change Rooms Compressor Room Head End Power Control Rooms & Offices Maintenance Shops Process Blower Room Service Blower Room SWP Lobby East Switch Gear Room	1	PACM in Blower Room (picture) on spray pump heat exchanger	Review with DA for repair ticket item
		2	Picked up 2 dead birds	n/a (complete)
		3	3 lights out (hallway, mcc room) Hanging emergency light (pic)	task repair w/ routine repetitive pkg. (SM-14-03614)
		4	Removed 2 ladders. Removed rubber overshoes from E Switchgear room	n/a (complete)
		5	missing BCA sign in switchgear room (Door 21). Question on confined space sign (non permit CF 2A-114)	BCA signage complete. Review confined space sign w/ IH/Safety
		6	water leaking in under double doors in blower room N side (picture)	Seal bottom of door using routine repetitive pkg

Excerpt 6: PUREX Annual Surveillance 2014, SM-14-04067

I observed on the “PUREX Annual Surveillance 2014, SM-14-04067” table what appears to be descriptions of repairs and remedial actions taken or references to work packages. Some of the items referring to scheduled actions do not reference the “repair ticket item” identification number, while others do provide an identification number. Three of the items appear to be completed or partially complete, although the date of the completed action is not documented. The Data Sheets 2 for paths 2-7 account for 16 more deficiencies noted, while the “PUREX Annual Surveillance 2014, SM-14-04067” table address the other 16 deficiencies observed in a similar manner to what I documented above. Also found on the “PUREX Annual Surveillance 2014, SM-14-04067” table are the actions to be taken for the deficiencies noted for the Data Sheet 1 – PUREX Exterior Surveillance (Conducted on August 25, 2014 and October 29, 2014) and Data Sheet 3 – PUREX Rail Cut and Storage Tunnel Surveillance (Conducted on December 16-17, 2014).

At the top of the Data Sheet 2 – PUREX Interior Surveillance instructions state, the following:

Personnel performing the surveillance are to circle the appropriate response for each item being checked. Any item(s) that does not apply is to be checked as “N/A.” Any item(s) that does not meet the criteria or requires notes is to be checked as “NO” and must have a detailed description on Data Sheet 4 – PUREX Facility Surveillance – Comments Sheet.

On the Data Sheet 2 – PUREX Interior Surveillance, for the “Main Floor, 2nd and 3rd Floor and Basement AMU” the criteria for “Water Intrusion (Leaks)” was marked “Yes” and had a circled 1 next to the mark. I also observed the same instance on the Data Sheet 2 for “Path 3,” for the “Lighting System” and “Water Intrusion (Leaks).”

I observed on the Data Sheet 2 – PUREX Interior Surveillance for Path 6 that “Occupational Hazards” was marked “No” with a circled “4” next to the mark. On the Data Sheet 4 associated with the Path 6 inspection, I observed the statement, “Oil in sump at glovebox of Q Cell may leak out and eventually create a slipping hazard. (Pics 7 & 8).”

I observed on the “PUREX Annual Surveillance 2014, SM-14-04067” table, the “Action to be taken” is “Review w/ DA, Safety, FPE.” I did not observed the date and nature of any repairs or remedial action to be taken, nor did I observe a reference to a repair ticket item or work package for the deficiency recorded during the Path 6 annual surveillance conducted on November 4, 2014. I also observed

comments regarding lighting problems on the Data Sheet 2 record for the surveillance conducted on Paths 1-5, and 6. I observed on the "PUREX Annual Surveillance 2014, SM-14-04067" table, the "Actions to be taken" as replacing the lamps. I did not observe a date for the action to be taken.

Additional Documentation and Information Requested – On July 7, 2015, I requested follow-up information and documentation regarding:

- 211-A: Bulk Cold Chemical Tank Farm
- 203-A: Acid Pump House / Acid Storage and Handling Facility
- Disposal documentation for the NPH and TBP stored in PUREX Plant tank systems.
- Differential pressure monitoring records associated with the containment building and ventilation system.

On September 14, 2015, I received a response from USDOE and CHPRC for my requested information and documentation. The following tables summarize information requested for the 211-A Bulk Cold Chemical Tank Farm and the 203-A Acid Pump House / Acid Storage and Handling Facility.

211-A: Bulk Cold Chemical Tank Farm

Vessel ID	Radioactive constituents (Y/N), if yes, then what are they?	What were the chemical constituents in the tanks?	What were the tanks / vessels used for?
TK-10	N	Cadmium Nitrate [Cd(NO3)2]	A 6,000 gallon tank that was used for storage of bulk liquid chemicals for use in the PUREX process. Note: This tank was drained and removed in the mid-1980's prior to deactivation.
TK-11	N	AFAN [NH4F—NH4NO3]	A 100,000 gallon tank that was used for storage of bulk liquid chemicals for use in the PUREX process.
TK-12	N	57% Nitric Acid (HNO3)	A 100,000 gallon tank used for storage of bulk liquid chemicals for use in the PUREX process.
TK-20	N	50% Sodium Hydroxide (NaOH)	A 30,000 gallon tank that was used for storage of bulk liquid chemicals for use in the PUREX process.
TK-21	N	45% Potassium Hydroxide (KOH)	A 30,000 gallon tank used for storage of bulk liquid chemicals for use in the PUREX process.
TK-30	N	Demineralized Water	A 100,000 gallon tank used for storage of demineralized water for use in the PUREX process.
TK-31	N	Pump House Sump Waste	Underground catch tank for pH adjustment prior to discharge to chemical sewer.
TK-33	N	50% Sodium Hydroxide (NaOH)	110-gallon product tank for use in neutralizing acidic solutions.
TK-34	N	Neutralizer	Neutralization of sump wastes
TK-40	Yes, contaminated with low levels of Sr-90, Ca-137, Pu-239, and Pu-240	NPH and TBP	A 65,000 gallon tank used for storage of bulk liquid chemicals for use in the PUREX process.
TK-41	N	TBP	A 30,000 gallon tank used for storage of bulk liquid chemicals for use in the PUREX process.
TK-42	N	Aluminum Nitrate Nonahydrate [Al(NO3)3].9H2O (ANN)	An 8,000 tank used for storage of bulk liquid chemicals for use in the PUREX process.
TK-50	N	93% Sulfuric Acid (H2SO4)	An 8,400 tank used for storage of bulk liquid chemicals for use in the PUREX process.
T-AX-1	N	Anion Resin (Purolite C-100)	Resin Storage (anion)
T-AX-2	N	Anion Resin (Purolite C-100)	Resin Storage (anion)
T-AX-3	N	Anion Resin (Purolite C-100)	Resin Storage (anion)
T-AX-4	N	50% Sodium Hydroxide (NaOH)	186.5 gallon tank for chemical storage
T-CX-1	N	Cation Resin (Amberlite IRA-93)	Resin Storage (cation)
T-CX-2	N	Cation Resin (Amberlite IRA-93)	Resin Storage (cation)
T-CX-3	N	Cation Resin (Amberlite IRA-93)	Resin Storage (cation)
T-CX-4	N	Cation Resin (Amberlite IRA-93)	Resin Storage (cation)

203-A: Acid Pump House / Acid Storage and Handling Facility

Vessel ID	Radioactive constituents (Y/N), if yes, then what are they?	What were the chemical constituents in the tanks?	What were the tanks / vessels used for?
TK-P1	N	Uranyl Nitrate – Hexahydrate (UNH)	A 100,000 gallon tank that was used for storage of UNH product used as part of the PUREX process.
TK-P2	N	UNH	A 100,000 gallon tank that was used for storage of UNH product used as part of the PUREX process.
TK-P3	N	UNH	A 100,000 gallon tank that was used for storage of UNH product used as part of the PUREX process.
TK-P4	N	UNH	A 100,000 gallon tank that was used for storage of UNH product used as part of the PUREX process.
TK-P5	Yes, U-235	UNH condensate	A 4,000 gallon tank that was used for storage of condensate from waste UNH concentration.
TK-P6	Yes, U-235	UNH	A 14,000 gallon tank that was used for storing and concentrating UNH and routing UNH solution back for to PUREX for rework.
TK-P13	Yes, U-235	Recovered Nitric Acid	A 7,300 gallon tank that was used for the storage of nitric acid recovered from the UO3 Plant.
TK-P14	Yes, U-235	Recovered Nitric Acid	A 7,300 gallon tank used for storage of nitric acid recovered from UO3 Plant.
TK-P15	Yes, U-235	Recovered Nitric Acid	13,800 gallon tank for storage of nitric acid recovered from UO3 Plant.

I reviewed the documentation regarding the completion of end point criteria for the 211-A Bulk Cold Chemical Tank Farm and the 203-A Acid Pump House / Acid Storage and Handling Facility. The documentation appeared to describe tank and vessel conditions after flushing actions as well as sample results if heels remained.

I reviewed the disposal documentation for the NPH and TBP stored in PUREX Plant tank systems, which states, the following.

An alternative was found using the Diversified Scientific Services Incorporated (DSSI) facility in Tennessee, with a plan to use this “low specific-activity material” to burn in a cogeneration facility to create electricity. Six (6) shipments of the “low specific-activity material” from PUREX were shipped to DSSI between September 27, 1995 and June 12, 1996.

The documentation provided appears to support the transport and disposal of the NPH and TBP at the DSSI facility in Tennessee.

I also reviewed the differential pressure monitoring records associated with the containment building and ventilation system. It is unclear if the data recorded on the *PUREX Surveillance and Monitoring Control System (SAMCONS) Rounds, 2CP-SOP-AU-05016, Data Sheet – SAMCONS Weekly Rounds for SOE* actually provides data to detect signs of releases of hazardous waste from the containment building.

References

- *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, WA78900008967, Revision 8c.*
- *October 1, 2008, Washington State Department of Ecology, PUREX Plant, Revision 12, Dangerous Waste Permit Application Part A Form.*
- *October 1, 2008, Washington State Department of Ecology, PUREX Storage Tunnels, Revision 7, Dangerous Waste Permit Application Part A Form.*
- *Hanford Federal Facility Agreement and Consent Order, 89-10, as amended through December 16, 2015.*
- *Surveillance and Maintenance Plan for the Plutonium-Uranium Extraction (PUREX) Facility DOE/RL-98-35, Revision 3, dated January 10, 2008.*
- *Calendar Year 2013 Hanford Site Mixed Waste Land Disposal Restriction Summary Report, DOE/RL-2014-14 Revision 0, Dated March 11, 2014*
- *Technical Procedure Surveillance of PUREX Facility 2CP-SUR-A-04002 Revision 3, Change 8, dated December 08, 2014.*
- *PUREX Facility Preclosure Work Plan, DOE/RL-95-78, Revision 1, dated April 1997.*
- *Building Emergency Plan for Surveillance and Maintenance, HNF-IP-0263-CP S&M, Revision 16 Dated February 5, 2015.*
- *PUREX Deactivation End Point Criteria, WHC-SD-WM-TPP-053, Revision 1*
- *WHC, 1995c, Sampling and Analysis Plan (SAP) for Plutonium-Uranium Extraction (PUREX) Plant Canyon Vessel Flushing, WHC-SD-CP-PLN-027*
- *Data Quality Objectives for PUREX Deactivation Flushing, WHC-SD-EN-TI-283, Revision 0, dated July 1994*

Compliance Problems

The Dangerous Waste inspection on **March 12, 2015** found the following compliance problems.

Each problem is covered in three parts:

- (1) **Citation from the regulations**
- (2) **Specific observations** from the inspection that highlight the problem
- (3) **Required actions** needed to fix the problem and achieve compliance.

The problems listed below must be corrected to comply with Washington Dangerous Waste Regulations (Chapter 173-303 WAC), or other environmental laws or regulations. Complete the required actions listed below and respond to Ecology at the following address within 60 days of receipt of this compliance report. Include all supporting documentation such as photographs, records, and statements explaining the actions taken and dates completed to return to compliance.

Attention: Edward Holbrook
Washington Department of Ecology
Nuclear Waste Program
3100 Port of Benton Blvd
Richland, WA 99354

You may request an extension of the deadlines to achieve compliance. Make the request in writing, including the reasons an extension is necessary and proposed date(s) for completion, and send it to Edward Holbrook before the date specified above. Ecology will provide a written approval or denial of your request.

**If you have any questions about information in this Compliance Report, please call:
Edward Holbrook at (509) 372-7909**

This does not relieve you of your continuing responsibility to comply with the regulations at all times.

- 1) **WAC 173-303-400(3), as referenced by the Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion Revision 8C- Condition I.A Effect of Permit.**

WAC 173-303-320(2)(d). The owner or operator must keep an inspection log or summary, including at least the date and time of the inspection, the printed name and the handwritten signature of the inspector, a notation of the observations made, an account of spills or discharges in accordance with WAC 173-303-145, and the date and nature of any repairs or remedial actions taken. The log or summary must be kept at the facility for at least five years from the date of inspection.

Observations: I observed on the inspection records for the 2014 Annual Surveillance of the PUREX Plant and Storage Tunnels had initials "WM" for the first and middle name and the full last name written. On the inspection records for the 2014 Annual Surveillance records of the PUREX Plant and Storage Tunnels, I did not observe the time of inspection. The date and nature

of repairs or remedial actions appear to be partially documented on the inspection records for the 2014 Annual Surveillance and attachments. The attachment *PUREX Annual Surveillance 2014, SM-14-04067*, does not clearly outline and describe whether a repair or remedial action has taken place, been put on a schedule with reference information, and the dates the actions were taken.

Action Required: USDOE and CHRPC must immediately start documenting the time of the inspection on the inspection records. USDOE and CHRPC must also immediately start documenting the date and nature of repairs or remedial actions taken.

Within 60 days upon receipt of this compliance report, USDOE and CHRPC must note in their operating record the dates that inspection records were deficient and the description of the deficiency with WAC 173-303-320(2)(d) requirements and submit a copy of the documentation placed in the operating record to Ecology.

- 2) **WAC 173-303-400(3), as referenced by the Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion Revision 8C- Condition I.A Effect of Permit.**

WAC 173-303-340(1), Preparedness and Prevention. Required equipment. All facilities must be equipped with the following, unless it can be demonstrated to the department that none of the hazards posed by waste handled at the facility could require a particular kind of equipment specified below: (a) An internal communications or alarm system capable of providing immediate emergency instruction to facility personnel; (b) A device, such as a telephone or a hand-held, two-way radio, capable of summoning emergency assistance from local police departments, fire departments, or state or local emergency response teams; (c) Portable fire extinguishers, fire control equipment (including special extinguishing equipment, such as that using foam, inert gas, or dry chemicals), spill control equipment, and decontamination equipment; and (d) Water at adequate volume and pressure to supply water hose streams, foam producing equipment, automatic sprinklers, or water spray systems. All facility communications or alarm systems, fire protection equipment, spill control equipment, and decontamination equipment, where required, must be tested and maintained as necessary to assure its proper operation in time of emergency.

Observations: I observed in my review of the S&M Building Emergency Plan, HNF-IP-0263-CP, that it does not describe spill or emergency equipment located at the PUREX Plant. During the field inspection, I did not observe spill or emergency equipment. A similar area of non-compliance was cited during the B Plant Complex Inspection (Compliance Index No.: 14.502). The PUREX Plant and the B Plant Complex share the same building emergency plan, HNF-IP-0263-CP. On November 24, 2015 during a meeting regarding the B Plant Complex and emergency equipment, I received verbal notification from Mr. Dixon and Mr. Corriell that a combination of spill and emergency equipment kit would be staged at the PUREX Plant and B Plant Complex. I was also told the Building Emergency Plan, HNF-IP-0263-CP would describe the location of the kit.

Action Required: Upon receipt of this compliance report, USDOE and CHRPC must place all required spill and emergency equipment in accordance with WAC 173-303-340(1) at the PUREX Plant. The location and description of the equipment must be included in the revised S&M BEP. Within 60 days of receipt of this compliance report, provide the dates in which the spill and emergency equipment were staged at the PUREX Plant and dates the changes were made to the S&M BEP.

3) WAC 173-303-400(3), as referenced by the Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion Revision 8C- Condition I.A Effect of Permit.

WAC 173-303-350(3). The contingency plan must contain the following: (f) An evacuation plan for facility personnel where there is a possibility that evacuation could be necessary. This plan must describe the signal(s) to be used to begin evacuation, evacuation routes, and alternate evacuation routes.

Observation: I observed the S&M Building Emergency Plan, HNF-IP-0263-CP is missing descriptions of evacuation and alternative evacuation routes for the PUREX Plant. A similar area of non-compliance was cited during the B Plant Complex Inspection (Compliance Index No.: 14.502). Both the PUREX Plant and the B Plant Complex share the same building emergency plan, HNF-IP-0263-CP. On November 24, 2015, during a meeting regarding the B Plant Complex and evacuation routes, I received verbal notification from Mr. Dixon and Mr. Corriell that evacuation route descriptions would be added to the Building Emergency Plan, HNF-IP-0263-CP.

Action Required: Upon receipt of this compliance report, USDOE and CHPRC must include descriptions of evacuation routes and alternative evacuation routes in the S&M BEP for the PUREX Plant. Within 60 days of receipt of this compliance report, provide the date the changes were made to the S&M BEP.

4) WAC 173-303-400(3), as referenced by the Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion Revision 8C- Condition I.A Effect of Permit.

WAC 173-303-640(5)(d). All tank systems holding dangerous waste must be marked with labels or signs to identify the waste contained in the tank. The label or sign must be legible at a distance of at least fifty feet, and must bear a legend which identifies the waste in a manner which adequately warns employees, emergency response personnel, and the public of the major risk(s) associated with the waste being stored or treated in the tank system(s). (Note-If there already is a system in use that performs this function in accordance with local, state or federal regulations, then such system will be adequate.)

Observation: USDOE and CHPRC have not provided the needed documentation to Ecology to demonstrate why the two tank systems (TK-40 and TK-P4) located outside of the 202-A Canyon Building do not need the required signs or labels to identify the major risk of the waste contained in the tank. I also observed in my review of the PUREX S&M Plan, that there was the potential presence of residual nitric acid, sulfuric acid, KOH, NOH, TBP, NPH, AFAN and ANN in the 203-A and 211-A areas. Additionally, I did not observe in my review of the PUREX End Point Document, PUREX Preclosure Work Plan, or the PUREX S&M Plan a section describing the interim status standards that cannot by met, its justification, or a proposed alternative to comply with WAC 173-303-640(5)(d).

Action Required: Within 60 days of receipt of this compliance report, USDOE and CHPRC must label the two tank systems (TK-40 and TK-P4) located at 203-A and 211-A in accordance with WAC 173-303-640(5)(d). USDOE and CHPRC must submit to Ecology supporting

photographs that labeling has been completed within the 60 days upon receipt of this compliance report.

5) WAC 173-303-400(3), as referenced by the Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion Revision 8C- Condition I.A Effect of Permit.

40 CFR 265.195(b) as incorporated by WAC 173-303-400(3)(a) and modified by WAC 173-303-400(3)(c)(ix)(H). The owner or operator must inspect at least once each operating day:

40 CFR 265.195(b)(2) Above ground portions of the tank system, if any, to detect corrosion or releases of waste; and

40 CFR 265.195(b)(3) The construction materials and the area immediately surrounding the externally accessible portion of the tank system, including the secondary containment system (e.g., dikes) to detect erosion or signs of releases of dangerous waste (e.g., wet spots, dead vegetation).

Observation: USDOE and CHPRC have not demonstrated why tank systems TK-40 and TK-P4 are not accessible (according to Table 6-1 in the PUREX S&M Plan) and not subject to 40 CFR 265.195 and WAC 173-303-320 requirements. USDOE or CHPRC have not conducted inspections at least once each operating day for tank systems TK-40 and TK-P4. I did not observe in the PUREX End Point Document, PUREX Preclosure Work Plan, or the PUREX S&M Plan a section describing the interim status standards that cannot be met, the justification, or a proposed alternative to comply with 40 CFR 265.195(b), 265.195(b)(2), and 265.195(b)(3).

Action Required: Within 60 days of receipt of this compliance report USDOE and CHPRC must begin to conduct inspections of tank systems TK-40 and TK-P4 in accordance with 40 CFR 265.195(b), 265.195(b)(2), 265.195(b)(3) and WAC 173-303-320. Within 60 days of receipt of this compliance report, the start date and two weeks of inspection records must be submitted to Ecology.

Concerns

- 1) I did not observe current tank and vessel system inventories of DW or MW remaining in the PUREX End Point Document, PUREX Preclosure Work Plan, PUREX S&M Plan, or PUREX Plant Part A.

I did obtain an inventory titled *PUREX Vessel Regulatory Status, Revision 1*, dated April 19, 1994, which would not have accounted for all of the flushes completed by the end of the Transition Phase. I observed inventory volumes ranged from 0 to 81,380 gallons as of April 19, 1994.

The PUREX End Point Document, Section II, states the following.

Many of the vessels containing the process and flush solutions from standby cannot be completely emptied since solutions are removed from the top using turbine pumps or jets, leaving a solution heel ranging from several liters to several hundred liters.

The PUREX Preclosure Work Plan, Section 7, states the following.

Following the completion of all vessel system flushing, the liquid level in the vessels will be left at the lowest level possible (the residual heels vary between approximately 70 and 400 liters) using existing jets and/or pumps. All liquid feed and/or drain lines will be isolated after emptying the vessel systems and cell sumps to prevent any inadvertent backflow of liquids.

The PUREX S&M Plan, Appendix A, appears to provide material descriptions, quantity, and states of materials (lead counterweights, jumpers, shielding, etc.). The Appendix A, appears to reference the "PUREX Plant Vessel Table in the Part A Form," and not provide the quantity or state of the residual or solution heel left in place.

I did not find an inventory, either current or generated at the end of the Transition Phase for DW or MW remaining in tank and vessel system DWMUs.

- 2) Characteristic information on Tank and Vessel System: Sampling individual vessels vs sampling a series of vessels to determine a heel no longer designates. Data Quality Objective for PUREX Deactivation deficiencies. I did observe sample and analytical results taken during deactivation and flushing operations during the Transition Phase, which appear to have incorporated all DWMU Tank Systems. It is not clear whether the sample and analytical results or the Data Quality Objective document had addressed Ecology's concerns.

The PUREX Preclosure Work Plan states the following.

The vessel systems were each identified as part of 12 loops (Figures 4-1 through 4-12) designated for flushing. Flush solutions were cascaded within each vessel. Samples were taken in a tank at the end of the flush loop. In addition to the 12 flush loops, tanks F4, M2, P4, and U3, individually were flushed and sampled. Tanks 40, Q21, and Q22 were not sampled because the tanks have bottom drains, which left no heel.

The PUREX S&M Plan, Section 6, Table 6-1, states the following.

These solutions were removed leaving a non-dangerous heel per the Data Quality Objectives for PUREX Deactivation Flushing, WHC-SD-EN-TI-283, Rev. 0. Removal of the dangerous waste solutions ensured that the vessels were left in a state for minimum surveillance and maintenance until subsequent closure. Therefore, per the Tri-Party Agreement M-80-94-01

agreement, no surveillances of the dangerous waste units or ancillary equipment are performed.

The PUREX S&M Plan, Appendix A, states the following for 203-A and 211-A.

All tanks in the 203-A area have been flushed and emptied to a minimum heel and their associated piping drained. However, there may exist the potential for residual nitric acid in these areas. Vessels located in 203-A are listed in the PUREX Plant Vessel Table in the Part A Form. Trace amounts to none.

All tanks in the 211-A area have been flushed and emptied to a minimum heel and their associated piping drained. However, there may exist the potential for residual nitric acid, sulfuric acid, KOH, NOH, TBP, NPH, AFAN and ANN in these areas. Vessels located in 211-A are listed in the PUREX Plant Vessel Table in the Part A Form.

I reviewed the *Data Quality Objectives for PUREX Deactivation Flushing, WHC-SD-EN-TI-283, Revision 0*, dated July 1994 and reviewed an Ecology letter titled PUREX Data Quality Objective Document Review, 0039532, dated November 14, 1994 with a receive stamp dated December 1994. The letter states, in part, the following.

I have reviewed the Data Quality Objectives for PUREX Deactivation Flushing Draft Document (WHC-SD-EN-TI-283 Draft A) and have found it deficient in a number of areas which need to be addressed.

The letter outlines eight concerns regarding missing or deficient information throughout WHC-SD-EN-TI-283. The concerns address sampling methods, process knowledge verification, and the lack of sufficient explanations in certain sections.

- 3) The 40 CFR Part 265, Subpart G, describes requirements for generating and maintaining a closure plan. Previous versions of the TPA, Section 8, described requirements for generating and maintaining preclosure work plan. The TPA, Section 8 version in affect during the Transition Phase (Documented in this compliance report), outlined the requirements for the PUREX Preclosure Work Plan. The sections included an introduction, facility description, process information, waste characteristics, groundwater monitoring, closure strategy and performance standards, closure activities, postclosure plan, and references. There appears to be discrepant or missing information from the PUREX Preclosure Work Plan, which include the following.
- I observed in §7.2 a reference to “WHC 1995d” regarding flushes of tank and vessel systems. I did not observe “WHC 1995d” in the reference section.
 - I observed in §7.2 a reference to 200-PO-2 operable unit for soil samples and analysis. Information regarding 200-PO-2 or a corrective action investigation is limited.
 - The facility description and processes for 10 of the 45 DWMU Tank Systems are described in detail. The facility description and processes of the 35 other DWMU Tank Systems were not described in detail.

It is unclear whether the PUREX Preclosure Work Plan, which is in accordance with TPA Sections 8 and 9, allows USDOE and CHPRC to not maintain a closure plan in accordance with 40 CFR Part 265, Subpart G. There is a difference between the obligation of USDOE and CHPRC to maintain a closure plan in the facility’s operating record and the requirement to

submit a closure plan during the Disposition Phase, in accordance with the TPA, Section 8. The TPA requirement to submit a final closure plan to Ecology does not preclude USDOE and CHPRC from the requirement to maintain a closure plan for the PUREX Plant in the operating record.

- 4) The PUREX S&M Plan describes the use of differential pressure monitoring as an alternative to inspecting the containment building, which was described as satisfying the 40 CFR 265.1101(c)(4) requirement "to maintain the containment building's integrity. The plan states that no additional surveillance of the dangerous waste or ancillary equipment will be performed to satisfy this requirement." The use of weekly differential pressure monitoring instead of inspections once every seven days does not clearly demonstrate the ability to detect a release of HW or MW.

Table 6-1 [referring to the 40 CFR 265.1101(c)(4)] states, the following.

Inspect and record in the facility's operating record at least once every seven days, except for Performance Track member facilities, that must inspect up to once each month, upon approval of the director, data gathered from monitoring and leak detection equipment as well as the containment building and the area immediately surrounding the containment building to detect signs of releases of hazardous waste. To apply for reduced inspection frequency, the Performance Track member facility must follow the procedures described in §265.15(b)(5).

The PUREX S&M Plan does not specify the frequency or criteria for differential pressure monitoring of the containment building or a procedure for monitoring the containment building.

- 5) I observed the PUREX Surveillance and Maintenance Plan, §3.3, Types of Maintenance and Frequency, appears to describe ventilation system maintenance and references unspecified regulatory requirements and procedures that dictate the frequency of maintenance. It is unclear if the maintenance frequency requirements are being met.

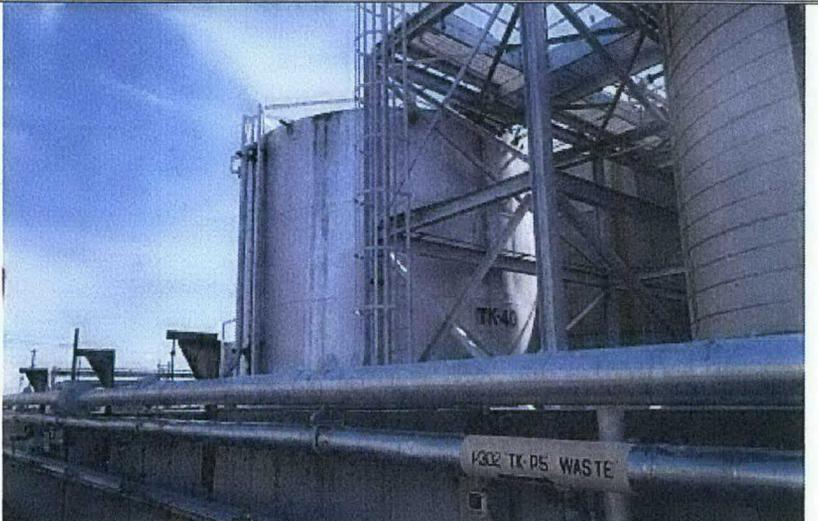
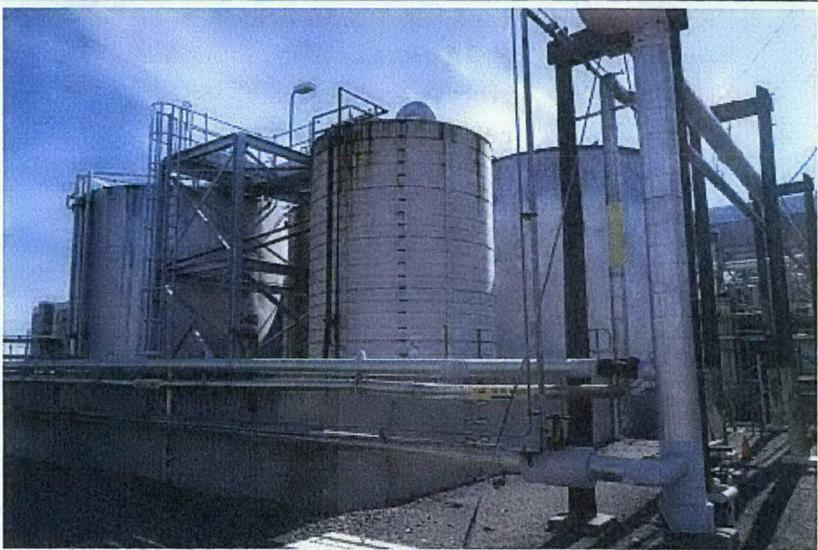
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PUREX Facility & Storage Tunnels (WA7890008967)

Inspection Date: March 12, 2015

Photographer: Jared Mathey

Witness: Edward Holbrook

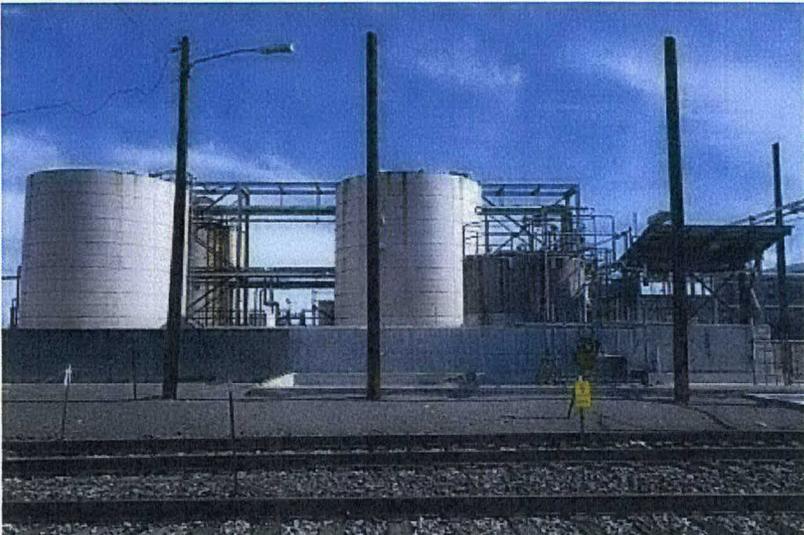
No.	Location	Activity Description or Other Comment	Photo
1.	PUREX – 200 Area East - Hanford Site	Tank TK-40 in Tank Farm 211-A.	 A photograph showing a large, cylindrical stainless steel storage tank labeled 'TK-40' in a tank farm. The tank is surrounded by a complex network of metal scaffolding and pipes. In the foreground, a horizontal pipe is labeled 'K302 TK-05 WASTE'. The sky is clear and blue.
2.	PUREX – 200 Area East - Hanford Site	211-A Bulk Cold Chemical Tank Farm – Facing Southeast.	 A photograph of a tank farm with several large, cylindrical stainless steel tanks. The tanks are interconnected by a dense network of pipes and metal structures. The view is from a slightly elevated position, looking across the tanks. The sky is blue with some light clouds.
3.	PUREX – 200 Area East - Hanford Site	Tank Farm 203A Acid Pump House/ Acid Storage and Handling Facility – Facing North.	 A photograph showing a tank farm with several large, cylindrical stainless steel tanks. The tanks are surrounded by a complex network of pipes and metal structures. In the foreground, there is a concrete walkway and a dark-colored building. The sky is blue.

PUREX Facility & Storage Tunnels (WA7890008967)

Inspection Date: March 12, 2015

Photographer: Jared Mathey

Witness: Edward Holbrook

No.	Location	Activity Description or Other Comment	Photo
4.	PUREX – 200 Area East - Hanford Site	Tank Farm 203A Acid Pump House/ Acid Storage and Handling Facility – Facing West.	 A photograph showing an industrial facility with several large white cylindrical tanks and a complex network of metal pipes and scaffolding. A concrete wall is in the foreground, and the sky is blue with some clouds.
5.	PUREX – 200 Area East - Hanford Site	Tank Farm 203A Acid Pump House/ Acid Storage and Handling Facility – Facing East.	 A photograph of an industrial site featuring two large white cylindrical tanks and a network of pipes. A utility pole and a street light are visible in the foreground. The sky is blue.
6.	PUREX – 200 Area East - Hanford Site	Tank Farm 211-A Bulk Cold Chemical Tank Farm – Facing East.	 A photograph of an industrial facility with large white cylindrical tanks and a complex piping system. A concrete wall is in the foreground, and the sky is blue.

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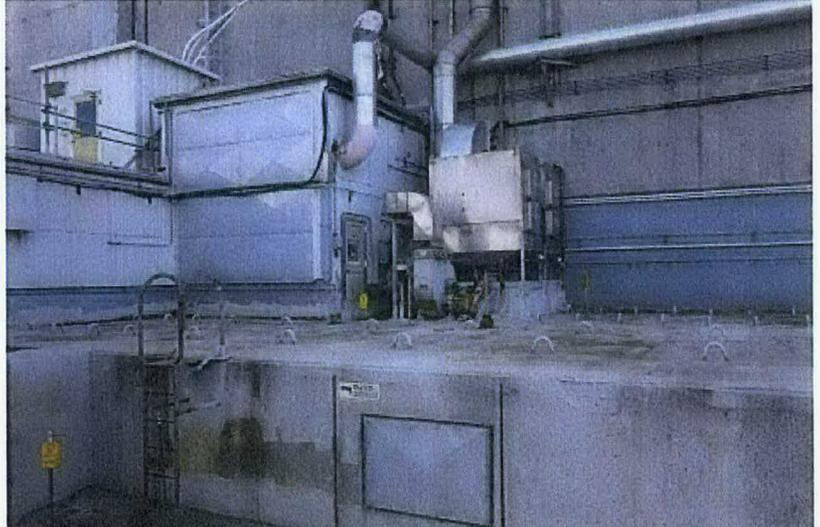
No.	Location	Activity Description or Other Comment	Photo
7.	PUREX – 200 Area East - Hanford Site	202-A PUREX Aqueous Make Up (AMU) entrance – Facing South.	
8.	PUREX – 200 Area East - Hanford Site	202-A PUREX Main Entrance and AMU – Facing Southeast.	
9.	PUREX – 200 Area East - Hanford Site	North side of 202-A PUREX Facility - Facing South.	

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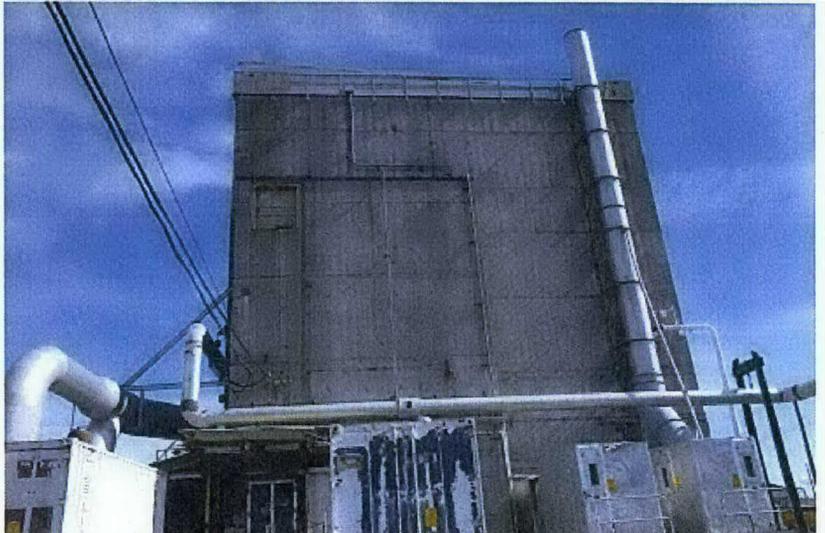
No.	Location	Activity Description or Other Comment	Photo
10.	PUREX – 200 Area East - Hanford Site	276-A R-Cell	
11.	PUREX – 200 Area East - Hanford Site	Top of 276-A R-Cell	
12.	PUREX – 200 Area East - Hanford Site	Top of 276-A R-Cell	

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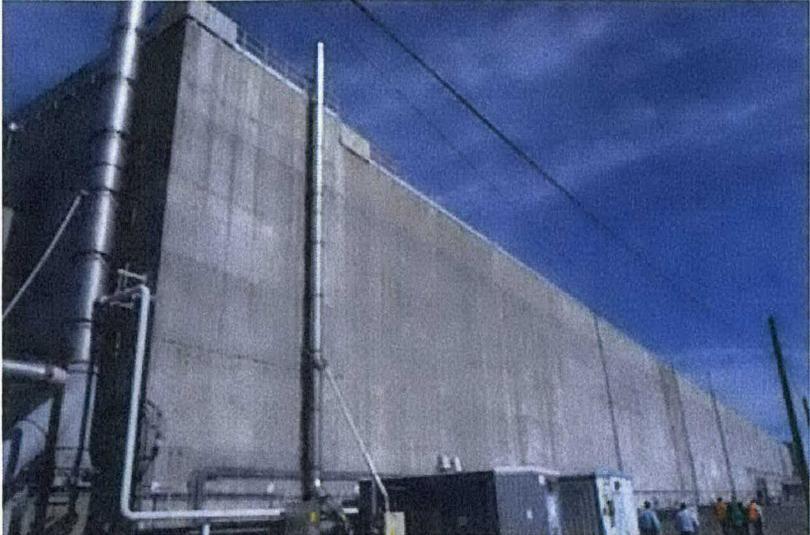
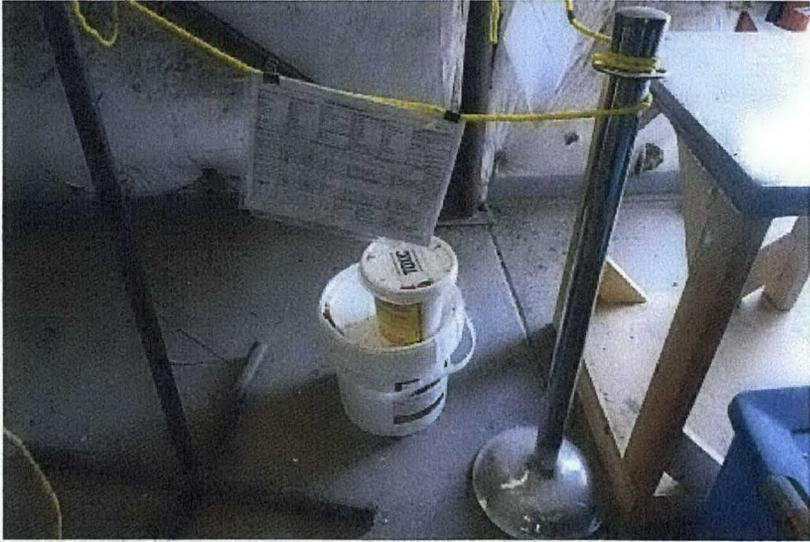
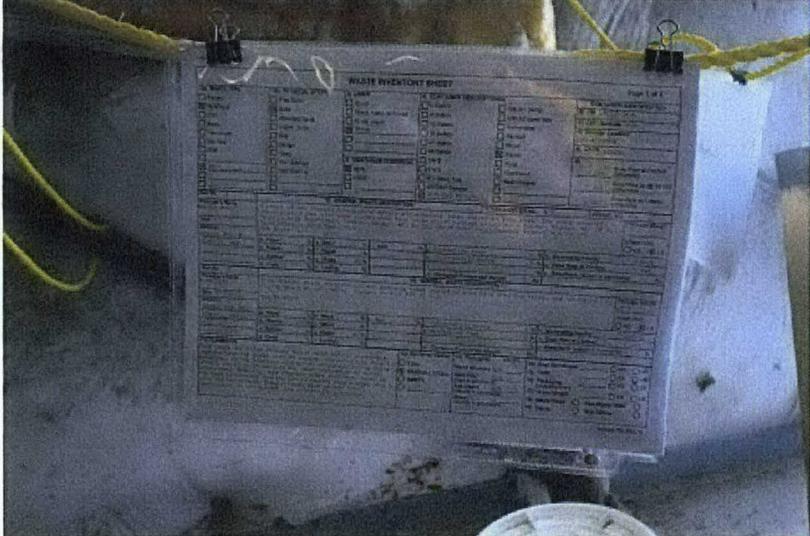
No.	Location	Activity Description or Other Comment	Photo
13.	PUREX – 200 Area East - Hanford Site	North side of 202-A on west end – Facing South.	
14.	PUREX – 200 Area East - Hanford Site	North side of 202-A on west end – Facing Southeast.	
15.	PUREX – 200 Area East - Hanford Site	West side of 202-A – Facing East.	

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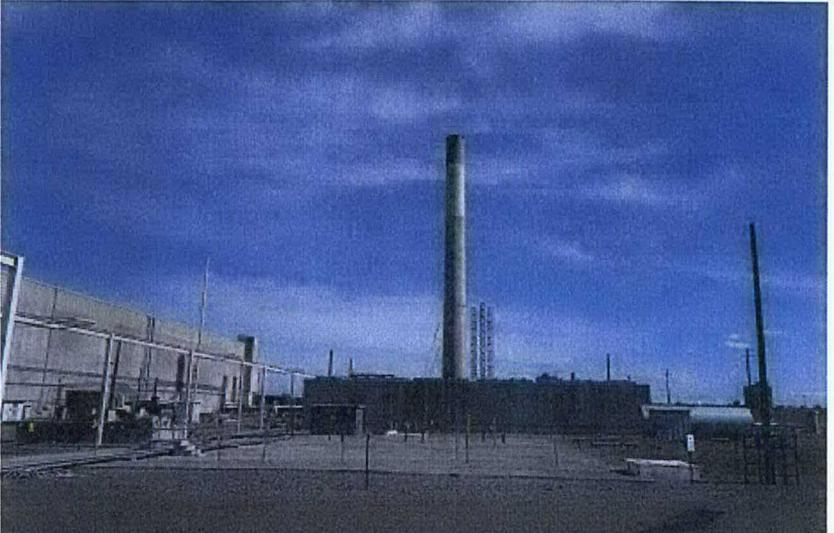
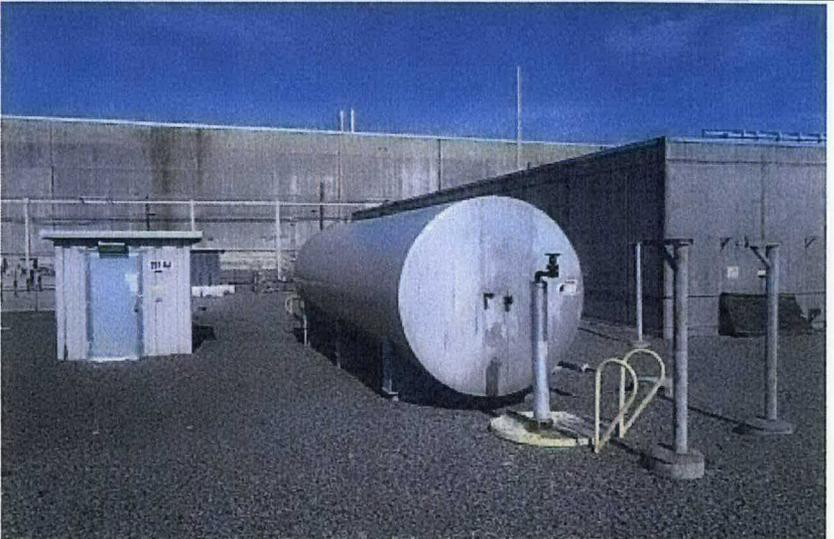
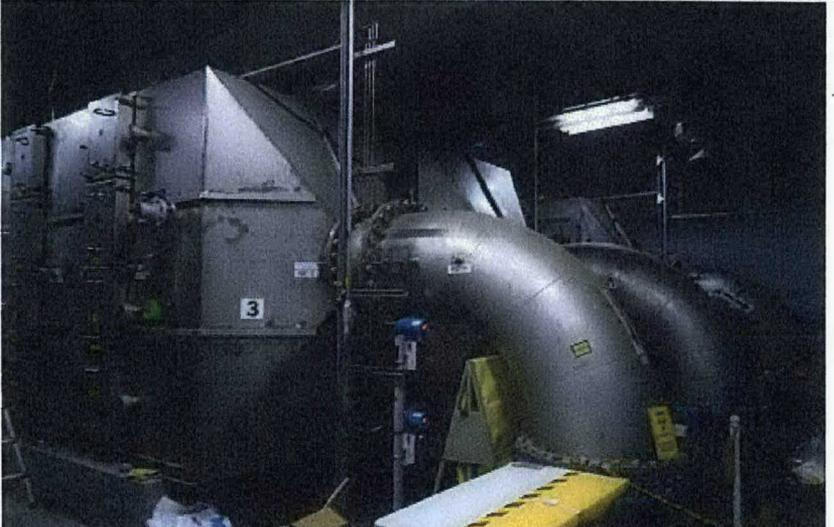
No.	Location	Activity Description or Other Comment	Photo
16.	PUREX – 200 Area East - Hanford Site	South side of 202-A on west end Facing Northeast.	
17.	PUREX – 200 Area East - Hanford Site	Satellite Accumulation Area (SAA) in 221-A building.	
18.	PUREX – 200 Area East - Hanford Site	SAA paperwork on 221-A building.	

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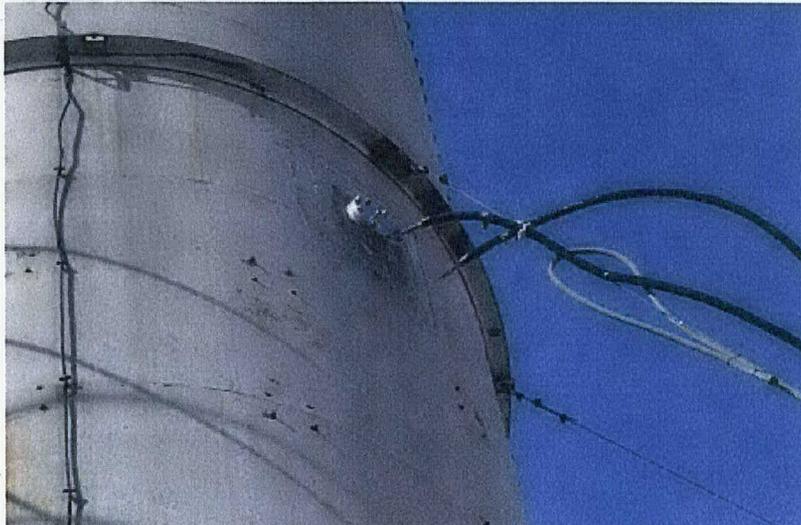
No.	Location	Activity Description or Other Comment	Photo
19.	PUREX – 200 Area East - Hanford Site	291-A-1 Exhaust Stack for 202-A and Building 291-AE - HEPA Filter Building in front of stack – Facing East.	 A photograph showing a tall, dark exhaust stack in the background. In the foreground, there is a large, light-colored industrial building with a flat roof. The sky is clear and blue.
20.	PUREX – 200 Area East - Hanford Site	3 rd Filter Outlet Water Seal Tank.	 A photograph of a large, horizontal, cylindrical metal tank. The tank is situated on a gravel surface. To the left of the tank is a small, light-colored utility building. In the background, there are large industrial structures and a clear blue sky.
21.	PUREX – 200 Area East - Hanford Site	Building 291-AE - HEPA Filter Exhaust Bank.	 An interior photograph of an industrial facility. The scene is dimly lit, with bright overhead lights. Large, complex metal structures, likely HEPA filter exhaust banks, are visible. A yellow caution sign is in the foreground, and a white box with the number '3' is on a piece of equipment.

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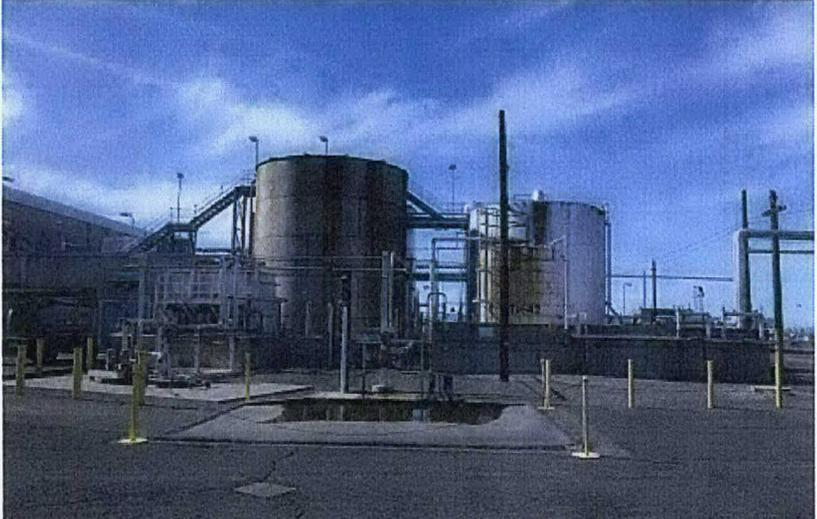
No.	Location	Activity Description or Other Comment	Photo
22.	PUREX – 200 Area East - Hanford Site	Building 291-A – Steam Operated Emergency Fan Building.	
23.	PUREX – 200 Area East - Hanford Site	Building 217-A – Surveillance, Monitoring, and Control System - SAMCON Building.	
24.	PUREX – 200 Area East - Hanford Site	Detached RAD sampling probe on 291-A-1 Exhaust Stack for 202-A.	

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No.	Location	Activity Description or Other Comment	Photo
25.	PUREX – 200 Area East - Hanford Site	Entrance to PUREX Storage Tunnel #1 – 218-E-14.	
26.	PUREX – 200 Area East - Hanford Site	SAA Building 221-A Storage Building.	
27.	PUREX – 200 Area East - Hanford Site	Tank Farm 211-A Bulk Cold Chemical Tank Farm – Facing West.	

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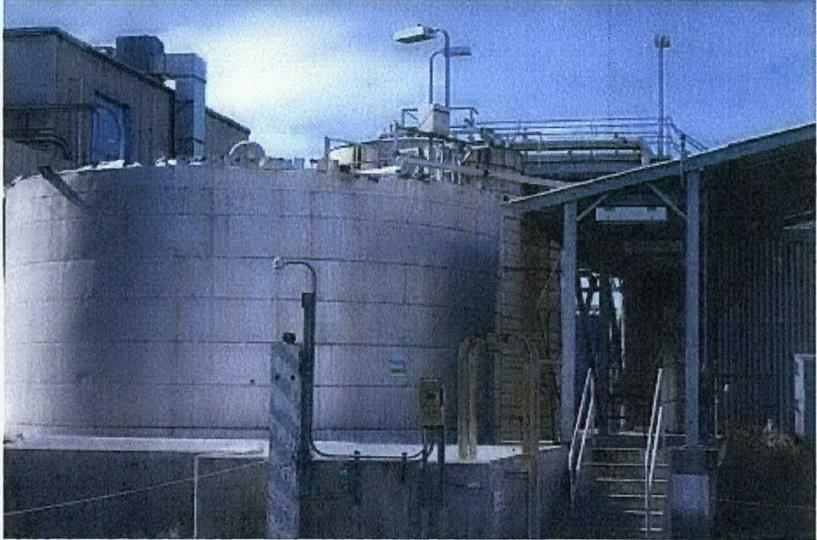
No.	Location	Activity Description or Other Comment	Photo
28.	PUREX – 200 Area East - Hanford Site	Tank Farm 211-A Bulk Cold Chemical Tank Farm – Facing Southwest.	
29.	PUREX – 200 Area East - Hanford Site	North side of 202-A Purex Facility East End – Facing South.	
30.	PUREX – 200 Area East - Hanford Site	North side of 202-A Purex Facility East End – Facing South.	

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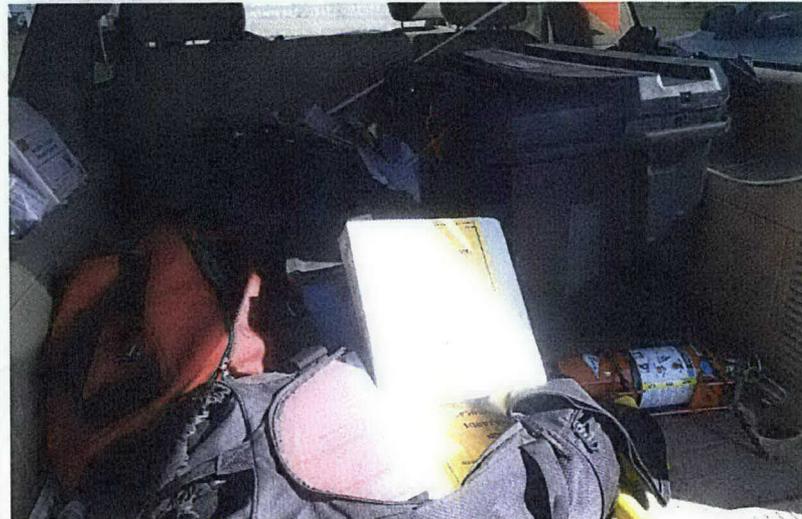
No.	Location	Activity Description or Other Comment	Photo
31.	PUREX – 200 Area East - Hanford Site	204-A U Cell Storage Vault.	
32.	PUREX – 200 Area East - Hanford Site	Deionized Water Tank – 211-A Tank Farm.	
33.	PUREX – 200 Area East - Hanford Site	Shut down exhaust on Purex Storage Tunnel 2 – South end of tunnel.	

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No.	Location	Activity Description or Other Comment	Photo
34.	PUREX – 200 Area East - Hanford Site	Isolated exhaust on Purex Storage Tunnel 2 – South end of tunnel.	 A photograph showing an industrial exhaust system. A vertical pipe with a yellow label at the top is connected to a large metal structure. The background shows a clear blue sky and some industrial buildings.
35.	200 Area East - Hanford Site	Backup emergency equipment box.	 A photograph of a room containing emergency equipment. On a white desk, there are several boxes, including one labeled 'GRAMIER', and two red fire extinguishers. A black plastic storage bin is on the floor in front of the desk.
36.	200 Area East - Hanford Site	Emergency equipment and manuals in back of BED Rig for surveillance and maintenance.	 A photograph of a storage area. In the foreground, there is a grey bag containing a white box and other items. In the background, there is a large black trash bin and other equipment.