

**277-T BUILDING  
ADDENDUM H  
CLOSURE PLAN  
CHANGE CONTROL LOG**

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The “**Modification Number**” represents Ecology’s method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

<b>Modification Date</b>	<b>Modification Number</b>
02/03/2026	PCN-277TBLDG-2025-02 (8C.2026.Q1)
03/11/2025	PCN-277TBLDG-2025-01 (8C.2025.Q1)
03/13/2024	PCN-277TBLDG-2024-01 (8C.2024.Q1)
08/17/2023	8C.2023.3F
12/06/2021	8C.2021.1F

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**277-T BUILDING  
ADDENDUM H  
CLOSURE PLAN**

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**ADDENDUM H  
CLOSURE PLAN**

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**TERMS**

ASTM	American Society for Testing and Materials
CFR	Code of Federal Regulations
COC	Chain-of-Custody
CPCCo	Central Plateau Cleanup Company, LLC
DOE	U.S. Department of Energy
DOE-RL	U.S. Department of Energy, Richland Operations Office
DQA	Data Quality Assessment
DQO	Data Quality Objectives
DWMU	Dangerous Waste Management Unit
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
FWS	Field Work Supervisor
HEIS	Hanford Environmental Information System
HHE	Human Health and the Environment
HWMA	Hazardous Waste Management Act (Revised Code of Washington [RCW] 70A.300, Washington Administrative [WAC] 173-303)
IQRPE	Independent Qualified Registered Professional Engineer
MTCA	<i>Model Toxics Control Act—Cleanup</i> (RCW 70A.305, WAC 173-340)
PQL	Practical Quantitation Limit
QA	Quality Assurance
QC	Quality Control
RCRA	<i>Resource Conservation and Recovery Act of 1976</i>
RCW	Revised Code of Washington
SAA	Satellite Accumulation Area
SAP	Sampling and Analysis Plan
SWOC	Solid Waste Operations Complex
VOA	Volatile Organic Analysis
WAC	Washington Administrative Code
WIDS	Waste Information Data System

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## 1 H.1 INTRODUCTION

2 The purpose of this plan is to describe the *Resource Conservation and Recovery Act of 1976*  
3 (RCRA)/Hazardous Waste Management Act (HWMA), Chapter 70A.300 Revised Code of Washington  
4 (RCW) closure process for the 277-T Building Dangerous Waste Management Unit (DWMU), hereinafter  
5 called the 277-T Building. The 277-T Building is located northeast of the central portion of the T Plant  
6 Complex in the 200 West Area of the Hanford Site (Figure H-1). The U.S. Department of Energy (DOE),  
7 Richland Operations Office (RL) and Central Plateau Cleanup Company (CPCCo), hereinafter called the  
8 Permittees, along with the Washington State Department of Ecology (Ecology), have agreed to close this  
9 DWMU. The DOE-RL and CPCCo appealed the seven Solid Waste Operations Complex (SWOC) closure  
10 plans shortly after they were issued in December of 2021. This closure plan is one of the seven that were  
11 part of the appeal. Ecology met with DOE-RL and CPCCo to resolve the appeal issues through mediation.  
12 A Settlement Agreement was reached in October 2022 (Pollution Control Hearings Board [PCHB]  
13 No. 22-001). This closure plan is revised to reflect changes agreed to in that Settlement Agreement. The  
14 277-T Building is no longer used for storage of dangerous or mixed waste and will be clean closed.

15 This closure plan complies with closure requirements in Washington Administrative Code  
16 (WAC) 173-303-610(2) through WAC 173-303-610(6), *Closure and post-closure*, and WAC 173-303-  
17 630(10), *Use and management of containers*.

18 Amendments to this closure plan must be submitted as a permit modification request in accordance with  
19 Permit Condition I.C.3.

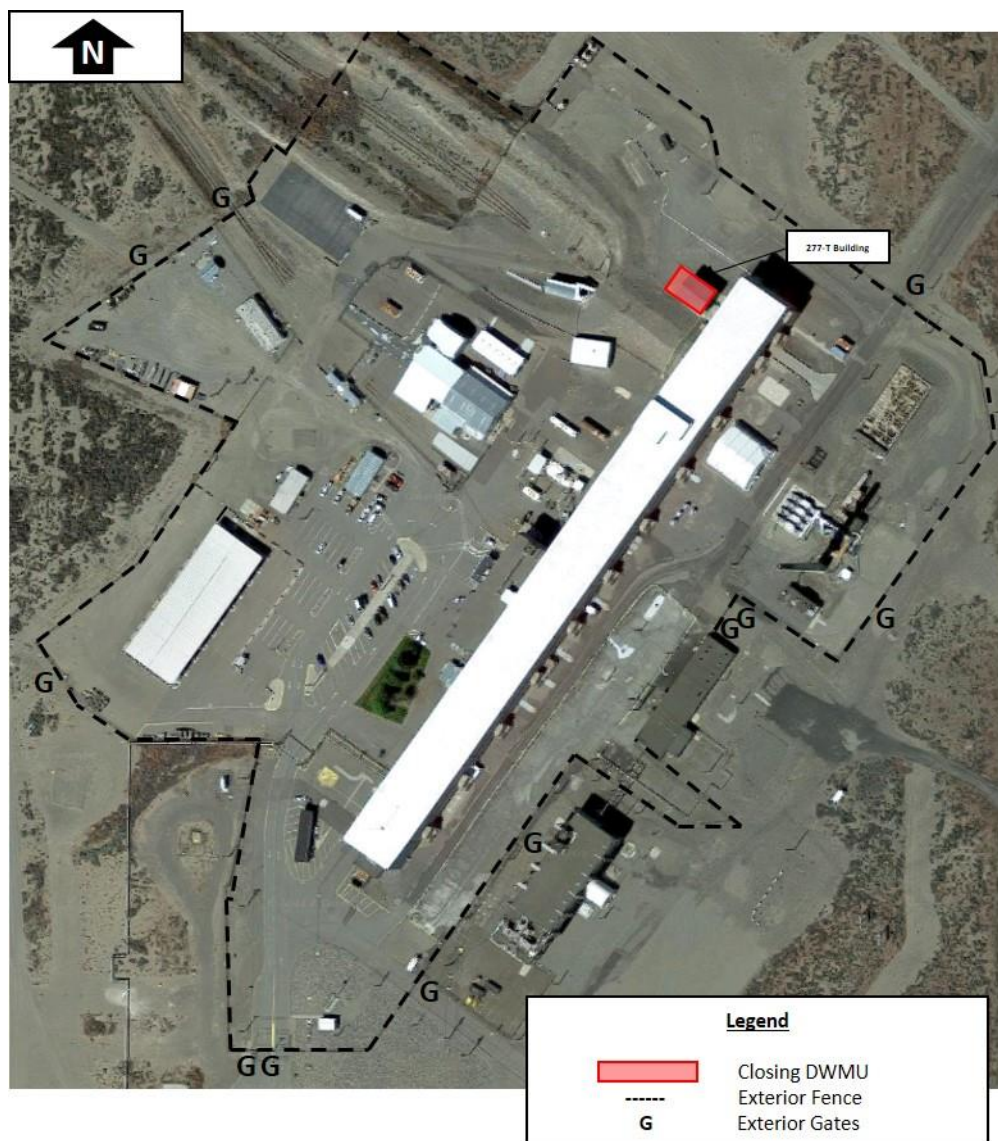
20 Minor deviations from this closure plan must be addressed in accordance with Permit Condition II.K.6  
21 and Unit-Specific Permit Condition V.27.B.2.

22 Closure requirements are based on RCW 70A.300, WAC 173-303, and Ecology guidance  
23 (Ecology Publication #94-111, *Guidance for Clean Closure of Dangerous Waste Units and Facilities*).  
24 This closure plan is also designed to fulfill the elements of the Data Quality Objectives (DQO) Process, as  
25 defined in U.S. Environmental Protection Agency (EPA) Publication EPA/240/B-06/001, *Guidance on*  
26 *Systematic Planning Using the Data Quality Objectives Process* (EPA QA/G-4). A site-specific DQO has  
27 been incorporated into this closure plan.

28 This closure plan describes in detail the closure activities necessary to achieve closure performance  
29 standards for the 277-T Building. Closure activities include:

- 30 • Removal of all dangerous and mixed waste.
- 31 • Records review (i.e., container storage, operating, and inspection records) for documented spills  
32 or releases of dangerous or mixed waste and subsequent cleanup activities.
- 33 • Visual inspection to evaluate the condition of the concrete surface and the likelihood of potential  
34 exposure pathways for contamination of the underlying soil.
- 35 • Decontaminate the concrete surface to meet the “Alternative Treatment Standards for Hazardous  
36 Debris” 40 Code of Federal Regulations (CFR) § 268.45, Table 1, footnote 3. Decontamination  
37 will remove at least 0.6 cm (~1/4 in.) of the surface layer and meet treatment to a “clean debris  
38 surface.”
- 39 • Visual inspection to confirm a “clean debris surface” has been met.
- 40 • Sampling of underlying soil to evaluate whether closure performance standards are met.
- 41 • Transmit closure certification to Ecology.

42 Closure will be performed in accordance with the schedule provided in Section H.6.



1 **Figure H-1 T Plant Complex Overview, 277-T Building**  
2 **Dangerous Waste Management Unit (Month Unknown, 2017)**  
3

4 **H.1.1 Unit Description**

5 The 277-T Building (Figure H-2 and Figure H-3) is located west of the 221-T Canyon Building and  
6 adjacent to the 277-T Outdoor Storage Area. The 277-T Building is a single story, pre-engineered, steel  
7 structure constructed of I-beams covered with corrugated steel on a concrete slab-on-grade foundation.  
8 The building is approximately 10 m (33 ft) wide by 12 m (39 ft) long by 7 m (23 ft) high. Rollup doors  
9 are located on each end for loading and unloading operations.



1 **Figure H-2 T Plant 277-T Building Exterior (Looking Southeast) (May 2017)**



1

**Figure H-3 T Plant 277-T Building Interior (Looking Southeast) (May 2017)**

1 The 277-T Building contains one sump on the north side of the building approximately 3 m (10 ft) long  
2 by 0.6 m (2 ft) wide that historically provided the collection and drainage of water from condensate  
3 blowdown lines. The condensate blowdown lines inside the building have been removed. The sump  
4 contains a 4 in. (10 cm) diameter cast iron pipe that connects to an 8 in. (20 cm) diameter vitrified clay  
5 pipe. The 8 in. (20 cm) diameter clay pipe carried the condensate from the 277-T Building sump to the  
6 216-T-1 drainage ditch located north of the 277-T Building. The drainage ditch was backfilled and  
7 stabilized in 1995 and permanently isolated by filling the manholes with concrete. The discharge pipes  
8 have been cut and capped. The drainage ditch and pipelines are currently Waste Information Data System  
9 (WIDS) sites and are being tracked in the WIDS database and will not be covered under this closure plan.  
10 Therefore, the surface of the sump floor, and the surface of the building floor are designated as the  
11 boundary of the 277-T Building DWMU.

12 The 277-T Building currently serves as equipment and material storage to support T Plant operations. The  
13 277-T Building does not currently store dangerous or mixed waste. Future storage of dangerous or mixed  
14 waste is not authorized within the 277-T Building DWMU.

### 15 **H.1.2 Maximum Waste Inventory**

16 Waste management records indicate that the maximum inventory of dangerous or mixed waste stored in  
17 the 277-T Building over its operational period included one container of mixed waste with a total volume  
18 of 27 m<sup>3</sup> (35 yd<sup>3</sup>). The waste was generated from canyon cleanout, and included metal and organic  
19 material. The waste package was introduced into the 277-T Building in December 2002 where it was  
20 over-packed and stored until September 2003. Details on the inventory of the waste container stored  
21 during the operational life of the 277-T Building are presented in Section H.3.2 of this closure plan.

### 22 **H.1.3 Personnel Safety and Training Requirements**

23 Closure will be performed in a manner to ensure the safety of Human Health and the Environment (HHE).  
24 Health and safety requirements are addressed in Section H.1.3.1, and training for facility and closure  
25 personnel is described in Section H.1.3.2.

#### 26 **H.1.3.1 Health and Safety Requirements**

27 Personnel will be trained in the applicable safety and environmental procedures described in Table H-1.  
28 Personnel will be equipped with appropriate personal protective equipment. Personnel will perform all  
29 field operations and any necessary closure activities in compliance with applicable health, safety, and  
30 environmental procedures and requirements.

31 Pre-job briefings will be performed to evaluate activities and associated hazards by considering the  
32 following factors:

- 33 • Objective of the activities.
- 34 • Individual tasks to be performed.
- 35 • Hazards associated with the planned tasks.
- 36 • Environment in which the job will be performed.
- 37 • Facility where the job will be performed.
- 38 • Equipment and material required.
- 39 • Safety protocols applicable to the job.
- 40 • Training requirements for individuals assigned to perform the work.
- 41 • Level of management control.
- 42 • Proximity of emergency contacts.

1 **H.1.3.2 Training Requirements**

2 The Permittees have instituted training and qualification programs to meet training requirements imposed  
3 by regulations, DOE orders, and national standards such as those published by the American National  
4 Standards Institute/American Society of Mechanical Engineers. For example, the environmental, safety,  
5 and health training program provides workers with the knowledge and skills necessary to execute assigned  
6 duties safely. Permit Attachment 5, *Hanford Facility Personnel Training Program*, describes specific  
7 requirements for the Hanford Facility Personnel Training Program. The Permittees will comply with the  
8 training matrix shown in Table H-1, which provides training requirements for Hanford Facility personnel  
9 associated with the 277-T Building.

10 Project-specific safety training will provide the knowledge and skills that personnel need to perform work  
11 safely and in accordance with Quality Assurance (QA) requirements. Training records are maintained for  
12 each employee in an electronic training record database. The Permittee’s training organization maintains  
13 the training records system.

14

**Table H-1 Training Matrix for the 277-T Building Dangerous Waste Management Unit**

Training Category Course Description <sup>a</sup>	Frequency of Training	Training Type <sup>b</sup>	Job Title/Position					
			Non-T Plant Personnel or Visitor	FWS	SPOC	ECO	BED	FS
General Training	Annual	GHFT, CPT	X	X	X	X	X	X
Building Emergency	Annual	ECT					X	
ECO Training	Initial	OT				X		
Facility Health and Safety	Annual	GHFT, CPT	X <sup>c</sup>	X	X <sup>c</sup>	X	X	X <sup>c</sup>
Sampler	Annual	GHFT, CPT						X

<sup>a</sup>The T Plant Complex Dangerous Waste Training Plan provides a complete description of coursework in each training category.

<sup>b</sup>Training types defined in Permit Attachment 5.

<sup>c</sup>This training is required only if workers are unescorted in the facility.

BED = Building Emergency Director

FWS = Field Work Supervisor

CPT = Contingency Plan Training

GHFT = General Hanford Facility Training

ECO = Environmental Compliance Officer

OT = Operations Training

ECT = Emergency Coordinator Training

SPOC = Single Point of Contact

FS = Field Sampler

15

16 **H.1.4 Maintenance and Security During Closure**

17 To maintain the 277-T Building in a compliant manner during closure, measures are taken to ensure  
18 inspections are performed and security and emergency preparedness activities are in place.

19 **H.1.4.1 Inspections**

20 The 277-T Building will be closed in a manner that demonstrates that all steps to prevent threats to HHE  
21 have been met and will continue to be taken. After closure activities have been completed, the  
22 277-T Building will be inspected annually until Ecology approves the unit closure certification. Table H-2  
23 shows annual inspection requirements that will be performed.

**Table H-2 277-T Building Inspection Schedule**

<b>Requirement Description</b>	<b>Frequency</b>	<b>DWMU Condition*</b>
Signage	Annual	Warning signs are present and clearly legible.
Site – General	Annual	There is no evidence that unusual conditions exist at the closing DWMU site.

\*The building is empty of dangerous and mixed waste. “No waste in storage” or equivalent words will be entered on the inspection log.

- 1
- 2 **H.1.4.2 Facility Security**
- 3 The following sections document security measures in effect at the T Plant Complex.
- 4 **H.1.4.2.1 Security Provisions**
- 5 Located within the 200 West Area of the Hanford Facility, the T Plant Complex complies with access
- 6 control and warning sign requirements pursuant to WAC 173-303-310(1) and (2), *Security*.
- 7 Security measures are used to control access to the active portions of the Hanford Facility in accordance
- 8 with Permit Condition II.M, *Security*. The entire Hanford Facility is a controlled access area as described
- 9 in Permit Attachment 3, *Security*. The security measures in Permit Attachment 3 and the unit-specific
- 10 security measures prevent the unknowing entry, and minimize the possibility for the unauthorized entry,
- 11 of persons or livestock. [WAC 173-303-310(1)]
- 12 **H.1.4.2.2 T Plant Complex Access Control**
- 13 Unknowing entry and the possibility for unauthorized entry of persons or livestock onto the active
- 14 portions of the T Plant Complex are minimized through implementation and maintenance of the following
- 15 security measures.
- 16 Access to T Plant DWMUs is controlled by an approximate 2.4 m (8 ft) high chain-link fence encircling
- 17 the operating boundary (Figure H-1). A two-part swinging chain link gate at the T Plant main entrance is
- 18 open during operational hours to allow vehicle and personnel ingress to the parking lot and outdoor areas.
- 19 Signs are posted at the main entrance instructing all visitors to check in at 271-T Building. This gate is
- 20 closed and locked when personnel are away from T Plant. Alternate vehicle access gates, found about the
- 21 fenced perimeter, are closed and locked except when in use. Keys to gates are controlled and accessible
- 22 only by authorized personnel. [WAC 173-303-310(2)(c)]
- 23 Upon arrival at T Plant, visitors are required to sign in at the 271-T Building administration office, and
- 24 must adhere to all personal protection requirements, and are subject to escorting protocols.
- 25 Section H.1.3.2 provides the personnel training requirements for T Plant Complex operators, workers, and
- 26 visitors.
- 27 Access to the 277-T Building is restricted by the enclosed structure of the building, including a closed
- 28 door with appropriate signage.
- 29 **H.1.4.2.3 Warning Signs**
- 30 Warning signs stating “Danger-Unauthorized Personnel Keep Out” are posted near the entrance gate of
- 31 the T Plant Complex. Identical signs are posted along the perimeter fence lines at distances not to exceed
- 32 250 ft (76.2 m) between signs. Permittees must maintain warning signs at points described in this closure
- 33 plan and ensure that signs are written in English, legible from a distance of 25 ft (approximately 7.6 m) or
- 34 more, and visible from all angles of approach. [WAC 173-303-310(2)(a)]

1 **H.1.4.3 Preparedness, Prevention, Emergency Procedures**

2 T Plant preparedness, prevention, and emergency procedures are described in the following subsections.  
3 Contingency information is contained in the Building Emergency Plan for the T Plant Complex, as well as  
4 Permit Attachment 4, *Hanford Emergency Management Plan*.

5 **H.1.4.3.1 T Plant Building Emergency Plan**

6 The T Plant Complex is within the Hanford Facility. The Building Emergency Plan for the  
7 T Plant Complex describes facility-specific hazards and emergency planning and response. This  
8 site-specific plan is intended to be used in conjunction with Permit Attachment 4, *Hanford Emergency*  
9 *Management Plan*. If an emergency occurs, the on-call Building Emergency Director will be notified, and  
10 the requirements associated with Permit Attachment 4, *Hanford Emergency Management Plan*, and the  
11 T Plant Complex Building Emergency Plan will be implemented. A copy of the T Plant Complex Building  
12 Emergency Plan is kept in the operating record.

13 **H.1.4.3.2 Hanford Emergency Management Plan**

14 Permit Attachment 4, *Hanford Emergency Management Plan*, addresses site emergency management and  
15 contingency plan requirements for the Hanford Facility.

16 **H.1.4.4 Facility Recordkeeping**

17 Historical records that describe dangerous and mixed waste management activities within the  
18 277-T Building are retained in the operating record, which ensures proper availability and retention  
19 periods. These records describe the source of the chemicals, quantity, and hazards associated with the  
20 chemicals.

21 Records will be stored in either electronic or hardcopy format. Documentation and records, regardless of  
22 medium or format, are controlled in accordance with internal work requirements and processes to ensure  
23 the accuracy and retrievability of stored records. Records generated during closure will be maintained in  
24 the operating record in accordance with Permit Condition II.I.

25 **H.2 CLOSURE PERFORMANCE STANDARDS**

26 The 277-T Building will be closed in a manner that complies with the closure performance standards in  
27 WAC 173-303-610(2)(a) and (b) and, therefore, achieves clean closure. The objectives of closure  
28 activities for the 277-T Building are as follows:

- 29 • Minimize the need for further maintenance.
- 30 • Control, minimize, or eliminate to the extent necessary to protect HHE, post-closure escape of  
31 dangerous waste, dangerous constituents, leachate, contaminated runoff, or dangerous waste  
32 decomposition products to the ground, surface water, groundwater, or atmosphere.
- 33 • Remove all waste and waste residues.
- 34 • Decontaminate the concrete surface utilizing a physical extraction method to remove at least  
35 0.6 cm (~1/4 in.) of the surface layer and treat to a “clean debris surface” as specified in  
36 40 CFR § 268.45.
- 37 • Perform soil sampling and analysis to ensure soils at the 277-T Building meet standard  
38 Model Toxics Control Act (MTCA) Method A or B cleanup levels, and remove any soils  
39 contaminated above these levels.
- 40 • Return the land to the appearance and use of surrounding land areas to the degree possible, given  
41 the nature of the previous dangerous waste activity.

42 **H.3 CLOSURE ACTIVITIES**

43 The 277-T Building will be clean closed.

1 The following closure activities are required to achieve and certify clean closure:

- 2 • Remove all dangerous and mixed waste inventory (completed; Section H.3.1).
- 3 • Review dangerous and mixed waste container storage, operating, and inspection records for  
4 documented spills or releases of dangerous or mixed waste during periods of waste storage and  
5 subsequent cleanup (completed; Section H.3.2).
- 6 • Perform initial visual inspection of the concrete surface to identify dangerous or mixed waste  
7 related staining, low points, cracks, holes, pits, or breaches significant enough to allow  
8 contamination to reach underlying soil. Evaluate surfaces to identify potential for focused sample  
9 locations (completed; Section H.3.2).
- 10 • Remove stored equipment and materials from the 277-T Building and perform a final visual  
11 inspection of the concrete surface to identify dangerous or mixed waste related staining, low  
12 points, cracks, holes, pits, or breaches significant enough to allow contamination to reach  
13 underlying soil. Evaluate surfaces to identify potential for focused sample locations  
14 (Section H.3.2).
- 15 • Decontaminate the concrete flooring and sump using a physical extraction method to remove  
16 0.6 cm (~1/4 in.) of the surface layer and treat to a “clean debris surface” (Section H.3.4).
- 17 • Perform soil sampling beneath the 277-T Building concrete flooring and sump (Section H.4.4).
- 18 • Confirm analytical results from soil samples meet closure performance standards (Section H.5.1).
- 19 • Identify and manage contaminated environmental media (Section H.3.5).
- 20 • Identify and manage waste generated during closure (Section H.3.6).
- 21 • Transmit closure certification to Ecology (Section H.5.3).

### 22 **H.3.1 Removal of Wastes and Waste Residues**

23 No dangerous or mixed waste is currently stored at the 277-T Building. The last mixed waste was  
24 removed in September 2003. The 277-T Building will not be used for storage of dangerous or mixed  
25 waste in the future.

26 It is unknown if dangerous or mixed waste residues are present at this DWMU. If dangerous or mixed  
27 waste residues are found during clean closure activities, then the residues will be removed and managed  
28 as newly generated waste in accordance with Section H.3.6.

### 29 **H.3.2 Operating Records Review and Visual Inspection**

30 To support the development of this closure plan and the Sampling and Analysis Plan (SAP), a review of  
31 the T Plant Complex container storage, operating, and inspection records was completed and submitted to  
32 the operating record. The records review included the following operating record documents: facility  
33 operating logbooks (including spill reports), and waste management inspection and surveillance records.  
34 The operating records that were reviewed focused on the period during active waste storage for the  
35 T Plant Complex (i.e., January 1985 through June 2013) including:

- 36 • 271-T Cage.
- 37 • 211-T Pad.
- 38 • 221-T Sand Filter Pad.
- 39 • 277-T Outdoor Storage Area.
- 40 • 277-T Building.
- 41 • 221-T Railroad Cut.
- 42 • 2706-TB Tank System.

- 1 • 221-T Pipe Gallery Storage.
- 2 • 221-T R5 Waste Storage Area.
- 3 • 221-T Tank System.

4 The records review extended past the active waste storage period to June 2013. The records review  
5 indicated no releases of dangerous or mixed waste in the 277-T Building. Table H-3 provides a summary  
6 of the records review.

7

**Table H-3 Operating Records Review Summary**

Document Title	Document Type	Time Frame of Records Reviewed		Items of Concern Noted
		Start Date	End Date	
T Plant Daily Operating Logbook	Logbook	01/02/1985	06/22/2010	No
T Plant Operation Logbook	Logbook	07/27/2010	04/07/2011	No
Waste Management Area Daily Inspection Data Sheet	Data Sheet	08/29/2005	12/01/2005	No
Waste Management Area Daily Inspection Data Sheet	Data Sheet	10/01/2007	04/22/2013	No
Weekly Surveillance Log, <90-day Storage Areas and Satellite Accumulation Areas	Log Sheet	06/07/1991	12/20/1999	No
Treatment Facility Waste Management Area Weekly Inspection Log Sheet Treatment Facility Waste Management Area Weekly Inspection Data Sheet Weekly Waste Area Surveillance Treatment Facility Waste Management Area Daily Inspection Log Sheet Treatment Facility Waste Management Area Daily Inspection Data Sheet T Plant Daily Waste Management Area Inspection Data Sheet	Inspection, Data, and Log Sheets	01/2000 01/2005	12/2002 12/2007	No
Waste Management Area Daily Inspection Report Weekly Waste Area Surveillance	Inspection Sheets	01/2003	12/2004	Yes*
T Plant Weekly Waste Management Area Inspection Data Sheet	Data Sheet	10/18/2007	06/12/2013	No

\*Item of concern was a container of Insulkote® leaking in 271-T Cage. Product was determined to be nonregulated material. Insulkote® is a registered trademark of Industrial Insulation Group, LLC, Brunswick, Georgia.

8

1 Waste management records reviewed in Table H-3 were used to determine the target analytes to be  
2 included when calculating closure performance standards (Section H.3.9). Information on the waste  
3 container stored in the 277-T Building is shown in Table H-4.

4

**Table H-4 277-T Building Waste Container Data**

Container ID	Waste Package Type	Total Volume (m <sup>3</sup> )	Waste Type	Beginning Storage Date	Ending Storage Date	Assigned Waste Codes
0006038	Box	27	MLLW	December 2002	September 2003	D004 through D011, F001 through F005

MLLW = Mixed low-level waste

5

6 For the purposes of focused sampling, visual inspections were performed by the Permittees in  
7 September 2013 and June 2015, to identify any dangerous or mixed waste related staining, major cracks,  
8 crevices, pits, low areas, or joints/seams that would allow liquid to migrate to the underlying soil. The  
9 Permittees' inspections showed stains related to rusting equipment, and motor vehicle oil/fluid. The  
10 Permittees identified one focused sample at the sump based on the lack of dangerous waste related  
11 staining, cracks or joints/seams.

12 Initial sample locations: Ecology and the Permittees performed an additional walk down and inspection of  
13 the DWMU in November of 2018. Ecology identified five additional focused soil sample locations,  
14 including three low point samples, and two construction joint/seam samples. Ecology also identified one  
15 focused concrete chip sample for the sump based on professional judgement. Sample locations are  
16 identified in Figure H-5. Section H.4.4.1 provides details on the sample design for the focused samples.

17 Sample locations after the Settlement Agreement was finalized: the sample locations for the focused soils  
18 samples are unchanged from the initial locations. However, the concrete chip sample in the sump was  
19 eliminated and replaced with a focused soil sample under the sump.

20 Ecology and the Permittees conducted the above inspections without removing stored equipment and  
21 non-waste materials. Once all stored equipment and materials have been removed from the  
22 277-T Building to support sampling and decontamination activities, a final visual inspection will be  
23 performed by the Permittees and Ecology (Section H.3.4).

24 Supporting documentation for the Permittees' visual inspections is included in Attachment A,  
25 *T Plant Complex 277-T Building Visual Inspection Supporting Documentation*.

26 **H.3.3 Unit Components, Parts, and Ancillary Equipment**

27 The 277-T Building does not have any unit components, parts, or ancillary equipment identified for  
28 removal as part of closure.

29 **H.3.4 Inspection and Decontamination Activities**

30 The following sub-sections discuss the final inspection of the 277-T Building, and the follow-on  
31 decontamination activities. The 277-T Building will remain in place pending confirmation and acceptance  
32 of clean closure.

1 **H.3.4.1 Inspection of Unit Before Decontamination**

2 Once closure activities begin, all stored equipment and material will be removed from the  
3 277-T Building. A visual inspection of the floor surface by the Permittees and Ecology will be conducted  
4 to identify any additional dangerous waste or mixed waste related staining, low points, joints/seams,  
5 cracks, holes, pits, or breaches significant enough to allow contamination to reach underlying soil.  
6 Additional focused sampling will be performed if the final visual inspection identifies areas where waste  
7 has a potential avenue to reach the underlying soil. If the need for additional focused soil sampling is so  
8 identified, the Permittees will submit a permit modification request to modify the closure plan.

9 **H.3.4.2 Decontamination**

10 Decontamination of the concrete surfaces in the 277-T Building DWMU will be performed by physically  
11 extracting at least 0.6 cm (~1/4 in.) of the concrete surface layer, to a “clean debris surface.” A series of  
12 cutter blades, impact hammers, rotating grinding wheels, or similar equipment will be used to break up  
13 the concrete surface layer. Physical extraction techniques will be performed in accordance with  
14 40 CFR § 268.45 and will include one or more of the following:

- 15 • Abrasive blasting.
- 16 • Scarification, grinding, and planing.
- 17 • Spalling.

18 Decontamination includes the following steps:

- 19 1. Ensure all stored materials and equipment are relocated or removed from the area.
- 20 2. If using wet-cutting equipment, seal all significant cracks, including expansion joints, identified  
21 during the visual inspection (Section H.3.4) using an appropriate sealant material.
- 22 3. Decontaminate the concrete surface by removing at least 0.6 cm (~1/4 in.), to a “clean debris  
23 surface” (as defined in Section H.5.1.1).

24 Residual material from decontamination activities will be managed as newly generated waste in  
25 accordance with Section H.3.6.

26 Equipment that becomes contaminated during decontamination and sampling activities will be  
27 decontaminated for re-use or managed and disposed of as newly generated waste in accordance with  
28 Section H.3.7. A temporary decontamination area may be established near the 277-T Building. This area  
29 will be constructed of Visqueen™ or an equivalent material, and may be used for decontamination of  
30 sampling equipment, personal protective equipment, and other miscellaneous small equipment used  
31 during decontamination and sampling activities. When decontamination of equipment is completed, the  
32 Visqueen™ or equivalent material, rinsate, and solid waste debris generated by equipment  
33 decontamination (e.g., rags and personal protective equipment) will be removed and managed as newly  
34 generated waste in accordance with Section H.3.6.

35 **H.3.5 Identifying and Managing Contaminated Environmental Media**

36 The records review and initial visual inspection outlined in Section H.3.2 did not identify any releases of  
37 dangerous or mixed waste or the presence of staining that could be related to dangerous or mixed waste.  
38 Contaminated environmental media (soil) removal is not anticipated. However, contaminated soil will be  
39 remediated at the focused soil sample location(s) where analytical results indicate contamination.

40 If contamination above closure performance standards is identified, then the nature and extent of  
41 contamination will be evaluated. Soil surrounding the sampling location will be removed up to 4.6 m  
42 (15 ft) below the surface. Contaminated soil will be removed using equipment capable of removing the  
43 quantity of material required to complete removal. If contamination exists in the soil deeper than 4.6 m  
44 (15 ft), the Permittees will collaborate with Ecology for a path forward on closure. Resulting changes to

1 this closure plan will be submitted to Ecology as a permit modification request in accordance with  
2 Permit Condition I.C.3.

3 Contaminated soil will be removed and managed as a newly generated waste stream. Contaminated soil  
4 will be managed in accordance with all applicable requirements of WAC 173-303-170, *Requirements for*  
5 *generators of dangerous waste*, through 173-303-230, *Special conditions*. [WAC 173-303-610(5)]

6 The contaminated soil will be containerized, labeled, and sampled as needed to designate for disposal of  
7 the entire volume of contaminated soil. Contaminated soil will be placed in U.S. Department of  
8 Transportation-compliant containers and sent to an appropriate land disposal unit, possibly with central  
9 accumulation as an intermediary step, in accordance with all applicable requirements of WAC 173-303-  
10 200, *Conditions for exemption for a large quantity generator that accumulates dangerous waste*.  
11 Contaminated soil subject to the requirements of WAC 173-303-140, *Land disposal restrictions*  
12 (which incorporates by reference 40 CFR 268 § *Land Disposal Restrictions*) will be characterized,  
13 designated, and treated, as applicable, prior to disposal in an appropriate land disposal unit.

### 14 **H.3.6 Identifying and Managing Waste Generated During Closure**

15 Closure activities for 277-T Building DWMU will result in waste generated during closure activities,  
16 requiring management and disposal. A vacuum-equipped system with a high efficiency particulate air  
17 filter will remove dust and chips during scarification, grinding, and planing to prevent release of possible  
18 contamination. Decontamination will be performed with the pads isolated from the surrounding area as  
19 much as possible. Concrete and dust collected during closure activities for the DWMU will be  
20 containerized, labeled, and sampled to properly characterize such waste prior to disposal.

21 Concrete will be removed from the surface layer of the concrete to meet the “clean debris surface”  
22 standard; concrete will also be removed to access the underlying soil for focused sampling where  
23 necessary. The waste will be managed as a newly generated waste stream and either disposed of or  
24 decontaminated in accordance with WAC 173-303-610(5).

25 Newly generated waste will be managed in accordance with all applicable requirements of WAC 173-303-  
26 170 through 173-303-230. Once waste characterization results are received, all waste will be designated.  
27 Dangerous and mixed waste will be treated, if necessary, to meet land disposal restrictions in  
28 WAC 173-303-140 *Land disposal restrictions*, (which incorporates by reference 40 CFR § 268,  
29 *Land Disposal Restrictions*), then ultimately disposed in an appropriate land disposal unit.

30 Management and disposal of waste generated during closure will be documented and included as part of  
31 the clean closure certification documentation (Section H.5.3).

### 32 **H.3.7 Closure Performance Standards for Soil**

33 The presumed exposure pathways considered for the 277-T Building are:

- 34 • WAC 173-340-740(3), MTCA—Cleanup, *Unrestricted land use soil cleanup standards*, Method  
35 B (cancer and noncancer), which considers human health based on direct soil contact.
- 36 • WAC 173-340-740(2), Table 740-1, “Method A Soil Cleanup Levels for Unrestricted Land Uses”  
37 (WAC 173-340-900, *Tables*), which includes closure performance standards for human health  
38 based on unrestricted land use. MTCA Method A is only used if MTCA Method B is not  
39 available for a particular contaminant in the Cleanup Levels and Risk Calculation tables.
- 40 • WAC 173-340-747, *Deriving soil concentrations for groundwater protection*, which notes soil  
41 concentrations protective of groundwater.
- 42 • WAC 173-340-7493, *Site-specific terrestrial ecological evaluation procedures*, which considers  
43 ecological indicators (plants, biota, wildlife) in Table 749-3, “Ecological Indicator Soil  
44 Concentrations (mg/kg) for Protection of Terrestrial Plants and Animals” (WAC 173-340-900).

- WAC 173-340-750, *Cleanup standards to protect air quality*, which describes human health risks due to fugitive vapors and dust.

Of the exposure pathways listed above, direct soil contact is always considered a complete and viable exposure pathway for all soil samples. The exposure pathway for soil protective of groundwater assumes that water or precipitation on a surface has an avenue to percolate through the surface and underlying soil to groundwater. The scenario for ecological indicators requires that vegetation, biota, and wildlife be present in order for the pathway to be complete. The exposure scenario for inhalation of fugitive vapors and dust assumes a complete pathway, which would begin with a source of contaminated media and end with a receptor.

Of the viable exposure pathways, the most conservative closure performance standard is selected. Per WAC 173-340-740(5)(c), the closure performance standard value cannot be below the following:

- Hanford Site background.
- Laboratory practical quantitation limit (PQL) found in the CPCCo laboratory contracts.

If a closure performance standard is below both values, the higher of these two values is selected.

A number of exposure pathways considered from the list above were determined to be incomplete pathways and were excluded when determining closure performance standards. The waste container in the 277-T Building contained physically solid waste and inspections indicate no releases (Section H.3.2). Therefore, there is no known waste-related source of contaminated media and the inhalation exposure pathway has been excluded. The concrete floor is within a maintained building where no vegetation is present; therefore, the soil pathway protective of ecological indicators has been excluded. When considering soil levels protective of groundwater, there must be a route of exposure from water or rainwater to the underlying soil. The sump at 277-T Building was designed to direct water from the sump to a WIDS drainage pipe that is outside of this DWMU. With no indication of cracks or joints/seams that would allow water to penetrate beneath the sump and into the soil, the soil concentration protective of groundwater pathway was excluded when calculating closure performance standards. The remaining applicable pathway for evaluation of closure performance standards was direct contact with soil which, as noted in the previous paragraph, is always a viable exposure pathway for soil samples.

Soil sampling and analysis will be conducted in accordance with the closure plan SAP located in Section H.4. Analytical results of the soil samples will be individually compared to closure performance standards consistent with closure requirements. [WAC 173-303-610(2)(b)(i)]

If target analytes are found above closure performance standards, then the contaminated soil will be remediated and confirmatory sampling will be conducted in accordance with Section H.4.4.3 to ensure the closure performance standards are met for the remaining soil. If failed constituents of concern do not meet closure performance standards after soil remediation, then the Permittees will meet with Ecology to determine a path forward for closure. Resulting changes to this closure plan will be submitted to Ecology as a permit modification request in accordance with Permit Condition I.C.3. The sample design for focused samples is discussed in Section H.4.4.1.

### **H.3.8 Closure Performance Standards for Concrete**

The closure performance standard for concrete is treatment using a physical extraction method to remove 0.6 cm (~1/4 in.) of the surface layer and treat to a “clean debris surface” as specified in 40 CFR § 268.45, as discussed in Section H.3.4.

1 Ecology Publication #94-111, Section 5.6, Decontamination of Concrete Containment Structures, states  
2 the following:

3 Facility owners/operators, generators, and transporters have two options for  
4 decontaminating concrete: meet the operating and performance standards associated with  
5 the Alternative Treatment Standards for Hazardous Debris appropriate to concrete, or  
6 propose a site-specific decontamination method.

7 On completion of decontamination activities, the 277-T Building concrete slab will be visually inspected  
8 to verify that the “clean debris surface” standard has been met per 40 CFR § 268.45 (Section H.5.1.1).

### 9 **H.3.9 Development of Closure Performance Standards**

10 The target analytes considered for evaluation during closure sampling and analysis were determined by  
11 reviewing the waste management records associated with operations involving the 277-T Building.  
12 Table H-5 provides the closure performance standards for soil and concrete for each individual target  
13 analyte associated with the dangerous waste codes identified. A list of closure performance standard  
14 values for all exposure pathways was provided to Ecology in July 2017 as correspondence from DOE-RL  
15 (17-AMRP-0217, “Dangerous Waste Management Unit [DWMU] 277-T Building Closure Plan Comment  
16 Disposition, and Performance Standards for Future Solid Waste Operations Complex [SWOC] Closure  
17 Plans”), which Ecology acknowledged (17-NWP-100, “Dangerous Waste Management Unit [DWMU]  
18 277-T Building Closure Plan Comment Disposition, and Performance Standards for Future Solid Waste  
19 Operations Complex [SWOC] Closure Plans”). Values in Table H-5 have been adjusted to remove  
20 nonviable pathways as noted above.

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**Table H-5 Closure Performance Standards for Soil and Analytical Performance Requirements**

CAS Number	Waste Code(s) <sup>a</sup>	Analyte	Closure Performance Standards		PQL <sup>b</sup> (mg/kg)
			Value (mg/kg)	Basis	
<b>SW-846 Method 6010</b>			<b>Accuracy Requirement ±20% Recovery<sup>c</sup> Precision Requirement ≤35 RPD<sup>d</sup></b>		
7440-38-2	D004	Arsenic <sup>c</sup>	2.00E+01	Background <sup>c</sup>	1.00E+00
7440-39-3	D005	Barium	1.60E+04	Human Health – Direct Contact (noncancer)	5.00E+00
7440-43-9	D006	Cadmium	8.00E+01	Human Health – Direct Contact (noncancer)	5.00E-01
7439-92-1	D008	Lead	2.50E+02	Unrestricted Land Use (MTCA Method A)	5.00E+00
7782-49-2	D010	Selenium	4.00E+02	Human Health – Direct Contact (noncancer)	1.00E+01
7440-22-4	D011	Silver	4.00E+02	Human Health – Direct Contact (noncancer)	1.00E+00
<b>SW-846 Method 6020</b>			<b>Accuracy Requirement ±20% Recovery<sup>c</sup> Precision Requirement ≤35 RPD<sup>d</sup></b>		
7440-38-2	D004	Arsenic <sup>c</sup>	2.00E+01	Background <sup>c</sup>	1.00E+00
<b>SW-846 Method 7196</b>			<b>Accuracy Requirement ±20% Recovery<sup>c</sup> Precision Requirement ≤35 RPD<sup>d</sup></b>		
18540-29-9	D007	Chromium (Hexavalent)	2.40E+02	Human Health – Direct Contact (noncancer)	5.00E-01
<b>SW-846 Method 7471</b>			<b>Accuracy Requirement ±20% Recovery<sup>c</sup> Precision Requirement ≤35 RPD<sup>d</sup></b>		
7439-97-6	D009, (U151)	Mercury <sup>f</sup>	2.40E+01	Human Health – Direct Contact (noncancer)	2.00E-01
<b>SW-846 Method 8260</b>			<b>Accuracy Requirement ±30% Recovery<sup>c</sup> Precision Requirement ≤20 RPD<sup>d</sup></b>		
67-64-1	F003	Acetone	7.20E+04	Human Health – Direct Contact (noncancer)	2.00E-02
71-43-2	F005	Benzene	1.82E+01	Human Health – Direct Contact (cancer)	5.00E-03
71-36-3	F003	<i>n</i> -Butyl alcohol	8.00E+03	Human Health – Direct Contact (noncancer)	2.50E-01
75-15-0	F005	Carbon disulfide	8.00E+03	Human Health – Direct Contact (noncancer)	5.00E-03
56-23-5	F001, F002, D019, (U211)	Carbon tetrachloride	1.43E+01	Human Health – Direct Contact (cancer)	5.00E-03

**Table H-5 Closure Performance Standards for Soil and Analytical Performance Requirements**

CAS Number	Waste Code(s) <sup>a</sup>	Analyte	Closure Performance Standards		PQL <sup>b</sup> (mg/kg)
			Value (mg/kg)	Basis	
108-90-7	F002	Chlorobenzene	1.60E+03	Human Health – Direct Contact (noncancer)	5.00E-03
108-94-1	F003	Cyclohexanone	4.00E+05	Human Health – Direct Contact (noncancer)	1.00E-01
141-78-6	F003	Ethyl acetate	7.20E+04	Human Health – Direct Contact (noncancer)	5.00E+00
100-41-4	F003	Ethyl benzene	9.09E+01	Human Health – Direct Contact (cancer)	5.00E-03
60-29-7	F003	Ethyl ether	1.60E+04	Human Health – Direct Contact (noncancer)	1.00E-02
78-83-1	F005	Isobutanol	2.40E+04	Human Health – Direct Contact (noncancer)	5.00E-01
108-10-1	F003	Methyl isobutyl ketone (MIBK)	6.40E+03	Human Health – Direct Contact (noncancer)	2.00E-02
78-93-3	F005	Methyl ethyl ketone (MEK) (2-Butanone)	4.80E+04	Human Health – Direct Contact (noncancer)	2.00E-02
75-09-22	F001, F002	Methylene chloride	4.80E+02	Human Health – Direct Contact (noncancer)	5.00E-03
127-18-4	F001, F002	Tetrachloroethylene	4.76E+02	Human Health – Direct Contact (cancer)	5.00E-03
108-88-3	F005	Toluene	6.40E+03	Human Health – Direct Contact (noncancer)	5.00E-03
79-01-6	F001, F002, D040, (U228)	Trichloroethylene	1.20E+01	Human Health – Direct Contact (cancer)	5.00E-03
71-55-6	F001, F002, (U226)	1,1,1-Trichloroethane	1.60E+05	Human Health – Direct Contact (noncancer)	5.00E-03
79-00-5	F002	1,1,2-Trichloroethane	1.75E+01	Human Health – Direct Contact (cancer)	5.00E-03
76-13-1	F001, F002	1,1,2-Trichloro-1,2,2-trifluoroethane	2.40E+06	Human Health – Direct Contact (noncancer)	1.00E-02
75-69-4	F002	Trichlorofluoromethane	2.40E+04	Human Health – Direct Contact (noncancer)	1.00E-02
1330-20-7	F003, (U239)	Xylenes (total)	1.60E+04	Human Health – Direct Contact (noncancer)	1.00E-02
<b>SW-846 Method 8270</b>			<b>Accuracy Requirement ±30% Recovery<sup>c</sup> Precision Requirement ≤30 RPD<sup>d</sup></b>		
95-48-7	F004	<i>o</i> -cresol <sup>g</sup>	4.00E+03	Human Health – Direct Contact (noncancer)	3.33E-01
95-50-1	F002	1,2-Dichlorobenzene	7.20E+03	Human Health – Direct Contact (noncancer)	3.33E-01
98-95-3	F004	Nitrobenzene	1.60E+02	Human Health – Direct Contact (noncancer)	3.33E-01
110-86-1	F005	Pyridine	8.00E+01	Human Health – Direct Contact (noncancer)	6.60E-01

**Table H-5 Closure Performance Standards for Soil and Analytical Performance Requirements**

CAS Number	Waste Code(s) <sup>a</sup>	Analyte	Closure Performance Standards		PQL <sup>b</sup> (mg/kg)
			Value (mg/kg)	Basis	
<b>SW-846 Method 8015</b>			<b>Accuracy Requirement <math>\pm 30\%</math> Recovery<sup>c</sup> Precision Requirement <math>\leq 30</math> RPD<sup>d</sup> (8015)</b>		
67-56-1	F003	Methanol	1.60E+05	Human Health – Direct Contact (noncancer)	5.00E+01
<b>Not Analyzed</b>			<b>Not Analyzed</b>		
110-80-5	F005	2-Ethoxyethanol <sup>h</sup>	79-46-9	F005	2-Nitropropane <sup>i</sup>

References:

17-AMRP-0217, “Dangerous Waste Management Unit (DWMU) 277-T Building Closure Plan Comment Disposition, and Performance Standards for Future Solid Waste Operations Complex (SWOC) Closure Plans.”

17-NWP-100, “Dangerous Waste Management Unit (DWMU) 277-T Building Closure Plan Comment Disposition and Performance Standards for Future Solid Waste Operations Complex (SWOC) Closure Plans.”

DOE/RL-92-24, *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes*.

ECF-HANFORD-11-0038, *Soil Background for Interim Use at the Hanford Site*.

Ecology, 2013, “Issues Associated with Establishing Soil Cleanup Levels for Arsenic.”

Ecology, 2019, *Cleanup Levels and Risk Calculation (CLARC) Data Tables*, Toxics Cleanup Program.

Howard et al., 1991, *Handbook of Environmental Degradation Rates*.

SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, Third Edition; Final Update V.

WAC 173-340, *Model Toxics Control Act Cleanup Regulations*.

173-340-740, *Unrestricted land use soil cleanup standards*.

173-340-747, *Deriving soil concentrations for groundwater protection*.

Notes: Screening levels considered when developing closure performance standards were drawn from the following:

- MTCA (WAC 173-340-740, MTCA—Cleanup, *Unrestricted land use soil cleanup standards*) (Ecology, 2019, *Cleanup Levels and Risk Calculation (CLARC) Data Tables*, May 2019 data tables are most recent). MTCA Method B values represent both cancer and noncancer human health risk values from direct soil contact. The most conservative value of the two Method B published values will be used. Method A values are substituted when MTCA Method B values are not provided in the CLARC tables.
- WAC 173-340-747(4) describes the fixed parameter three-phase partitioning model. Where applicable, these values were used. Values selected were from the 25°C vadose zone. If values were not listed for 25°C, values from the 13°C vadose zone were used.
- Background levels as published in ECF-HANFORD-11-0038, *Soil Background for Interim Use at the Hanford Site*, and DOE/RL-92-24, *Hanford Site Background: Soil Background for Nonradioactive Analytes*. Background values were used at the 90<sup>th</sup> percentile of calculated Hanford Site background values.

**Table H-5 Closure Performance Standards for Soil and Analytical Performance Requirements**

CAS Number	Waste Code(s) <sup>a</sup>	Analyte	Closure Performance Standards		PQL <sup>b</sup> (mg/kg)
			Value (mg/kg)	Basis	

- Closure performance standard values for all exposure pathways were provided to Ecology in July 2017 correspondence from DOE-RL (17-AMRP-0217) and which values Ecology acknowledged (17-NWP-100). Values in this table have been adjusted to remove nonviable pathways.
- Values taken from the above resources that fell below background levels were not considered.

<sup>a</sup>Many of the chemicals listed in this table also have P and U waste codes associated with them (WAC 173-303-9903, *Discarded chemical products list*). (1) These codes are listed in the table because it is unknown whether or not the waste container had a “discarded chemical product” (per WAC 173-303-081) or if it was a chemical contaminant of the waste. (2) The P and U code designations do play a part in the determination of dangerous waste criteria (WAC 173-303-100), as they indicate that chemical as either acutely hazardous (P) or dangerous (U) waste based on toxicity and/or persistence calculations. For these reasons, the P and U codes are listed in parentheses.

<sup>b</sup>Highest allowable PQL will be defined in the individual laboratory contract with CPCCo. In practice, the laboratory PQL values have the potential to be lower.

<sup>c</sup>Accuracy criteria for associated batch matrix spike percent recoveries. Evaluation based on statistical control of laboratory control samples is also performed. Precision criteria for batch laboratory replicate matrix spike analyses or replicate sample analysis.

<sup>d</sup>Precision is determined by the laboratory based on historical data or statistically derived control limits. Limits are reported with the data. Where specific acceptance criteria are listed, those acceptance criteria may be used in place of statistically derived acceptance criteria.

<sup>e</sup>Arsenic – The Hanford Site closure performance standard is 20 mg/kg based on a letter (Ecology, 2013, “Issues Associated with Establishing Soil Cleanup Levels for Arsenic”) indicating that the Method A soil closure performance standard of 20 mg/kg can be used to define natural background levels when developing Method B soil closure performance standards for the Hanford Site. One of the two methods (SW-846 6010 or 6020) may be used.

<sup>f</sup>Mercury – Equation 740-1 and Equation 740-2 from WAC 173-340-740(3)(b) are used to calculate the MTCA Direct Contact Human Health soil closure performance standards. The MTCA human health direct contact soil closure performance standard for mercury is calculated to be 24 mg/kg.

<sup>g</sup>Cresols – The closure performance standard for *o*-cresol will be reported as total cresols: a total of the three isomeric forms: *o*-cresol, *m*-cresol, and *p*-cresol.

<sup>h</sup>2-Ethoxyethanol – Due to the extremely short half-life of 2-ethoxyethanol (between 168 and 672 hours), its presence in soil samples is highly unlikely; therefore, samples will not be analyzed for this constituent. Degradation rates from Howard et al., 1991, *Handbook of Environmental Degradation Rates*, p. 420.

<sup>i</sup>2-Nitropropane is listed with an inhalation value in the CLARC Tables. However, because the inhalation pathway is not being addressed as part of this closure plan, it will not be analyzed.

CAS = Chemical Abstracts Service

CLARC = Cleanup Levels and Risk Calculation

CPCCo = Central Plateau Cleanup Company, LLC

MTCA = Model Toxics Control Act–Cleanup

PQL = Practical Quantitation Limit

RPD = Relative Percent Difference

### 1 **H.3.10 Conditions That Will be Achieved When Closure is Complete**

2 Upon completion of the closure activities, the 277-T Building will remain in an “as-is” state with the  
3 building remaining in place. The 277-T Building will continue to be used for equipment and material  
4 storage in support of the T Plant Complex operations. Once Ecology accepts the clean closure  
5 certification, a permit modification request will be submitted to remove the 277-T Building DWMU  
6 closure requirements from the Permit.

## 7 **H.4 SAMPLING AND ANALYSIS PLAN**

8 Sampling and analysis of the 277-T Building underlying soil will be conducted to confirm whether closure  
9 performance standards have been met. Sampling includes six focused soil samples; three at low points, two  
10 at concrete seams/joints and one in the low point of the building sump (Figure H-5). Sampling and analysis  
11 will be performed in accordance with the sampling and quality standards established in this closure SAP.

### 12 **H.4.1 Sampling and Analysis Plan Requirements**

13 Sampling and analysis activities were designed using the EPA guidance document EPA/240/R-02/005,  
14 *Guidance on Choosing a Sampling Design for Environmental Data Collection for Use in Developing a*  
15 *Quality Assurance Project Plan* (EPA QA/G-5S) and Ecology Publication #94-111, and will be conducted  
16 via this SAP. The objective of the soil sampling described in this section is to determine if the closure  
17 performance standards (Table H-5) established in this closure plan pursuant to WAC 173-303-610(2)(b)(i)  
18 and WAC 173-303-610(2)(b)(ii) have been satisfied, demonstrating clean closure for the 277-T Building.

19 The closure SAP details sampling and analysis procedures in accordance with SW-846, *Test Methods for*  
20 *Evaluating Solid Waste: Physical/Chemical Methods*, Third Edition; Final Update V; the American  
21 Society for Testing and Materials (ASTM) *Annual Book of ASTM Standards* (ASTM International, 2017);  
22 and applicable EPA guidance. Sampling and analysis activities will meet applicable requirements of  
23 SW-846, ASTM standards, and EPA-approved methods at the time of closure. This SAP was also  
24 developed using guidance from Ecology Publication #94-111, Section 7.0, Sampling and Analysis for  
25 Clean Closure, and EPA/240/R-02/005.

### 26 **H.4.2 Sampling and Analysis Schedule**

27 Closure sampling and analysis will be performed in accordance with the closure plan schedule located in  
28 Section H.6.

### 29 **H.4.3 Project Management**

30 The following subsections address project management and ensure that the project has defined goals,  
31 participants understand the goals and approaches used, and planned outputs are appropriately  
32 documented. Project management roles and responsibilities discussed in this section apply to the major  
33 activities covered under this SAP.

#### 34 **H.4.3.1 Project/Task Organization**

35 The Permittees are responsible for planning, coordinating, sampling, preparing, packaging, and shipping  
36 samples to the contract analytical laboratory. The project has the following key positions.

37 **Regulatory Representative.** Ecology will assign an Ecology employee as Project Manager responsible  
38 for oversight of the 277-T Building closure.

39 **Project Manager and Technical Lead.** The CPCCo Project Manager provides oversight of closure  
40 activities and coordinates with the DOE-RL, Ecology, and contract management. In addition, support is  
41 provided to the project technical lead to ensure that work is performed safely and cost effectively.

42 The Project Manager (or designee) for the 277-T Building closure sampling is responsible for direct  
43 management of sampling documents and requirements, field activities, and subcontracted tasks.

1 The Project Manager is responsible for ensuring that project personnel are working to the approved  
2 version of the 277-T Building Closure Plan in the Permit and for providing updates to field personnel.

3 The Project Manager works closely with QA, Health and Safety, and the FWS to integrate these and other  
4 lead disciplines in planning and implementing the work scope. The Project Manager also coordinates with  
5 DOE-RL and the primary contractor management on all sampling activities. The Project Manager  
6 supports DOE-RL in coordinating sampling activities with the Regulatory Representative.

7 **Environmental Compliance Officer.** The Environmental Compliance Officer provides technical  
8 oversight, direction, and acceptance of project and subcontracted environmental work, and develops  
9 appropriate mitigation measures with a goal of minimizing adverse environmental impacts.

10 **Health and Safety.** The Health and Safety organization is responsible for coordinating industrial safety  
11 and health support within the project, as carried out through health and safety plans, job hazard analyses,  
12 and other pertinent safety documents required by federal regulation or internal primary contractor work  
13 requirements.

14 **Waste Management Lead.** The Waste Management Lead communicates policies and protocols, and  
15 ensures project compliance for storage, transportation, disposal, and waste tracking.

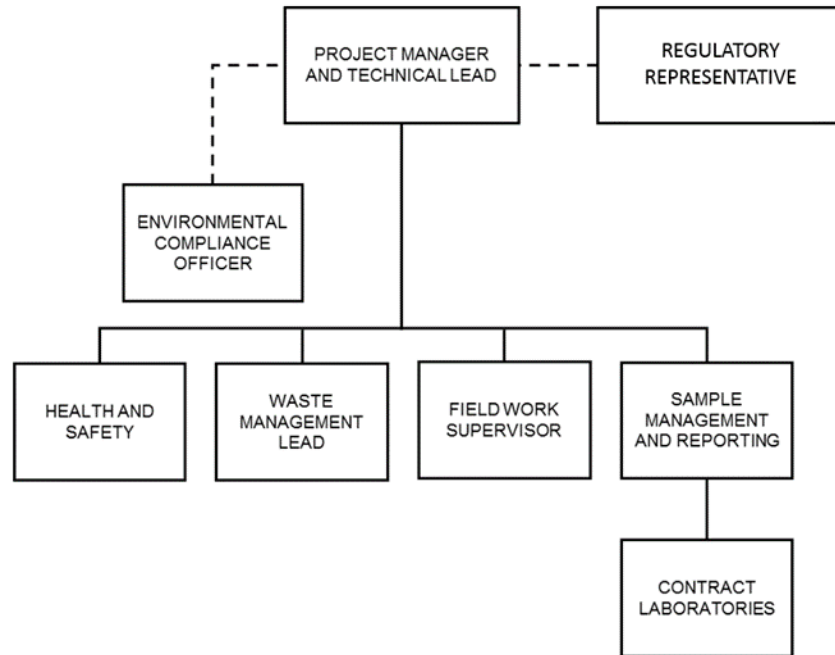
16 **Field Work Supervisor.** The FWS is responsible for planning and coordinating field sampling resources.  
17 The FWS ensures that samplers are appropriately trained and available. Additional related responsibilities  
18 include ensuring that the sampling design is achievable, understood, and can be performed as specified.

19 The FWS must document all deviations from procedures or other problems pertaining to sample  
20 collection, chain-of-custody (COC) protocols, analytes, sample analysis, sample transport, or  
21 noncompliant monitoring. As appropriate, such deviations or problems will be documented in the field  
22 logbook or in nonconformance report forms in accordance with internal corrective action procedures. The  
23 FWS is responsible for communicating field corrective actions to the Project Manager and for ensuring  
24 that immediate corrective actions are applied to field activities.

25 **Sample Management and Reporting.** The Permittee's sampling organization coordinates field sampling  
26 as well as laboratory analytical work, ensuring that laboratories conform to the specifications of SW-846  
27 analytical methodology at the time of closure. The sampling organization receives the analytical data from  
28 the laboratories, performs the data entry into the Hanford Environmental Information System (HEIS)  
29 database, and arranges for data validation. The sampling organization is responsible for informing the  
30 Project Manager of any issues reported by the contract analytical laboratory.

31 **Contract Laboratories.** The contract laboratories analyze samples in accordance with established  
32 procedures and provide necessary sample reports and explanation of results in support of data validation.

33 The roles described above make up the project organization structure (regarding sampling and analysis)  
34 and interact in a manner shown graphically in Figure H-4.



1 **Figure H-4 Sampling and Analysis Plan Project Organization**

2

3 **H.4.3.2 Field Sampler Training/Certification**

4 Training records of field samplers are maintained by the sampling organization, retained in the electronic  
5 training record database, or archived with operating records. Field samplers will be collecting grab  
6 samples of the soil beneath the concrete floor and sump for analysis to determine if closure performance  
7 standards have been met.

8 **H.4.3.3 Sampling Documents and Records**

9 The Project Manager is responsible for ensuring that the current version of the SAP is being used and  
10 providing any updates to field personnel. Version control is maintained by the administrative document  
11 control process. Changes to the SAP affecting the data needs will be submitted as a permit modification  
12 request.

13 Logbooks are required for field activities. A logbook must be identified with a unique project name and  
14 number. The individual(s) responsible for logbooks will be identified in the front of the logbook and only  
15 authorized persons may make entries in logbooks. After review, logbooks will be signed by the field  
16 manager, supervisor, cognizant scientist/engineer, or other responsible individual. Logbooks will be  
17 permanently bound, waterproof, and ruled with sequentially numbered pages. Pages will not be removed  
18 from logbooks for any reason. Entries will be made in indelible ink. Corrections will be made by marking  
19 through the erroneous data with a single line, entering the correct data, and initialing and dating the  
20 changes.

21 The Project Manager is responsible for ensuring that a project file is properly maintained. The project file  
22 will contain the records or references to their storage locations. The following items will be included in  
23 the project file, as appropriate:

- 24
- 25
- 26
- 27
- Field logbooks or operational records.
  - Global positioning system data.
  - Sample authorization forms.
  - Data forms.

- 1 • COC forms.
- 2 • Sample receipt records.
- 3 • Inspection or assessment reports and corrective action reports.
- 4 • Interim progress reports.
- 5 • Final reports.
- 6 • Laboratory data packages.
- 7 • Data verification and validation reports.

8 The contract analytical laboratory is responsible for maintaining, and having available upon request, the  
9 following items:

- 10 • Analytical logbooks.
- 11 • Raw data and Quality Control (QC) sample records.
- 12 • Standard reference material or proficiency test sample data.
- 13 • Instrument calibration information.

14 Records will be stored in accordance with Section H.1.4.4.

#### 15 **H.4.4 Sampling Design and Analysis**

16 The sampling design includes input parameters used to determine the number and location of samples.  
17 The primary purpose of sampling the soil is to determine if analytical results meet closure performance  
18 standards (Table H-5).

##### 19 **H.4.4.1 Sampling Process Design**

20 This SAP is based on guidance from Ecology Publication #94-111, Section 7.0, to determine the type of  
21 sampling design that will be used to demonstrate clean closure. When designing the sampling plan, both  
22 focused and grid sampling methods were considered. The basis for focused sampling is described in the  
23 following paragraphs.

24 **Focused (Judgmental) Sampling.** As identified in Ecology Publication #94-111, Section 7.2.2,  
25 Focused Sampling, this method is selective sampling of areas where contamination is expected or releases  
26 have been documented.

27 Focused sampling should be conducted in addition to grid sampling where there is evidence of leaks or  
28 spills or potential for a dangerous waste constituent to migrate. Focused sampling could involve liner  
29 sampling along a drainage-way, boundary, or other linear dimension. Likely areas for focused sampling  
30 include, but are not limited to:

- 31 • Containers, tanks, waste piles, or any other units (such as ancillary pipes) in contact with soil;
- 32 • Below any sumps or valves;
- 33 • Load or unload areas;
- 34 • Storage units with underlying pavements or concrete that appears to be cracked or broken; and
- 35 • Areas receiving runoff or discharge from DWMUs, such as a ditch, a swale, or the discharge  
36 point down gradient from a pipe.

37 Evidence for additional areas of focused sampling could include:

- 38 • Visual or olfactory evidence of contamination including evidence based on direct reading field  
39 instrumentation or field test kits;
- 40 • Knowledge, such as reports by employees, inspectors, or others that releases have or may have  
41 occurred;

- 1       • Length of time the unit has been in existence;
- 2       • Entries into the unit operating record; and
- 3       • Soil gas surveys or soil borings.

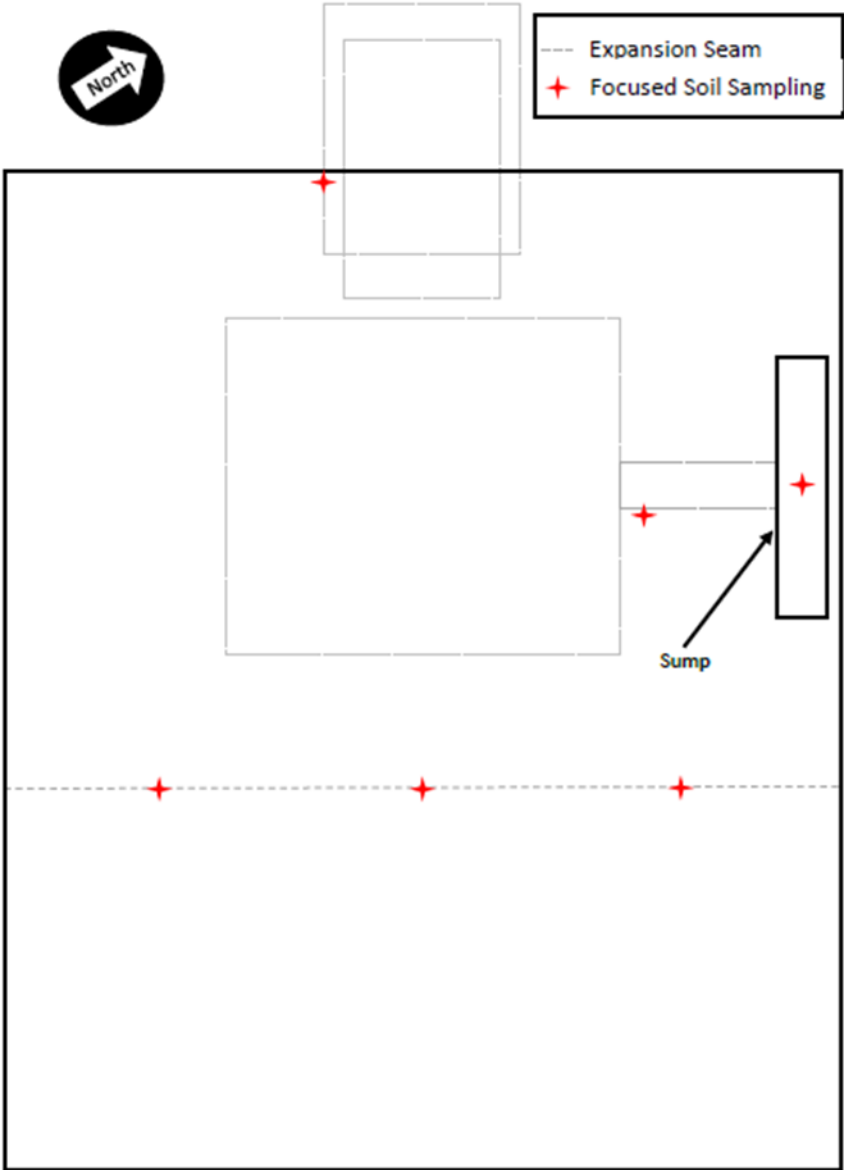
4 Per the visual inspections (Section H.3.2) and Ecology's professional judgment, six focused soil sample  
5 locations are identified. Identified are three low point soil samples, two construction joint/seam soil  
6 samples, and one sump soil sample (Figure H-5).

7 The concrete construction joint/seams within the 277-T Building are considered possible avenues for  
8 waste to migrate to the soil below the concrete. The low end of the sloping concrete floor and sump are  
9 also considered possible avenues for waste to migrate to the soil, as these are areas where waste could  
10 accumulate. Therefore, these locations are identified for focused soil sampling.

11 Any spill within the 277-T Building would likely drain and collect in the sump, therefore reinforcing the  
12 need for a focused soil sample below that point.

13 Selection of focused sampling units (i.e., the number and location of samples) is generally based on  
14 knowledge of the feature or condition under investigation and on professional judgment. Focused  
15 sampling is distinguished from probability-based sampling in that inferences are based on professional  
16 judgment, not statistical scientific theory. Therefore, conclusions about the target population are limited  
17 and depend entirely on the validity and accuracy of professional judgment.

18 The use of statistical evaluation for focused data is not possible. Any focused data must be reviewed  
19 directly against the closure performance standards as to whether they are above or below the standards.



1 Figure H-5 277-T Building Sampling Locations

1 **H.4.4.2 Sampling Methods and Handling**

2 The grab sample matrix will consist of soil collected in clean sample containers. Soil will be collected at a  
3 depth of no more than 15 cm (6 in.) below ground surface, unless staining or discoloration indicates  
4 contamination is below that depth. For the purpose of this SAP, ground surface is defined as the exposed  
5 surface layer once concrete and gravel (if present) have been removed. Once the soil is collected, the  
6 sampled media will be screened to remove material larger than approximately 2 mm (0.08 in.) in  
7 diameter, which allows for a larger surface area-to-volume ratio. This ratio increases the likelihood of  
8 identifying any potential contamination in the sample. Samples will be stored out of direct sunlight and  
9 cooled to  $\leq 6^{\circ}\text{C}$ , then delivered to the laboratory for analysis.

10 To ensure sample and data usability, sampling will be performed in accordance with established sampling  
11 practices, procedures, and requirements pertaining to sample collection, collection equipment, and sample  
12 handling. Sampling includes the following:

- 13 • Preparation and review of sampling paperwork such as COC or labels.
- 14 • Sample container and equipment preparation.
- 15 • Field walk down of sample area (includes locating and marking sample locations and sample  
16 boundary areas).
- 17 • Sample collection.
- 18 • Sample packaging and shipping.

19 Sample preservation and holding time requirements are specified in Table H-6. These requirements are in  
20 accordance with the analytical method specified. The final container type and volumes will be identified  
21 on the sampling authorization form and COC form.

22

**Table H-6 Preservation, Container, and Holding Time Requirements for Soil Samples**

<b>EPA Method</b>	<b>Analysis (Analytes)</b>	<b>Preservation Requirement</b>	<b>Holding Time</b>	<b>Bottle Type</b>
6010	ICP-AES (Metals)	None	180 days	G/P
6020	ICP-MS (Metals)	None	180 days	G/P
7196	Colorimetric (Hexavalent Chromium)	Cool to $\leq 6^{\circ}\text{C}$	30 days from sampling to extraction; 7 days from extraction to analysis	G/P
7471	Cold Vapor Atomic Absorption (Mercury)	Cool to $\leq 6^{\circ}\text{C}$	28 days	G/P
8015	GC/Flame Ionization Detector (Nonhalogenated Organics [Methanol])	Cool to $\leq 6^{\circ}\text{C}$	14 days	G
8260	GC/MS (Volatile Organic Compounds)	Frozen*	14 days	G
8270	GC/MS (Semivolatile Organic Compounds)	Cool to $\leq 6^{\circ}\text{C}$	14 days from sampling to extraction; 40 days from extraction to analysis	Amber Glass

**Table H-6 Preservation, Container, and Holding Time Requirements for Soil Samples**

EPA Method	Analysis (Analytes)	Preservation Requirement	Holding Time	Bottle Type
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Reference: SW-846, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, Third Edition, Final Update V.

\*Preservation techniques for soil samples collected include refrigeration immediately following collection (placing on ice) and freezing overnight prior to shipping. Holding times are from sampling to analysis unless specified otherwise.

AES = Atomic Emission Spectrometry

ICP = Inductively Coupled Plasma

EPA = U.S. Environmental Protection Agency

MS = Mass Spectrometry

GC = Gas Chromatography

G/P = Glass/Plastic

- 1
- 2 A sampling and data-tracking database (e.g., HEIS) is used to track the samples from the point of
- 3 collection through the laboratory analysis process. HEIS sample numbers are issued to the sampling
- 4 organization for the project. Each sample is identified and labeled with a unique HEIS sample number.
- 5 To prevent potential contamination of the samples, clean equipment will be used for each sampling
- 6 activity. Equipment used during sampling will be decontaminated or disposed of and managed as newly
- 7 generated waste in accordance with Section H.3.6. Level I EPA pre-cleaned sample containers will be
- 8 used for samples collected for chemical analysis. Container sizes may vary, depending on
- 9 laboratory-specific volumes/requirements for meeting the PQL.
- 10 The date and time of sample collection, and the sample location, depth, and corresponding HEIS numbers
- 11 will be documented in the sampler's field logbook. A custody seal (e.g., evidence tape) will be affixed to
- 12 each sample container (except for Volatile Organic Analysis [VOA] sample containers) or the sample
- 13 collection package in such a way as to indicate potential tampering. The custody seal will be inscribed
- 14 with the sampler's initials and date. Custody tape is not applied directly to VOA sample containers based
- 15 on the potential for affecting analyte results or fouling of laboratory equipment. Alternatively, VOA vials
- 16 are placed in a sealable plastic bag affixed with custody seals and any other required
- 17 labels/documentation.
- 18 Data verification and validation will also note any issues with sample collection and analysis. Each
- 19 sample container will be labeled with the following information on firmly affixed, water-resistant labels:
- 20
  - Sample authorization form and form number.
- 21
  - HEIS number.
- 22
  - Sample collection date and time.
- 23
  - Sampler identification (e.g., initials).
- 24
  - Analysis required.
- 25
  - Preservation method (if applicable).
- 26
  - COC identification number.
- 27 In addition to the container label information, sample records must include:
- 28
  - Sample location.
- 29
  - Matrix (e.g., soil).
- 30 Sample custody will be maintained in accordance with existing Hanford Facility protocols to ensure
- 31 maintenance of sample integrity throughout the analytical process. COC protocols will be followed
- 32 throughout sample collection, transfer, analysis, and disposal to ensure that sample integrity is
- 33 maintained. A COC record is initiated in the field at the time of sampling and will accompany each set of
- 34 samples shipped to any laboratory. At a minimum, the following information must be identified on a
- 35 completed COC record:

- 1 • Collector(s) names.
- 2 • Project designation.
- 3 • Unique sample numbers.
- 4 • Date, time, and location (or traceable reference thereto) of sample collection.
- 5 • Chain of possession information (i.e., signatures/printed names of all individuals involved in the
- 6 transfer of sample custody and storage locations, dates of receipt and relinquishment).

7 Additional information regarding the sample and specific analytical instructions may also be documented.

8 Discrepancies with the sample material (unusual color, texture, or odor), collection techniques, containers,  
9 or transfer packages are noted in the field logbook, communicated with the Project Manager, and  
10 corrective actions are initiated. For example, where a custody seal is damaged or missing, each case is  
11 individually reviewed for usability of the sample. The damaged or missing seal and action taken will be  
12 documented in the final data package. Data verification and validation will also note any issues with  
13 sample collection and analysis.

14 Contaminated environmental media and newly generated waste resulting from sampling activities will be  
15 handled in accordance with all applicable requirements of WAC 173-303-170 through WAC 173-303-230  
16 as outlined in Sections H.3.5 and H.3.6.

#### 17 **H.4.4.3 Sampling and Analysis Requirements to Address Removal of Contaminated Soil**

18 If focused soil sample results based on direct comparison (Section H.4.4.1) indicate contamination above  
19 closure performance standards, then sample location(s) will be remediated to remove contaminated soil.  
20 Following remediation, confirmatory sampling will be performed in accordance with this closure SAP.  
21 Analytical results of confirmatory sample(s) collected at focused soil sample location(s) will be directly  
22 compared to the closure performance standards to confirm remediation efforts were effective and the area  
23 is clean. If after remediation the soil does not meet closure performance standards, then the Permittees  
24 will meet with Ecology to determine a path forward for closure. Resulting changes to this closure plan  
25 will be submitted to Ecology as a permit modification request in accordance with Permit Condition I.C.3.

#### 26 **H.4.4.4 Analytical Methods**

27 All analyses and testing will be performed consistent with this closure plan, laboratory contracts, and  
28 laboratory analytical procedures at the time of closure. The contracted analytical laboratory must achieve  
29 the lowest PQLs consistent with the selected analytical method (identified in Table H-5) in order to  
30 confirm that the closure performance standards are met.

#### 31 **H.4.4.5 Quality Control**

32 QC procedures must be followed in the field and laboratory to ensure that reliable data are obtained. Field  
33 QC samples will be collected to evaluate the potential for cross-contamination and provide information  
34 pertinent to field sampling variability. Field QC samples include the collection of:

- 35 • Field trip blanks.
- 36 • Field transfer blanks.
- 37 • Equipment rinsate blanks.
- 38 • Field duplicates.

39 Laboratory QC samples estimate the precision and bias of the analytical data. Laboratory QC samples  
40 include:

- 41 • Method blanks.
- 42 • Laboratory duplicates.

- 1 • Matrix spikes.
  - 2 • Matrix spike duplicates.
  - 3 • Surrogates.
  - 4 • Laboratory control samples.
- 5 Field and laboratory QC samples are summarized in Table H-7.

**Table H-7 Project Quality Control Sampling Summary**

QC Sample Type	Frequency	Characteristics Evaluated
<b>Field QC</b>		
Field Trip Blanks	One per 20 samples, minimum of one per decision unit	Field trip blanks are used to assess contamination from sample containers or during transportation and storage procedures.
Field Transfer Blanks	One per day that volatile organic compounds are sampled	Field transfer blanks are used to assess contamination from surrounding sources during sample collection.
Equipment Rinsate Blanks	One per 20 samples per analytical method	Equipment rinsate blanks are used to measure the cleanliness of sampling equipment and effectiveness of equipment decontamination procedures. Equipment rinsate blanks are not required if only disposable equipment is used, or if rinsing between samples is not practical (e.g., core drilling equipment).
Field Duplicates	One per 20 samples with a minimum of one per decision unit	Field duplicates are used to assess the precision of the entire data collection activity, including sampling, analysis, and site heterogeneity.
<b>Laboratory QC*</b>		
Method Blanks	One per batch	Method blanks measure contamination associated with laboratory sample preparation and analysis.
Laboratory Duplicates	One per laboratory analytical batch	Laboratory duplicates measure laboratory reproducibility and precision.
Matrix Spikes	One per laboratory analytical batch	The matrix spike recovery measures the effects of interferences in the sample matrix and reflects the accuracy of the determination.

**Table H-7 Project Quality Control Sampling Summary**

QC Sample Type	Frequency	Characteristics Evaluated
Matrix Spike Duplicates	One per laboratory analytical batch	The relative percent difference between matrix spikes and matrix spike duplicates measures the precision of a given analysis.
Surrogates	Added to each sample and QC (laboratory and field) sample	Surrogate standards are added prior to extraction of the sample to evaluate accuracy, method performance, and extraction efficiency.
Laboratory Control Samples	One per laboratory analytical batch	The laboratory control samples measure the accuracy of the analytical methods.

\*Batching across projects is allowed for similar matrices.

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**H.4.5 Data Review, Verification, Validation, and Usability Requirements**

Analytical results will be received from the contract analytical laboratory, loaded into a database (e.g., HEIS), and verified in accordance with Section H.4.5.1. A total of 5 percent of the data will be validated as described in Section H.4.5.2. A data quality assessment (DQA) will be conducted to ensure the output of the DQO process provided appropriate values (Section H.4.5.3).

**H.4.5.1 Data Verification**

Verification activities ensure analytical data in the database were properly uploaded and reflect the contract laboratory program equivalent data packages. The steps outlined below will consider both the primary and QC samples. Activities will include, but are not limited to, the following:

- Amount of data requested matches the amount of data received (number of samples for requested methods of analytes).
- Correct procedures/methods are used.
- Issues with sample collection and analysis are noted.
- Documentation/deliverables are complete.
- Hard copy and electronic versions of the data are identical.
- Data is reasonable based on analytical methodologies.

**H.4.5.2 Data Validation**

The contract analytical laboratory supplies the equivalent of contract laboratory program analytical data packages intended to support data validation by the third party. These data packages are supported by QC test results and raw data. Data validation includes both primary and QC samples, and considers issues with sample collection and analysis.

Controls are in place to preserve the data sent to the validators, such as allowing only additions to be made, not changes to the raw data. The format and requirements for data validation activities are based on the most current version of EPA-540-R-08-01, *National Functional Guidelines for Superfund Organic Methods Data Review* (OSWER 9240.1-48), and EPA-540-R-10-011, *National Functional Guidelines for Inorganic Superfund Data Review* (OSWER 9240.1-51). As defined by the validation guidelines, 5 percent of the analytical results will undergo Level C validation.

1 **H.4.5.3 Data Quality Assessment**

2 A DQA will be performed on the final data using the guidance in EPA/240/B-06/002, *Data Quality*  
3 *Assessment: A Reviewer's Guide* (EPA QA/G-9R), and implementing the specific requirements in  
4 Sections H.4.5.1 through H.4.5.2.

5 **H.4.6 Revisions to the Sampling and Analysis Plan and Constituents to be Analyzed**

6 Changes to the SAP may be necessary due to unexpected events during closure. An unexpected event  
7 would be an event outside the scope of the SAP or a condition that inhibits implementation of the SAP as  
8 written. Revisions to the SAP will be submitted no later than 30 days after the unexpected event as a  
9 permit modification request. [WAC 173-303-610(3)(b)]

10 **H.5 CONFIRMATION AND CERTIFICATION OF CLOSURE ACTIVITIES**

11 Confirmation of closure will be performed using methods defined in Section H.5.1. Closure certification  
12 is performed by an Independent Qualified Registered Professional Engineer (IQRPE) (Section H.5.2).  
13 Certification will be submitted to Ecology as described in Section H.5.3, and the conditions of the  
14 DWMU after closure are described in Section H.3.10. The timing of closure is described in Section H.6.

15 **H.5.1 Confirmation of Clean Closure**

16 The 277-T Building DWMU will be clean closed through confirmation of successful decontamination of  
17 the concrete by removing at least 0.6 cm (~1/4 in.) of the surface and treating to a "clean debris surface"  
18 (Section H.5.1.1); and confirmation that samples of the underlying soil meet soil closure performance  
19 standards (Table H-6).

20 **H.5.1.1 Confirmation of Clean Debris Surface**

21 On completion of decontamination of the concrete surface, the area will be visually inspected to verify  
22 whether the "clean debris surface" standard, as defined below, has been met.

23 The following definition of a "clean debris surface" standard is identified in 40 § CFR 268.45, Table 1,  
24 footnote 3:

25 "Clean debris surface" means the surface, when viewed without magnification, shall be  
26 free of all visible contaminated soil and hazardous waste except that residual staining  
27 from soil and waste consisting of light shadows, slight streaks, or minor discolorations,  
28 and soil and waste in cracks, crevices, and pits may be present provided that such staining  
29 and waste and soil in cracks, crevices, and pits shall be limited to no more than 5% of  
30 each square inch of surface area.

31 This confirmation step will be documented. Documentation will include photos, locations and dimensions  
32 of residual staining or waste remaining, cracks, crevices, or pits (if any). Staining or waste remaining on  
33 the surface will be calculated to confirm whether the impacted area is less than 5 percent of the surface.  
34 Once it has been determined that the "clean debris surface" standard has been met, then the concrete  
35 surfaces shall have achieved the closure performance standard for concrete, and that portion of  
36 277-T Building will be considered clean.

37 If a "clean debris surface" is not achieved for the concrete surfaces after initial treatment the Permittees  
38 will continue to remove additional layers of concrete to achieve a "clean debris surface." If a  
39 "clean debris surface" cannot be achieved then the Permittees will meet with Ecology to determine a path  
40 forward for closure. Resulting changes to this closure plan will be submitted to Ecology as a permit  
41 modification request in accordance with Permit Condition I.C.3.

1 **H.5.1.2 Confirmation of Soil Sample Results**

2 Soil sample results from the contract analytical laboratory will be reviewed to confirm that target analytes  
3 have met closure performance standards (Table H-5). Once it has been determined that soil sample results  
4 have met closure performance standards, then the soil beneath the 277-T Building will be considered  
5 clean.

6 Once clean closure has been confirmed for the 277-T Building DWMU, a closure certification will be  
7 prepared in accordance with Section H.5.3.

8 **H.5.2 Role of the Independent Qualified Registered Professional Engineer**

9 An IQRPE will be retained to provide certification of the closure as required by WAC 173-303-610(6).  
10 The IQRPE will be responsible for observing field activities and reviewing documents associated with  
11 clean closure of the 277-T Building DWMU. At a minimum, the following field activities will be  
12 completed:

- 13 • Review 277-T Building visual inspection documentation.
- 14 • Observe and/or review decontamination of concrete surface and sump.
- 15 • Verify that the surface meets the “clean debris surface” standard.
- 16 • Verify that locations of soil samples are as specified in the SAP.
- 17 • Observe and/or review soil sampling activities.
- 18 • Review sampling procedures and results.
- 19 • Observe and/or review contaminated environmental debris removal (as applicable).
- 20 • Observe and/or review newly generated waste management and disposition records.
- 21 • Verify that closure activities were performed in accordance with this closure plan.

22 The IQRPE will record observations and reviews in a written report that will be retained in the operating  
23 record. The resulting report will be used to develop the clean closure certification, which will then be  
24 submitted to Ecology.

25 **H.5.3 Closure Certification**

26 Within 60 days of completion of closure of the 277-T Building DWMU, a certification that the DWMU  
27 has been closed in accordance with the specifications in this closure plan will be submitted to Ecology by  
28 registered mail or other means that establish proof of receipt (including applicable electronic means). The  
29 certification will be signed by the Permittees and by the IQRPE. At the time of the closure certification  
30 submittal, the Permittees will submit to Ecology information to support the closure certification.  
31 [WAC 173-303-610(6)]

32 The supporting information will include at least the following:

- 33 • All field notes and photographs related to closure activities.
- 34 • A description of any minor deviations from this closure plan and justification for the deviations.
- 35 • Documentation of the removal and final disposition of any unanticipated contaminated  
36 environmental media.
- 37 • Documentation of the removal and final disposition of any newly generated waste.
- 38 • All laboratory and/or field data, including sampling procedures, sampling locations, QA/QC  
39 samples, and COC procedures for all samples and measurements, including samples and  
40 measurements taken to determine background conditions and determine or confirm clean closure.

- A summary report that identifies and describes the data reviewed by the IQRPE, and tabulation of the analytical results of samples taken to determine and confirm clean closure performance standards were met.
- Description of the 277-T Building DWMU appearance at completion of closure, including what parts of the former unit, if any, will remain after closure.

## H.6 CLOSURE SCHEDULE AND TIME FRAME

Closure activities will take longer to complete<sup>1</sup> than 180 days after the effective date of the approved permit modification incorporating this closure plan. The permit modification request to extend the completion of closure has set the revised date of closure completion by March 14, 2027. This request also had the required information on steps to be taken to prevent threats to human health and the environment. [WAC 173-303-610(4)(b)]

Should an unexpected event occur and an extension to the revised closure activity expiration date be deemed necessary, a permit modification request will be submitted to Ecology for approval at least 30 days prior to the March 14, 2027, expiration date. [WAC 173-303-610(4)(c)]

The permit modification request will include the statement that closure activities, will of necessity, take longer than the March 14, 2027, date to complete, and the supporting basis for the statement. The permit modification request will also include necessary information demonstrating that all steps to prevent threats to HHE have been and will continue to be taken, including compliance with all applicable permit requirements. [WAC 173-303-610(4)(b)]

The closure certification will be submitted to Ecology within 60 days following completion of closure activities at the 277-T Building DWMU (Table H-8 and Figure H-6).

**Table H-8 277-T Building Dangerous Waste Management Unit Closure Schedule**

Activity	Description	Duration
<b>Closure Activities</b>		
Remove All Waste	Package and ship mixed waste container from 277-T Building to a RCRA permitted facility for treatment, storage or disposal.	Completed (Section H.3.1)
Records Review	Perform review of 277-T Building container storage, operating, and inspection records.	Completed (Section H.3.2)
Perform Initial Visual Inspection of 277-T Building	Inspect concrete surface and sump for dangerous or mixed waste related staining.	Completed (Section H.3.2)
	Inspect for visible holes, cracks, crevices, pits, joints/seams, or other breaches in structural integrity. Identify focused sampling locations (as applicable).	

<sup>1</sup>The closure timeline was extended from March 14, 2024, to March 14, 2025, through approval of Class <sup>1</sup>1 Permit Modification PCN-277TBLDG-2024-01 and was extended again from March 14, 2025, to March 14, 2026, through approval of Class <sup>1</sup>1 Permit Modification PCN-277TBLDG-2025-01. The closure timeline is extended from March 14, 2026, to March 14, 2027, through approval of Class <sup>1</sup>1 Permit Modification PCN-277TBLDG-2025-02. The permit modification incorporating this closure plan was issued on August 17, 2023 (8C.2023.3F). The original date for closure activity completion was March 14, 2024.

**Table H-8 277-T Building Dangerous Waste Management Unit Closure Schedule**

<b>Activity</b>	<b>Description</b>	<b>Duration</b>
Remove Equipment and perform Final Visual Inspection of 277-T Building	Remove equipment and material from the 277-T Building and perform a final visual inspection of the floor surface (Section H.3.2).	20 Days
Address Concrete Flooring and sump of 277-T Building	Decontaminate the 277-T Building concrete surface and sump as defined in Section H.3.4.	90 Days
	If necessary, remove contaminated concrete (Section H.4.4).	
Address Soil Beneath 277-T Building	Perform focused soil sampling and analysis in accordance with SAP (Section H.4).	60 Days
	Perform data verification/validation and data quality assessment (Section H.4.5).	
	If necessary, remove contaminated environmental media, resample, and analyze (Section H.4.4).	
Confirm Clean Closure	Review sample results from contract analytical laboratory. Ensure closure performance standards were met (Section H.5.1).	10 Days
<b>Closure Certification</b>		
Permittees and IQRPE Submit Closure Certification	Within 60 days of completion of closure activities, submit certification to Ecology that the DWMU has been closed in accordance with the specifications in this closure plan (Section H.5.3).	60 Days

Reference: WAC 173-303-610, Dangerous Waste Regulations, *Closure and post-closure*.

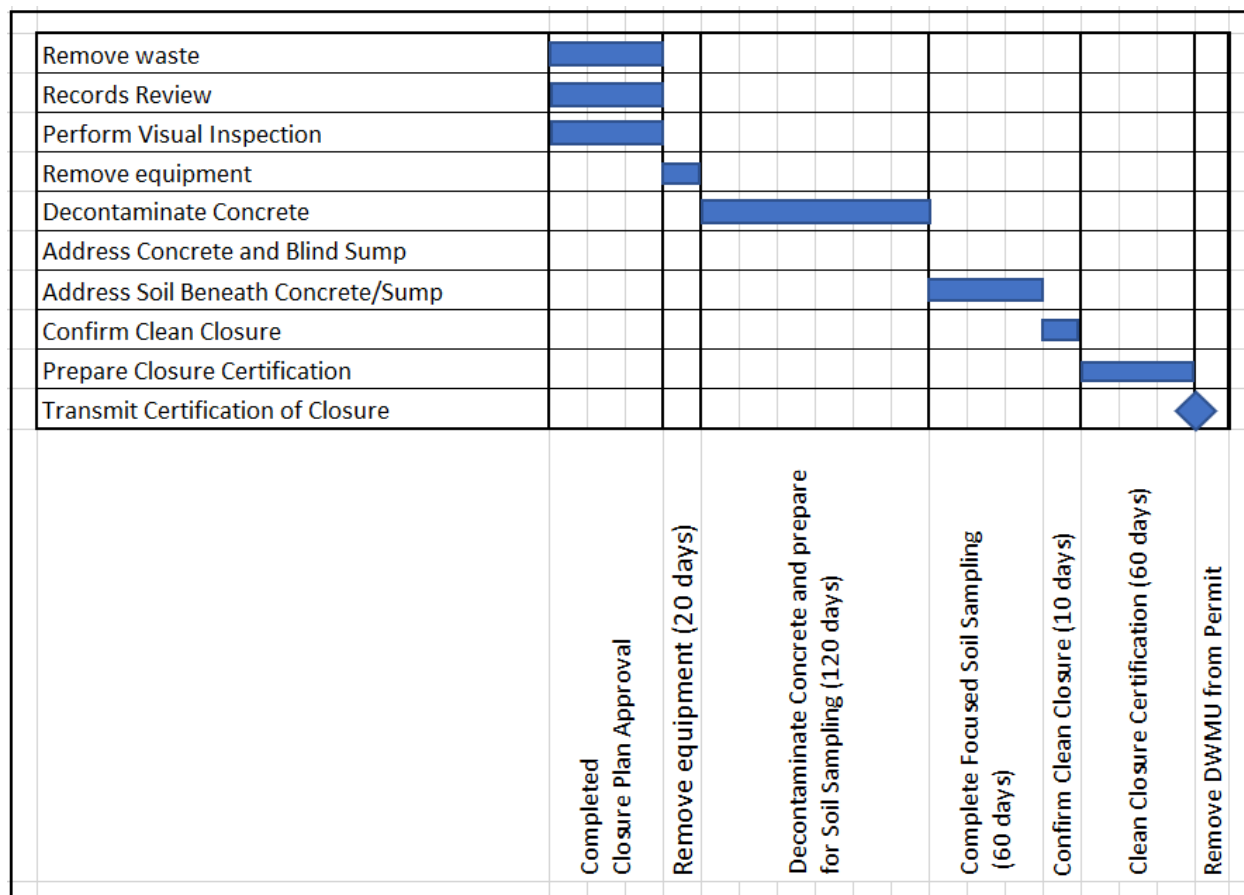


Figure H-6 277-T Building Closure Schedule Activities

**H.7 CLOSURE COSTS**

An annual report outlining updated projections of anticipated closure costs for the Hanford Facility treatment, storage, and disposal units is not required per Permit Condition II.H.

**H.8 REFERENCES**


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**277-T BUILDING  
ATTACHMENT A  
T PLANT COMPLEX 277-T BUILDING VISUAL INSPECTION SUPPORTING  
DOCUMENTATION**



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T Plant Complex 277-T Building Storage Area

**Purpose:**

A visual inspection of the T Plant Complex 277-T Building Storage Area was performed to identify low points, seams, cracks, crevices, sumps, and drains for the purpose of focused sampling during closure. If a random sample determined through the use of the Visual Sampling Plan software was already identified in the vicinity of a low point, crack, crevice, sump or drain, additional focused samples were not deemed necessary.


The inspection was performed on June 15, 2015.

**Results:**

As a result of the inspection, six focused sample locations were identified. Identified were three low point samples, two seam samples, and one sump sample. These sample locations along with the current VSP random samples are identified in the below figure which will be included in the 277-T Building closure plan.

Signature/Date:

Sarah Horn

 6/15/2015

T Plant Complex 277-T Building Storage Area

**Purpose:**

A visual inspection of the T Plant Complex 277-T Building Storage Area was performed to determine if there is any evidence of spills and/or leaks from waste packages containing dangerous waste that was stored at this location from past operations. The inspection was to identify and document by photographing any waste related staining of the storage area surface, and to denote any remaining waste related items.

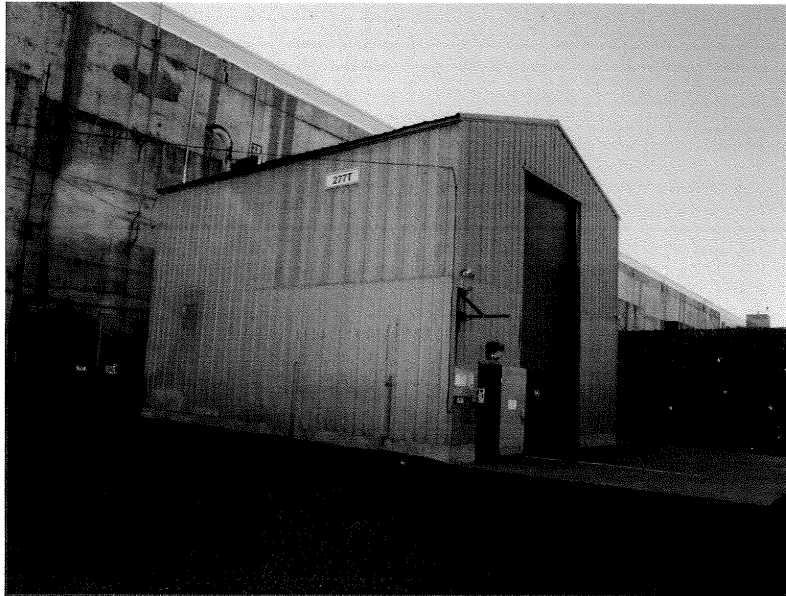
The inspection was performed on September 18, 2013 by David Richards Manager, T Plant (CHPRC).

**Results:**

Concrete floor inside the 277-T building shows stains from rusting equipment and motor vehicle oil/fluid.

No waste is being stored in this building. Building is currently used to house equipment and supplies: Inorganic absorbents, Perlite, mock up drums for NDA testing, new drum venting assemblies, new spill pallets, fans, vacuums, totes, ducting, new drum lids, test weights, box liners, drum dolly's, carts, and shielding etc.

Area was photographed.

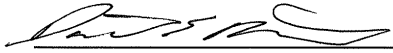


T Plant Complex 277-T Building Storage Area



Signature/date:

David E. Richards

 9-26-13

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